

Multiple Manhole Rehabilitation Technologies for a Shutout Win Against I&I



UNDERGROUND CONSTRUCTION TECHNOLOGY
THE UNDERGROUND UTILITIES EVENT | February 7-9, 2023 | Orlando, FL



Agenda

- **NTMWD Overview**
- Project Overview
- Manhole Inspections
- Analysis & Prioritization
- Rehabilitation Alternatives
- Construction



NTMWD VISION, MISSION AND GOALS

VISION: Regional Service Through Unity – Meeting Our Region’s Needs Today and Tomorrow

MISSION: Provide high quality and dependable water, wastewater and solid waste services in a cost efficient manner

Goal 1: Service Provide superior water, wastewater and solid waste services today and tomorrow.

Goal 2: Stewardship Responsibly manage public resources to ensure responsiveness, effectiveness and efficiency.

Goal 3: Partnership Actively work with members, customers, partners, employees and stakeholders.

Goal 4: People Build a talented, competent and committed team.



Regional Provider: Water, Wastewater, Solid Waste



BY THE NUMBERS

DID YOU KNOW?



SERVE up to **80** COMMUNITIES

Service area of 2,200 square miles in 10 counties

Serving 2 million people in one of the fastest-growing regions in the country



18

MAJOR RAW & TREATED WATER PUMP STATIONS

6

WATER TREATMENT PLANTS
876 MGD Capacity
(million gallons/day)

610+
MILES

WATER TRANSMISSION PIPELINES



226+
MILES

LARGE-DIAMETER WASTEWATER PIPELINES

13

WASTEWATER TREATMENT PLANTS

163+
MGD

WASTEWATER TREATMENT CAPACITY
MGD (million gallons/day)



3 TRANSFER STATIONS

up to 3,370 tons of solid waste/day

around **1 million**

tons/year accepted at landfill



Rev. July 2022

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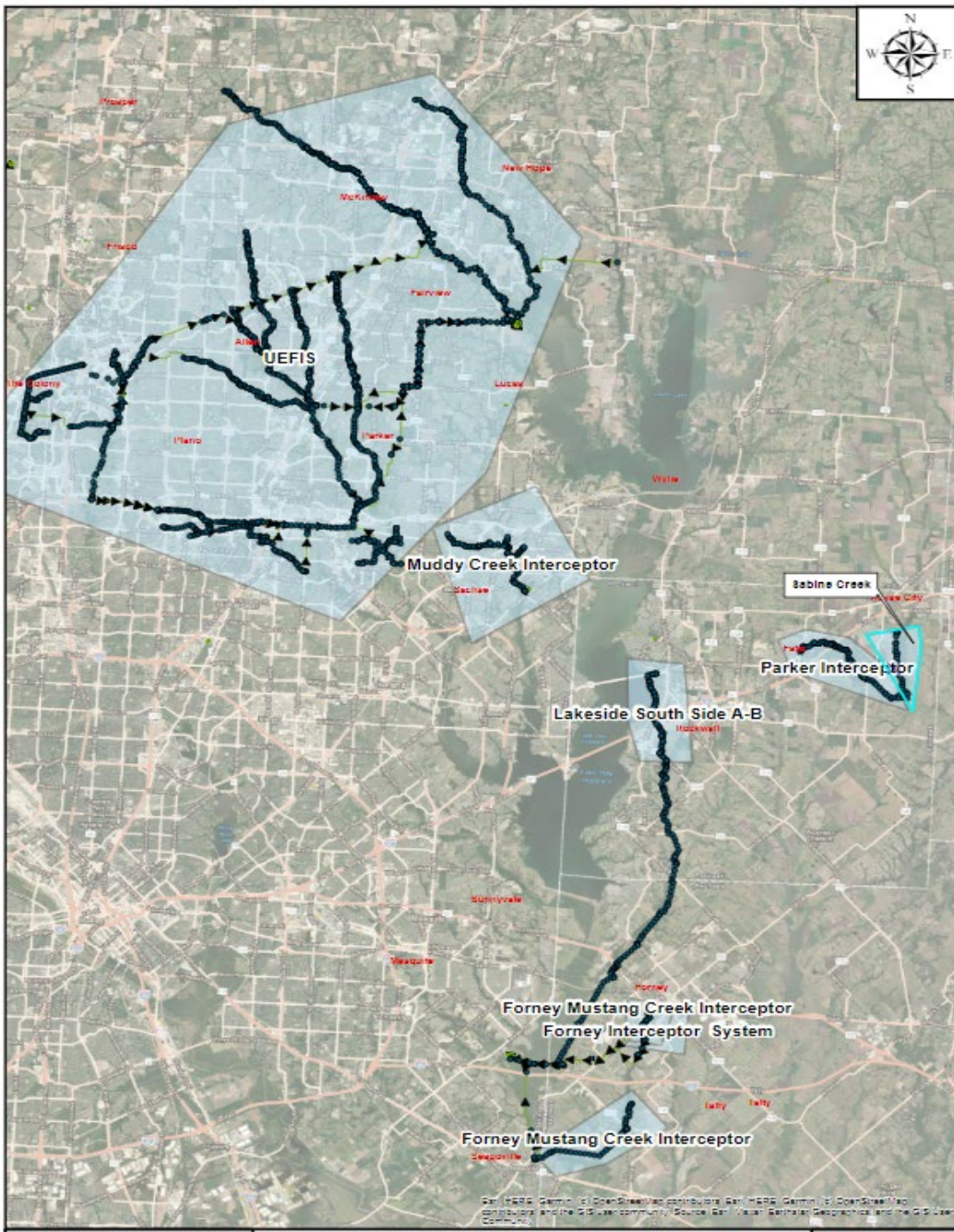


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2018 Manhole Improvement Project Overview

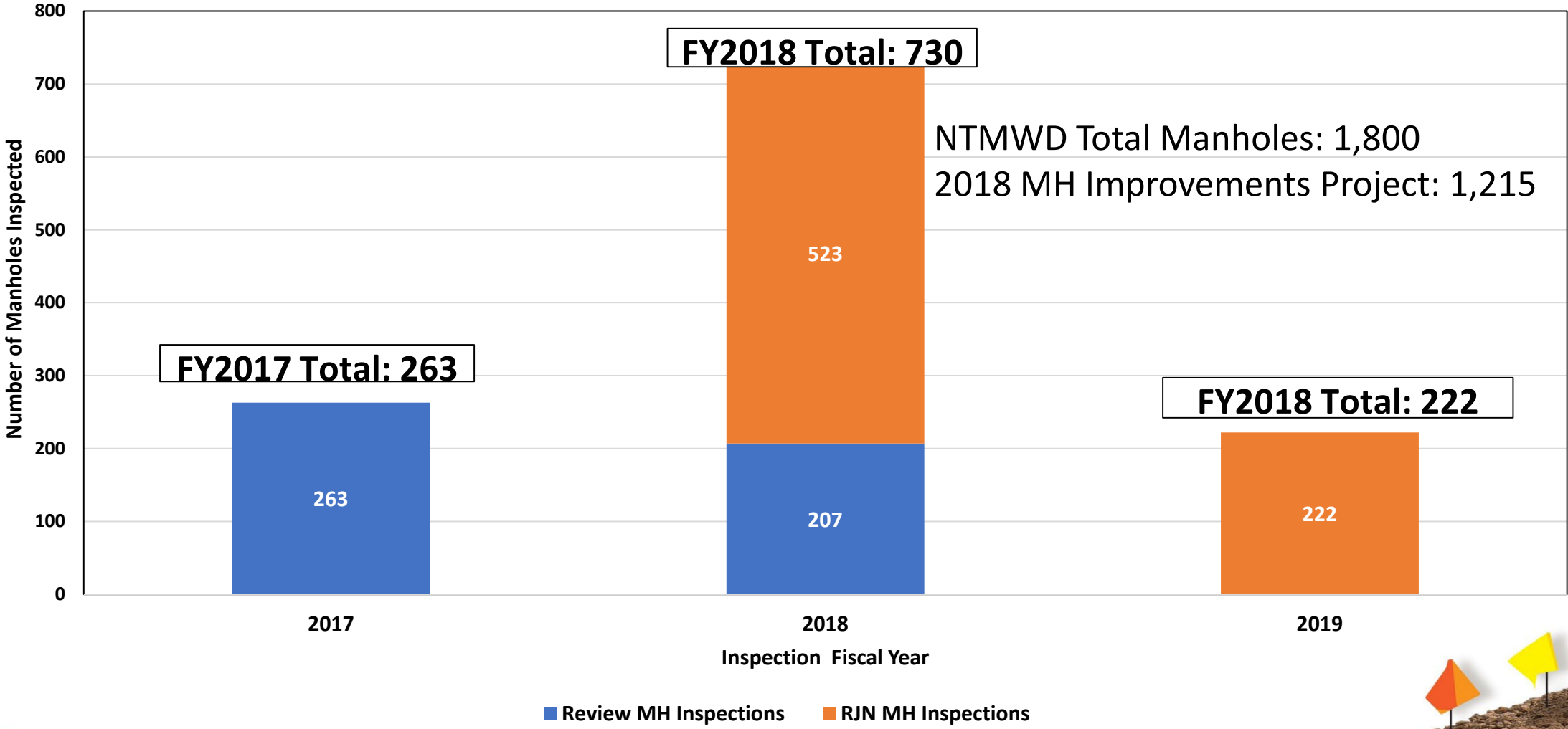


Project Overview

- Survey & MACP condition assessment: 745 manholes
- Review 470 previous manhole inspections
- Final design services of prioritized manhole recommended improvements
- Bid phase services
- Construction phase services



NTMWD Manhole Condition Assessments



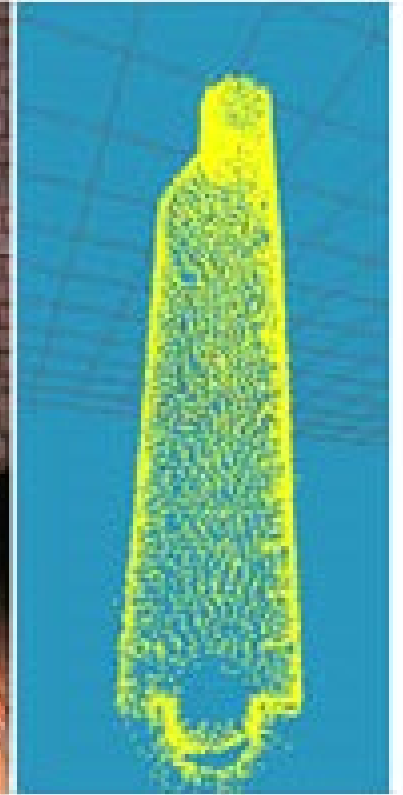
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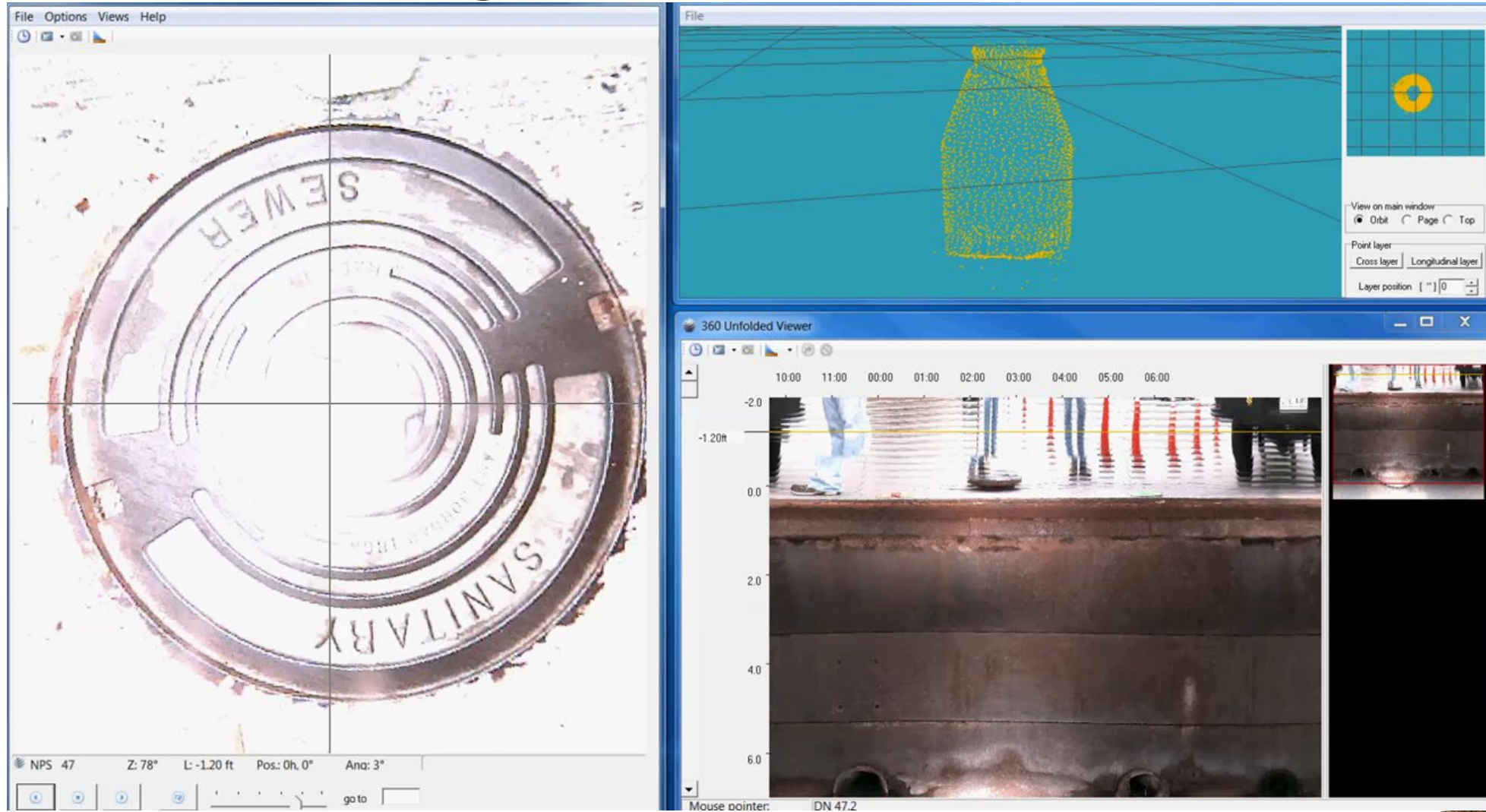


Inspection Techniques

- NASSCO MACP v6
- 3D manhole scanning



3D MH Scanning



Typical Defects Observed



Infiltration Runner – MACP Score 5



Surface Aggregate Missing – MACP Score 4



Typical Defects Observed



Surface Aggregate Visible – MACP Score 3



Infiltration Weeper – MACP Score 2



Typical Defects Observed



Surface Aggregate Projecting – MACP Score 3



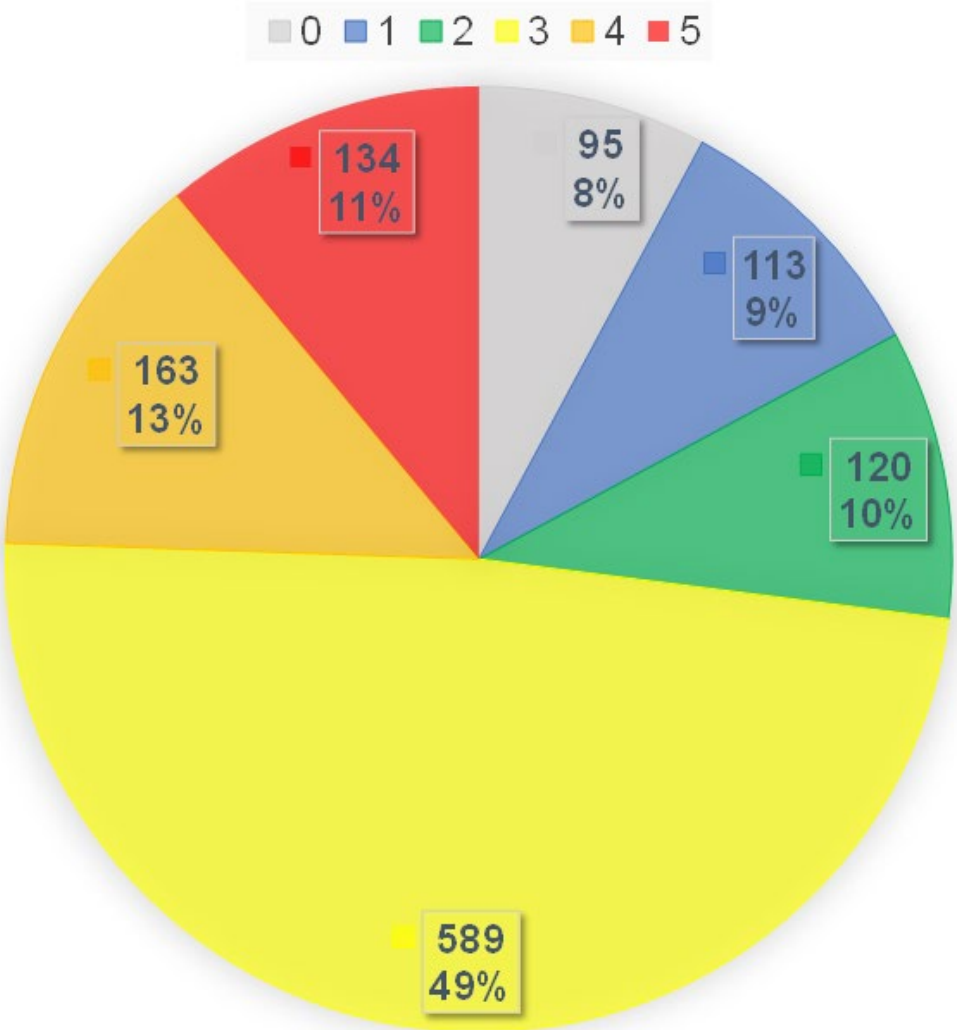
Surface Aggregate Projecting – MACP Score 3

Manhole Inspections Results

Observation	Observation Count
Broken/Holes	53
Cracks/Fractures	270
Deposits/Obstructions	891
Active/Evidence of I/I	2,942
Defective Joints	213
Coating Failures	923
Roots	93
Repairs	89
Observed Corrosion	4,059



Manhole Inspection Ratings



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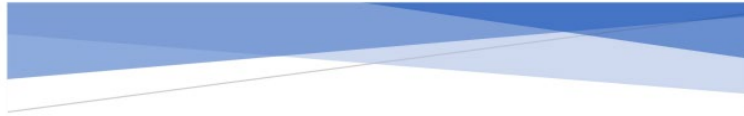
Analysis/Prioritization

- Analyzed for I/I, structural condition
- Established initial prioritization via NASSCO MACP

Peak Defect Score & GPD of I/I



Inflow and Infiltration Analysis



NASSCO MACP
DEFECT ANALYSIS
Inflow/Infiltration Defect Rate Application

$$Q = CdA\sqrt{2gh}$$

Orifice
Equation

Approx. 2.8
MGD of I/I

Estimates
developed per
component

Observed active
I/I



Final Prioritization

- Priority 0 • No MACP Defects or Deposit Type Defects
- Priority 1 • MACP Score 1 or Vented Covers w/no Defects
- Priority 2 • MACP Score 2
- Priority 3 • MACP Score 3
- Priority 4 • MACP Score 4
- Priority 5 • MACP Score 5

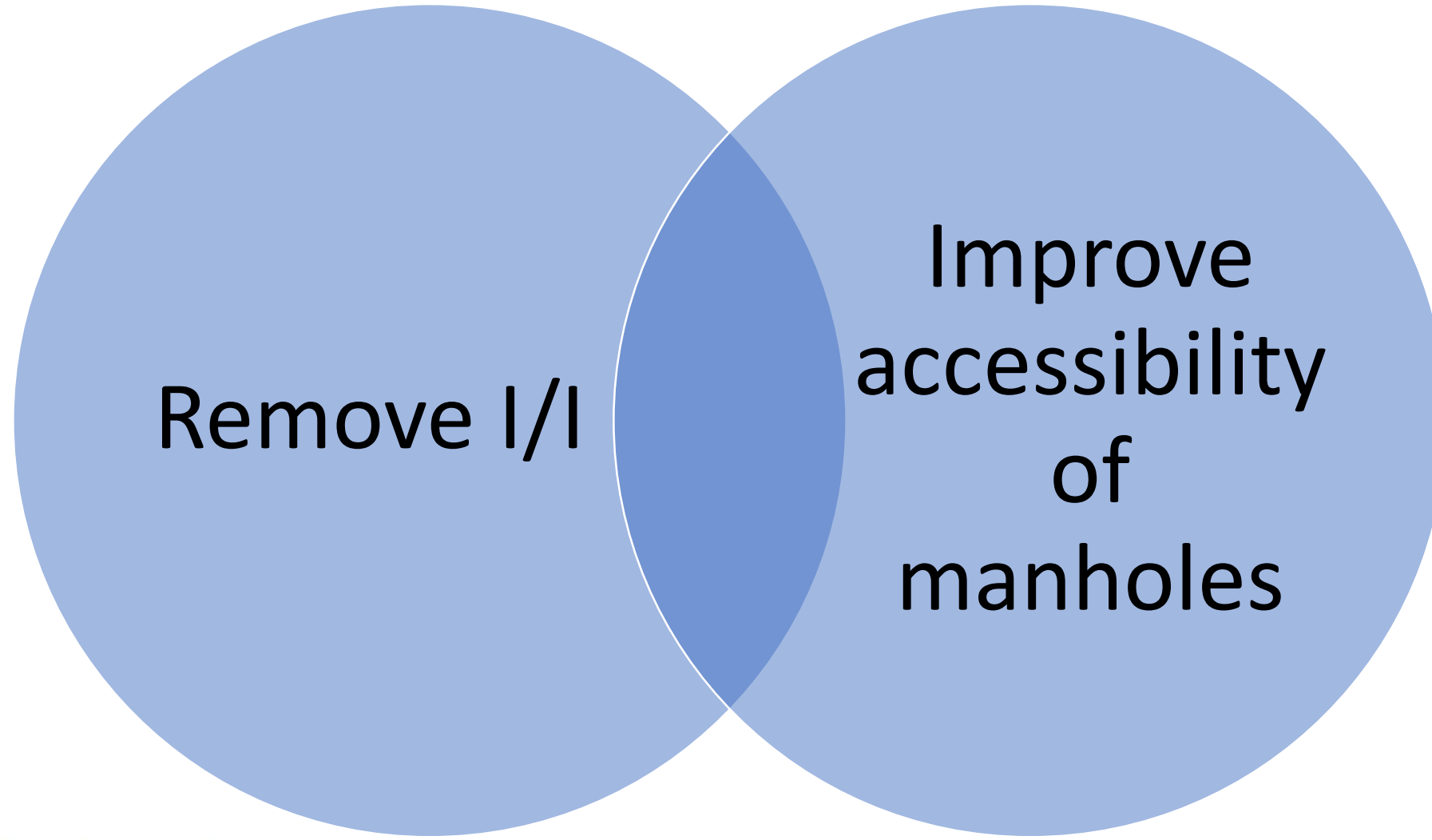


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Rehabilitation Goals



Rehabilitation Alternatives

Replace
manholes

Rehabilitate
manholes

Increase MH
cover diameter

Coatings

Inserts

Composite
Covers

Design Decisions

Increase MH
cover diameter

- Composite covers to prevent corrosion

Two-part
coating system

- Cementitious layer
- Epoxy layer

Inserts

- Polymer manhole inserts (trial)

Bid Package

- Base Bid, Alternates 1 & 2 for manholes; Alternative 3 for point repairs
- Approximately 500 manholes:
 - 485 covers upsized
 - 8,286 vertical feet of coating
 - 125 vertical feet of polymer insert
 - Injection grout for 75 manholes



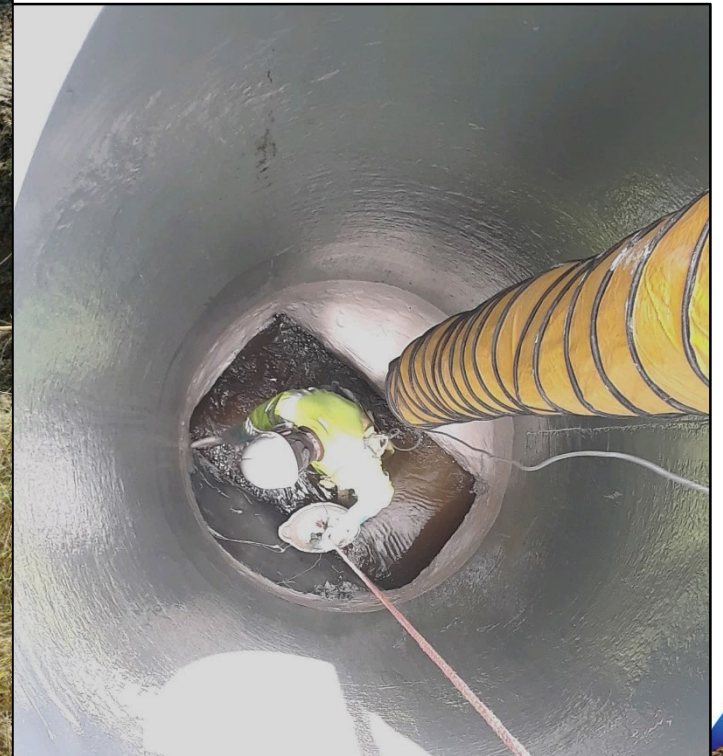
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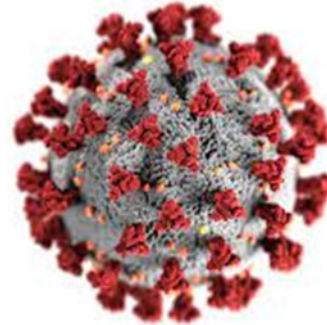
Construction

- Contractor proposed fiberglass inserts in lieu of lining/coating



Construction

- Began April 2020
- COVID-19 Pandemic impacts
- Reduced scope: 41 MHs removed; 12 point-repairs



Construction



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Questions?



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