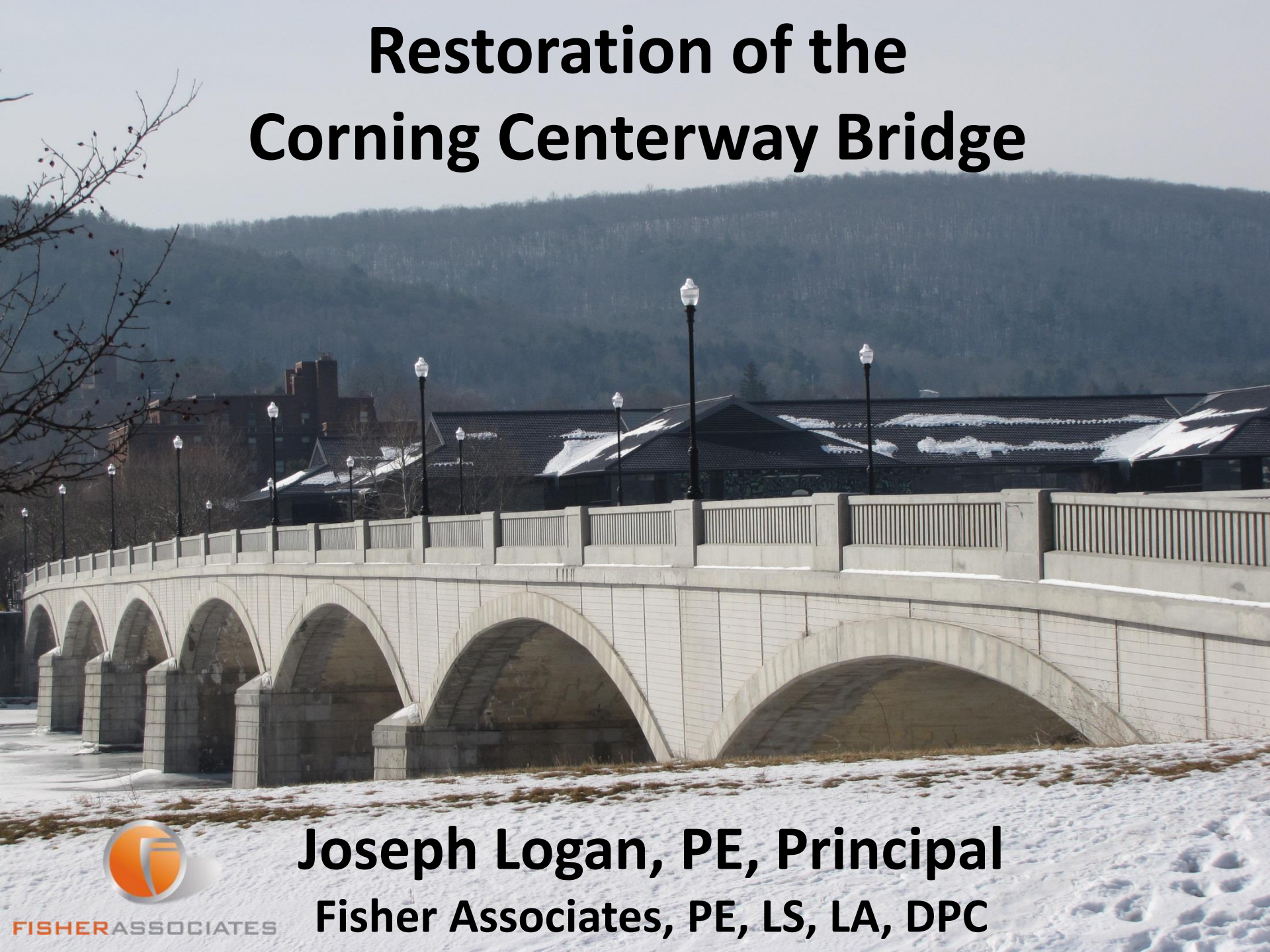
Restoration of the Corning Centerway Bridge



Joseph Logan, PE, Principal

Fisher Associates, PE, LS, LA, DPC

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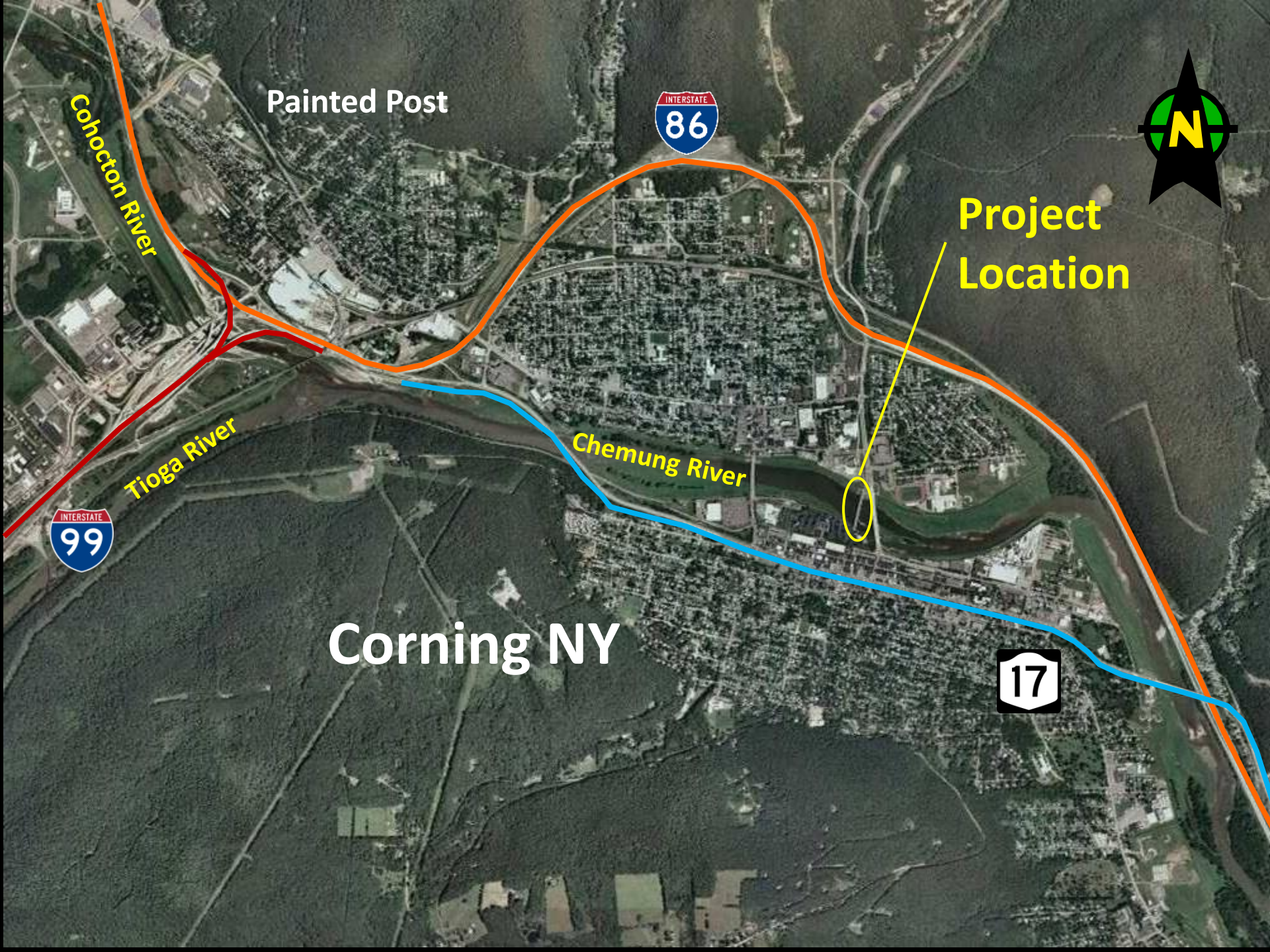
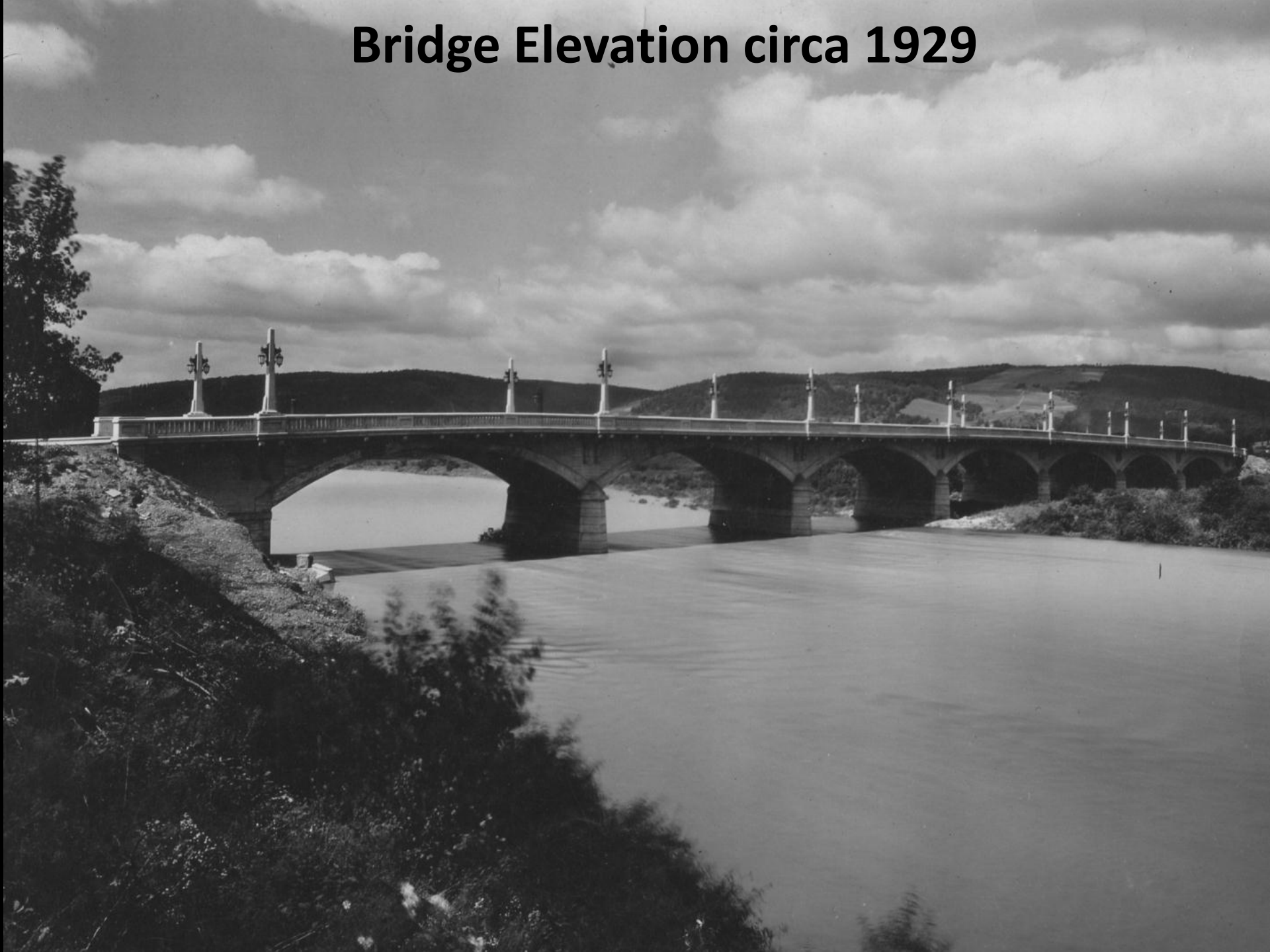
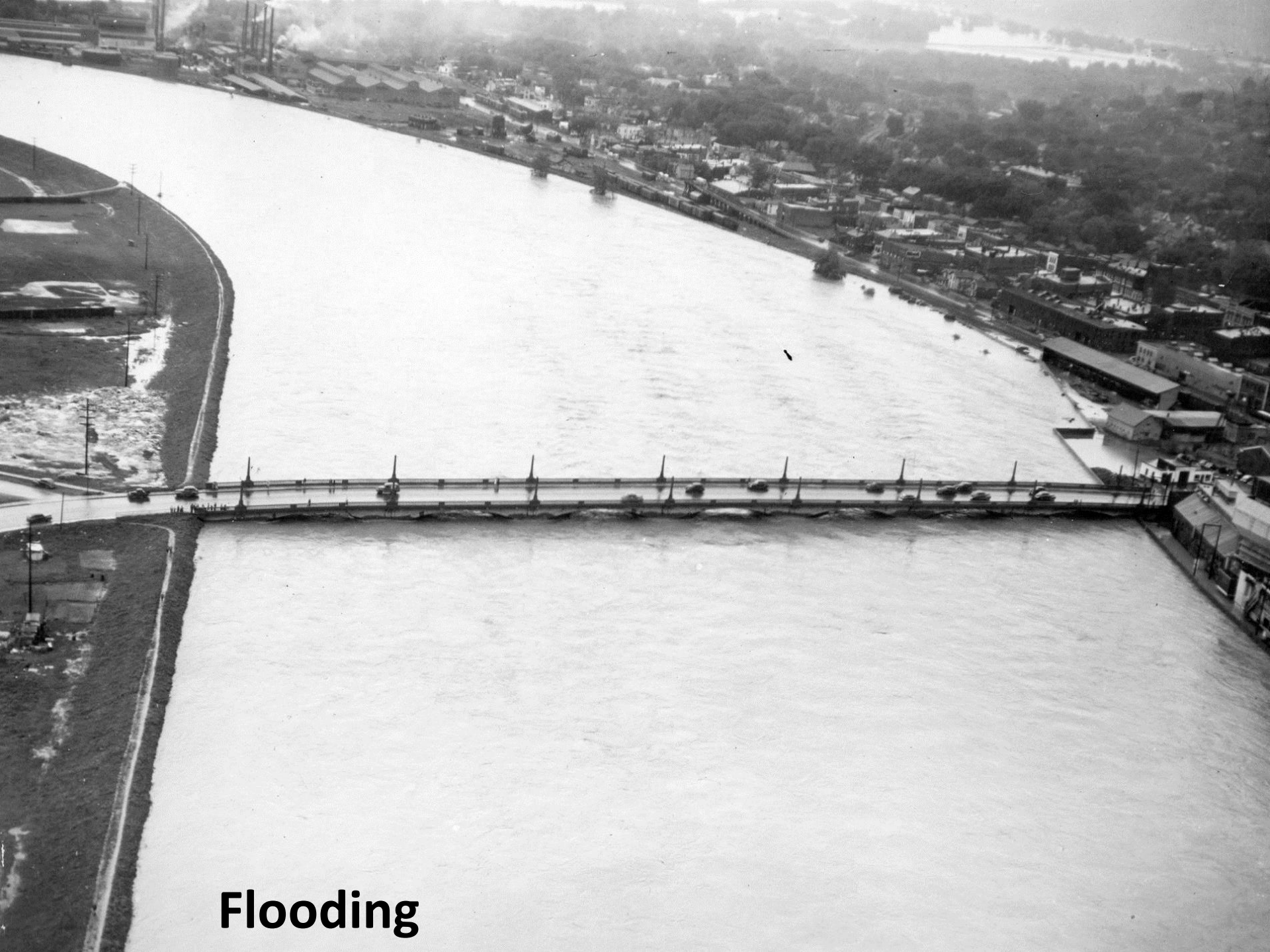

Painted Post
Cohocton River
INTERSTATE
86
N
Project
Location
Tioga River
Chemung River
INTERSTATE
99
Corning NY
17


CMOG
Flood Levee
the YMCA
Bridge Street
(1937)
Chemung River
East High
School
CORNING
Centerway
Arch Bridge
(1922)
Brisco
Bridge
(1987)
Corning's
GAFFER DISTRICT

Bridge Elevation circa 1929

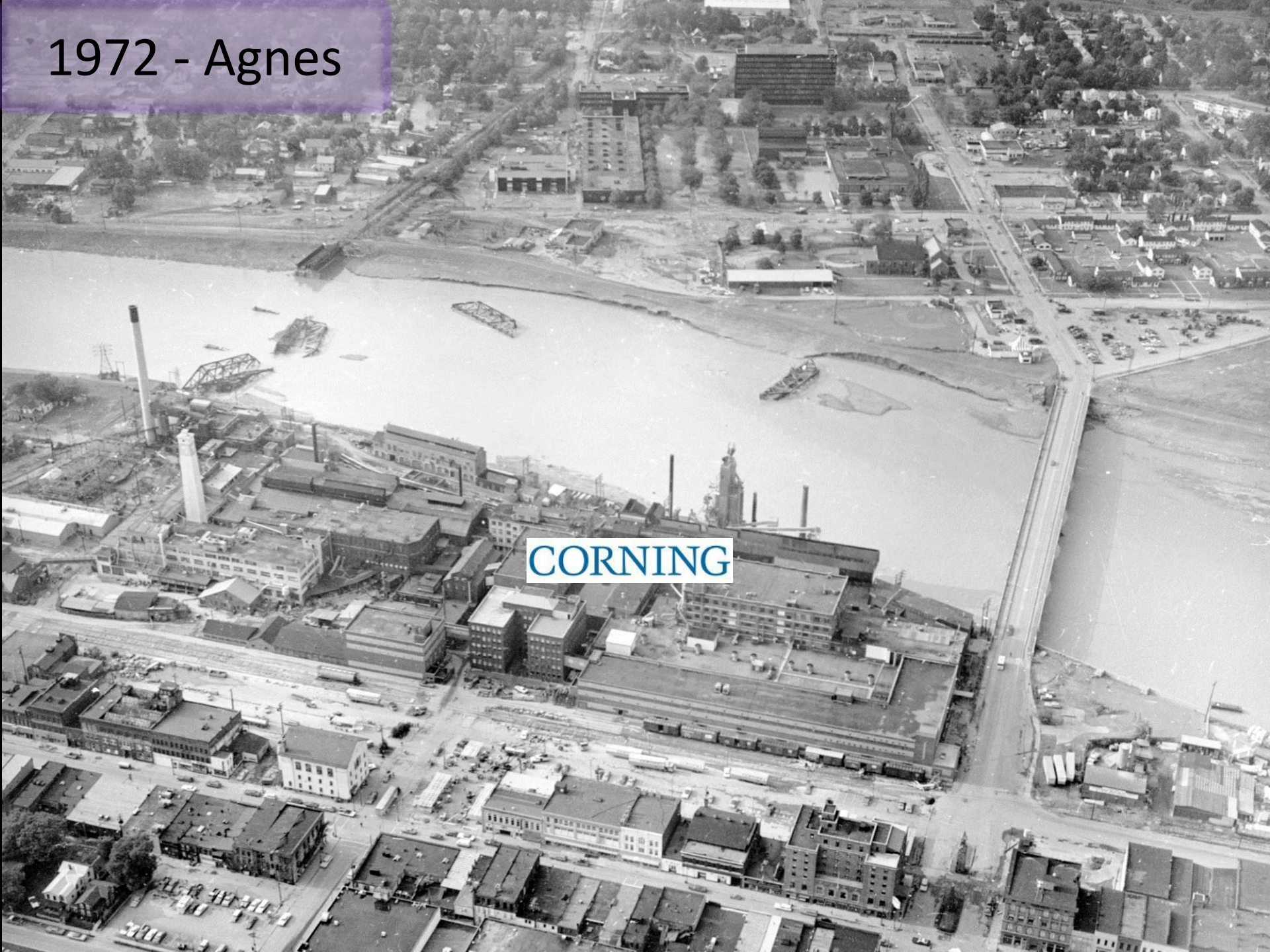


Bridge Elevation circa 2009



Flooding

1972 - Agnes



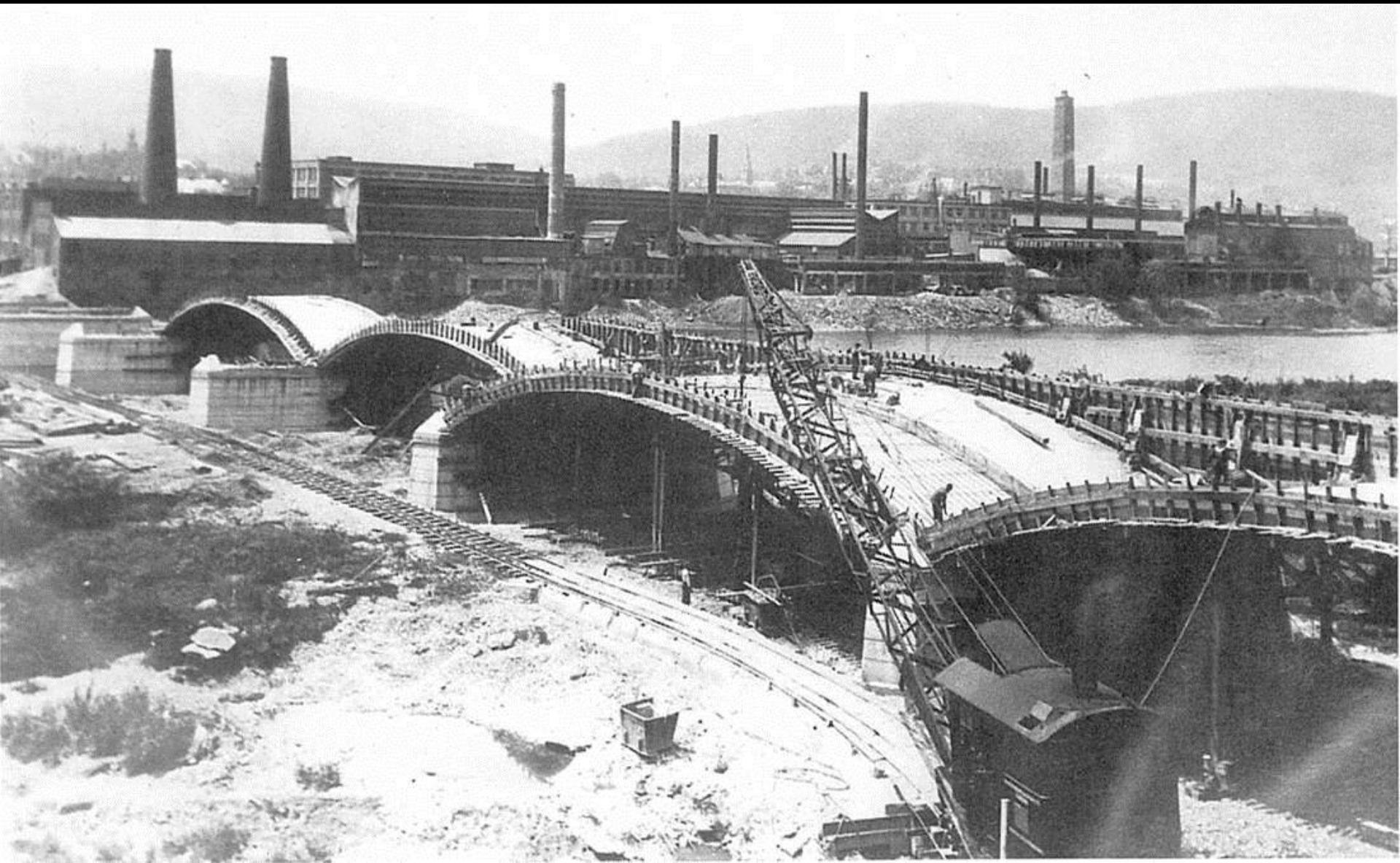
- Bridge Rehabilitation
- Maintain Historic Integrity

Centerway Arch Bridge

- 7 - 92 ft. (clear) spans: 720 ft. overall length

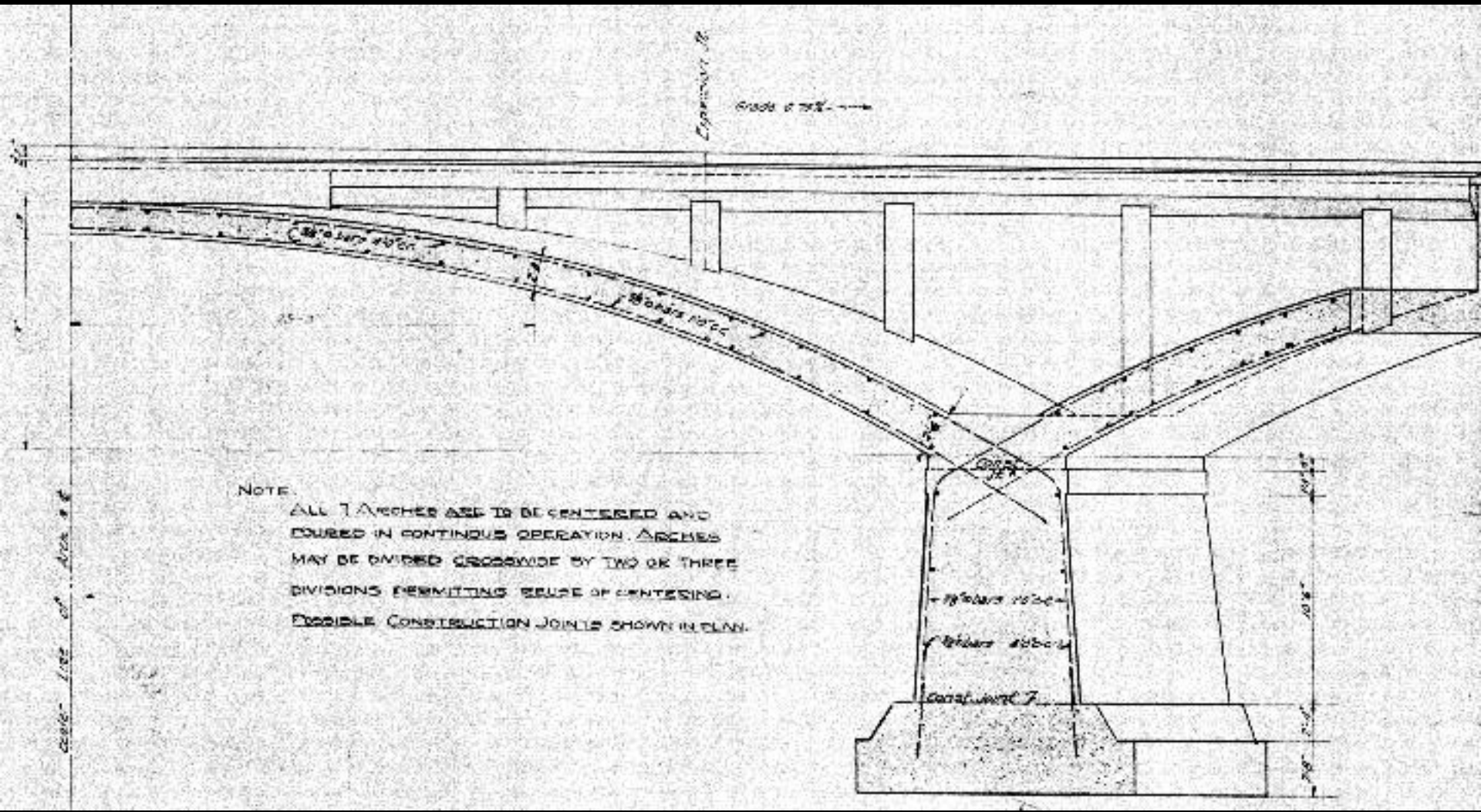
Age of the Bridge: 90+ years

1922 Construction



Arch Section

- Cast-in-place earth-filled reinforced concrete arch



1989 Deck Modifications

30 ft. curb-curb roadway, 40 ft. wide arch plus 5 ft. sidewalk overhangs

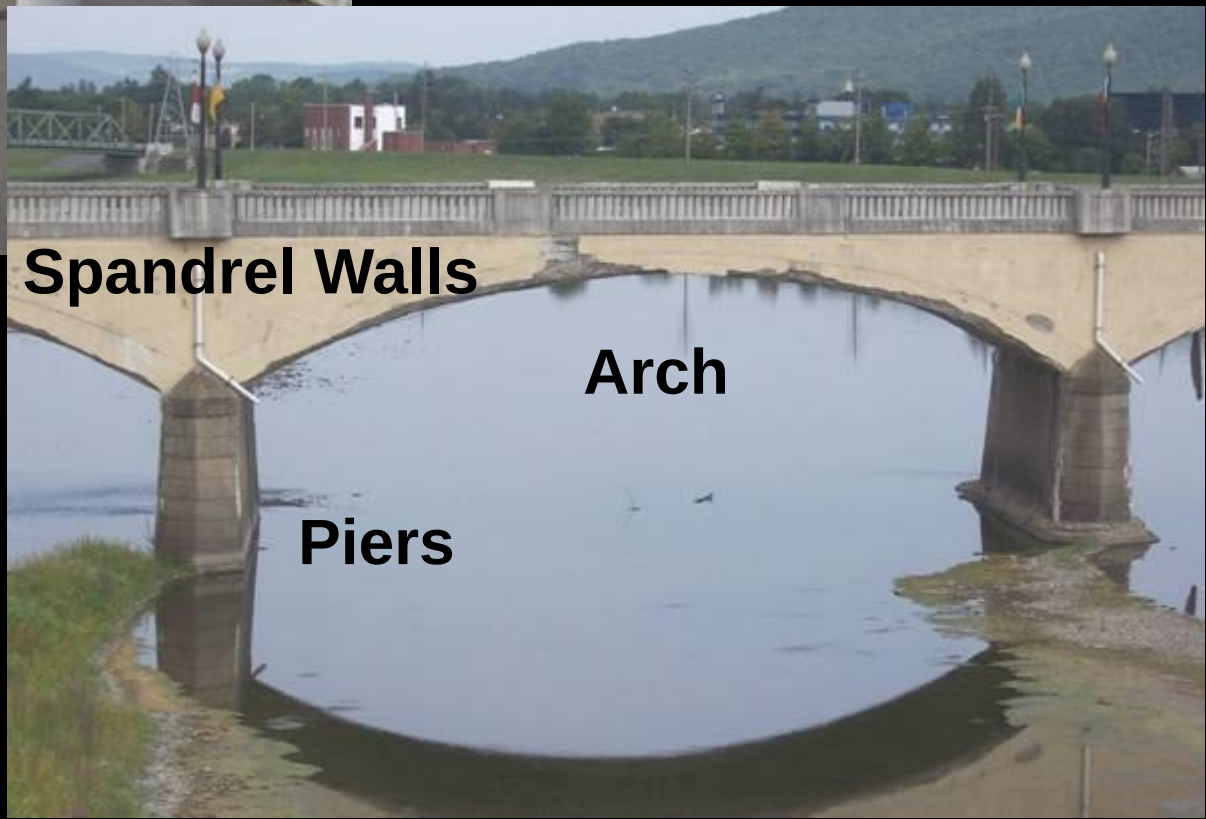
Sidewalk overhangs removed during 1989 conversion to pedestrian bridge

Reconstructed Deck Configuration

Preliminary Engineering

- **In-depth Bridge Inspection**
  - Define repair scope & quantities to get the most accurate cost estimates
- **Testing**
  - Non-destructive testing: impact echo, GPR, LIDAR, concrete sounding
  - Concrete coring for chlorides, petrographic analysis, strength, ASR
- **Reports**
  - Inspection Condition Report
  - GPR (deck)
  - Concrete Coring and Powder testing
  - Petrographic Analysis
  - Service Life Assessment

Inspection Components



In-depth Bridge Inspection

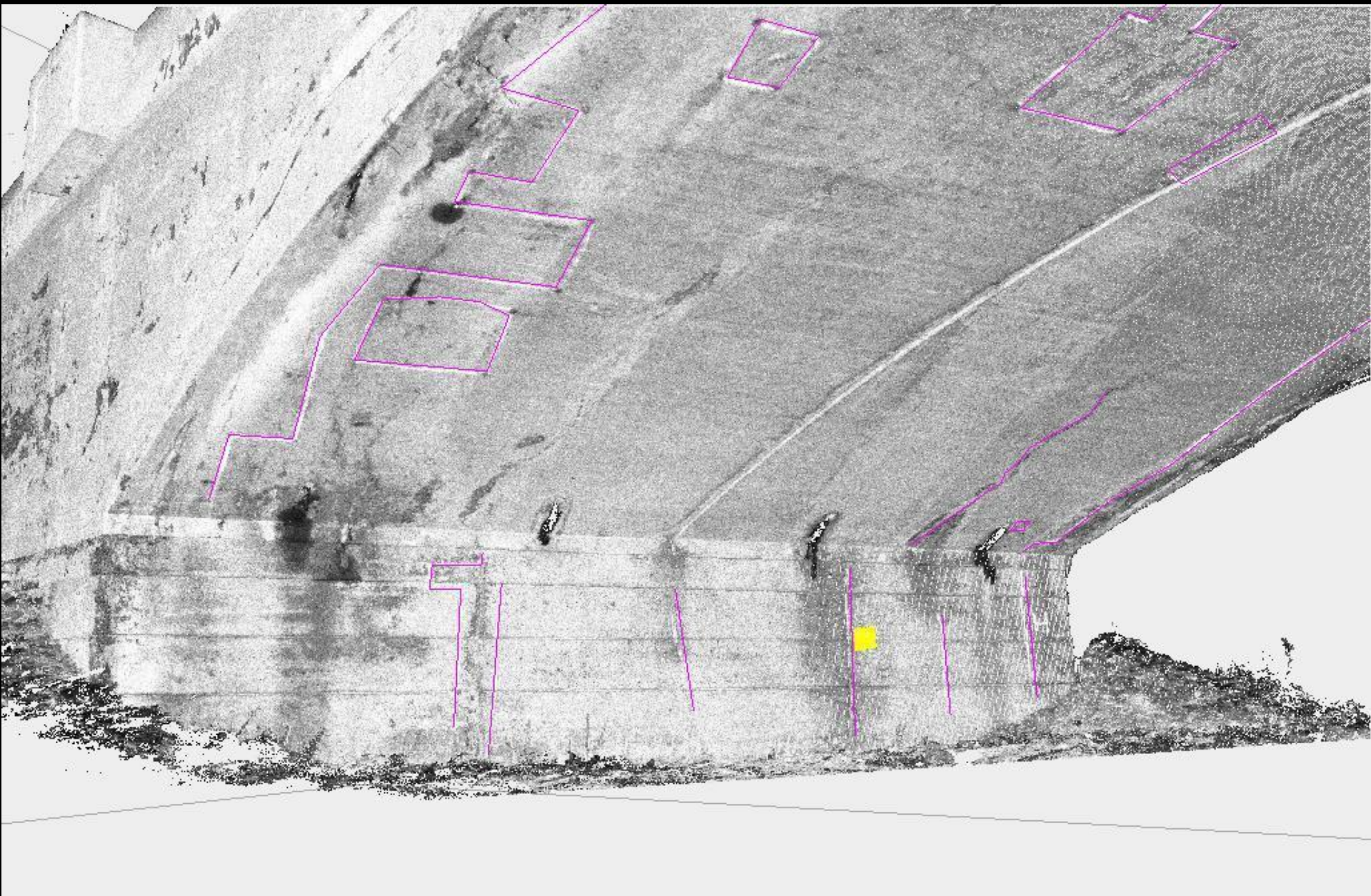
Full detailed inspection and testing program

- Best way to define repair scope & quantities to get the most accurate cost estimates

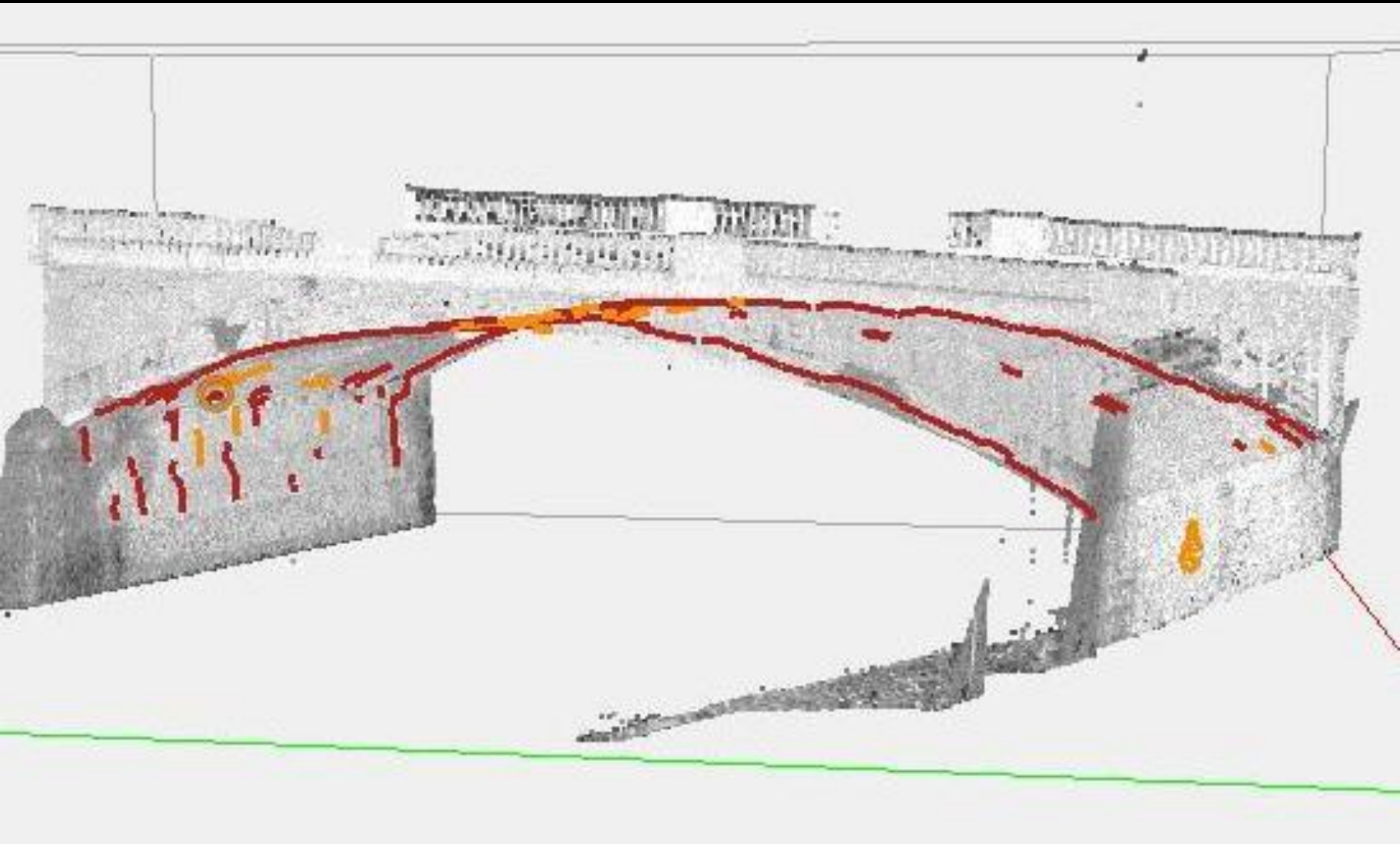
Reflective Markings from Sounding

LIDAR Scans – Data Mapping
(Light Detection and Ranging)

Desktop Compilation

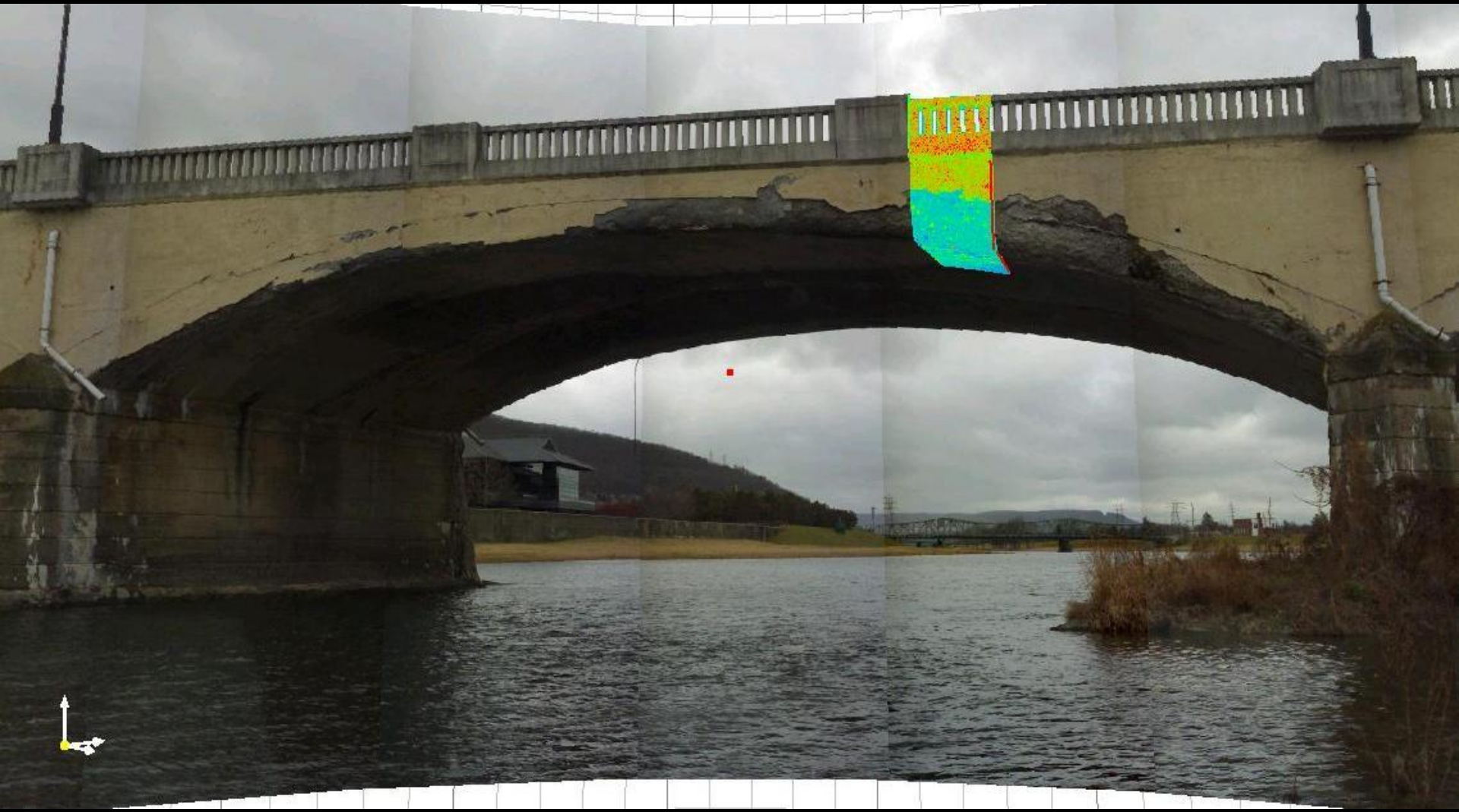


Assembling of Field Markings

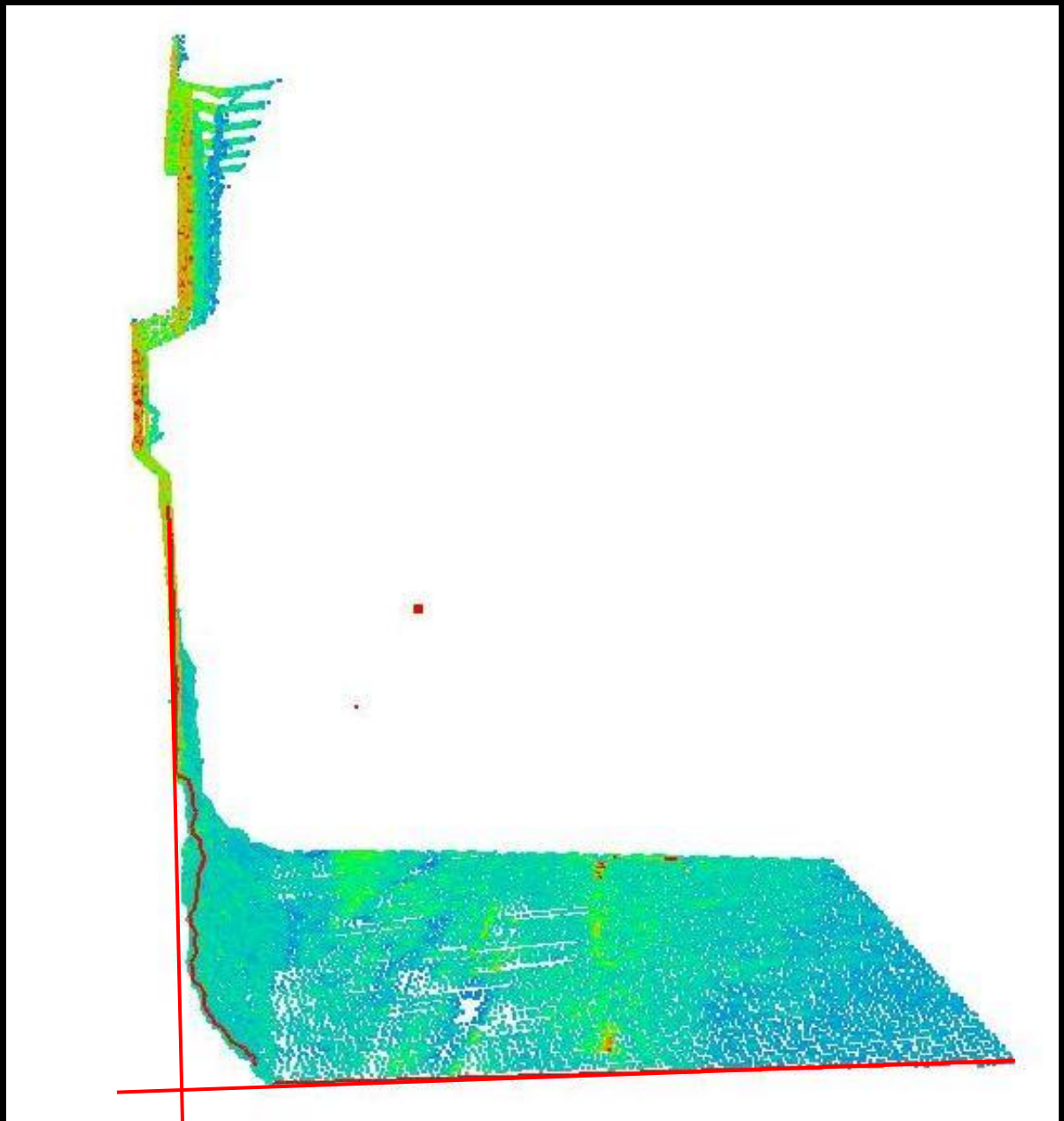


Rendering of Deteriorated Areas

Focused Area Investigation



Section Loss from 3-D Rendering



Impact Echo (NDT)

Concrete Coring & Testing

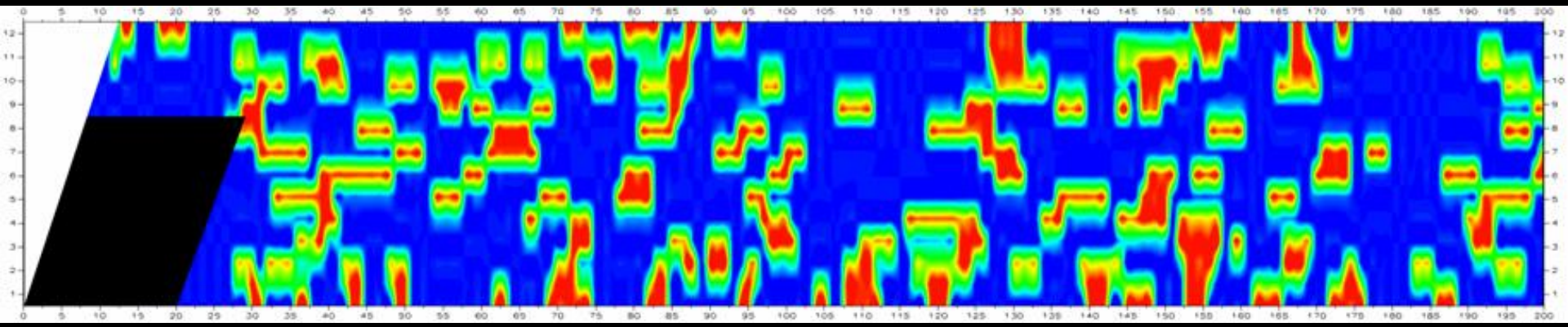
ASR In Petrograph Section

- Cracking
- Gel Formation/Aggregate Discoloration

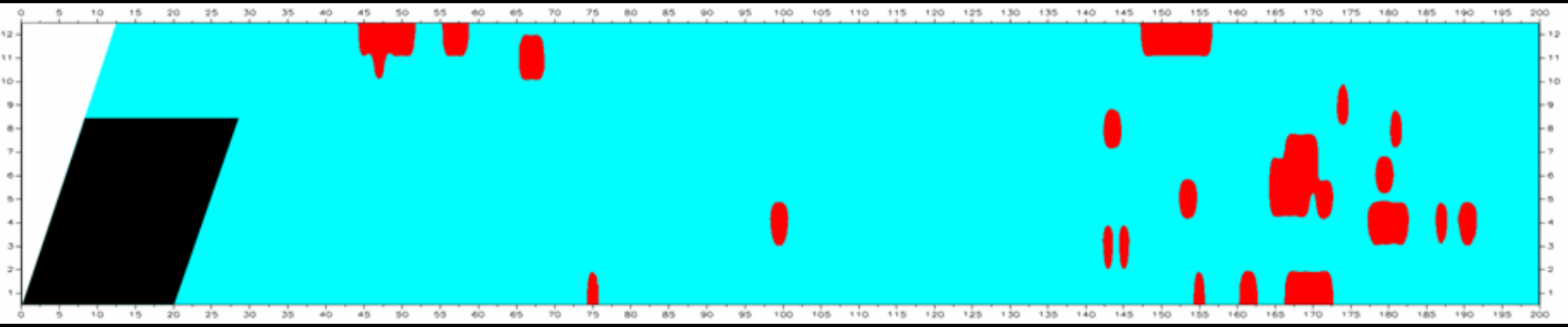
Spandrel Walls

Abutments and Piers

GPR on Deck

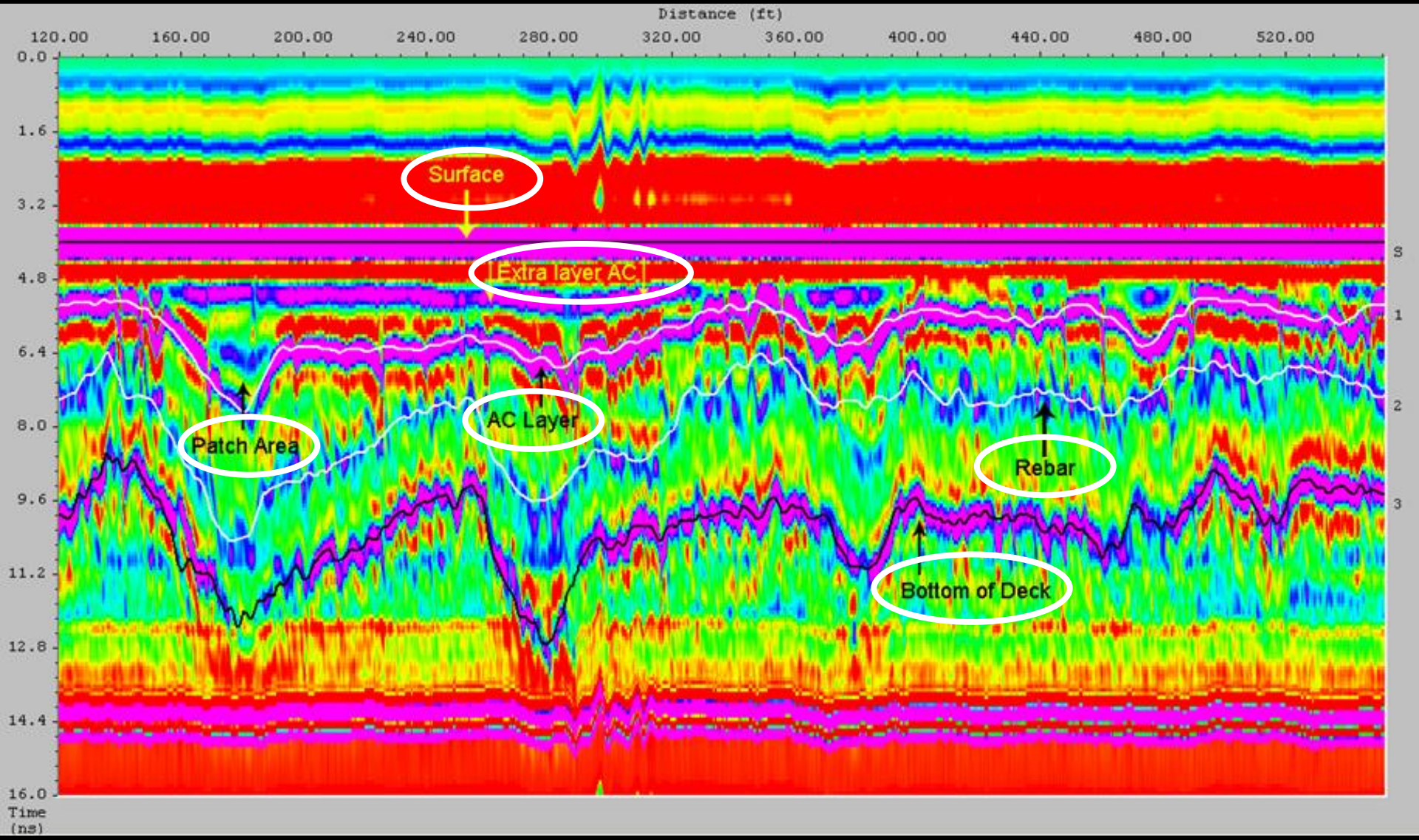


Delaminations/Voids



Surface Scaling
Conditions verified by concrete cores

GPR Section



440 ft. Longitudinal Deck Section

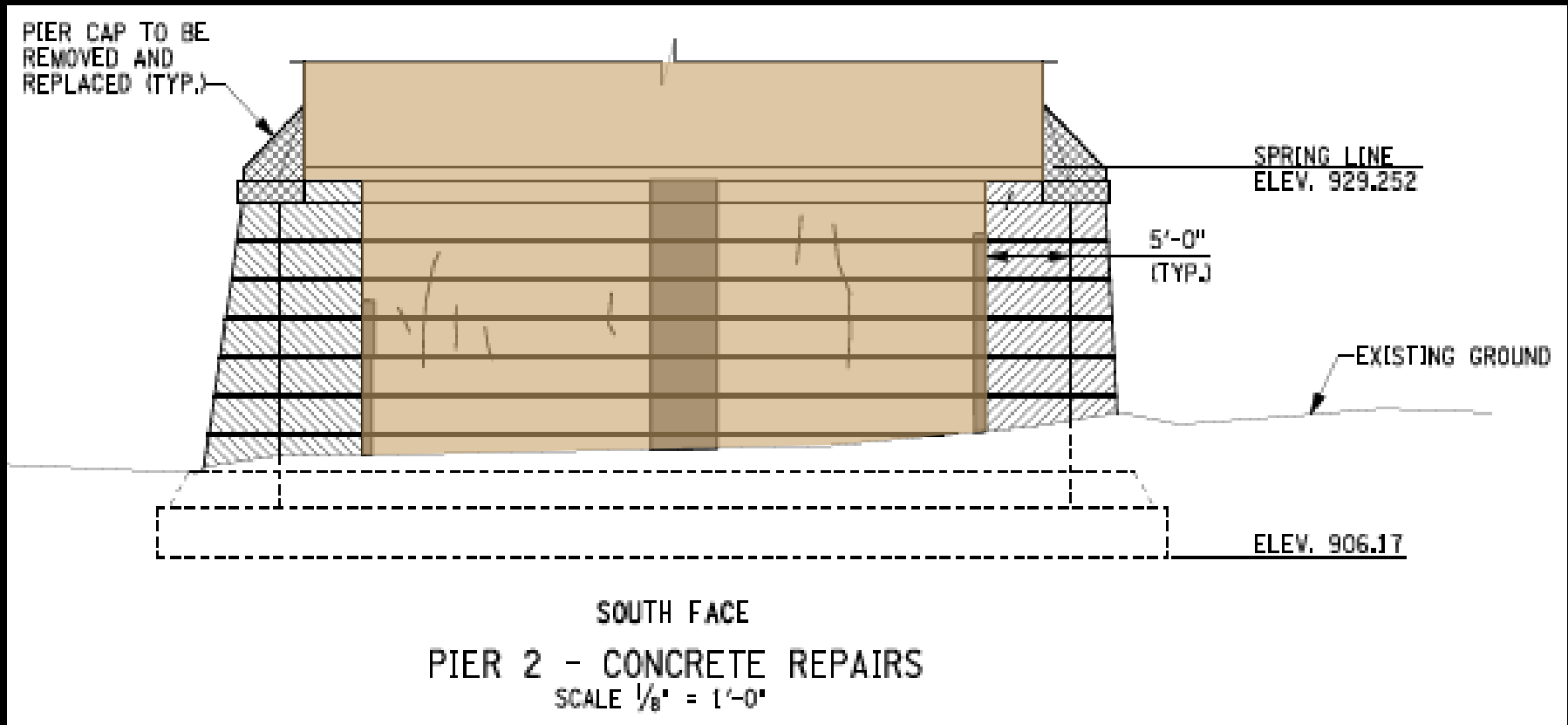
Condition Summary

- Concrete in Abutments, Wingwalls, and Spandrel Walls show spalling, advanced concrete degradation due to moisture retention from coating applied in 1989 due to Alkali-Silica Reaction (ASR).
- Concrete Arches were not coated, but exhibited advanced ASR, cracking, and some delamination.
- Complete loss of integrity from ASR. Restoration/overlay is not feasible due to condition.

Recommended: Rehabilitation

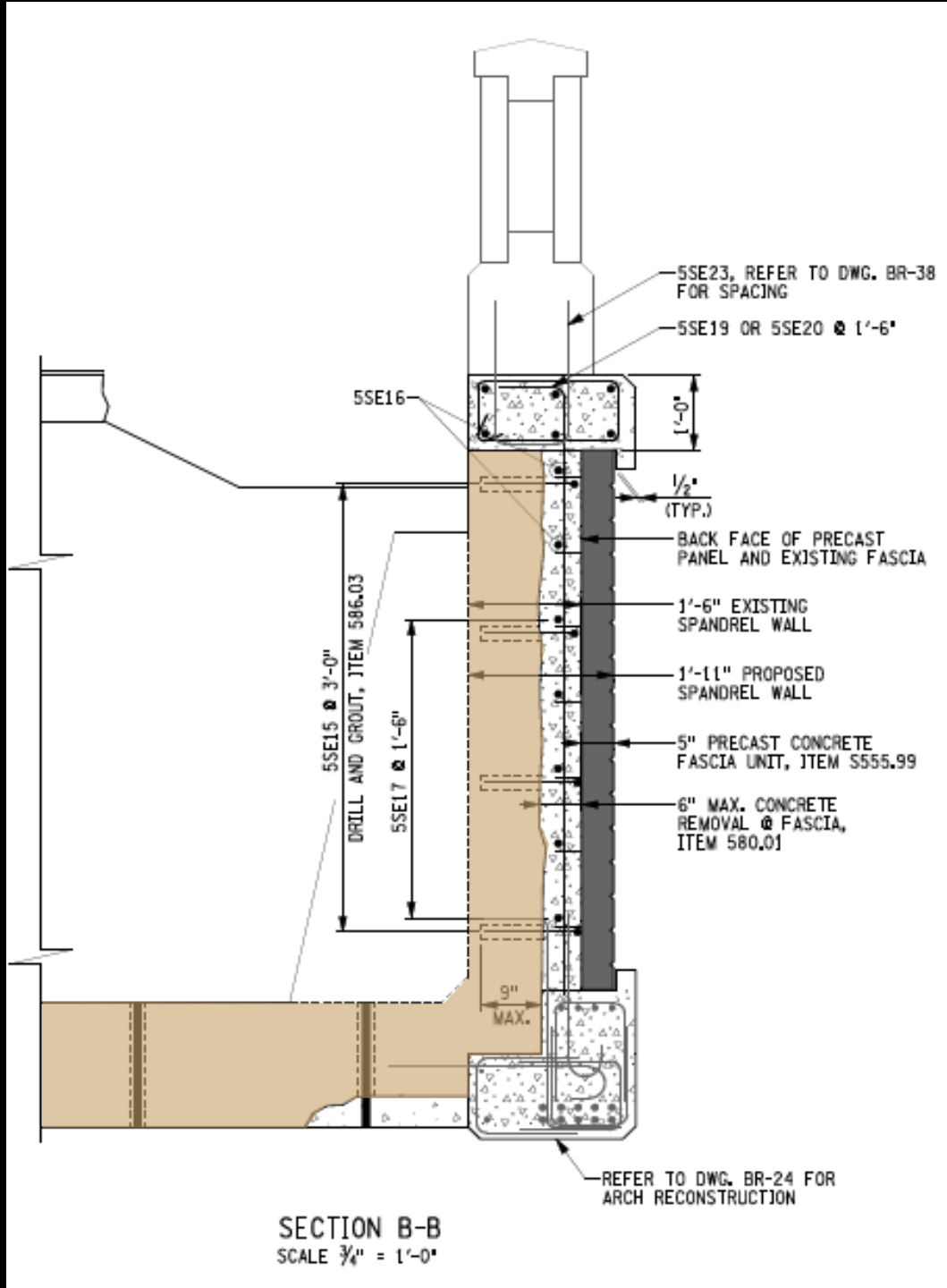
Piers and Abutments

- Rehabilitation at upstream/downstream ends due to spalling/cracking of surface.
- Repair cracks and perform partial depth concrete repairs; seal surfaces.



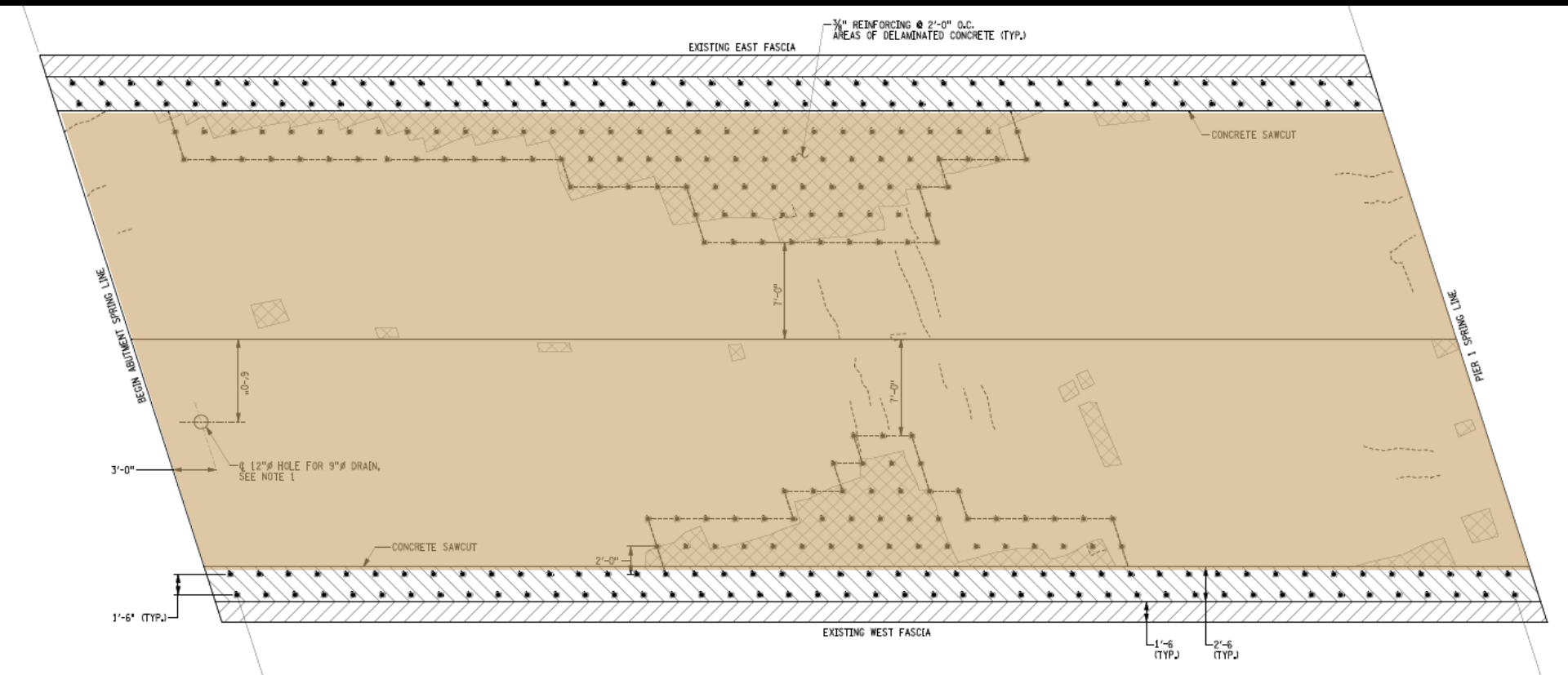
Spandrel Walls

- Resurface with Precast Panels and reinforce to obtain desired design life: minimum 25 years.
- Provide surface texturing in panels to evoke historic façade.
- Precast concrete parapets removed, stored and reset. Bump-outs removed and replaced in-line for new lighting.



Arch

- Isolate the arch from water infiltration with membrane;
- Strengthening recommended to maintain minimum 25 yr. life expectancy;
- Undersides: Repair cracks and perform partial depth concrete repairs as necessary.



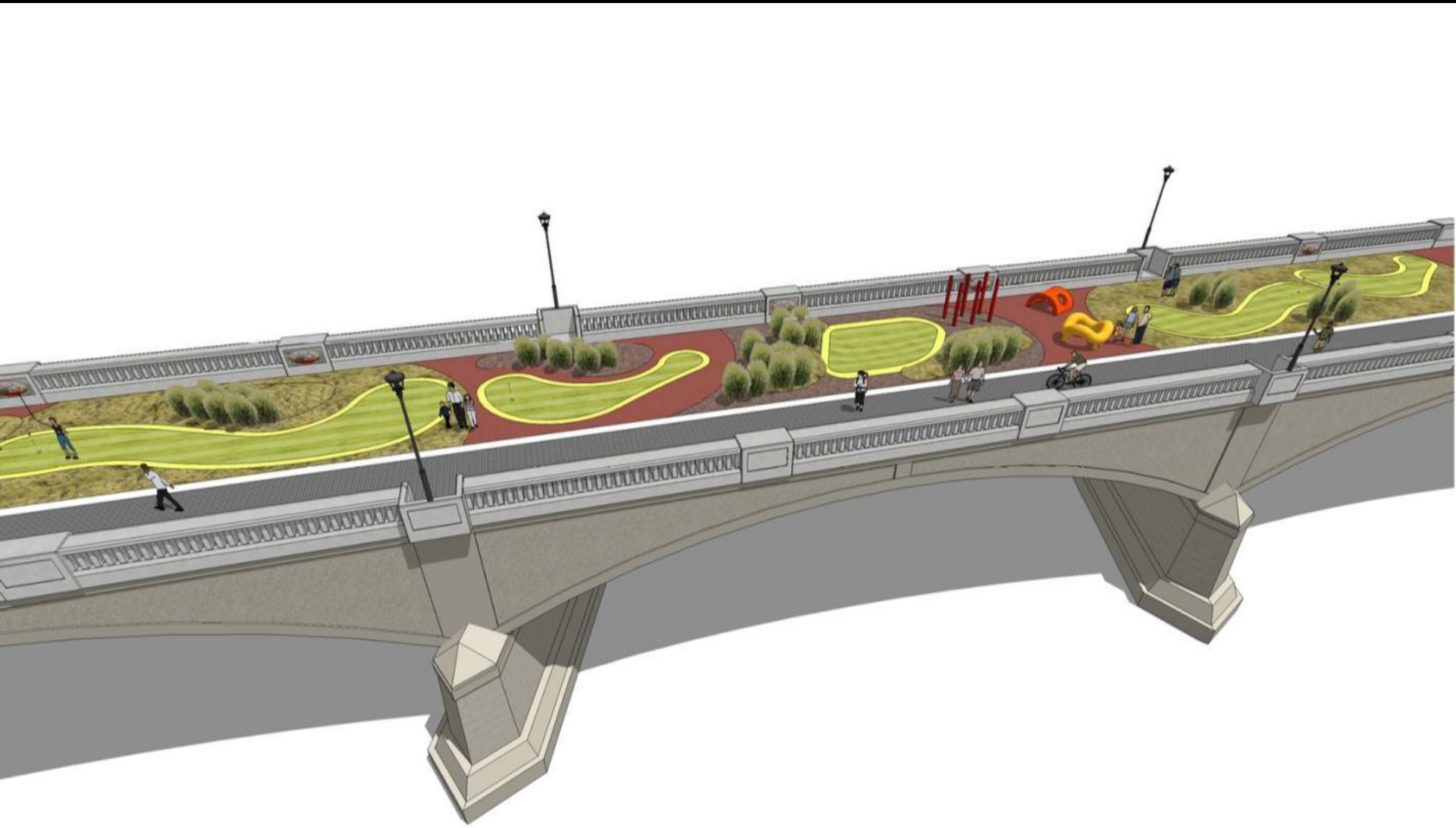
Deck

- Deck replacement recommended.

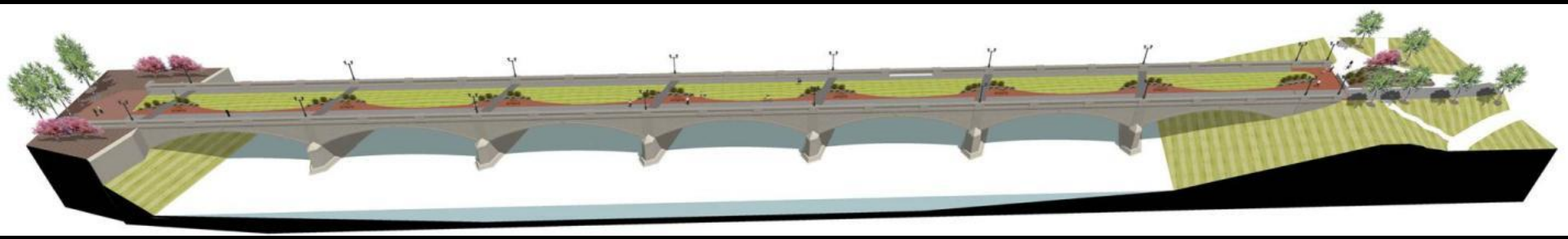
Deck Concepts: Garden and Walkway

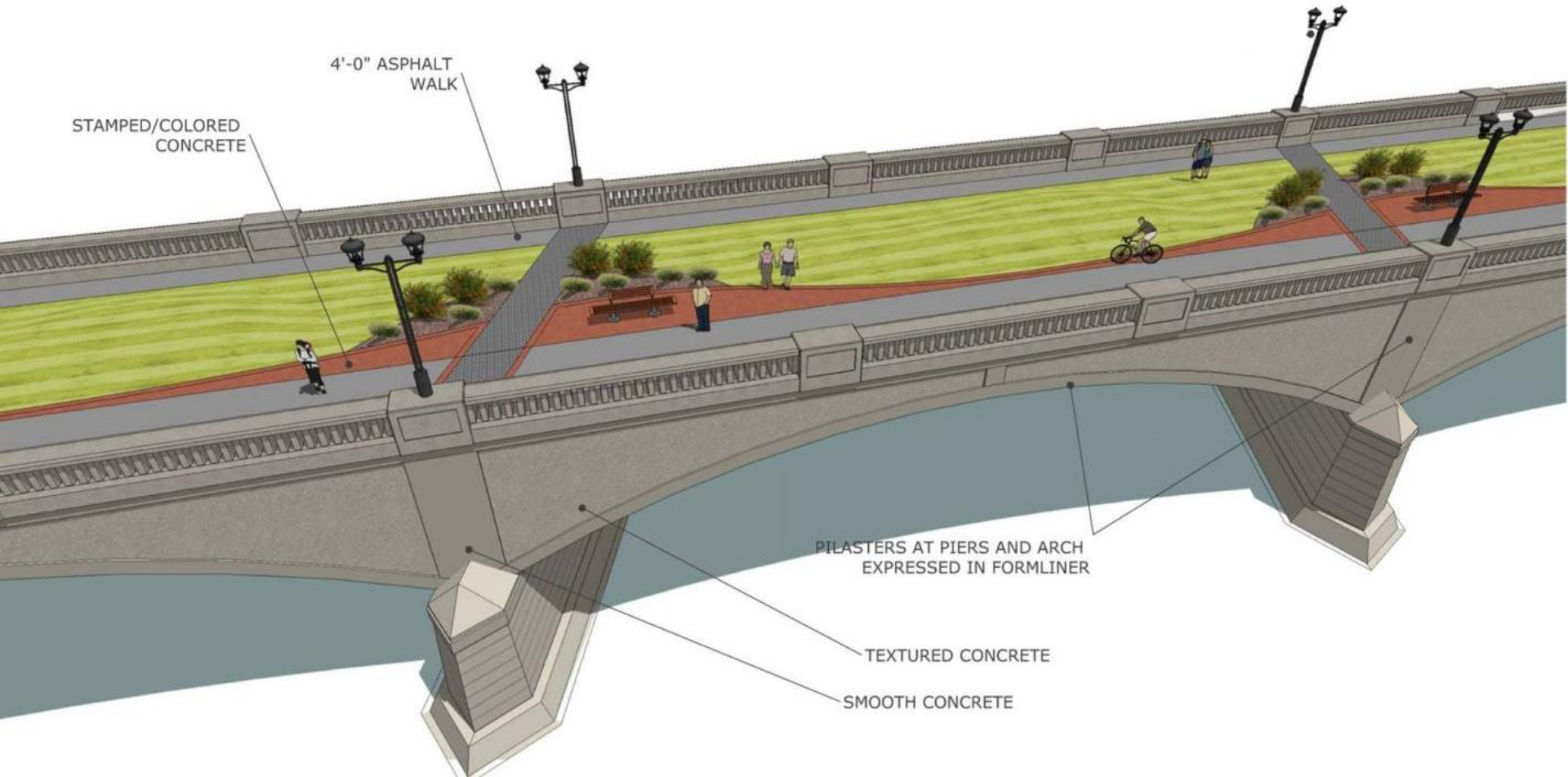
Deck Elements

Linear Putting Course

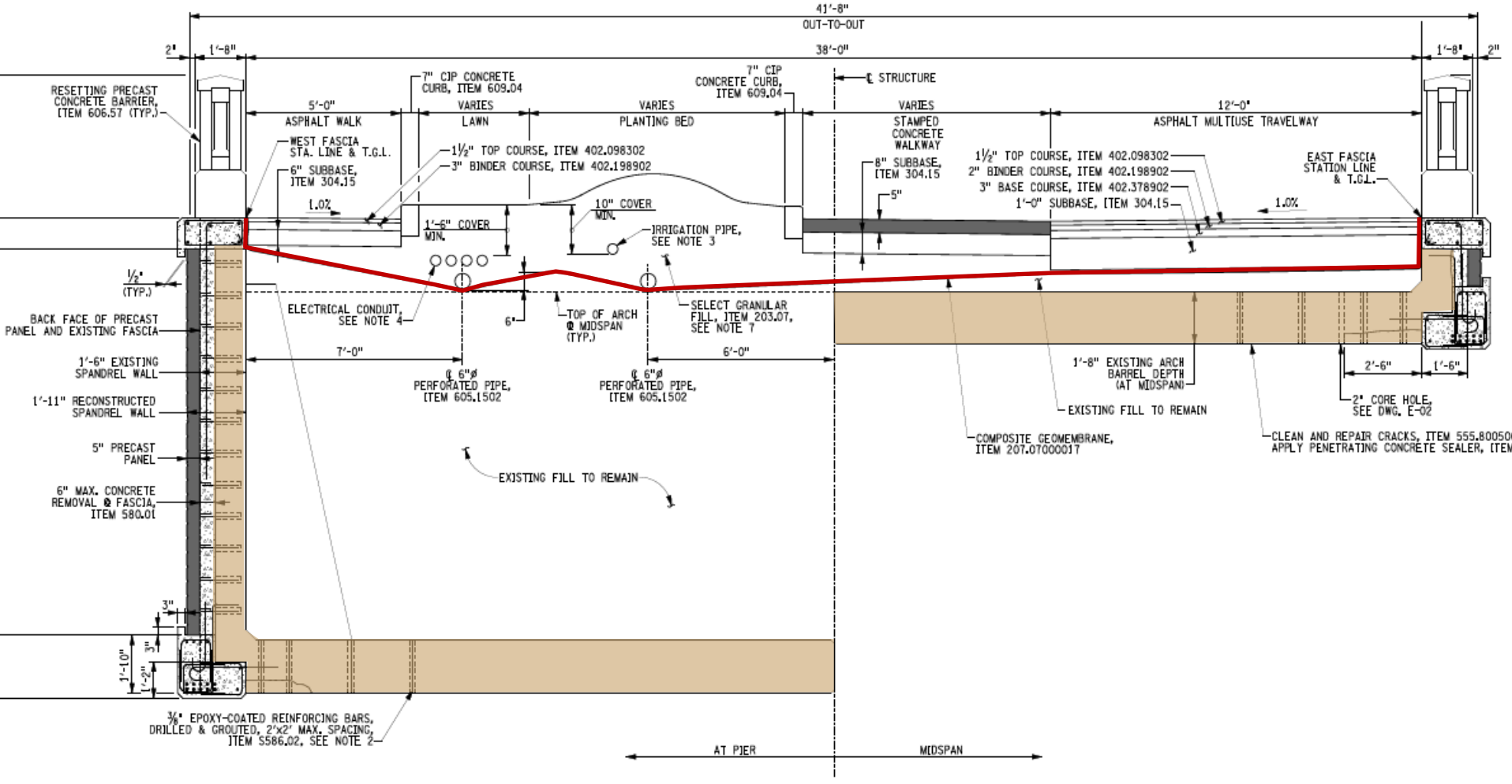


Final Design Renderings





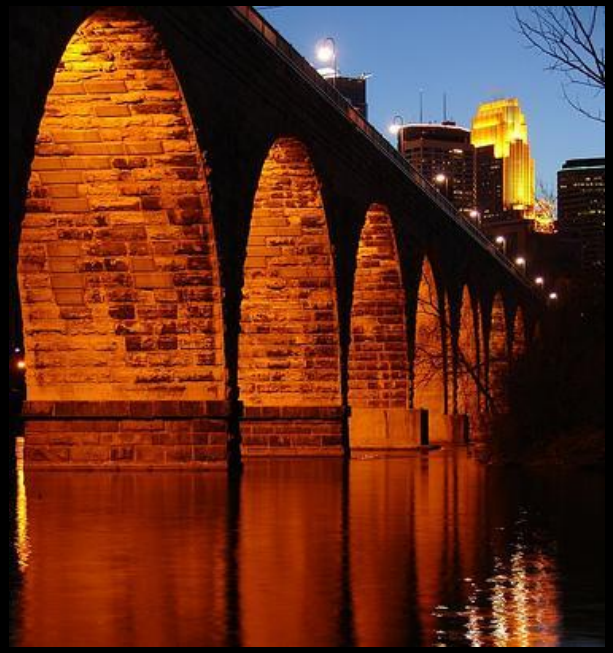
Design Bridge Section



Existing South Approach

Proposed South Approach

Bridge Lighting Concepts



Superstructure Rehabilitation

- Deck Removal
- Re-facing Spandrel Walls
- Replace Parapets
- Arch Reinforcement
- Deck Landscaping and Surface Treatments
- Re-facing Pier Ends
- Pier and Abutment Crack and Spall Repairs
- Application of Protective Coating over Walls and Arches

Project Costs

TOTAL = $5,834,729

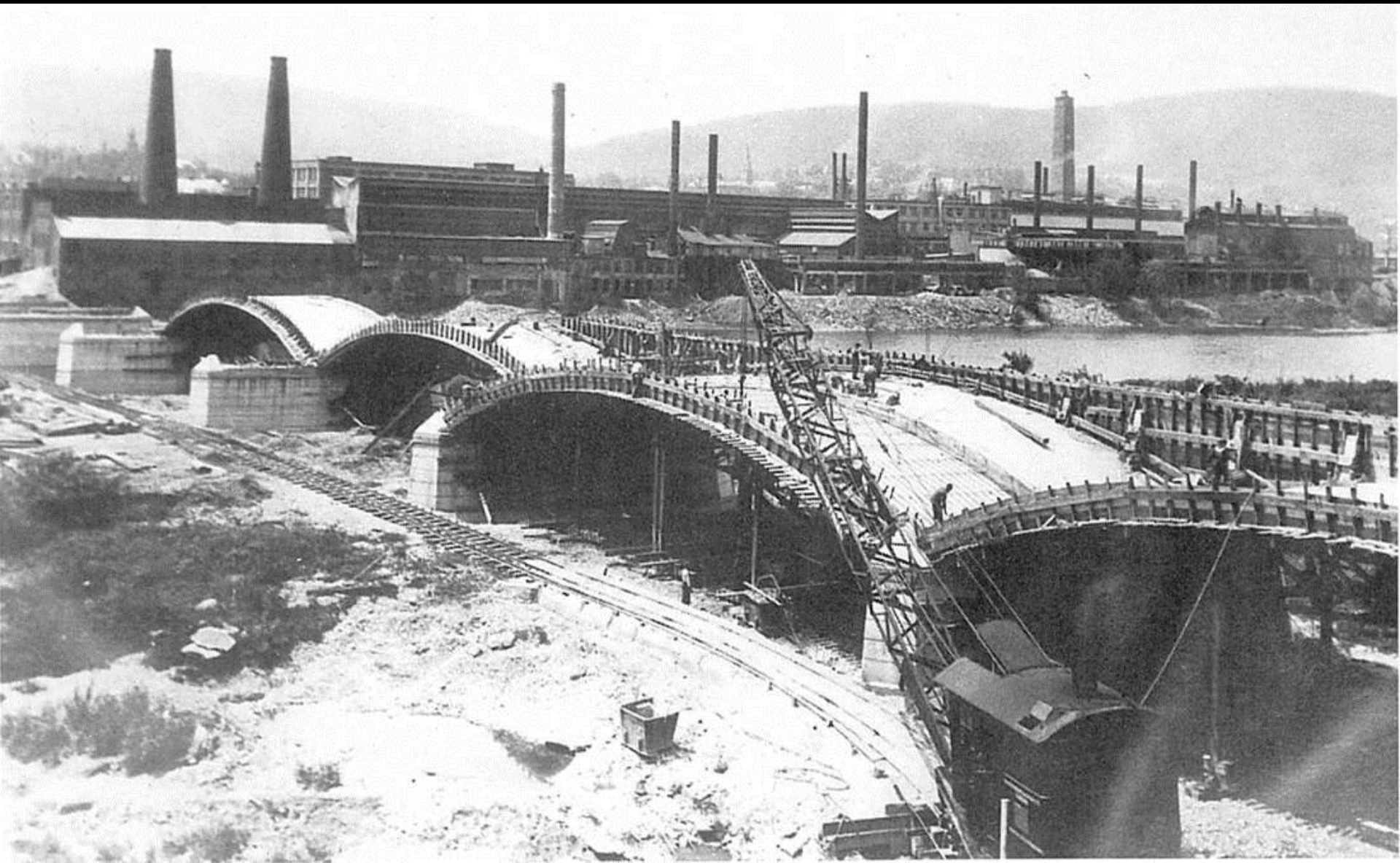
- Inspection, Investigation and Design: $554,321
- Construction Bid: $4,620,408
- Construction Inspection: $660,000

Construction Timeline

- Bid Advertisement – May 31, 2012
- Bid Opening – June 28, 2012
- Award – July 23, 2012
- Substantial Completion - August 1, 2013
- Final Completion - October 30, 2013

Construction Logistics

No Causeway Permitted



Deck Access


Piers 1-5
Scaffolding


Pier 6

Match Existing Texturing

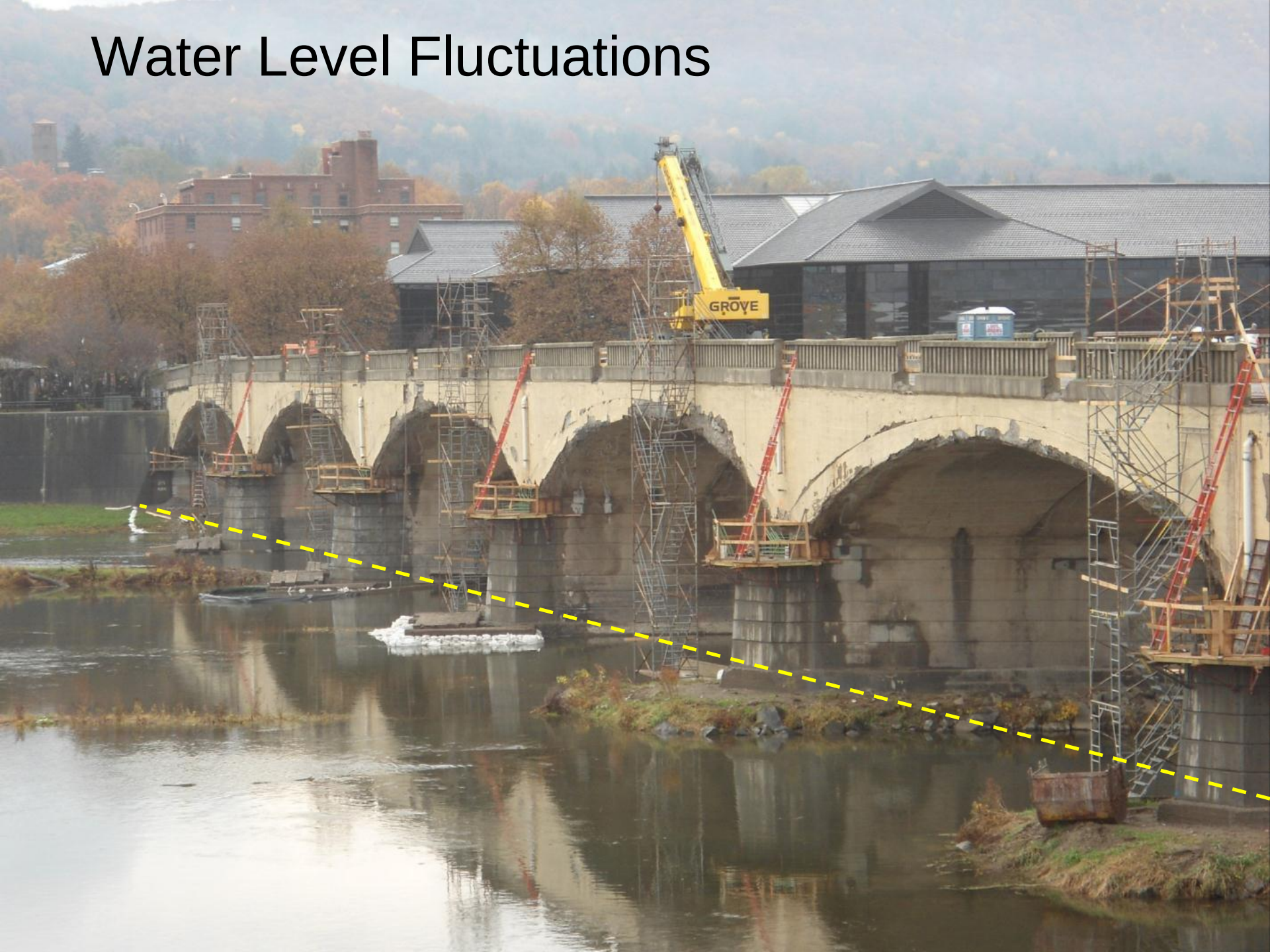
Noise Restrictions

CORNING

Pier Cap Reconstruction

Weather

Water Level Fluctuations




Sandy
10/30/2012 08:26

Prep for Underbridge Scaffolding

Underbridge Scaffolding Suspension

Underbridge Scaffolding

Underbridge Scaffolding

Winter Arch Construction

Concrete Arch Beam

Arch Reinforcement

SCC Concrete

Vacuum Injection Crack Repairs

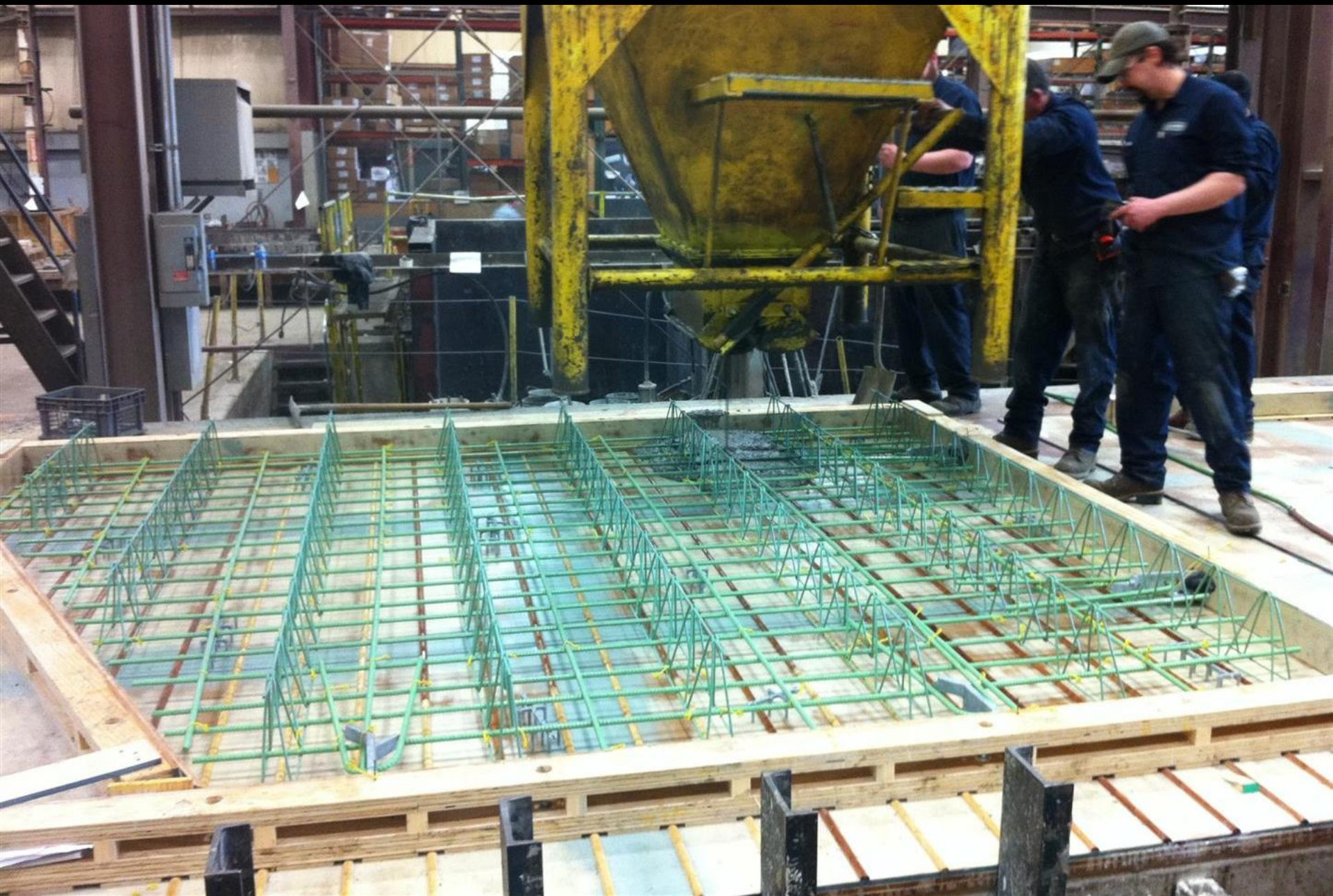
Parapet Removal

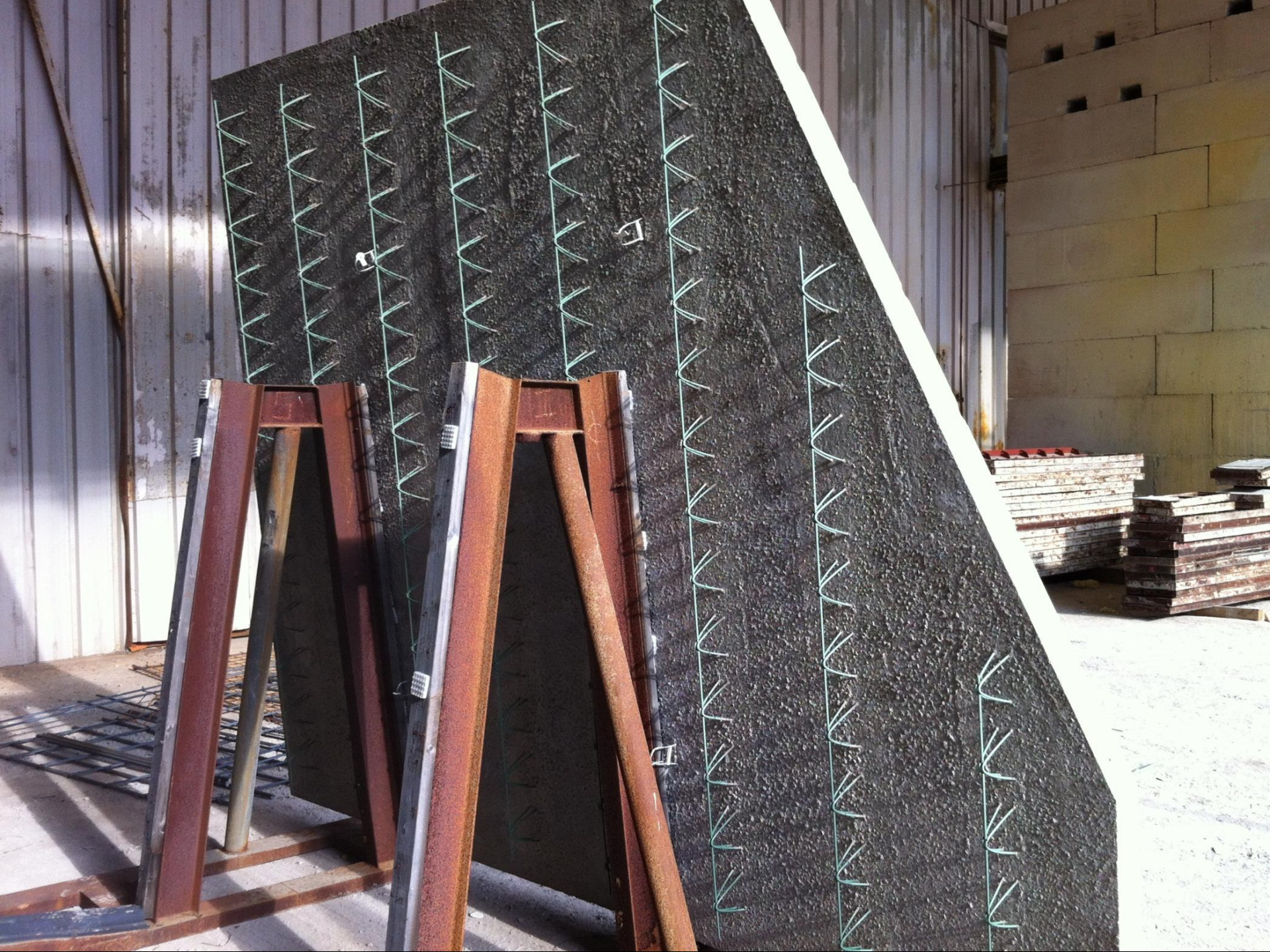
Spandrel Walls

Prep for Precast Spandrel Wall Panels

Wall Reinforcement

Precast Panels





Precast Panel Fit-up

Parapet Construction

Membrane, Drainage & Electrical

Completed Bridge Elevation

Deck Treatment

Aerial Overview Looking South

Aerial Overview Looking SW

Center Span Maze

Grand Opening Celebration

Project Acknowledgements

City of Corning Office of Planning

Steve Dennis, Director of Planning

Fisher Associates PE, LS, LA, DPC Consulting Engineers

Joe Logan, P.E., Principal Structural Engr.

Roseann Schmid, P.E., Project Manager

Emily Smith, P.E., Design Engineer

Don Freeland, Resident Engineer

Trowbridge & Wolf (Landscape Arch.)

Pathfinder – (Electrical)

Ravi Engineering – (Construction Inspection)

Sara Parsons, Inspector

New York State DOT, Region 6

Brian Kelley, P.E. – Regional Director

Brent Rauber, RLPL

Additional Project Sponsors

Corning Inc.

Corning Gaffer District

Contractor

CP Ward, Inc.

Questions?