37TH INTERNATIONAL NO-DIG FLORENCE 2019

Fortezza da Basso • FLORENCE (Italy)

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Spray Applied Lining Systems Address Unique Infrastructure Problems

Karl Bissinger, Chairman of the Board, Vortex Europe AG

VORTEX europe ag
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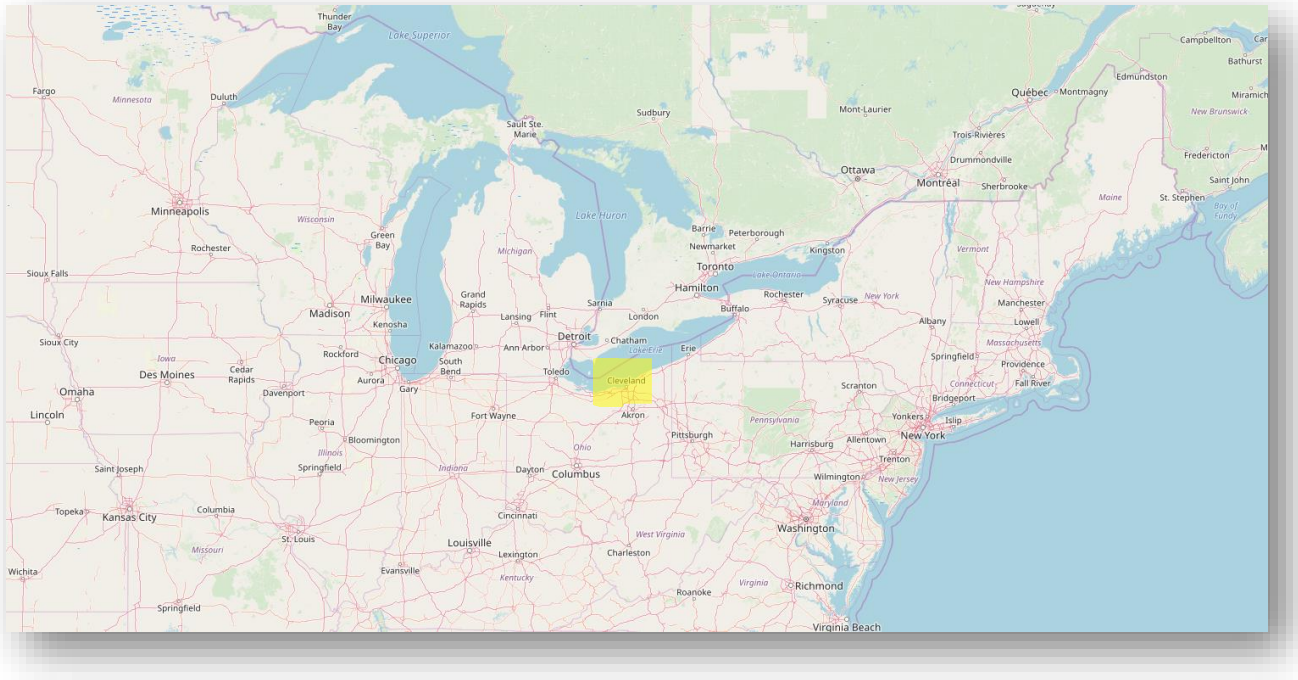

Site location – Lakewood, Cleveland, Ohio

PROJECT

- Lakewood, Cleveland, Ohio
- Manhole 40m deep
- Culvert 110m long
- Constructed 1912 – 1915
- Brick construction

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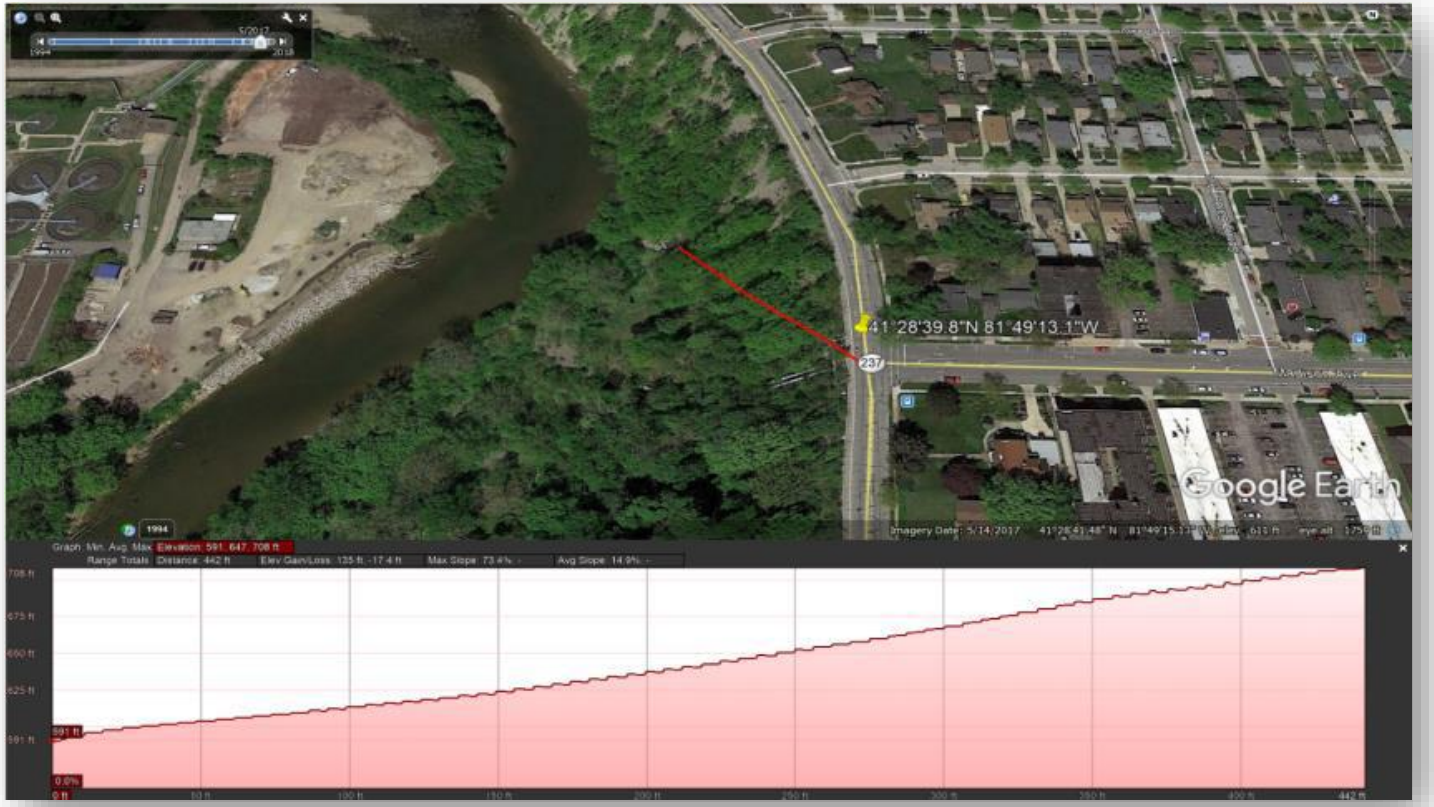

CHALLENGE LOCATION

- Traffic maintenance
- Manhole on T-intersection

Site location – centered in traveling lane of a T-intersection

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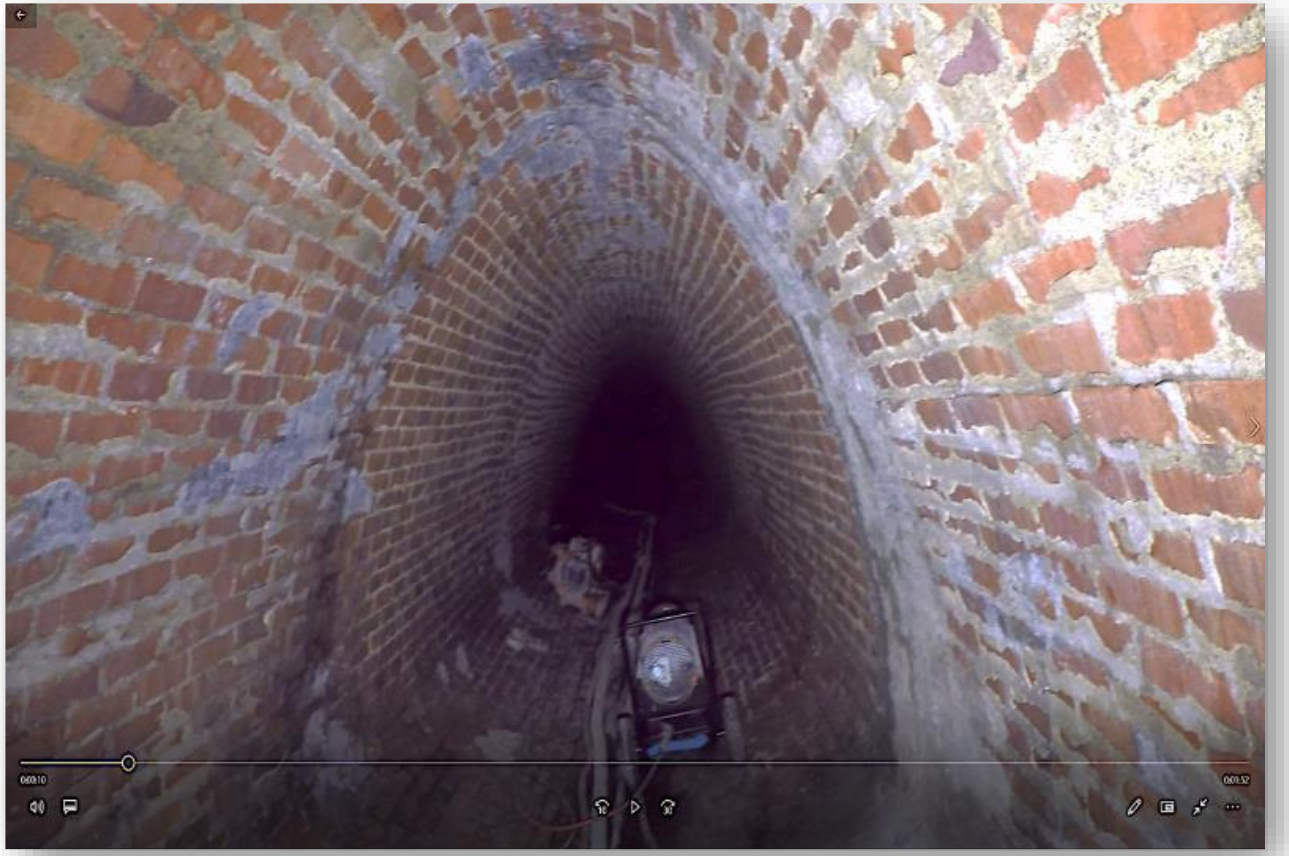

Heater in Pipe

SPECIAL REQUIREMENTS

- Rain, snow, high winds …
- Very low temperatures
- Additional heating system requested

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Interior of Manhole at the Base

MANHOLE

- Brick construction
- Depth 40m
- DN 1200 – 2400
- Diameter increasing to bottom

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CULVERT

- Brick construction
- Length 110m
- Height 2.0m
- Width 1.7m
- W egg-shaped

Brick culvert

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Outfall - Rain event

OUTFALL

- At bottom of steep river embankment
- Extremely difficult to access

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GeoKrete® Geopolymer spray application

WHY GEOPOLYMER SPRAY LINING?

- Extraordinary depth
- Age of construction
- Shape of culvert
- Soil, traffic and hydraulic loadings on manhole
- Significant abrasion due to flow changes

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Manhole Access Structure

WHY GEOPOLYMER SPRAY LINING?

- Excellent long-term performance (50+)
- Resisting inflow & infiltration (I&I)
- Withstanding deicing salts!
- Applicable from pH0 – pH14
- Highest freeze-thaw resistance
- Comfortable handling and application
- **Full structural rehabilitation**

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Manhole Original Condition

APPLICATION PROCESS

- Basket attached to a winch and crane to hold the crew
- Lowered into the manhole to spray apply and hand trowel the geopolymer mortar
- Section completed - crane operator lowers basket to next stage
- This step was repeated throughout the process

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Manhole Structural Lining Completed (View from the bottom up)

RESULTS

- 23 working days
- A month ahead of schedule
- Manhole and culvert completely restored
- Full structural integrity
- Another 50+ years of corrosion-free service

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CULVERT renovation

- Spray apply
- Patented spray head

Brick culvert

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KEYS TO SUCCESS

- Sophisticated engineering and design methods

Pipe Structural Lining Completed

- Selection of right material
- Outstanding compressive strength
- Proper application under harsh conditions

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