



# Well Road Project – Accelerated Bridge Construction Using Self-Propelled Modular Transporters (SPMT's)

By: Mark Bucci, P.E.

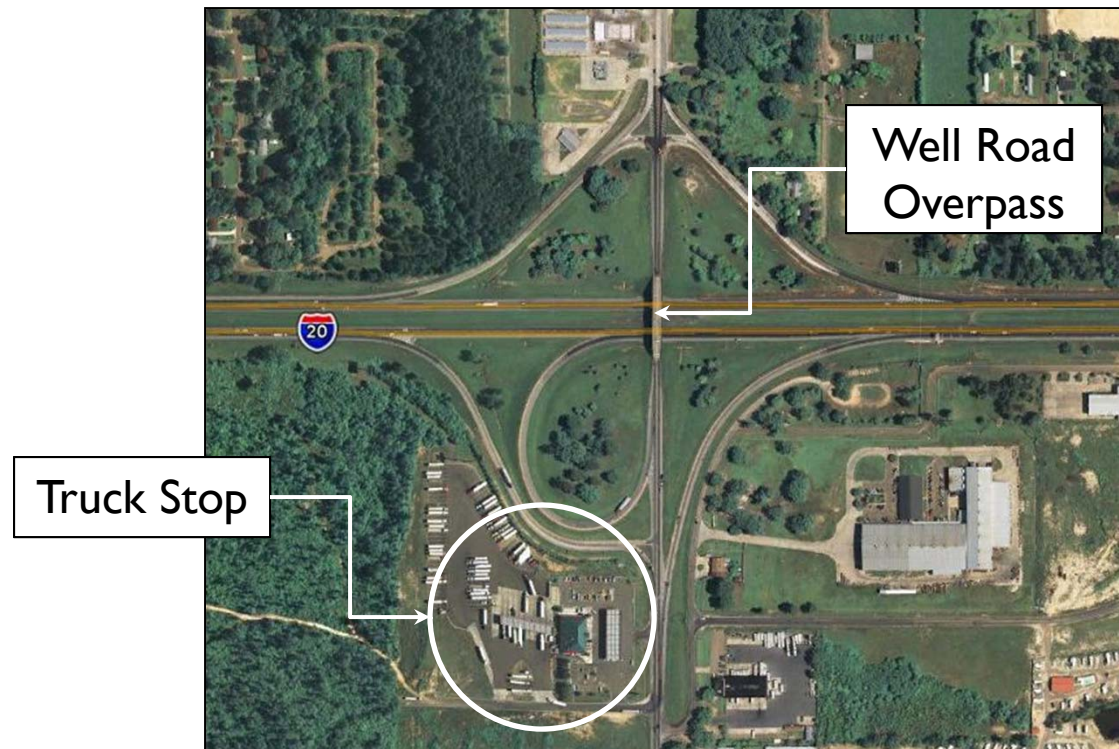


# Presentation Outline

- Project History
- Project Scope
- Construction Alternatives
- Plan Development
- Contractor's Methodology
- Current Project Status

# Project History

- Site Information
  - West Monroe, LA
  - LA 3249 (Well Road) over I-20





# Project History

- Site Information
  - High Average Daily Traffic (ADT)
    - I-20 ➡ 41,300 ADT
    - LA 3249 (Well Road) ➡ 18,700 ADT
  - High truck traffic



# Project History

- Existing Bridge
  - Built in 1963
  - 4 – Simple Span Composite Steel Plate Girder Bridge (55 ft – 70 ft – 85 ft – 50 ft)
  - Lightweight concrete deck



# Project History

- Bridge Condition
  - Deck Deterioration





# Project History

- Deck Deterioration



# Project History

- Deck Deterioration





# Project History

- Bridge Condition
  - Bearing Corrosion



# Project History

- Bearing Corrosion (Cont.)



# Project History

- Bridge Condition
  - Column Bent Spalling







# Project History

- Bridge Load Testing (March 2008)
  - Bridge Diagnostics, Inc. (BDI) performed the testing
  - Determine the structural capacity considering deck deterioration
  - Review the load rating
  - Provide information to assist in determining the best course of action for rehabilitation

# Project History

- Bridge Load Testing





# Project History

- **Bridge Load Testing**
  - **Finite Element Model**
    - Calibrated to match the test results
    - The structure was load rated
  - **Results**
    - The bridge did not need to be load posted
    - An overlay could be applied



# Project History

- Temporary Repairs
  - Quick Set Concrete Patches



# Project History

- Temporary Repairs
  - Asphalt Overlay
    - Recommended by the District to reduce maintenance





# Presentation Outline

- Project History
- Project Scope
- Construction Alternatives
- Plan Development
- Contractor's Methodology
- Current Project Status





# Project Scope

- Project created in mid 2008 to perform permanent repairs
- Funded by State Surplus
- Aggressive delivery schedule
- Proposed July 2009 letting



# Project Scope

- Requirements

- Replace the deck
- Minimize impacts to businesses and the traveling public
- Maintain vertical clearance
- Strengthen substructure if necessary

- Considerations

- High ADT
- Heavy Truck Traffic
- Future widening



# Accelerated Construction





# Presentation Outline

- Project History
- Project Scope
- Construction Alternatives
- Plan Development
- Contractor's Methodology
- Current Project Status

# Construction Alternatives

- Accelerated Construction
  - Precast Panel Units



# Construction Alternatives

- Accelerated Construction
  - Precast Panel Units





# Construction Alternatives

- Accelerated Construction
  - Span Replacement



# Construction Alternatives

- Accelerated Construction
  - Span Replacement
    - Self-Propelled Modular Transporters (SPMT's)



# Construction Alternatives

- Accelerated Construction
  - Span Replacement
    - Self-Propelled Modular Transporters (SPMT's)





# Construction Alternatives

- Accelerated Construction
  - Span Replacement
    - Crane





# Construction Alternatives

- Accelerated Construction
  - Recommend span replacement
    - Reduce traffic impacts
    - Limit overall closure period



# Presentation Outline

- Project History
- Project Scope
- Construction Alternatives
- Plan Development
- Contractor's Methodology
- Current Project Status





# Plan Development

- Project Initiation
  - Task order was created with Modjeski and Masters (NTP issued July 2008)
    - Design and develop plans for the new steel girder spans with a concrete deck
    - Load rate the repaired bridge
    - Develop plans to strengthen the substructure if necessary
    - Establish constructability
    - Traffic control plan

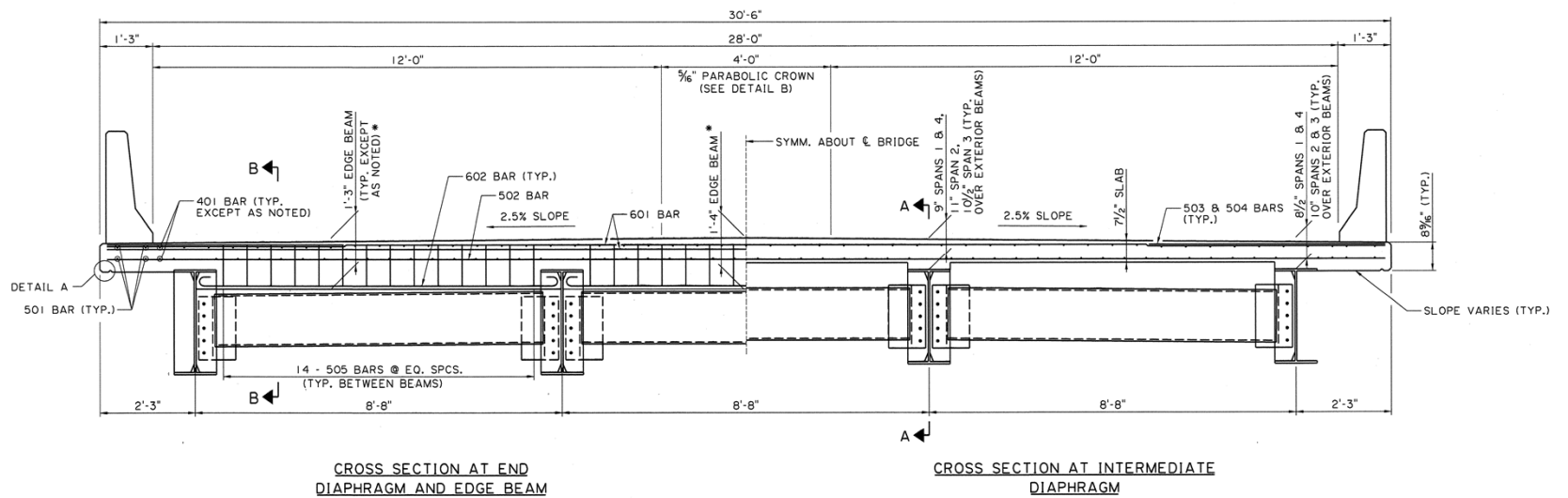


# Plan Development

- **Steel Girder Replacement Spans**
  - 28' clear roadway
  - Weathering steel rolled W-shape girders
  - Girders to be composite with deck
  - 7 1/2" thick concrete deck
  - Epoxy coated deck steel

# Plan Development

- Steel Girder Spans





# Plan Development

- **Bridge Load Rating**
  - Existing bridge was designed using the HS-20 truck
  - The rating showed that the substructure required strengthening using LRFR (HL-93 truck)



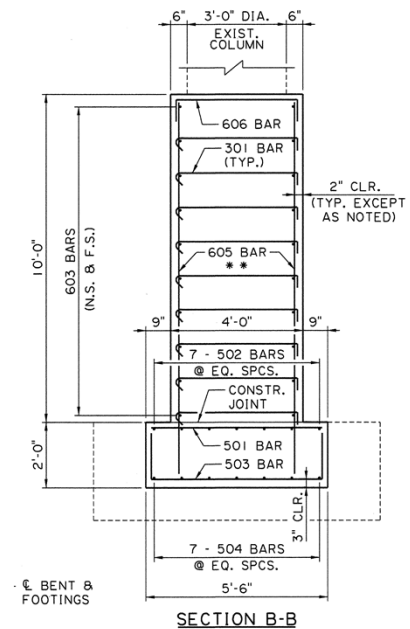
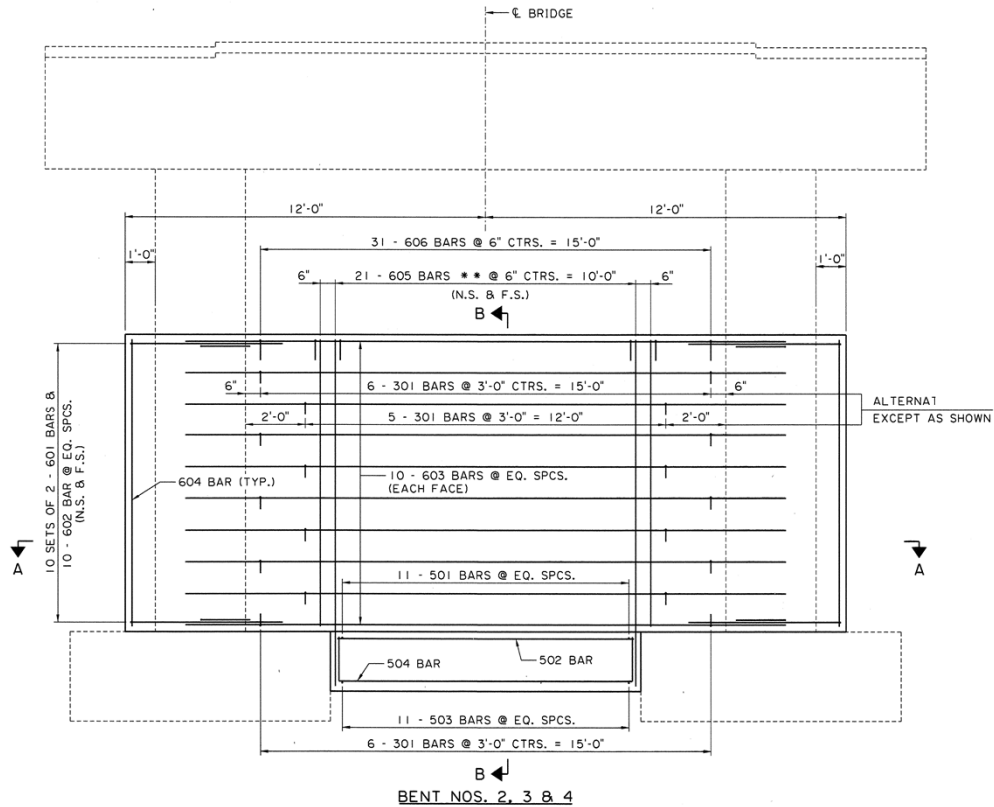


# Plan Development

- Substructure Strengthening
  - A spread footing was added between the existing pile footings of column bents
  - Drilled shafts were added to the existing end bents

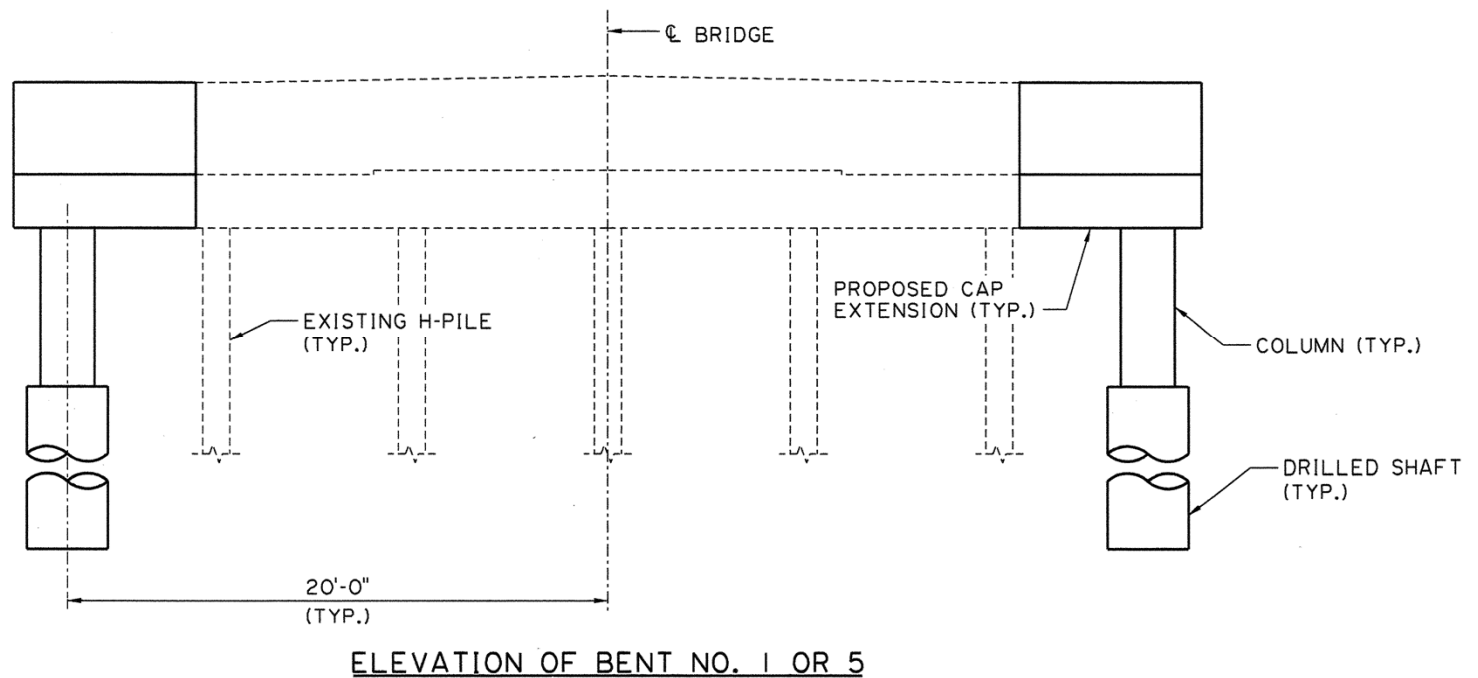
# Plan Development

- Substructure Strengthening
  - Column Bent Spread Footing



# Plan Development

- Substructure Strengthening
  - End Bent Strengthening (Drilled Shafts)





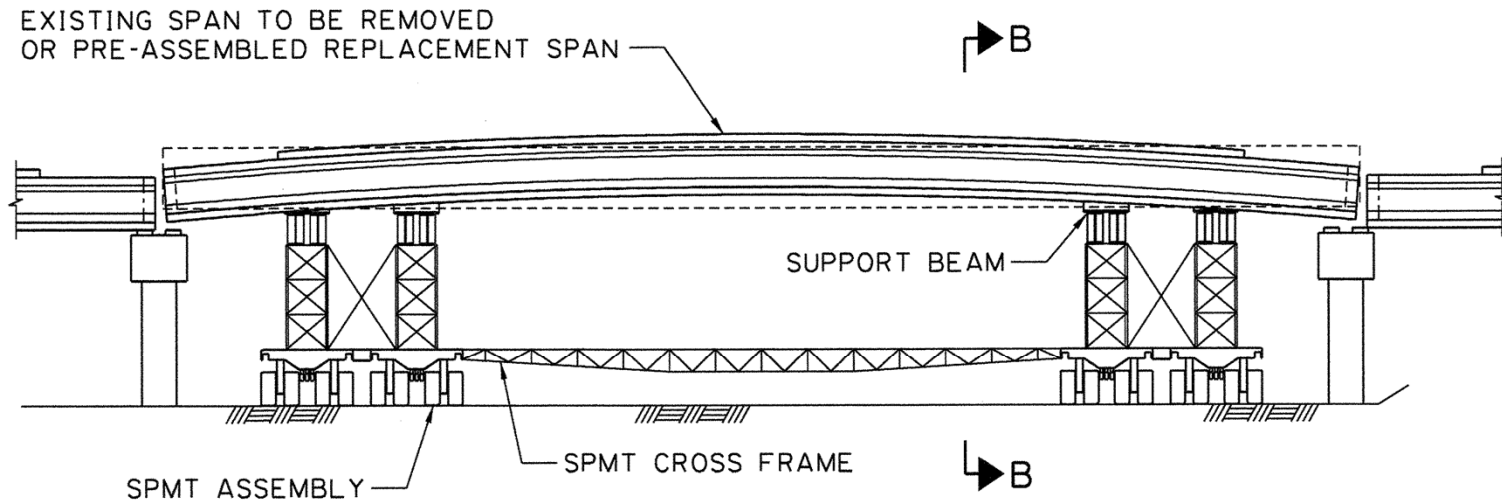
# Plan Development

- Suggested Method of Construction
  - Construct spans in a staging area
  - Move the spans using SPMT's
    - Replace the spans over four consecutive nightly closures from 7:00 PM to 7:00 AM
    - Replace all four spans over a weekend closure beginning at 7:00 PM Friday and re-opening the bridge at 7:00 AM the following Monday



# Plan Development

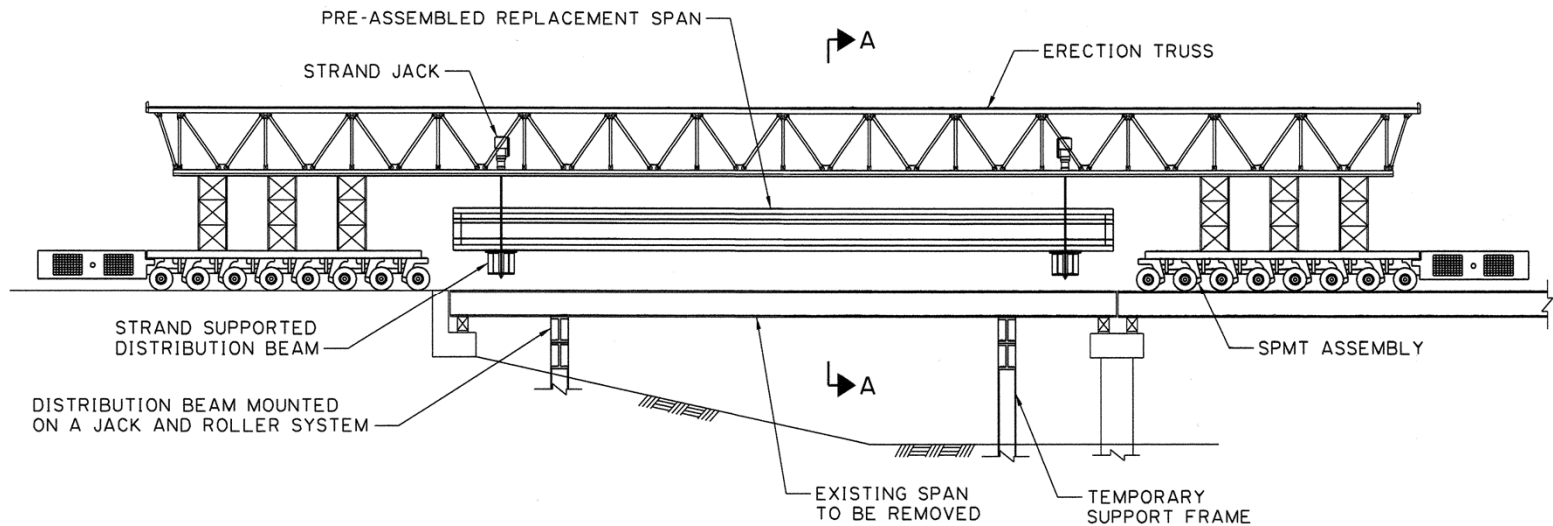
- Suggested Method of Construction



POTENTIAL ACCELERATED INTERIOR SPAN REPLACEMENT

# Plan Development

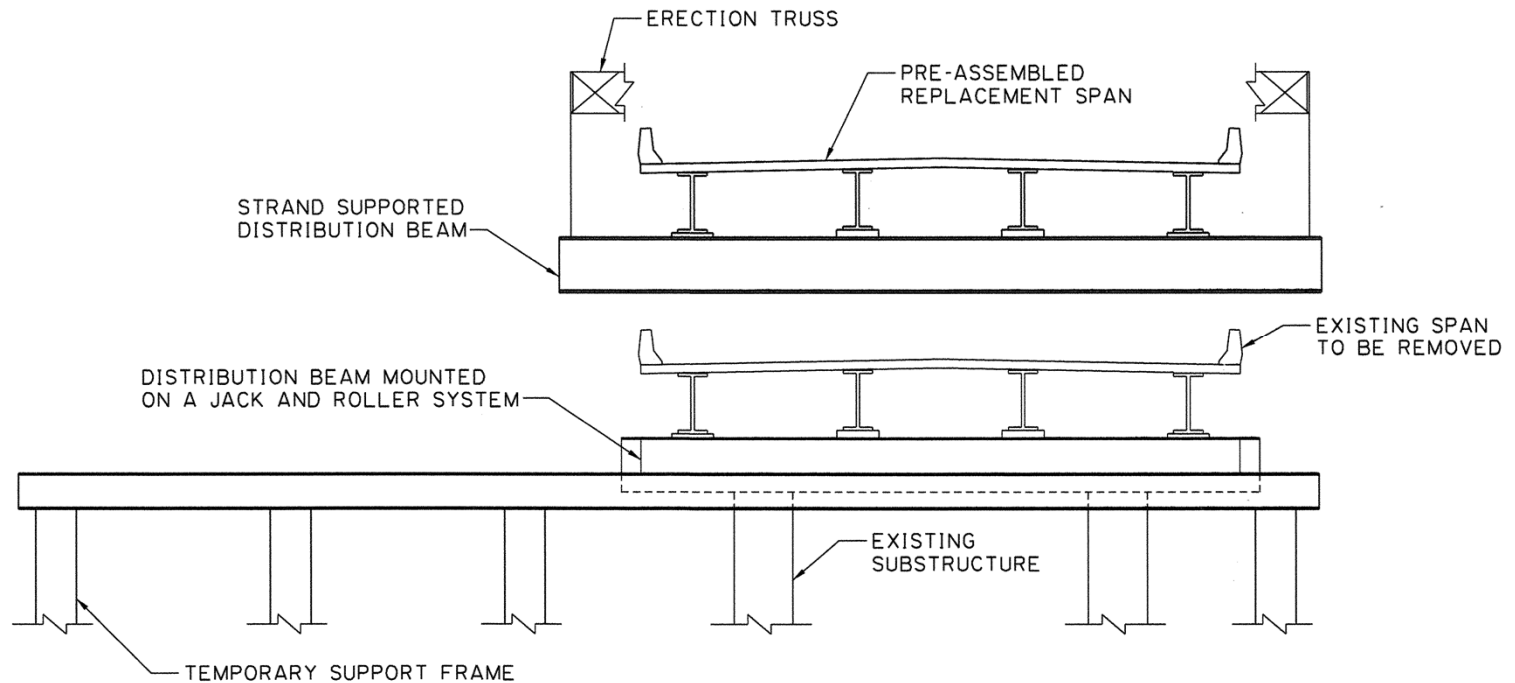
- Suggested Method of Construction



POTENTIAL ACCELERATED END SPAN REPLACEMENT

# Plan Development

- Suggested Method of Construction





# Plan Development

- Prefabrication Plan
  - Geotechnical assessment
  - Design of temporary supports
  - Settlement analysis and monitoring





# Plan Development

- **Movement Plan**
  - As-built survey
  - Moving equipment
  - Path of movement
  - Lift point locations
  - Analysis of temporary loads on spans
  - Geotechnical assessment
  - Span monitoring
  - Contingency planning

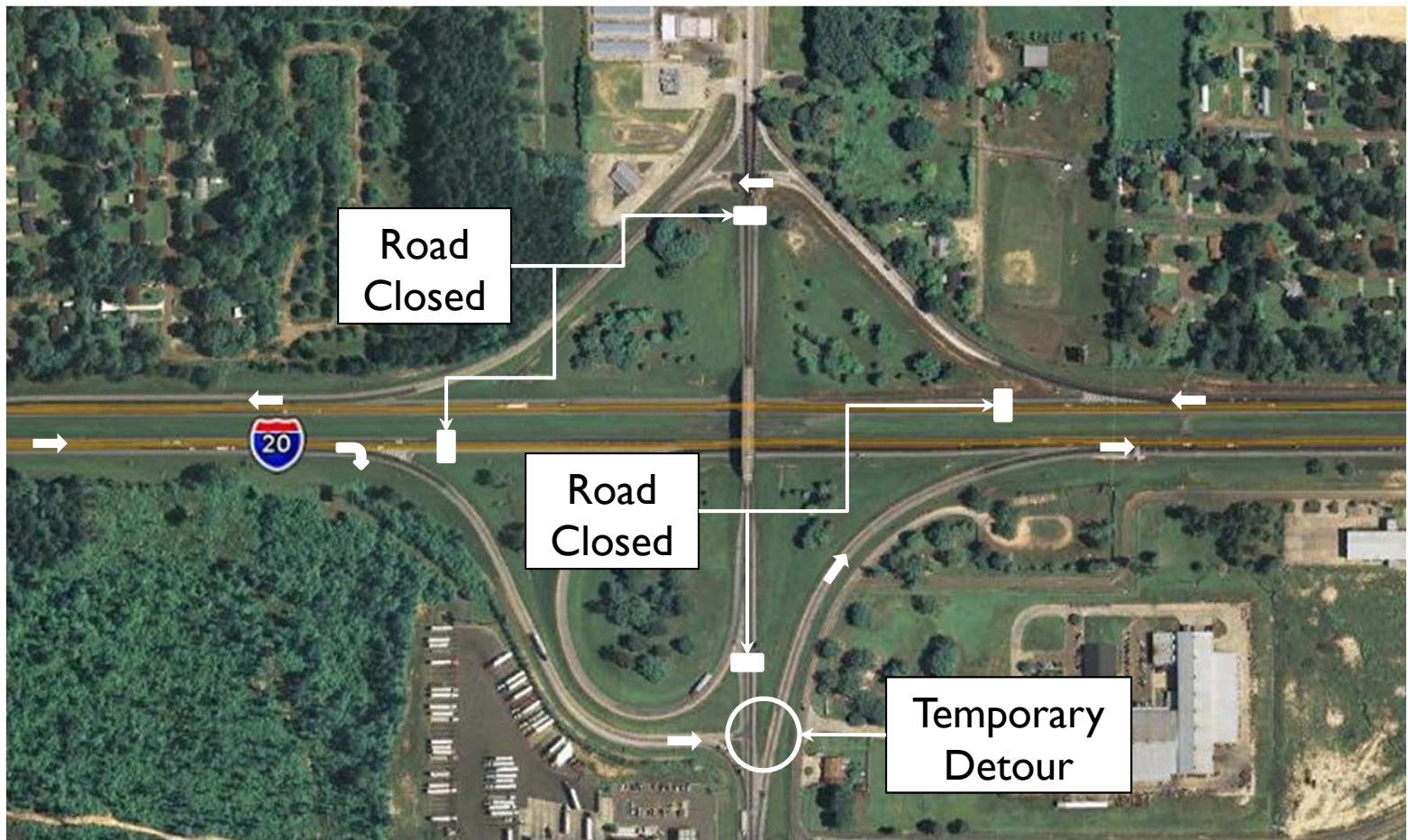


# Plan Development

- **Span Monitoring**
  - 10 – Elevation reference points per span
  - Monitoring Intervals
    - Before Lift
    - Immediately After Lift
    - As needed through transport to maintain relative elevations
    - Final Position

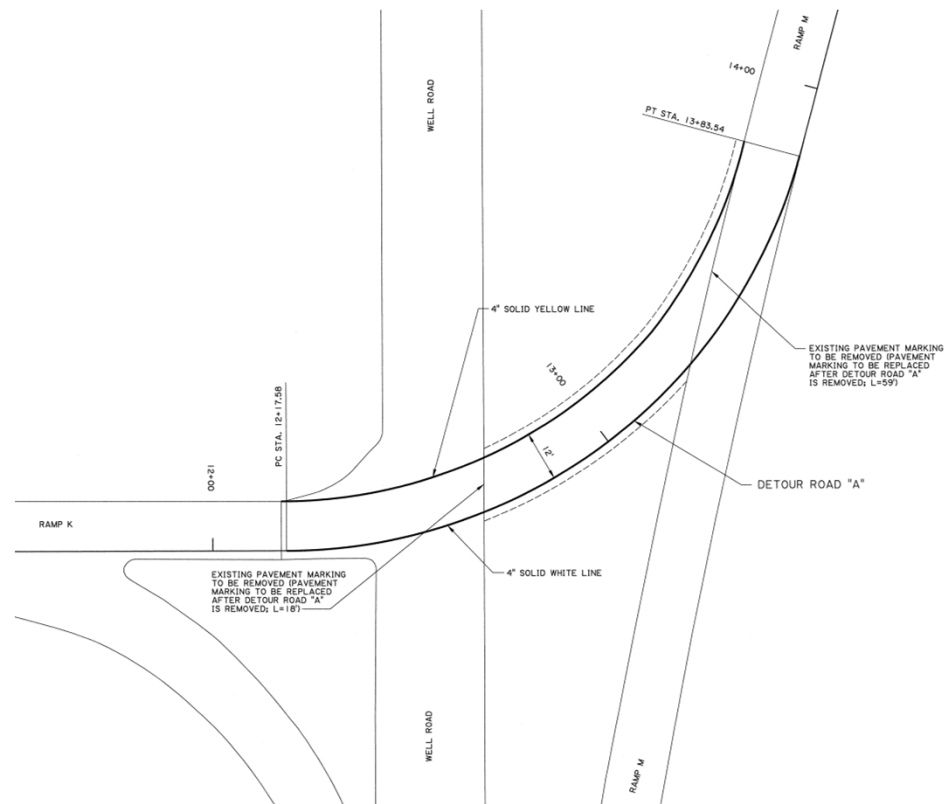
# Plan Development

- Traffic Control Plan



# Plan Development

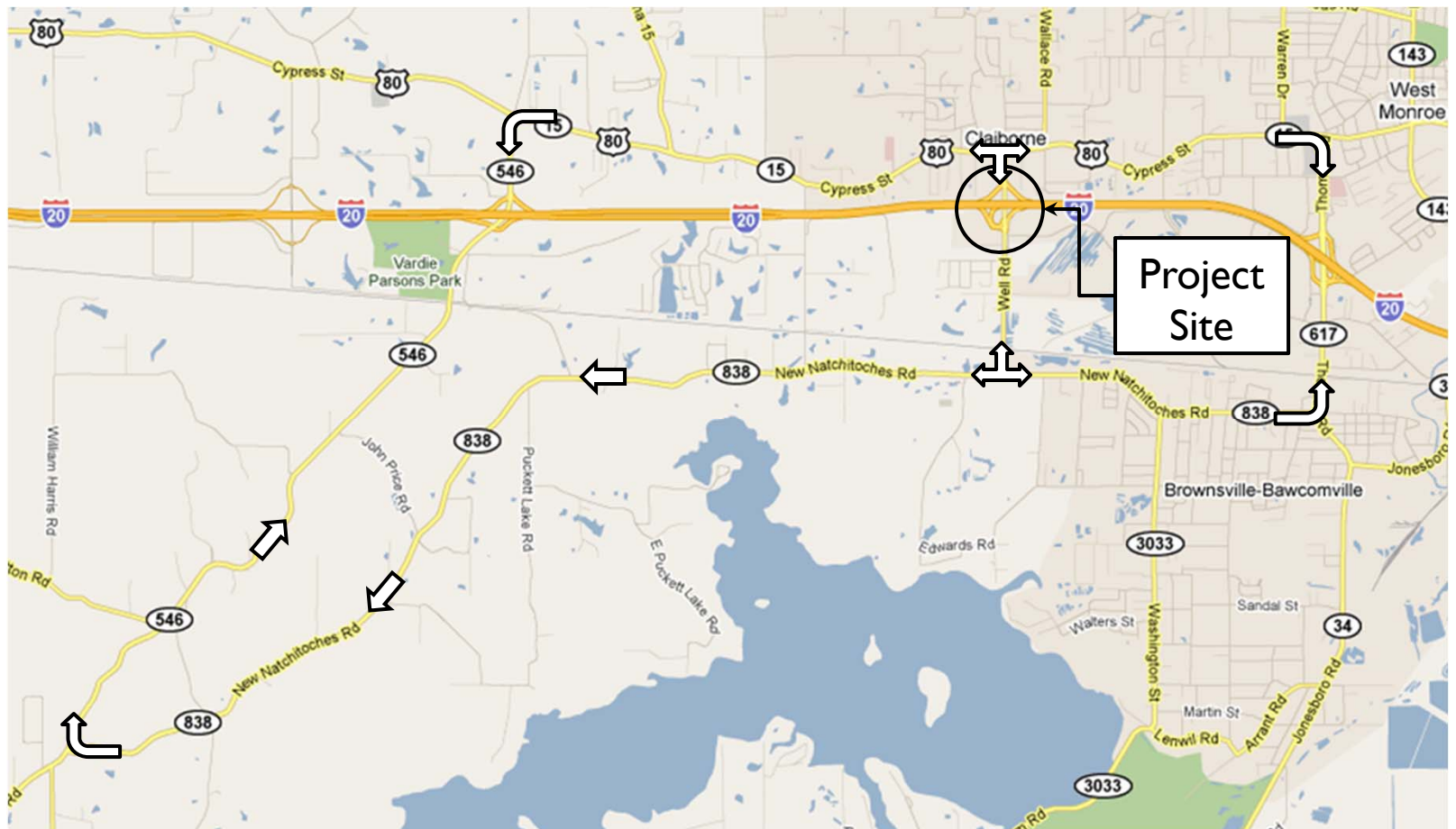
- Traffic Control Plan
  - Temporary Detour Road





# Plan Development

- Traffic Control Plan





# Plan Development

- Project was let in December 2009
  - Engineer's Estimate ➡ \$3.95 Million
  - Contractor's Bid Price ➡ \$ 3.17 Million
  - Awarded to Gibson and Associates
  - Work Order issued March 2010



# Presentation Outline

- Project History
- Project Scope
- Construction Alternatives
- Plan Development
- Contractor's Methodology
- Current Project Status



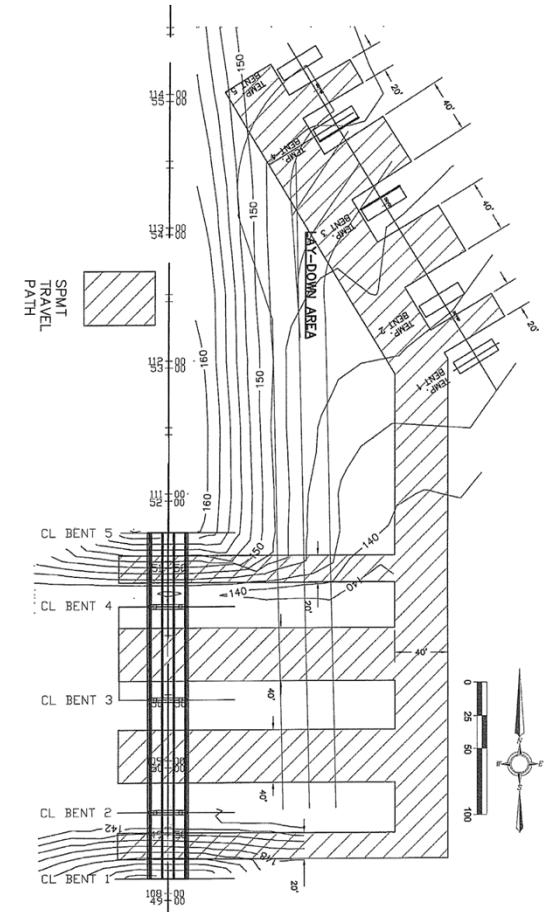
# Contractor's Methodology

- Staging area within the interchange
- Temporary steel pipe trestle
- SPMT's to move the spans
- Perform the moves over a weekend closure



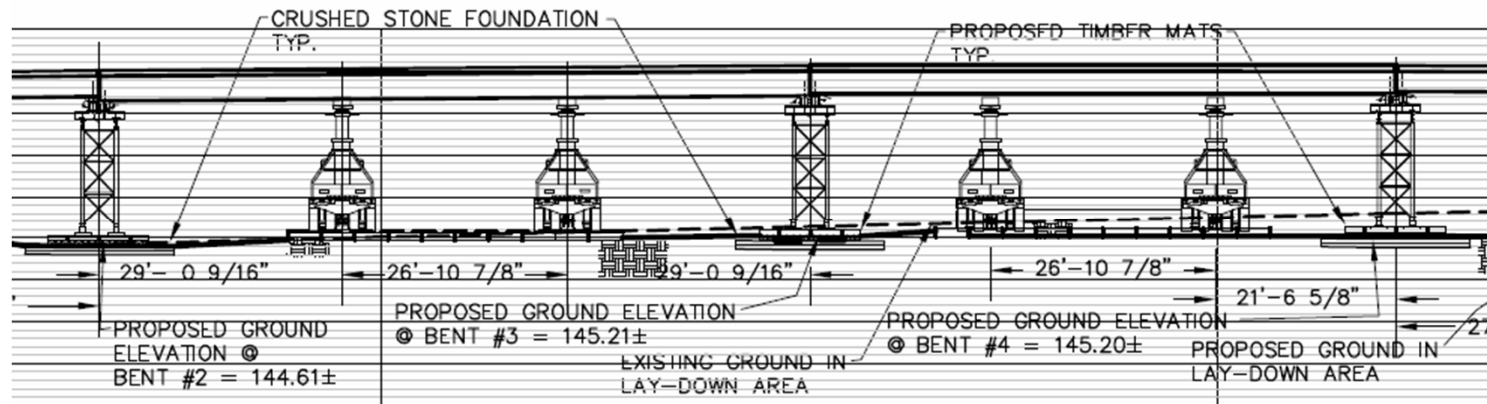
# Contractor's Methodology

- Staging Area and Movement Path



# Contractor's Methodology

- Temporary Support



**ELEVATION VIEW @ LAY-DOWN LOCATION**

# Contractor's Methodology

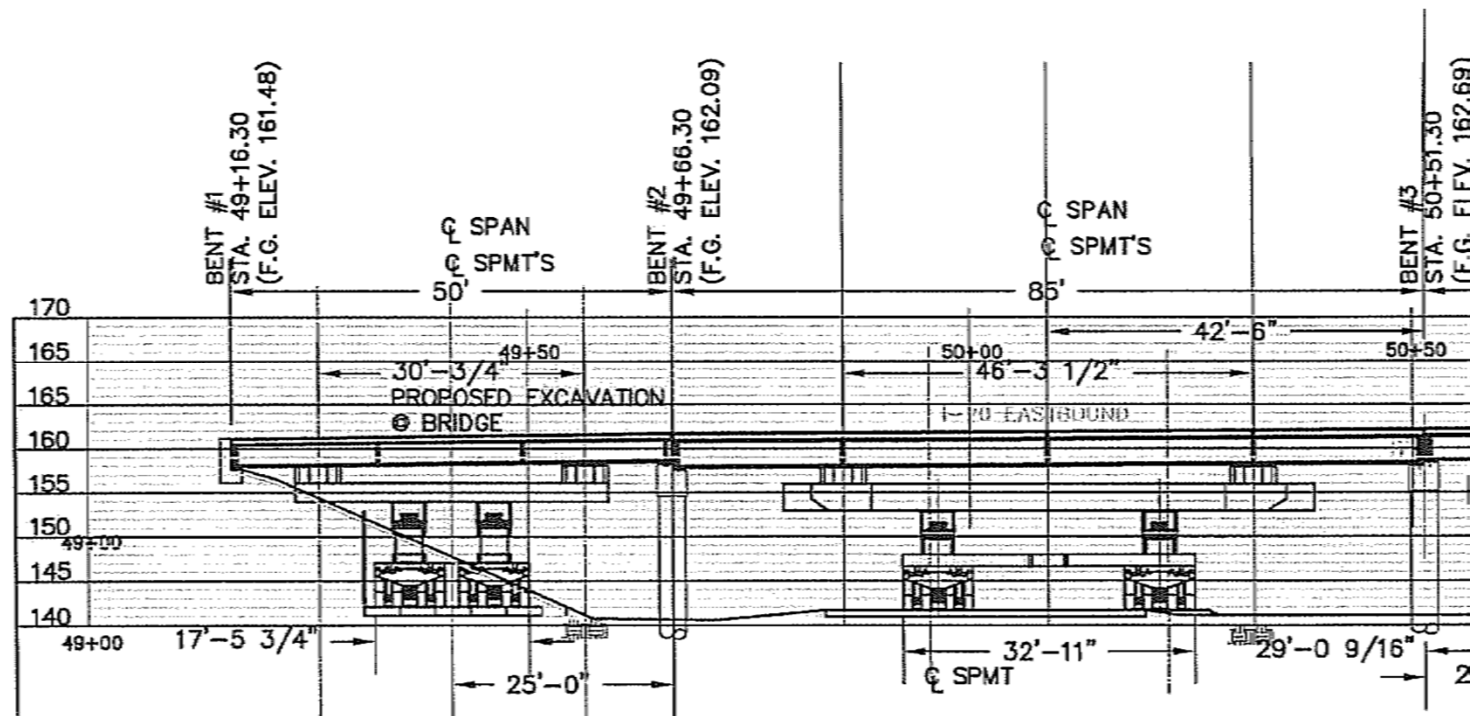
- Temporary Support





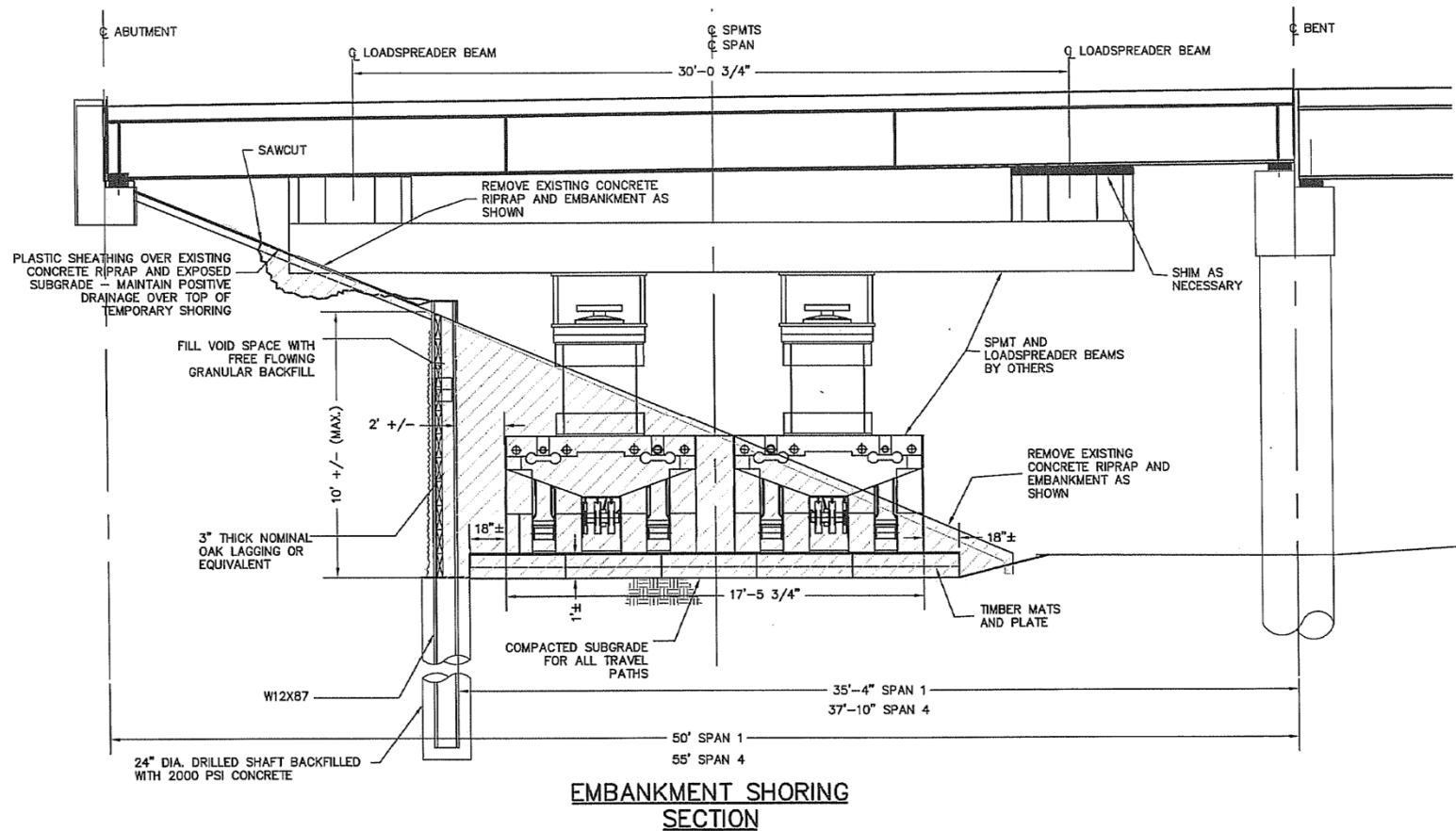
# Contractor's Methodology

- Movement Method



# Contractor's Methodology

- Movement Method







# Presentation Outline

- Project History
- Project Scope
- Construction Alternatives
- Plan Development
- Contractor's Methodology
- Current Project Status

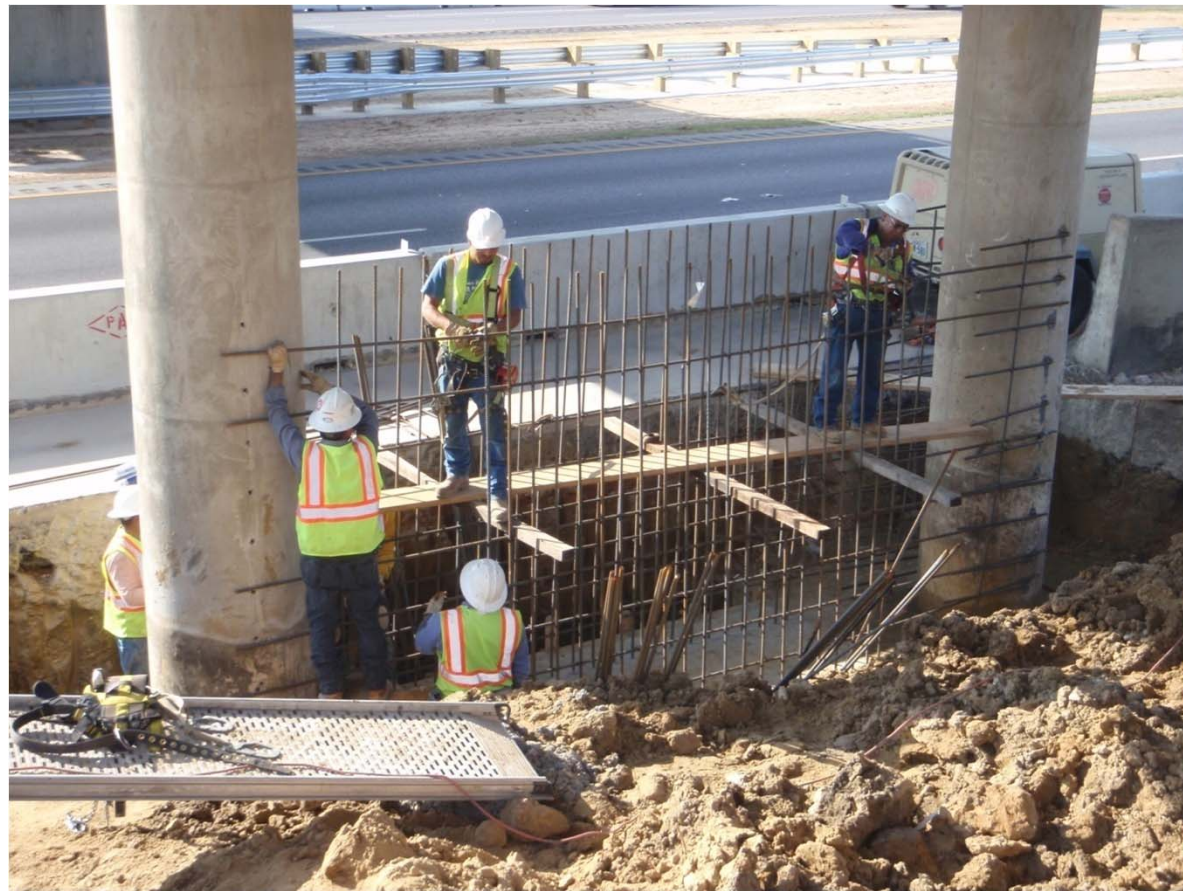
# Current Project Status

- Substructure Strengthening



# Current Project Status

- Substructure Strengthening





# Current Project Status

- Substructure Strengthening



# Current Project Status

- Span Construction







# Current Project Status

- **Span Movement**
  - Span movement plan is currently under review
  - Span movement is tentatively scheduled for early February 2011

The End

