

OTEC 2007 - Bridge Innovation

Performance of Distributed Anode System for Slab Bridge on I-75

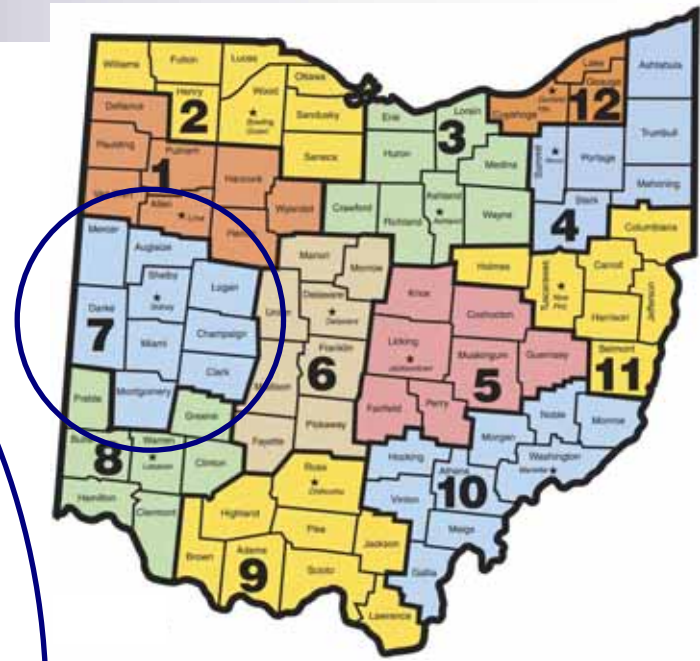
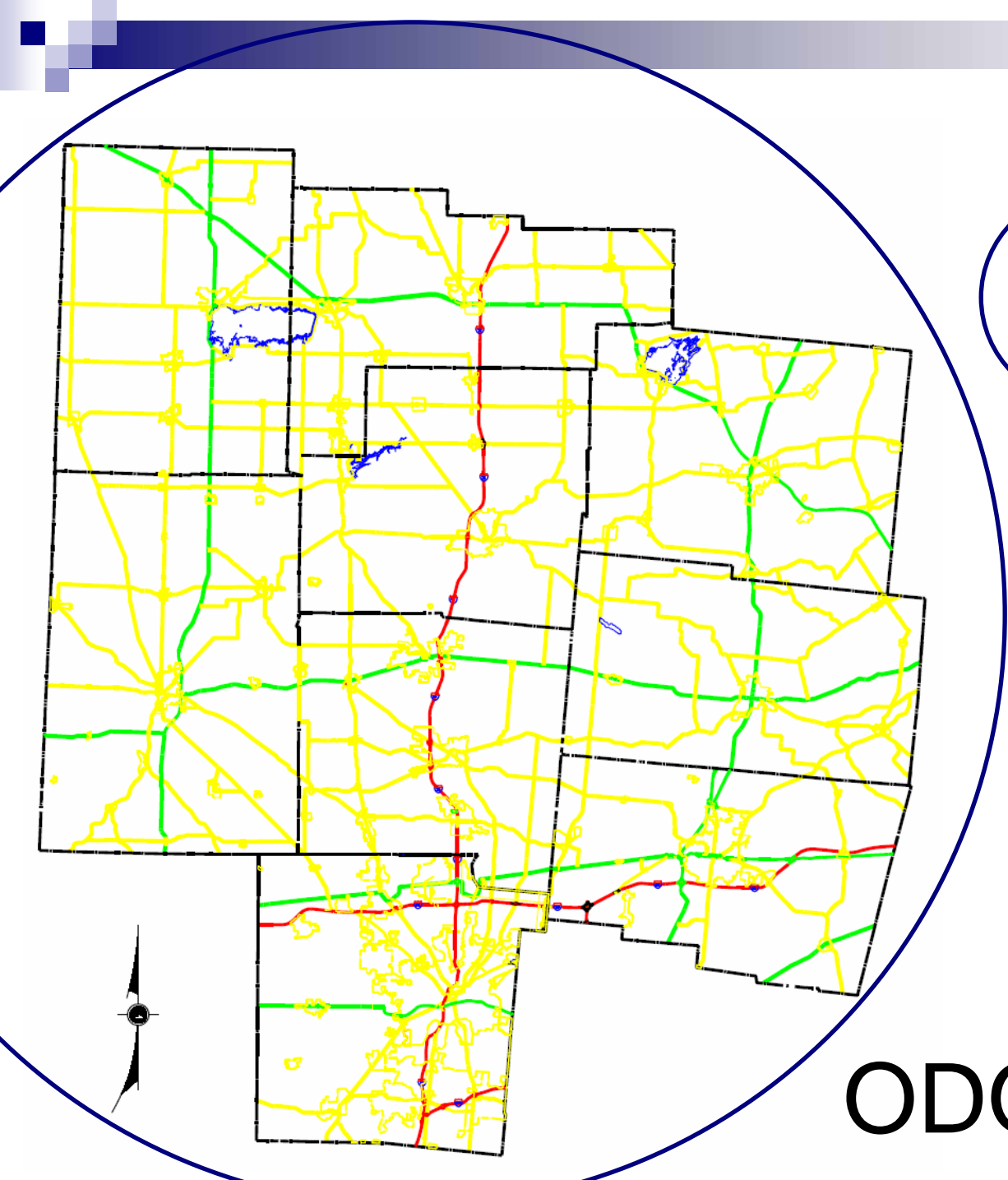
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ODOT - District 7, Planning

Chris Ball

Vector Corrosion Technologies

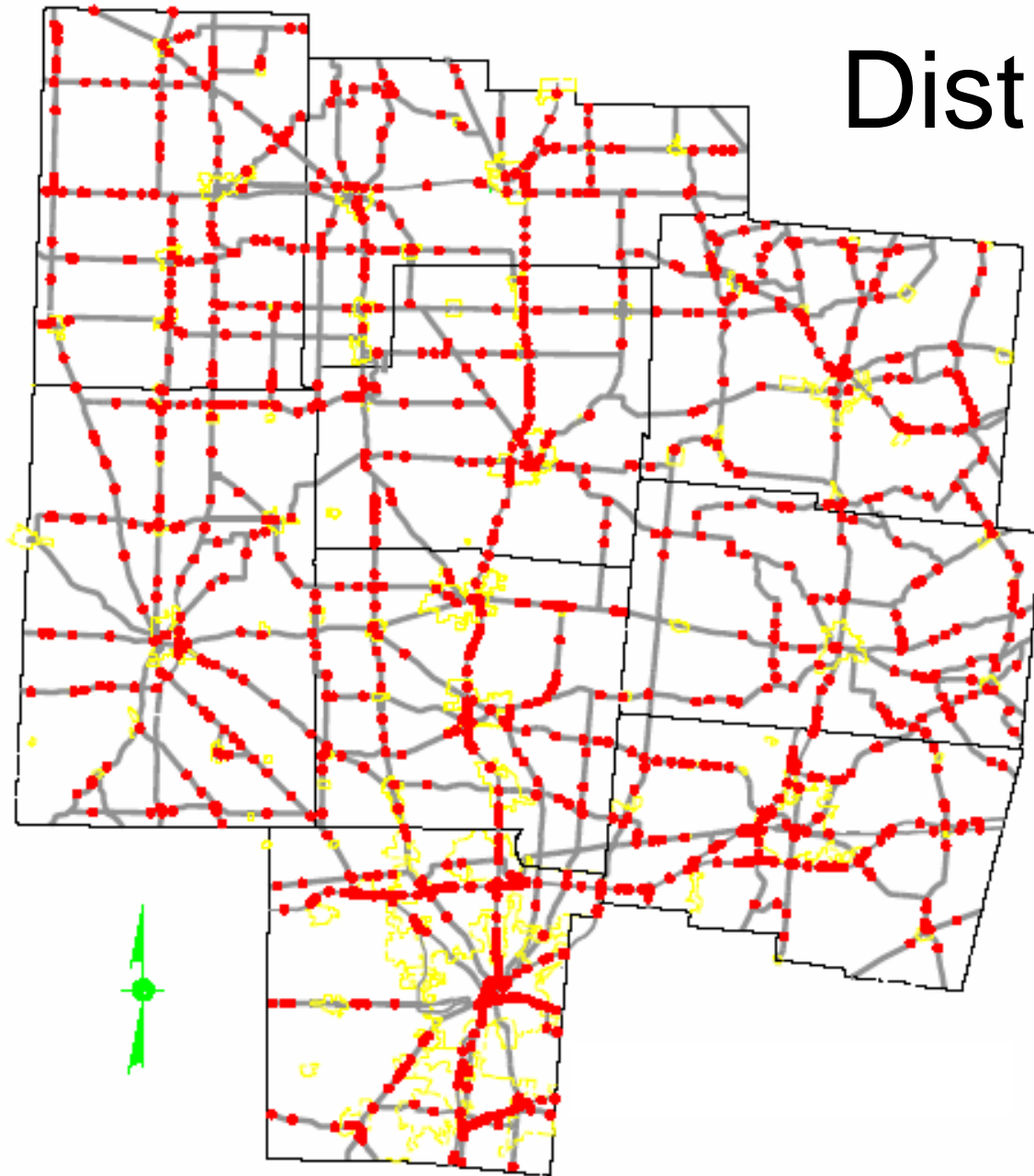




ODOT District 7

District 7 Bridges

- 1408 Bridges
- 250 Continuous Slab Bridges
- Of 250 Continuous Slab Bridges, 225 have abutments rated 2,3, or 4

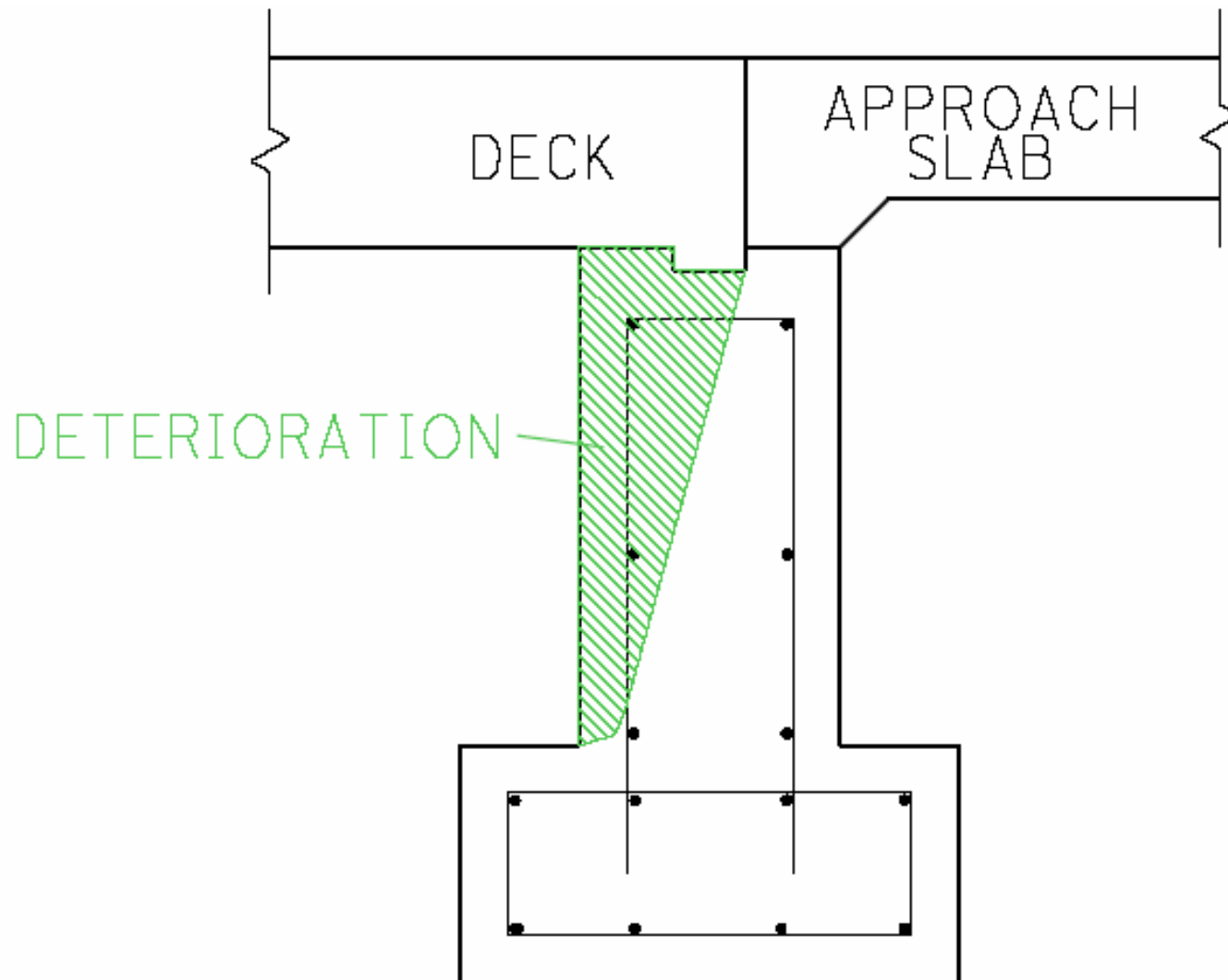


On Many Slab Bridges...

- Slabs are in good condition
- Deterioration at abutment around the key way



Cross-Section of Slab / Stub Abutment









Options

- Do Nothing
 - Not a feasible alternative for deficient bridges on the interstate system
- Repair bridge
 - With appropriate repair, most of these bridges have remaining service life
- Replace bridge
 - Not cost-effective to remove a good slab





Past Practice for Repairs

- Slab would be temporarily supported
- Abutments would be replaced
- Requires closure or part-width construction

Maintenance of Traffic

- Current Policy:



After Conventional Patching Repair



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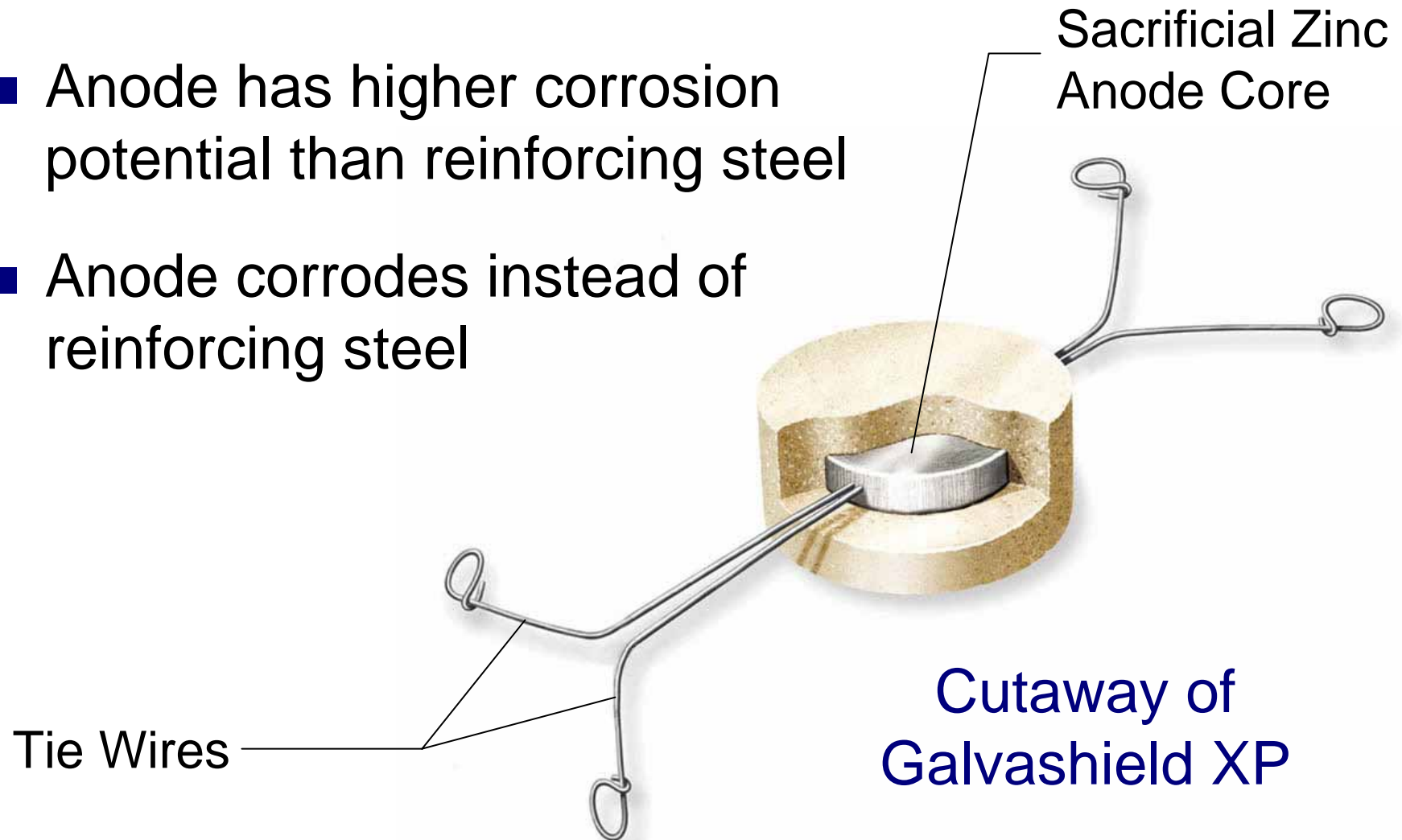
Innovative Approach

- Minimal Impact to Interstate traffic
- Economical
- Durable
- Simplicity of Repair

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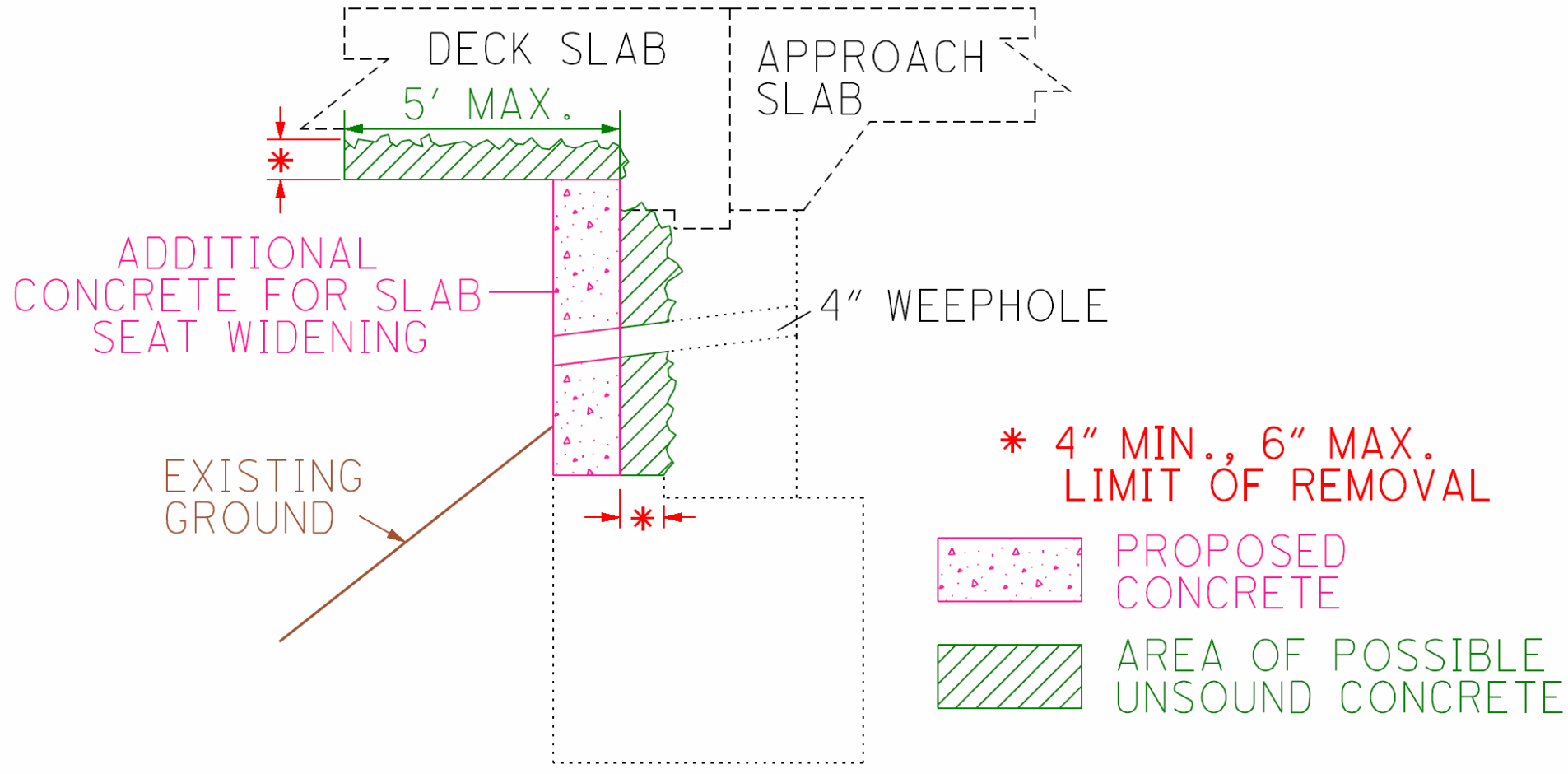
What Anode Is and How It Works

- Anode has higher corrosion potential than reinforcing steel
- Anode corrodes instead of reinforcing steel



Galvashield XP “Pucks”





SECTION A-A

CONCRETE REMOVAL AND REPLACEMENT

Concrete Removal

- Remove less than 6"
- If more than 6", contractor to perform structural assessment
- Temporary shoring may be needed



Temporary Shoring



Part Width for Superloads

- Blanket permits issued up to 120,000 lbs.
- Loads must be accommodated throughout rehabilitation process

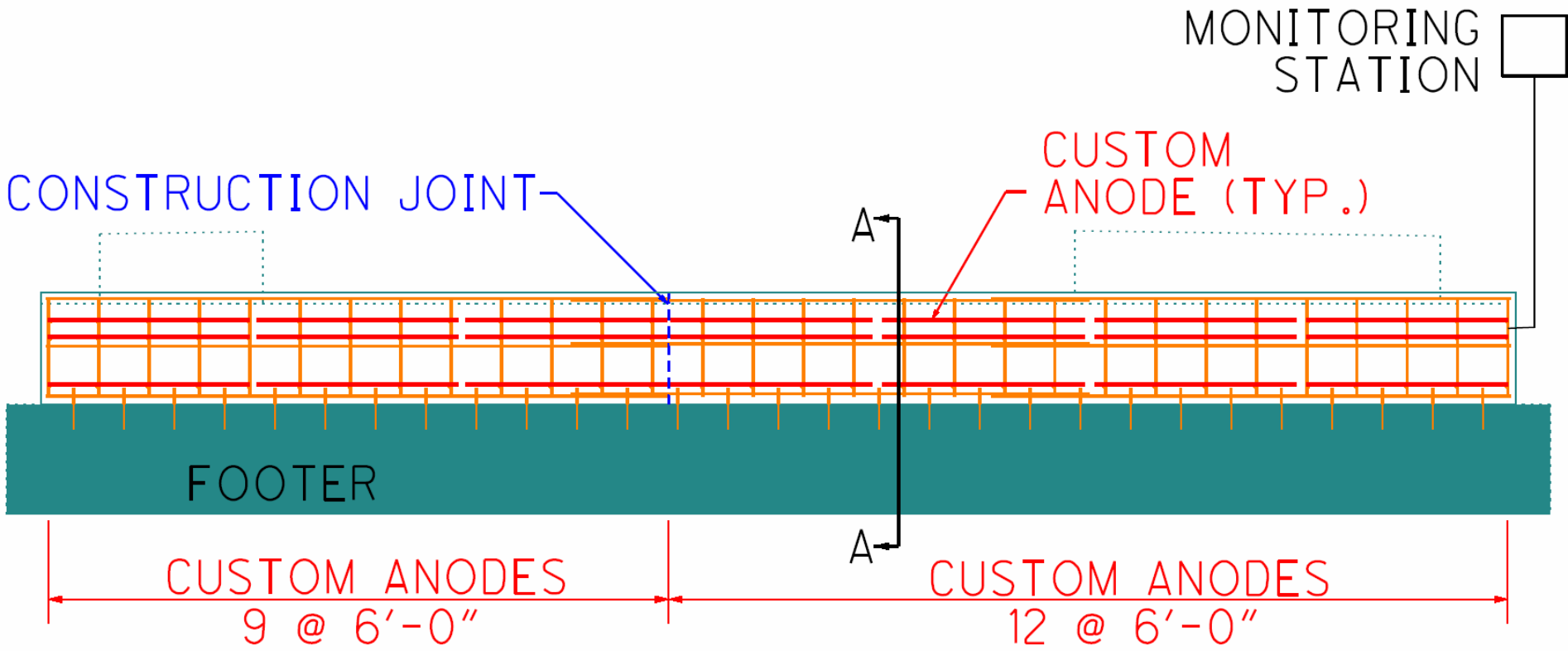




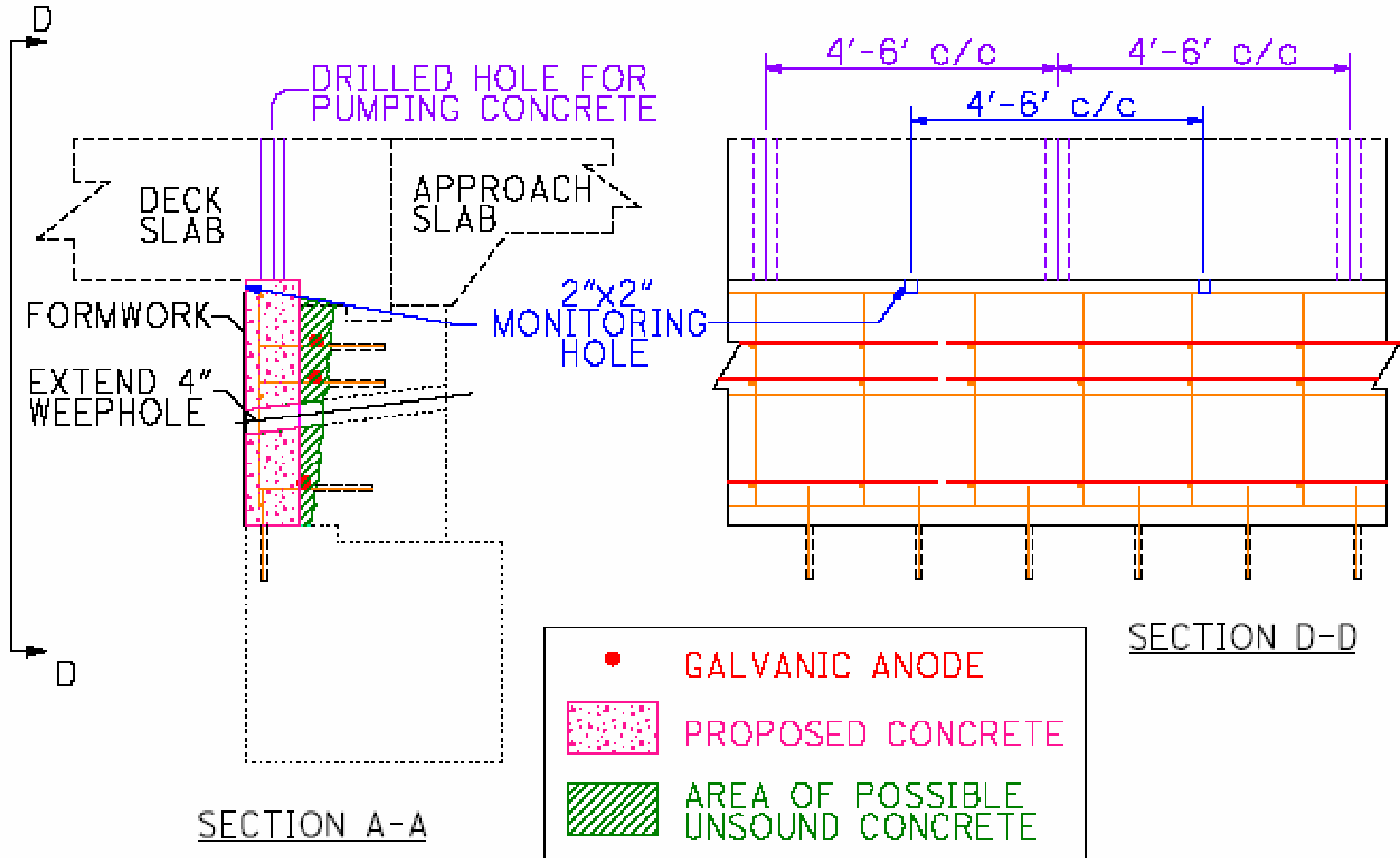
Strip Anodes



Elevation View with Anodes

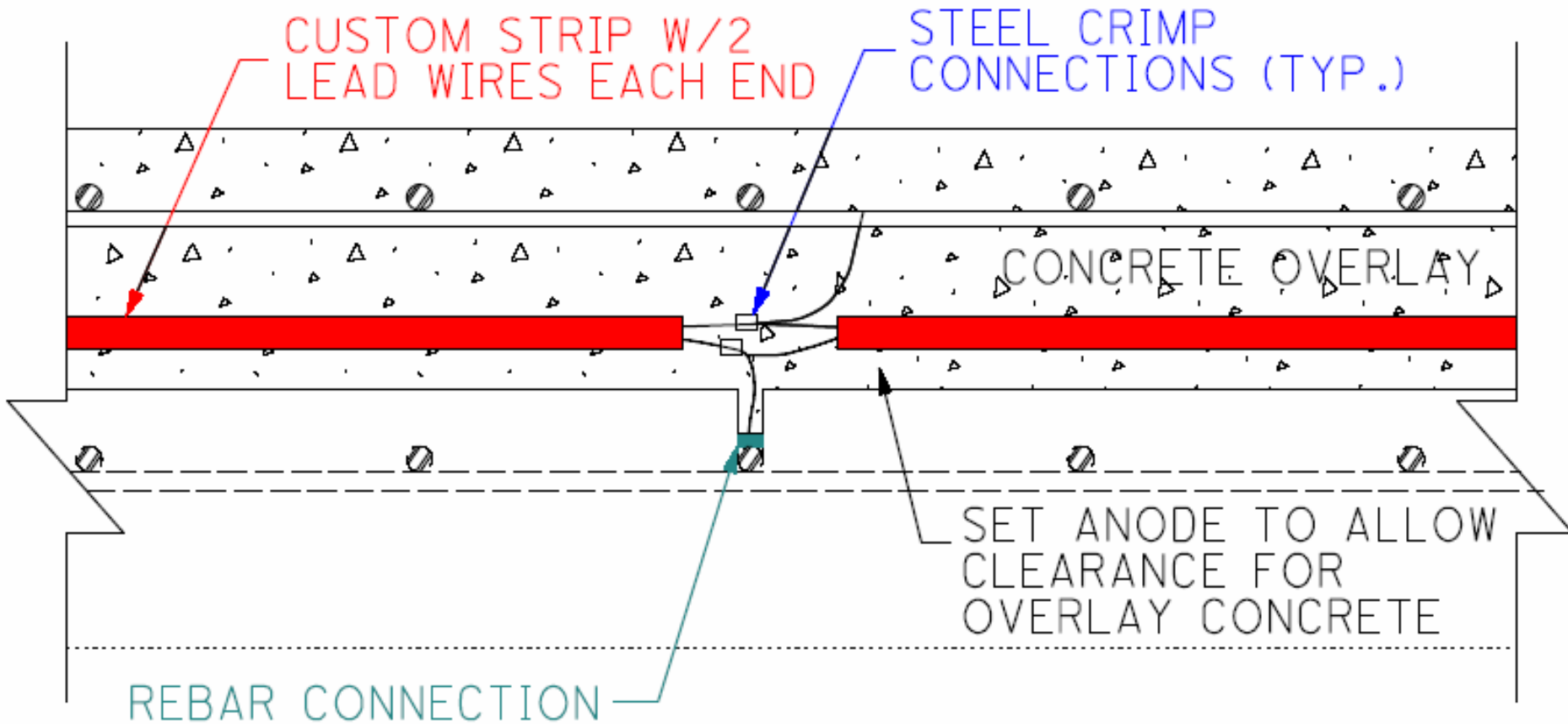


Cross Sections with Anodes



Plan View

TYPICAL EMBEDDED GALVANIC ANODE TO REINFORCING STEEL ATTACHMENT DETAIL



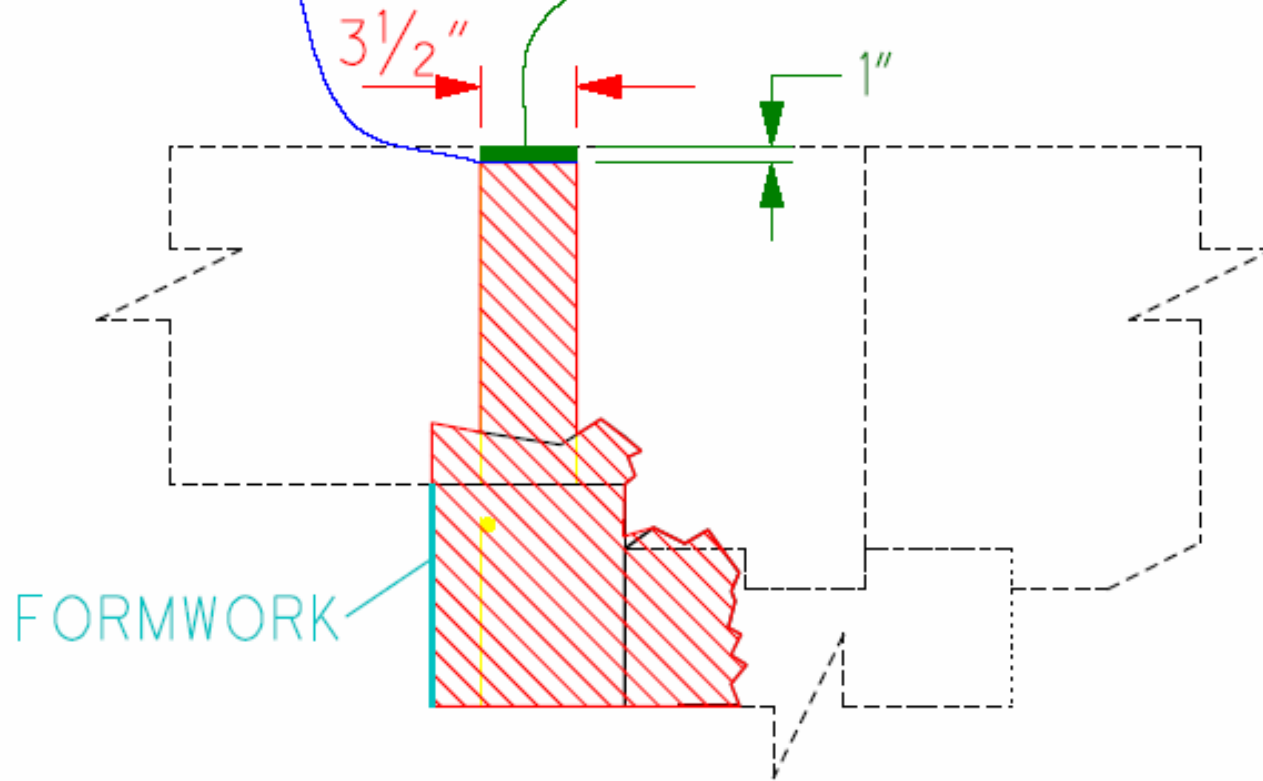


Connection of Anodes to Rebar

Proposed Filled Core Hole

CONCRETE SURFACE SEALED
WITH HMWM RESIN

REPLACEMENT ASPHALT



 ITEM 519 SPECIAL-PATCHING CONCRETE STRUCTURE, MISC.:
WITH HIGH EARLY STRENGTH PUMPED SC CONCRETE

Innovative Concrete Pumping Technique



Final Product

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Project Evaluation

- Project had minimal impact on interstate traffic
- One step repair with galvanic protection
- Cost Comparison
 - Rehabilitation with anodes - \$319K
 - Abutment Replacement / Temporary Shoring - \$427K
 - Replacement of structures - \$4.5M
- Success continues to be tracked through monitoring

Acknowledgements

- Mary Hoy, E.I. – PowerPoint presentation
- Matt Miltenberger, P.E.
Tourney Consulting
- Rachel Stiffler
Vector Corrosion Technologies
- ODOT Office of Structural Engineering