



## Project Team

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- Kittelson & Associates
- Mason, Bruce & Girard
- GreenWorks
- Shannon & Wilson, Inc.
- Heritage Research Associates
- David Place
- Michael Minor & Associates
- Universal Field Services



# OR213: I-205 to Redland Road

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- Project Overview
- Bridge Construction Staging Alternatives
- Designing for ABC
- Constructability



## Key Project Elements

- A. Construct new OR213 bridge using rapid bridge construction
- B. Widen OR213
- C. Realign Washington Street
- D. Construct new roundabout
- E. New traffic signals
- F. Environmental mitigation site
- G. Redland Road intersection upgrades



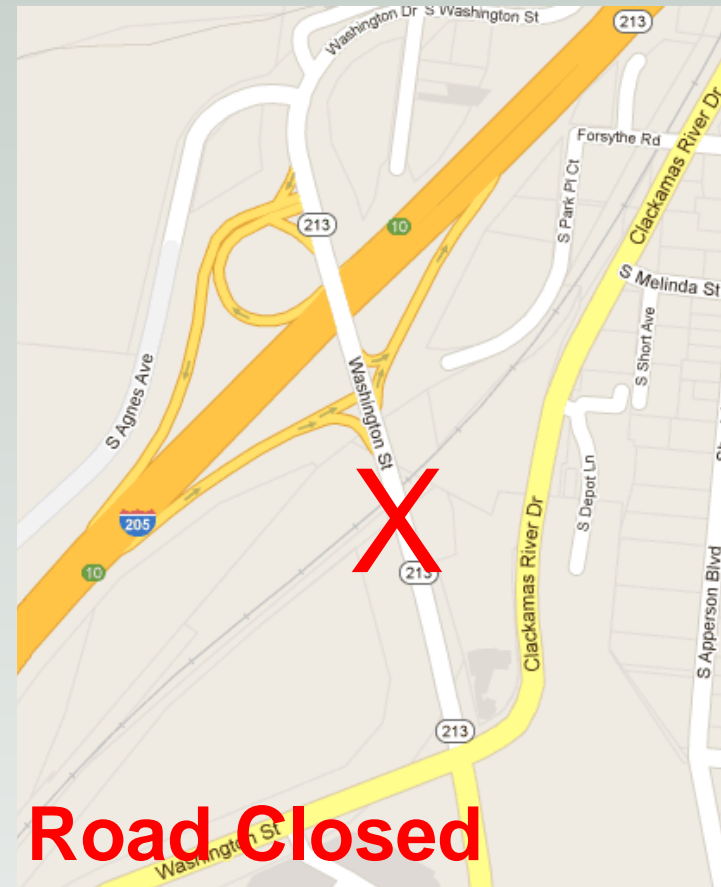
## Bridge Construction Staging Alternatives

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1. Road Closure
2. Staged Construction
3. Accelerated Bridge Construction

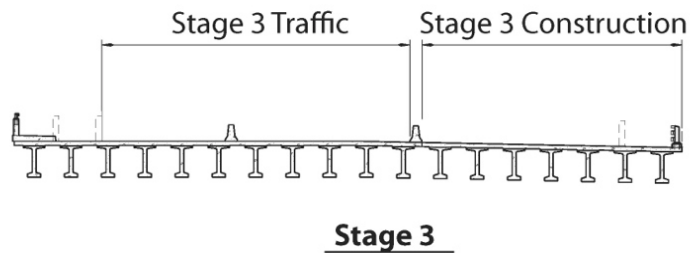
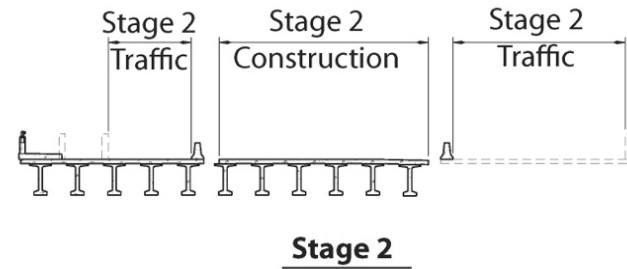
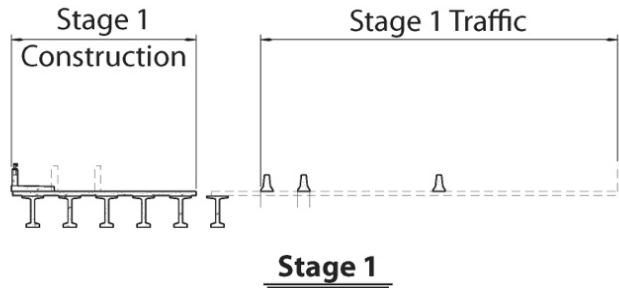
## Alternative 1 Road Closure

- 9-week closure of OR 213
- Two 10-hour shifts



**Road Closed**

## Alternative 2 Staged Construction



30 weeks of closing a  
lane on OR213

## Alternative 3 Accelerated Bridge Construction

- Construct foundations during nightly lane closures
- One 4-day closure of OR 213
- Build the entire bridge alongside roadway
- Excavation occurs and the bridge is slid into place





## Conclusions

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Alternative	Traffic Impact	Duration of Traffic Impact	Conclusions
1	Total Road Closure	> 60 Days	Extended OR213 closure is unacceptable
2	Closes 1 lane each way	30 weeks	Long duration of lane closures

## Alternative 3 was selected:

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- Shortest overall bridge construction time
- Shortest duration of impacts to the public
- Highest level of safety to the contractor and the public



## Designing for Accelerated Bridge Construction

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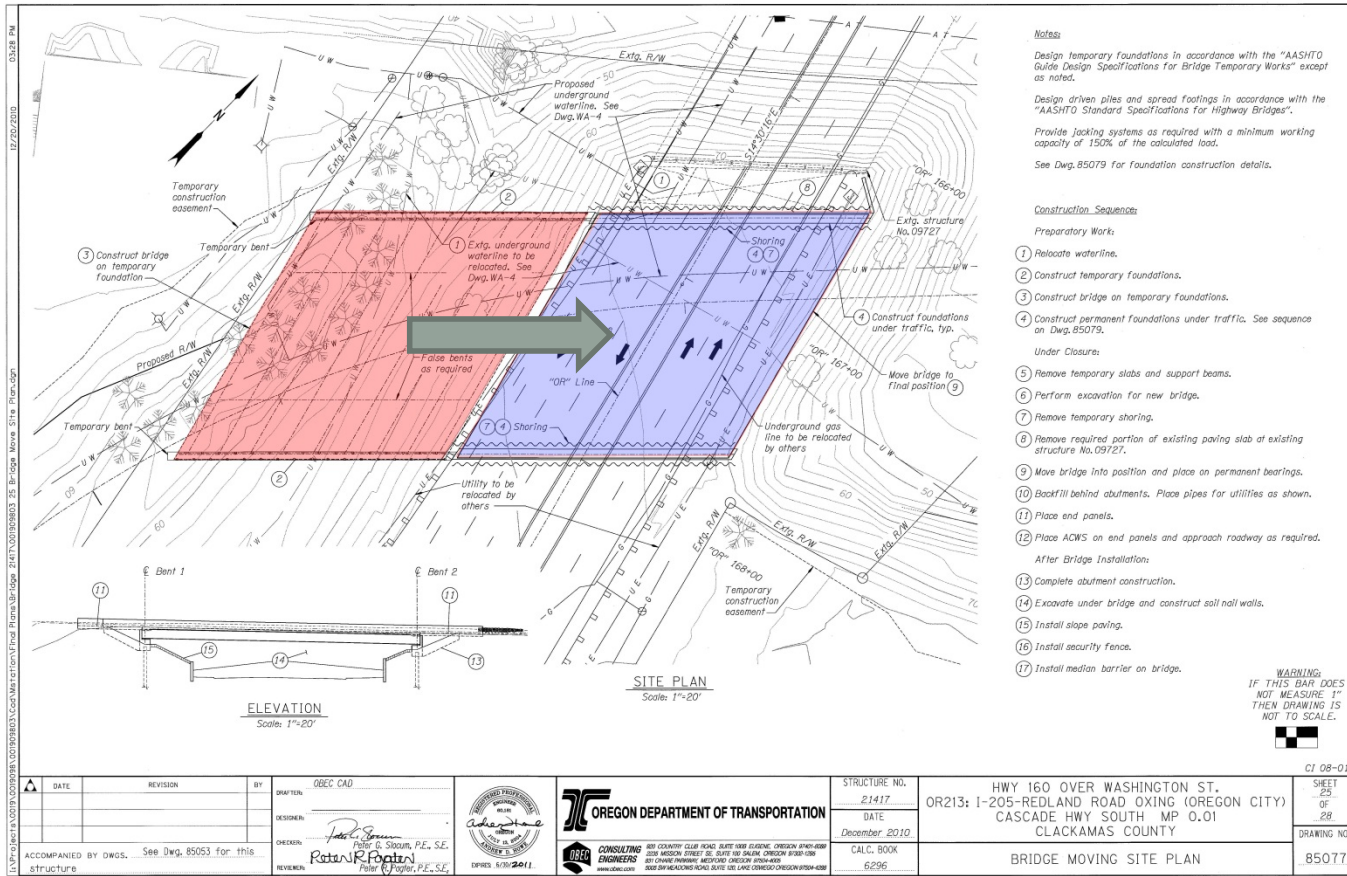
- Superstructure (the easy part)
  - Constructed “off line”
  - Consider structure weight
  - Plan to roll
  - Detail for field fit
- Substructure (the hard part)
  - Staged construction? Yes.
  - Night lane closures
  - Constructed “under traffic”

## Superstructure – Build and Roll

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- Conventional construction “off line”
  - Most details are typical
  - Temporary foundations
  - Requires significant staging area
  - **3D Geometric layout can be difficult**
    - **Build a spiral and superelevation rotation offset 150 feet along a skew**
- Structure type – Choose light
  - Lighter structure will require less jack and roller capacity
  - Lighter structure will generate less rolling friction
  - Concrete alternative – Dead Load = 4000 kips
  - Steel alternative – Dead Load = 3200 kips

## Superstructure – Build and Roll





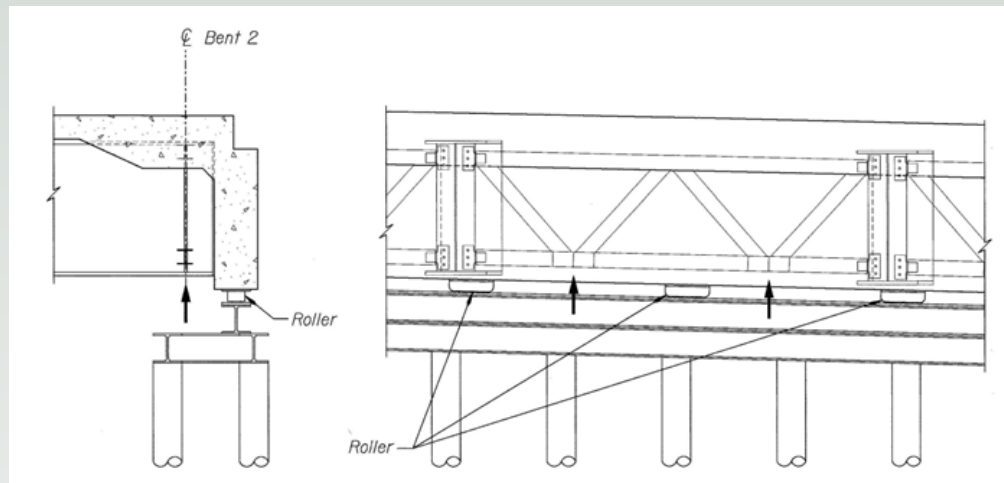
## Superstructure – Build and Roll

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- Plan to roll
  - Roll uphill and on a plane (no superstructure twisting)
    - Bridge located in a superelevation transition, but rolling surfaces must be planar
    - Varied depth of integral backwall and pile cap to make constant 2% slope
  - Simple details means economy
    - High tech details limit contractor competition and increase cost
    - Allow Contractor flexibility
      - Generic rollers and jacks shown to convey constructible concept
      - Contractor designed system used to lift and move the bridge

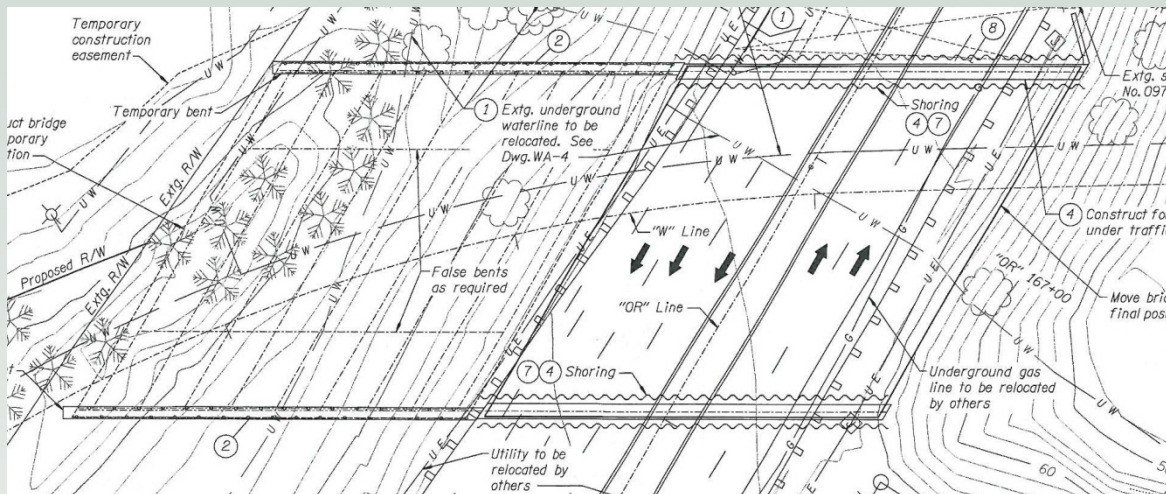
## Superstructure – Build and Roll

- Plan to roll (continued)
  - Design for superstructure and substructure for multiple load paths
    - Steel cross frames for construction stability and jacking points
    - Concrete end diaphragm as backwall and superstructure stiffness/support during roll
    - Design pile cap to be loaded by rollers, jacks, and bearings



## Substructure – “Under” Traffic

- Staged Construction
  - Requires excavation into existing roadway
  - Install temporary shoring and bridging
  - Design bridging for durability and ease of removal/reinstallation



### Foundation Construction Sequence:

Under nightly lane closures in stages:

- ① Install shoring. Remove existing paving slab at existing structure No. 09727. Repair pavement as required prior to reopening lane to traffic.
- ② Install temporary slab support beams. Repair pavement as required prior to reopening lane to traffic.
- ③ Excavate for pile cap and install temporary slabs.\* Stagger joints 2'-0" min. from joints between support beam segments.
- ④ Drive piles.\*
- ⑤ Construct pile cap\* (excluding west wingwalls and shear blocks).
- ⑥ Install roller system.\*

\*Remove and reinstall temporary slabs nightly as required.

## Substructure – “Under” Traffic

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- Night lane closures only
  - Short work shifts
  - Bridging system enables quick removal and access to construction
  - Night excavation and pile driving
- Construction “under” traffic
  - Pile cap construction can be completed under the bridging
  - Preparation for moving can be completed under the bridging
- When it is time for the move, remove bridging and shoring



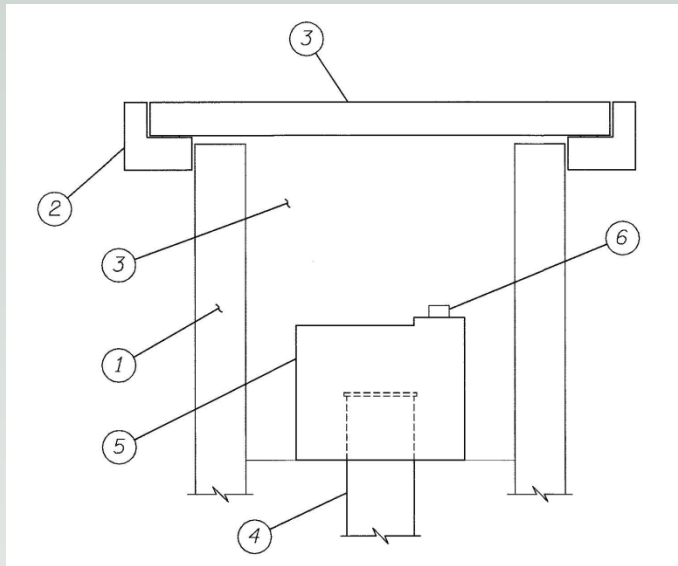
# Constructability





## Shoring System and Substructure Construction

- Shoring System installed as designed.
- Foundation Construction at night a success.



# Temporary Bridge Foundation

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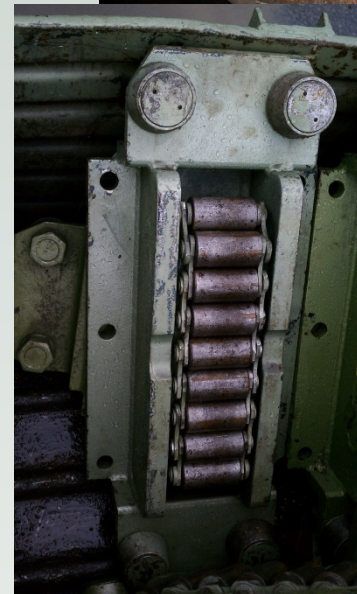
- Standard Piling Foundation
- Dual Caps for support and moving system



Designed By: Dick Lindell, PE  
Mowat Construction

# Track and Roller System

- Roller Guide Channels
- Hilman 100/150 Modified Rollers



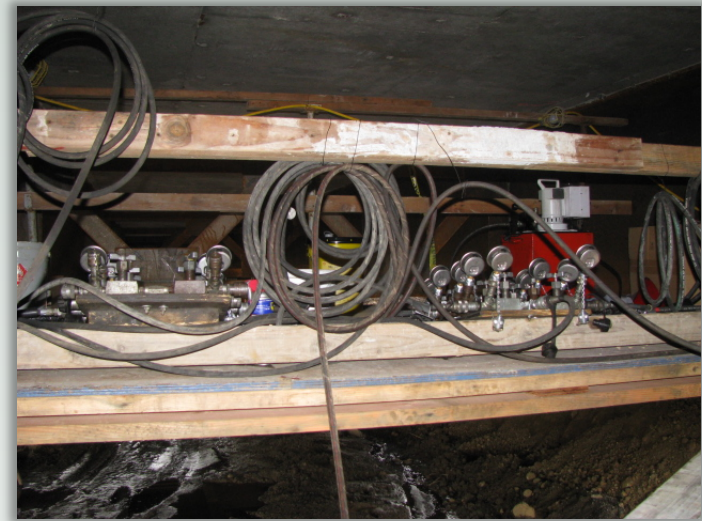
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# Vertical & horizontal Jacking System

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- Central pump and manifold system mounted to the bridge
- Pull rods from new bridge to the Eastern Wing Walls
- Double acting 30T Jacks for Horizontal movement



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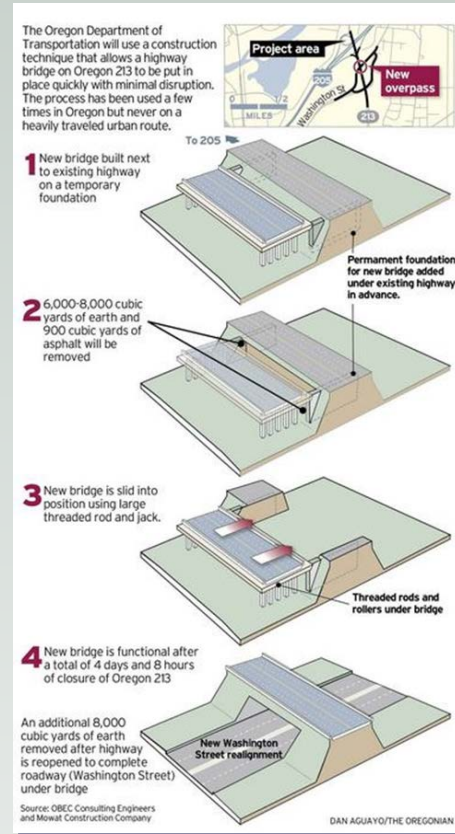




## Outreach Plan



JAIME VALDEZ / THE OREGON CITY NEWS  
Crews from Mowat Construction prepare to move a new bridge at the Jughandle Project in Oregon City by moving it 5 feet during a test haul on Friday. The bridge will replace a section of Highway 213.





# Questions

