Innovative Pipe/Culvert Repair Project: Valley City District

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Culvert Repair Project
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ND Highway 1 - Valley City District

• This project is one of the FIRST of its kind for NDDOT
Culvert Repair Project

• Repaired 4 reinforced concrete box culverts and 1 reinforced concrete pipe

• Conducted during the winter months to minimize impact to the environment and no running water in culverts
The Repair Process

- Flaps installed at each end to keep heat in pipe

Flaps help keep heat inside of pipe
The Repair Process

• Conducted during winter months to minimize impact to the environment and no running water in culverts.

Machine pumps warm air to thaw culvert floor

Warm air melts ice to help dry out work area
The Repair Process

• Dewater the pipe-pump into existing draining system.
  ➢ Eco friendly-as not to transfer sediment from existing pipe into environment

Workers pump water out of culvert to help dry it out
The Repair Process

- Vacuuming the culvert to clean sediment from the existing pipe

Clearing sediment from culvert

Cleaning culvert to prepare for repair
The Repair Process

• Seal joints-Four step process

Contractor works to prepare crack for repair

Huge crack in culvert wall in need of repair
The Repair Process

• Step #1-Install Hydrophilic Polyurethane (Mountain Grout –Gel-Foam II) saturated Oakum Rope into joint to seal front end
The Repair Process

• Step #2 – Inject Hydrophilic Polyurethane Resin (Mountain Grout–Ultra) behind the Oakum Rope into the rear of the joint.
The Repair Process

• Step #3 – Inject two component hydrophilic polyurethane (mountain grout-u4.0 to fill voids)

Holes drilled to prepare for fill

Holes filled with grout to fix voids
The Repair Process

- Step #4 – UV Protection – Apply flexible multipurpose epoxy gel adhesive (Prime Resins – Gel 2200 Flexible)

Applying UV protection to the repair

Letting resin dry
THE REPAIR PROCESS

• Strategically drill injection holes (3/8”)

• Pump polyurethane system into holes to seal joints and voids
THE REPAIR PROCESS

Trimmed Joint

Completed Box Culvert
REINFORCED CONCRETE PIPE REPAIR

Existing end section joint

Growth through joint

Joint tie bar
Challenges

• Hard to estimate size of void

➤ Cannot predict how much material it will take to repair
Benefits of this Process

• Major cost savings
  ➢ Project Cost this project = $174,000
  ➢ Estimated Cost to Replace the RBCs and RCP could be $2,000,000 in round numbers

• Time savings
  ➢ Do not have to dig up roadway
Benefits of this Process

• No road closures/keeps traffic moving

• Provides a long term repair
Questions?