A PROACTIVE APPROACH TO A REACTIVE SITUATION

Stretching your dollar for SSO Abatement

Presented By: City of Largo, FL and McKim & Creed, Inc.

McKIM&CREED

BACKGROUND AND OBJECTIVES

BACKGROUND

Potential overflows stemming from severe weather events are increasing along with the required public notification efforts. These types of overflow events do not just cause bad press and media attention, but can also result in a $1 per gallon fine and a required $2 per gallon fee to address the issue going forward.

OBJECTIVES

To minimize the risk of future SSOs and their consequences, sanitary sewer overflow (SSO) abatement programs have evolved into a hybrid “find and fix” initiative that significantly decrease wet weather flows, minimized the potential for SSOs, increase collection system reliability, and decrease public health risks and environmental pollution.

DEVELOPING A SUCCESSFUL SSO ABATEMENT PROGRAM

SANITARY SEWER SYSTEM SURVEY (SSES)

I&I Identification and Abatement

SYSTEM CAPACITY EVALUATION

Flow Monitoring and Hydraulic Modeling

DESIGN AND CONSTRUCTION

Abbreviated design process and “short-list” of contractors

AGENDA

- ✓ **Introduction** to the Project
- ✓ **Project Goal – <u>Eliminate Recurring SSOs</u>**
  - ➢ Establish Areas with Excessive I/I Volumes
  - ➢ Determine System Capacity Limitations
  - ➢ Complete I/I Source Identification
  - ➢ Develop I/I Abatement Alternatives
  - ➢ Complete R&R Planning & Capacity Enhancement Designs
  - ➢ Complete I/I Abatement & Capacity Improvements
- **Project Results**

CASE STUDY

HURRICANE HERMINE SANITARY SEWER COLLECTION SYSTEM ENGINEERING EVALUATION

The City of Largo, Florida was plagued with recurring SSOs during periods of heavy rainfall and undertook a $38-million wet weather program to address their pump station and force main capacity problems. However, wanting to alleviate the SSO problem altogether, the City implemented an inflow and infiltration (I&I) reduction program in the affected areas.

Flow Monitoring

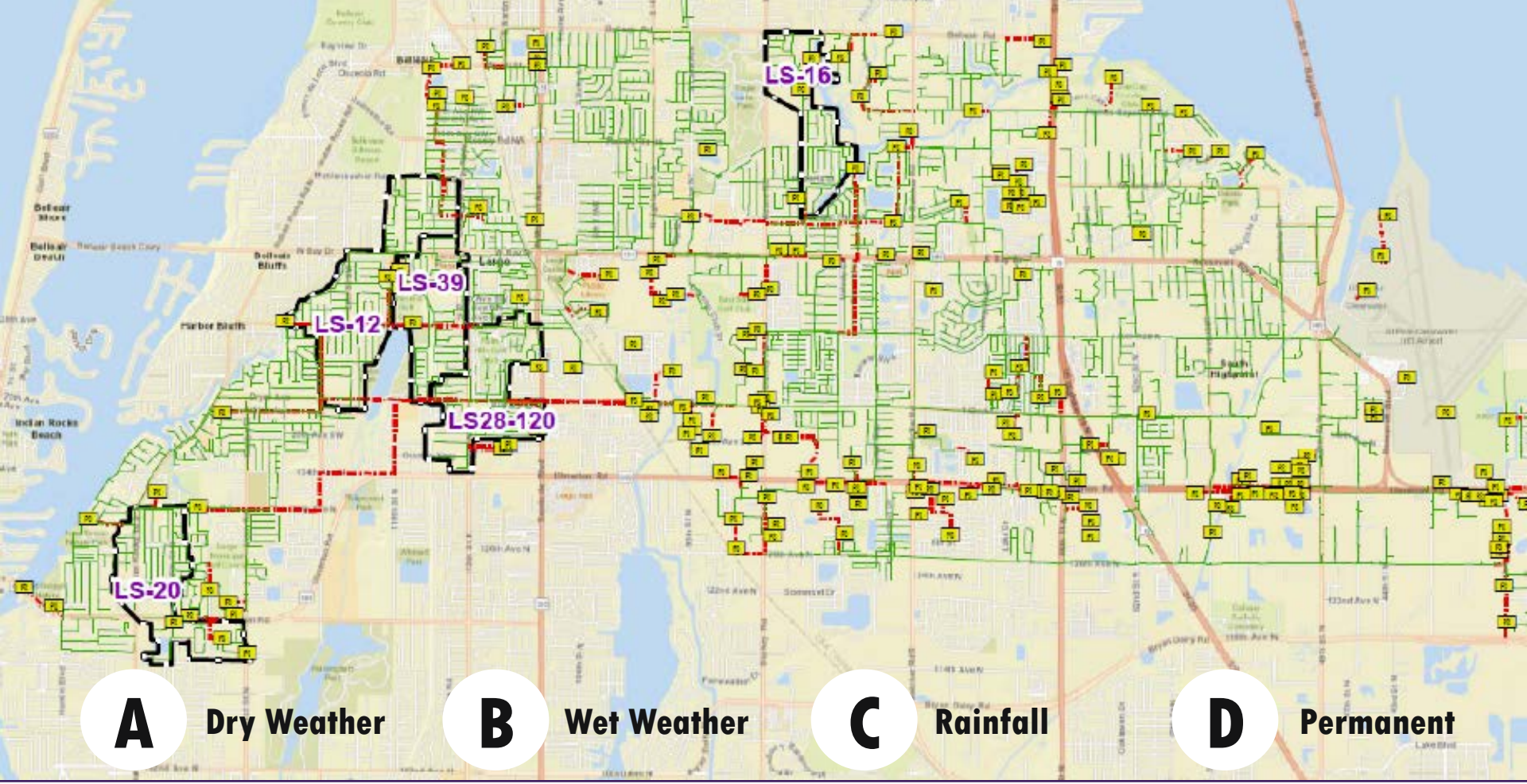
Hydraulic Modeling

Manhole Inspections

Smoke Testing

Night Flow Isolations

CCTV


LS-16
LS-39
LS-12
LS28-120
LS-20
A
Dry Weather
B
Wet Weather
C
Rainfall
D
Permanent

PHASE 1 - FLOW MONITORING & RAINFALL/GROUNDWATER GAUGING

Flow Monitoring – Open Channel

Rainfall Gauging

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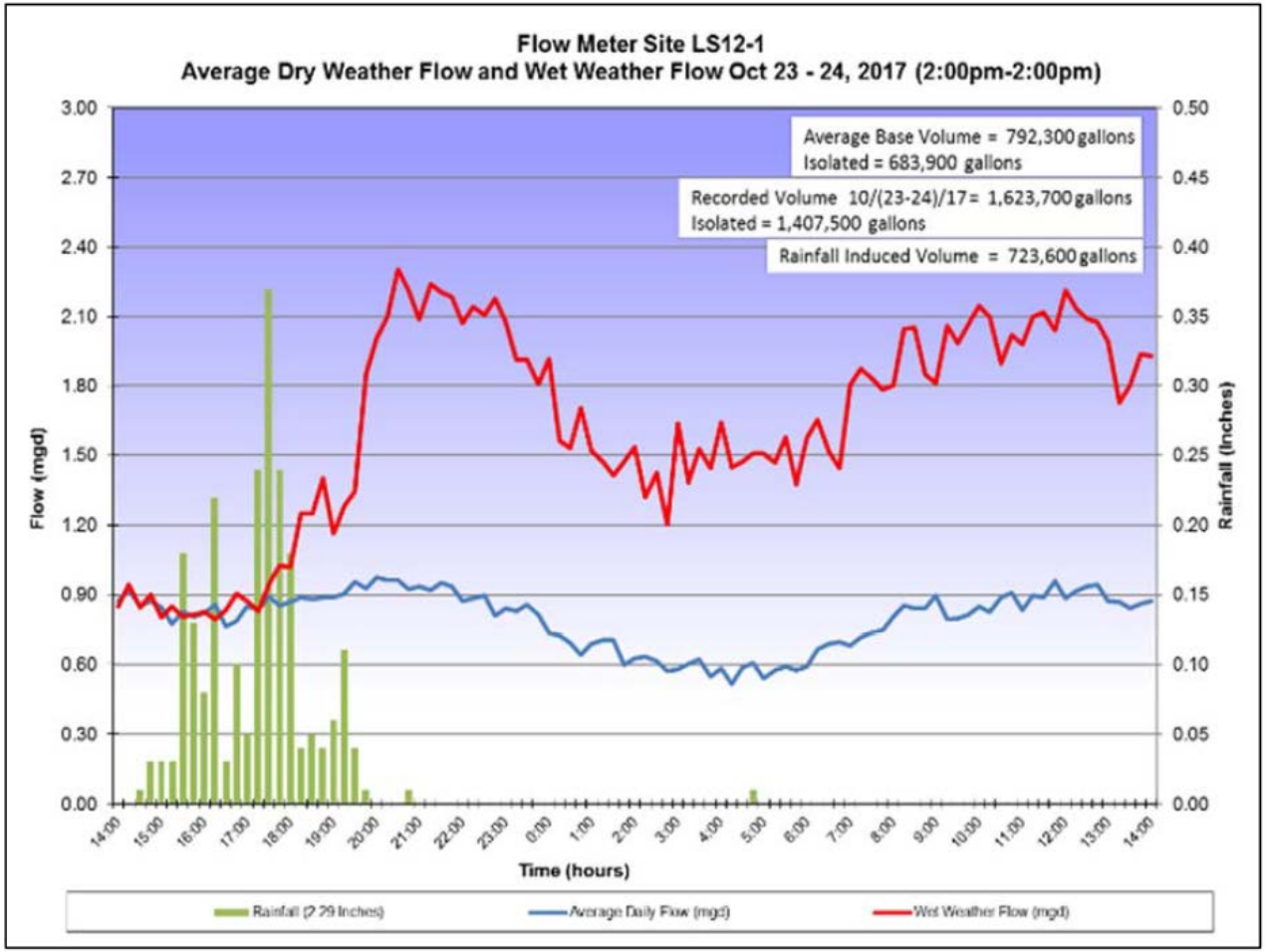
IDENTIFY LOCATIONS WITH EXCESSIVE I/I IN EACH SERVICE AREA

Installed 18 Temporary Open Channel Flow Meters & 10 Rainfall Gauges

Utilized Remote Telemetry Units to Upload Daily Flow & Rainfall Data

Performed Flow Meter & Rainfall Gauge Maintenance/Calibrations For 9 Months

Evaluated Collected Data; and Performed RDII/Infiltration Analysis on a Monthly Basis


Flow Meter Site LS12-1
Average Dry Weather Flow and Wet Weather Flow Oct 23 - 24, 2017 (2:00pm-2:00pm)
Average Base Volume = 792,300 gallons
Isolated = 683,900 gallons
Recorded Volume 10/(23-24)/17 = 1,623,700 gallons
Isolated = 1,407,500 gallons
Rainfall Induced Volume = 723,600 gallons
Flow (mgd)
Rainfall (Inches)
Time (hours)
Rainfall (2.29 Inches)
Average Daily Flow (mgd)
Wet Weather Flow (mgd)

Determine Dry/Wet Weather Pipe Capacity

Developed Dry Weather Hydraulic Model Using GIS & Water Usage Data (List Software Utilized)

Utilized Flow & Rainfall Data to Calibrate Dry & Wet Weather Hydraulic Models

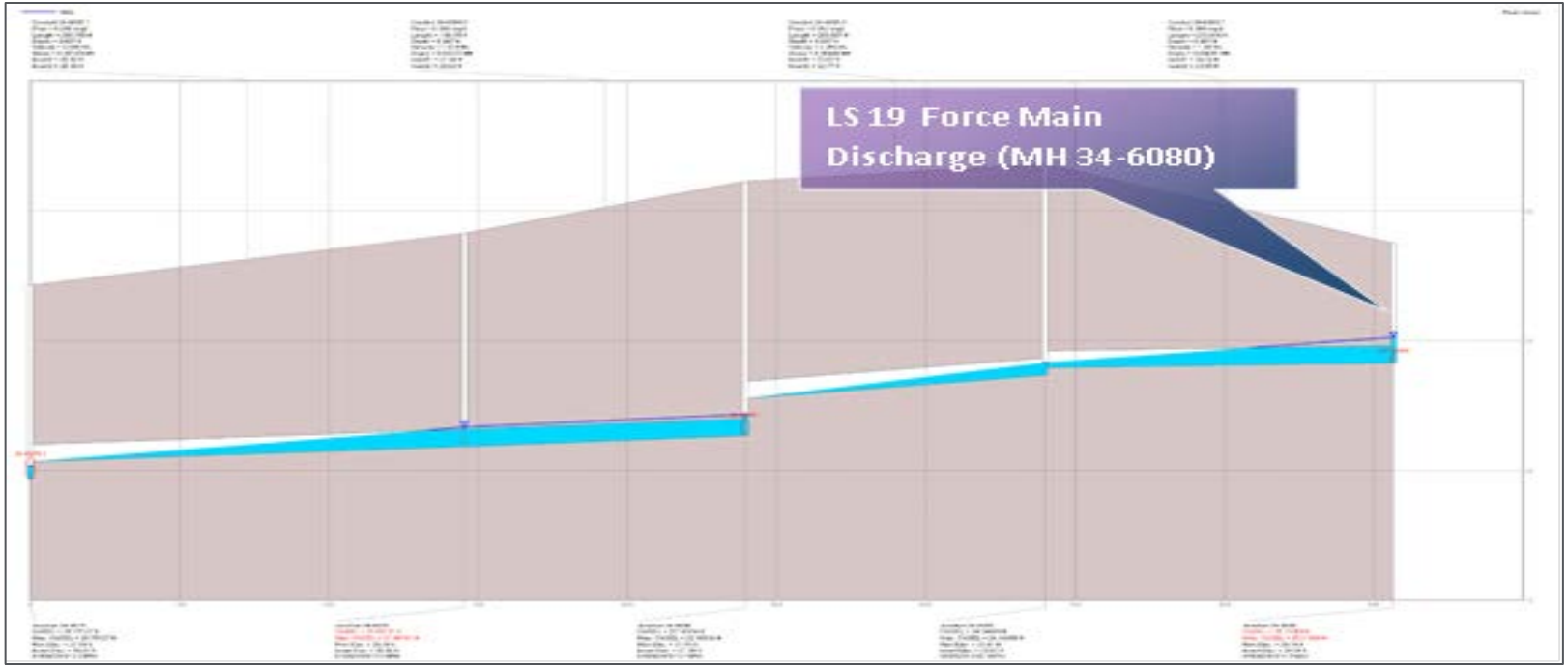
Determined Hydraulic Capacity Limitations Within Each System and Established What Caused the Limitations

Modeled Proposed System Enhancements to Effectively Convey a Projected 10-Year Return Rainfall Event

DETERMINE SYSTEM DRY/WET WEATHER CAPACITY LIMITATIONS

Identify Dry Weather Capacity Limitations (LS 20)

DETERMINE SYSTEM DRY/WET WEATHER CAPACITY LIMITATIONS



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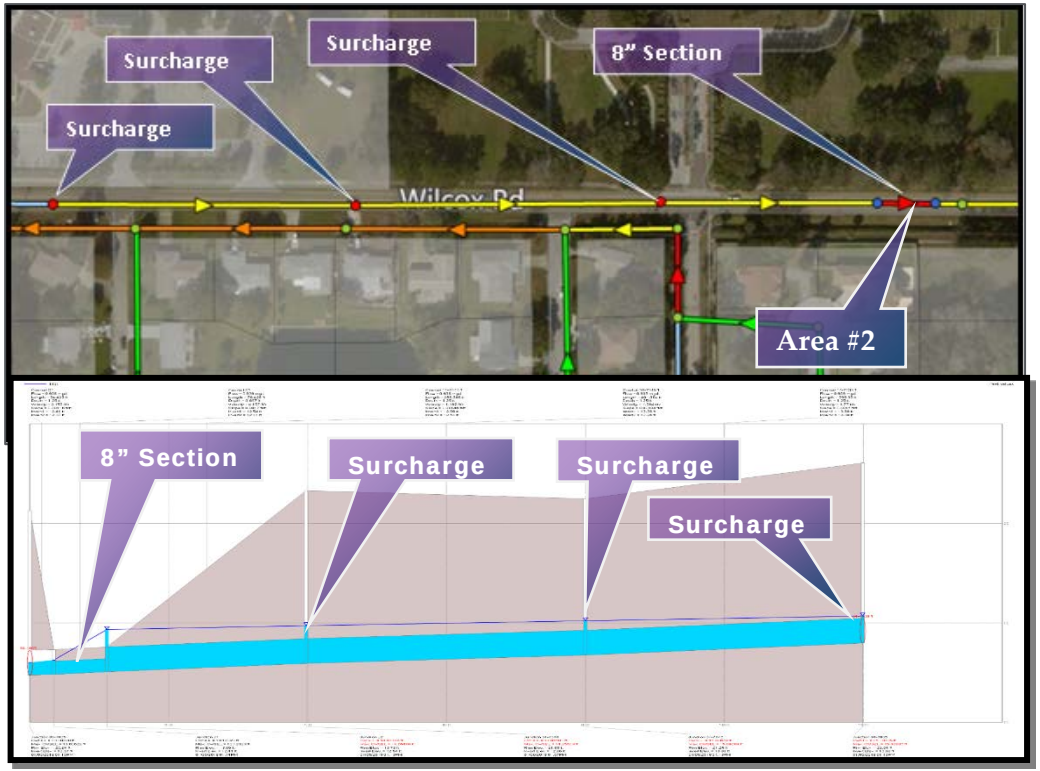

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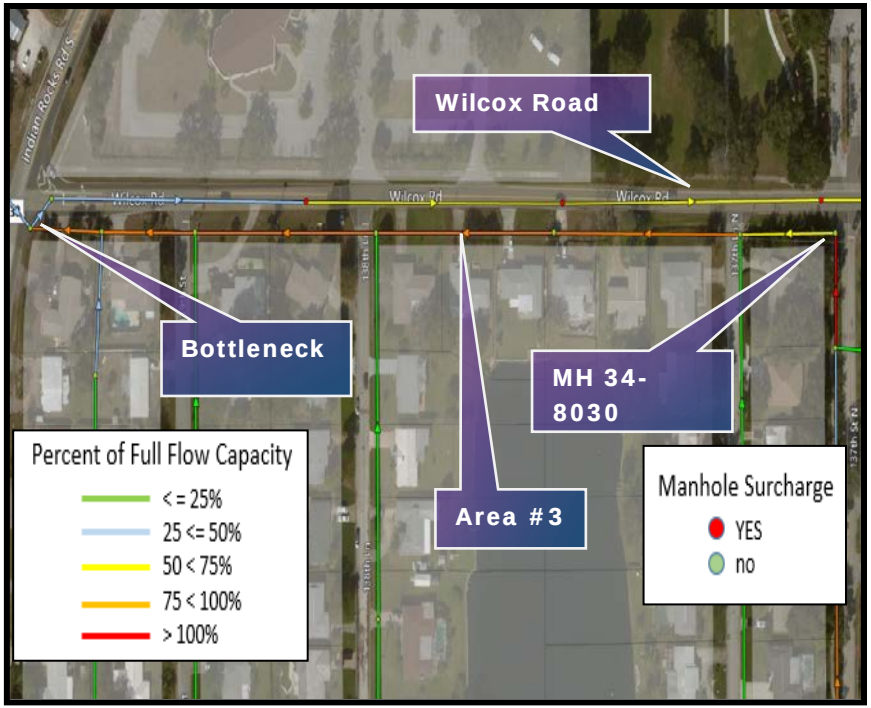

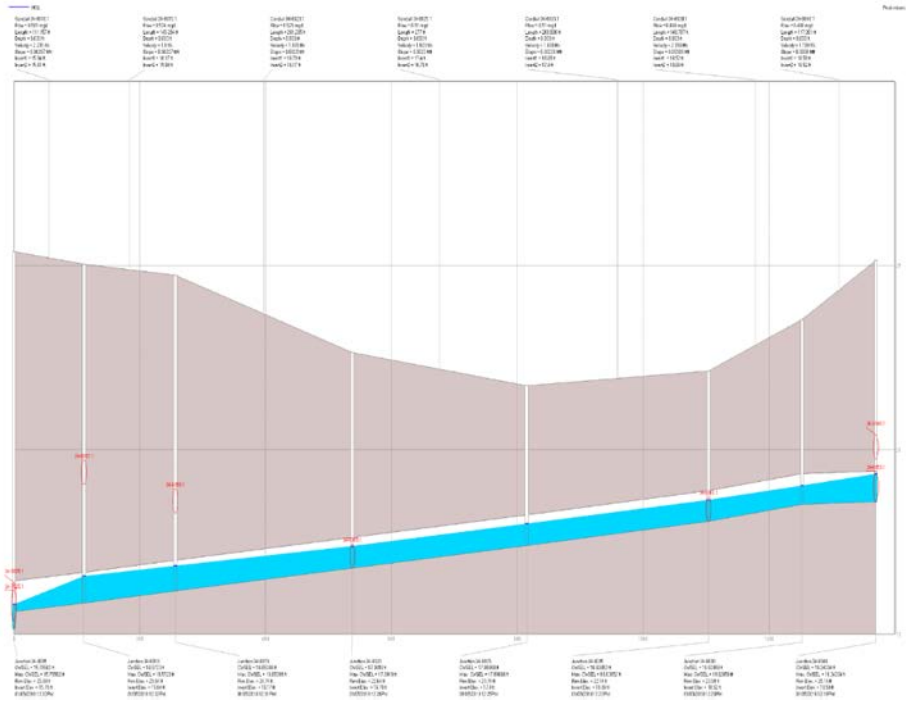

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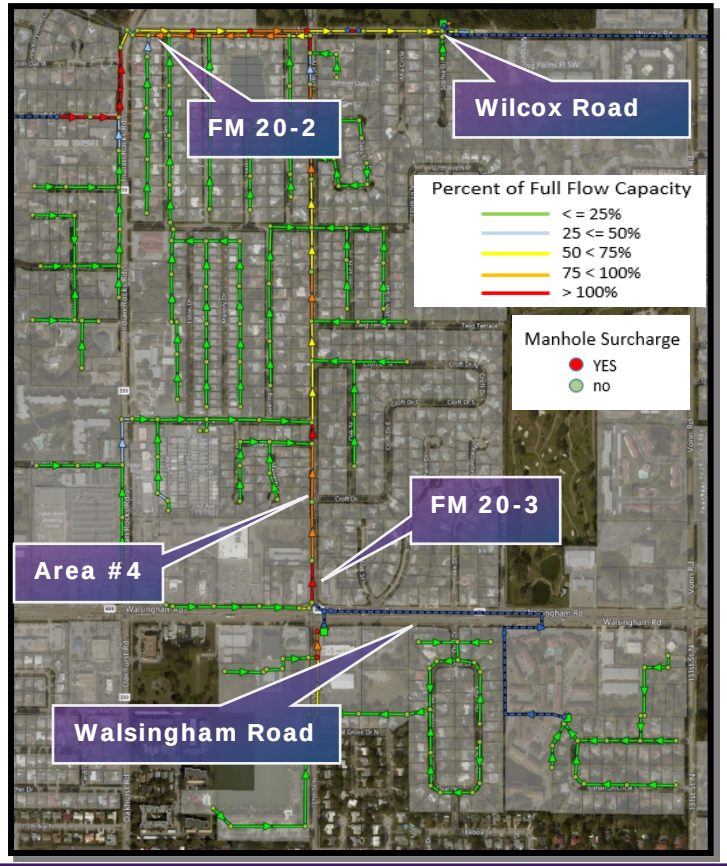

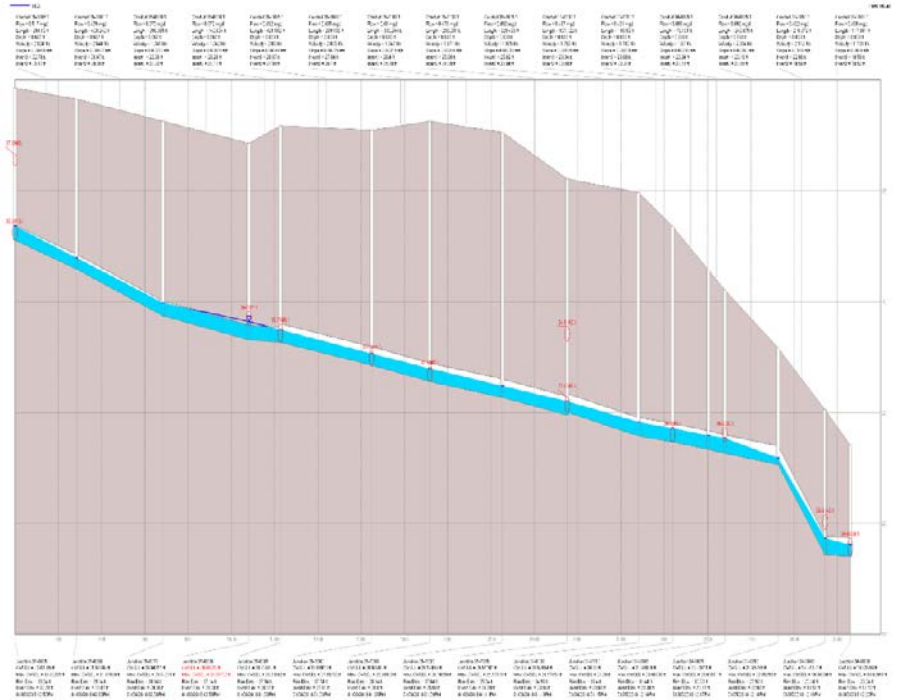

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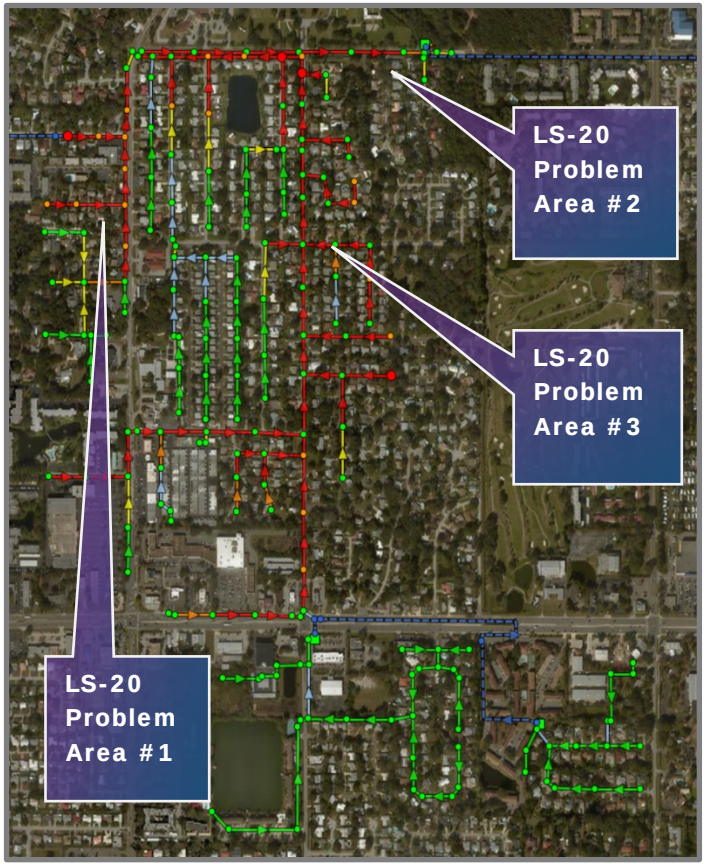

Identify Wet Weather Capacity Limitations and Recommend Enhancements (LS 20)

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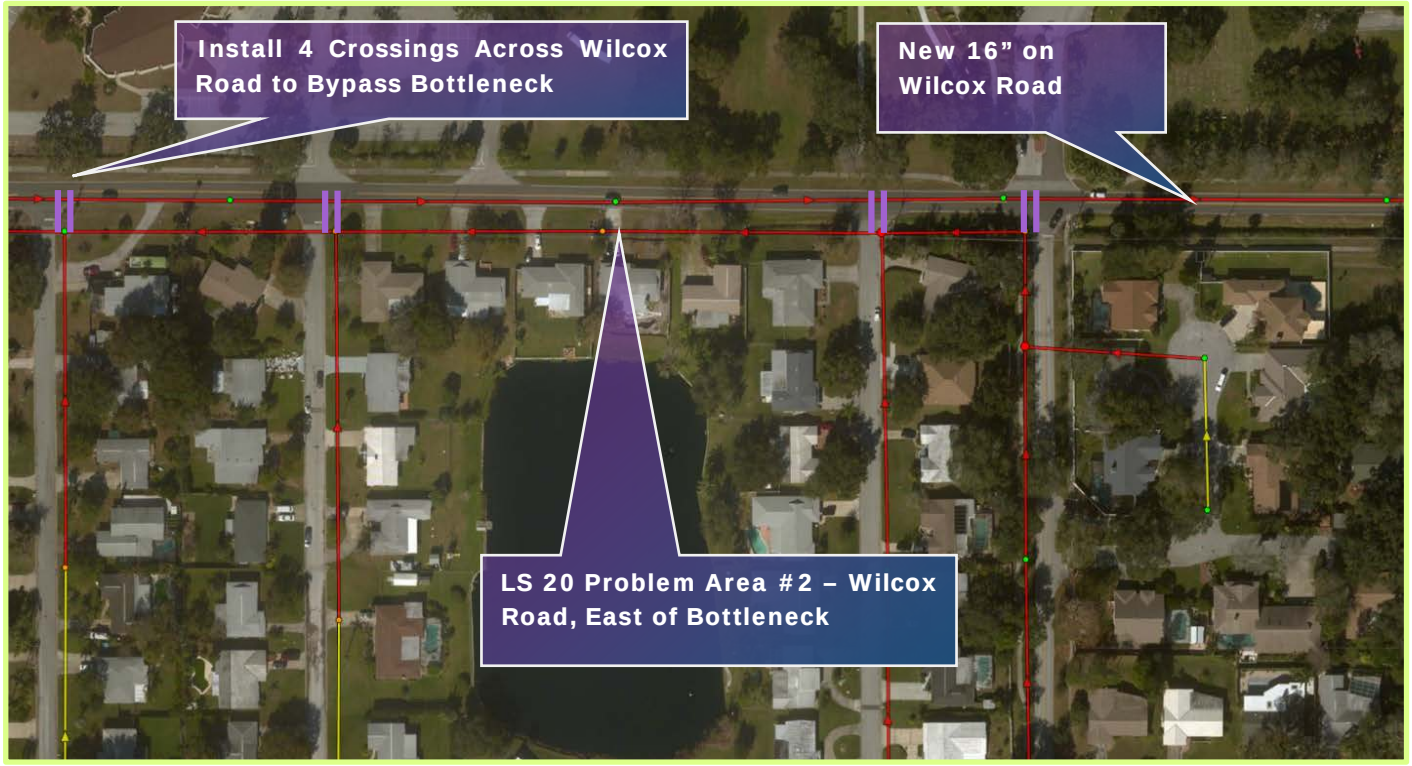

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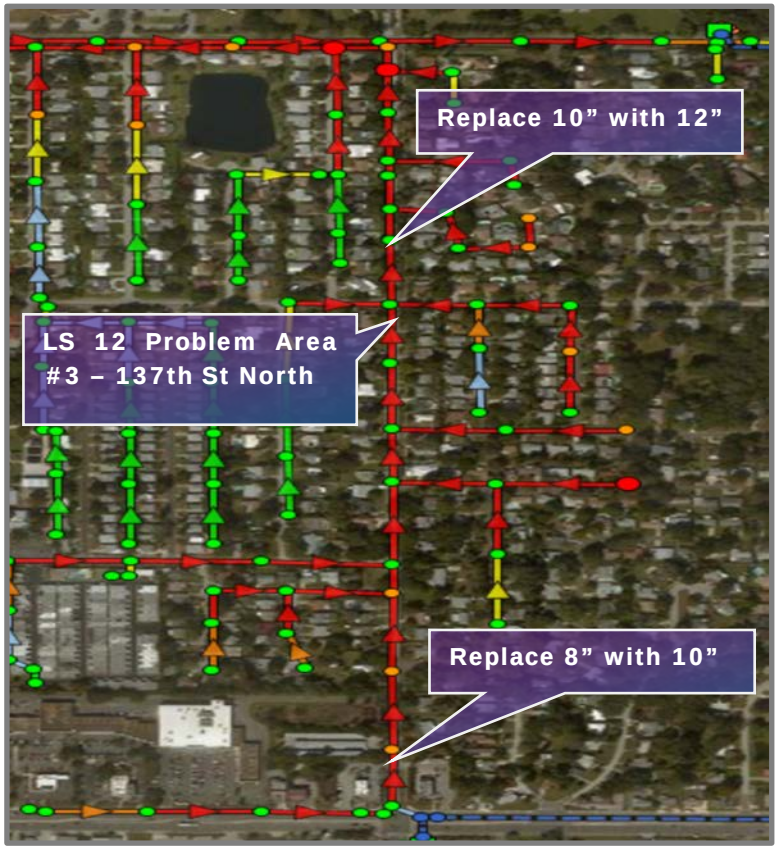

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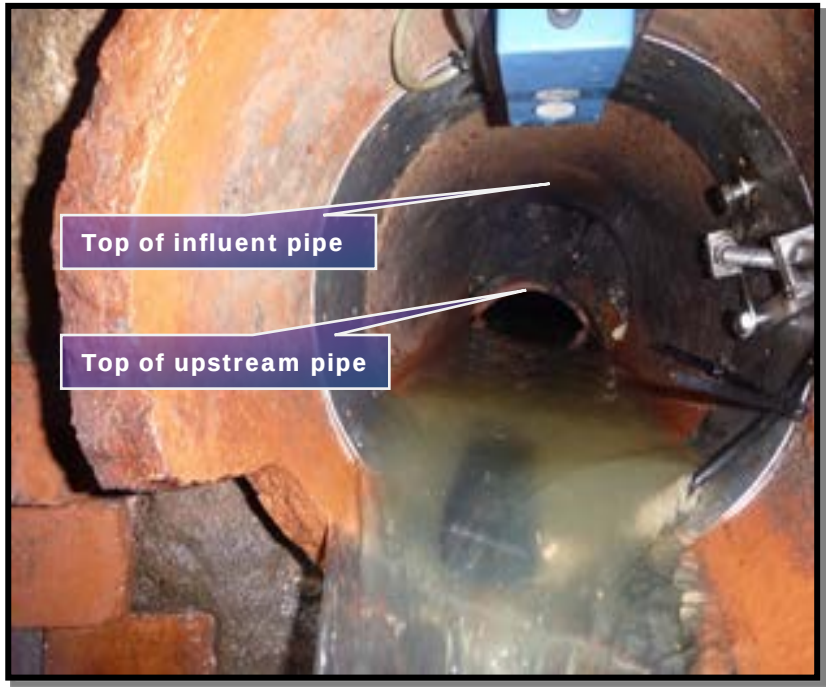
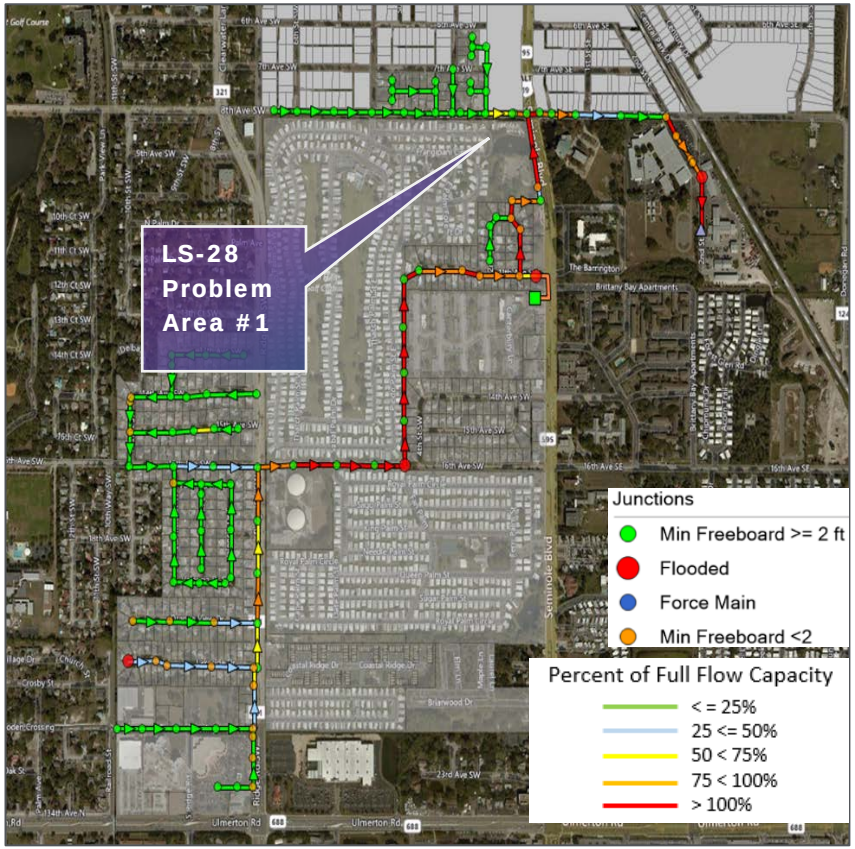


Identify Dry Weather Capacity Limitations (LS 28)

DETERMINE SYSTEM DRY/WET WEATHER CAPACITY LIMITATIONS



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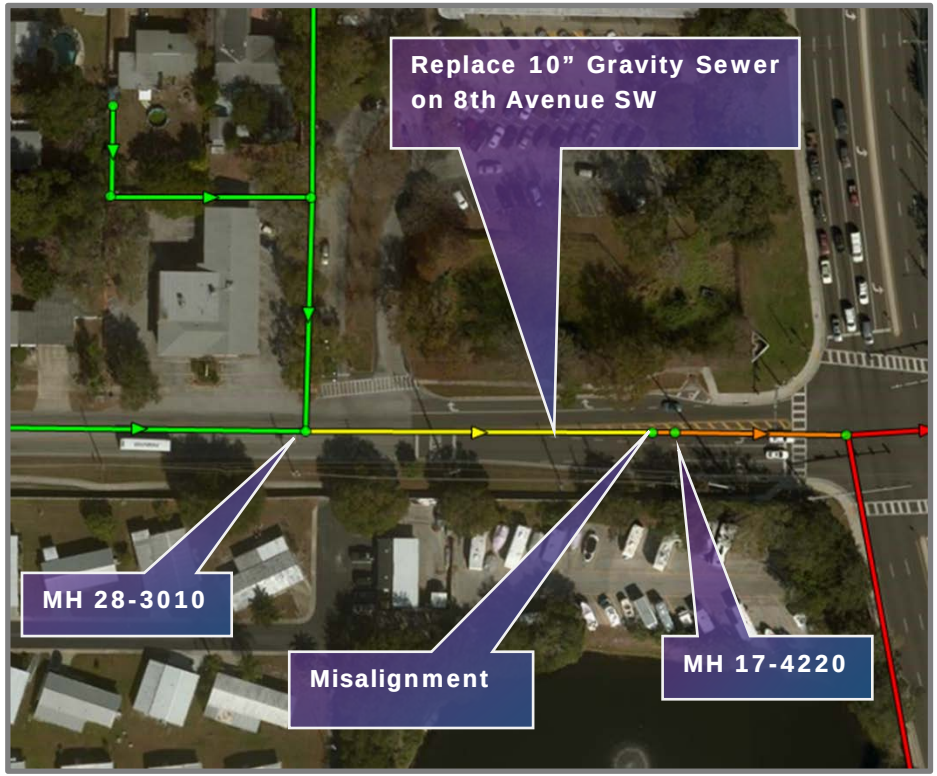

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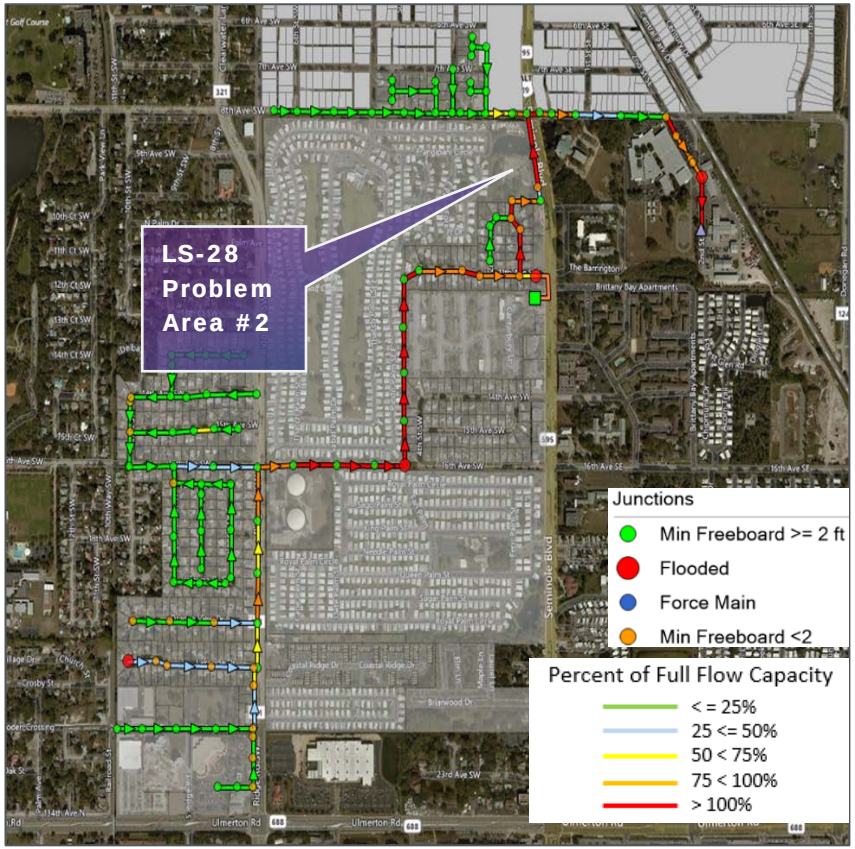

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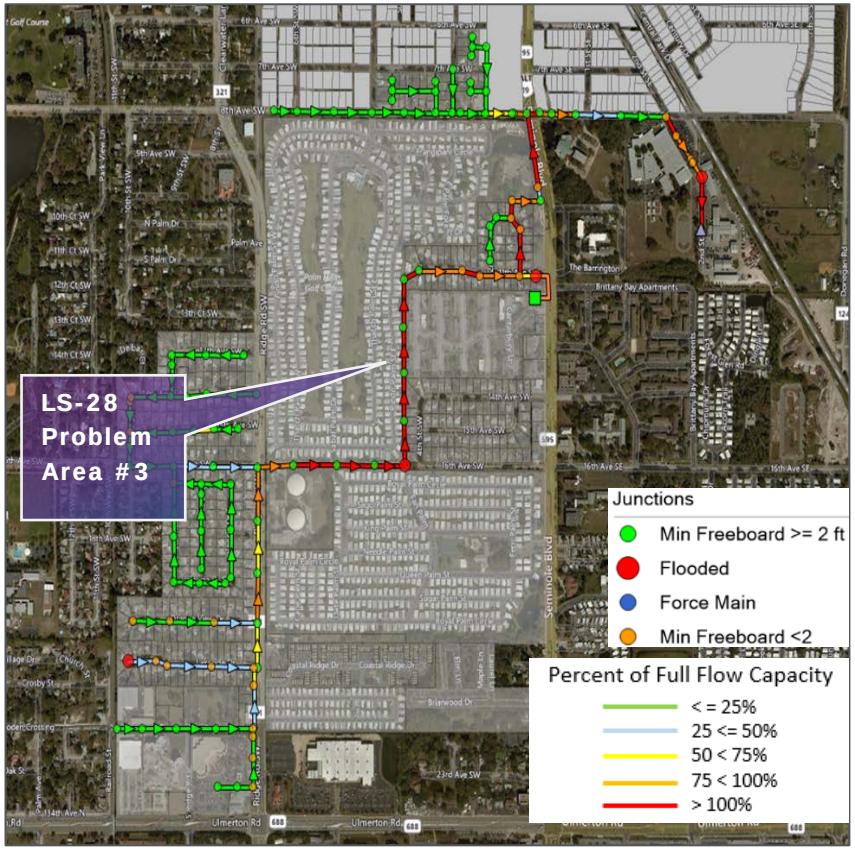

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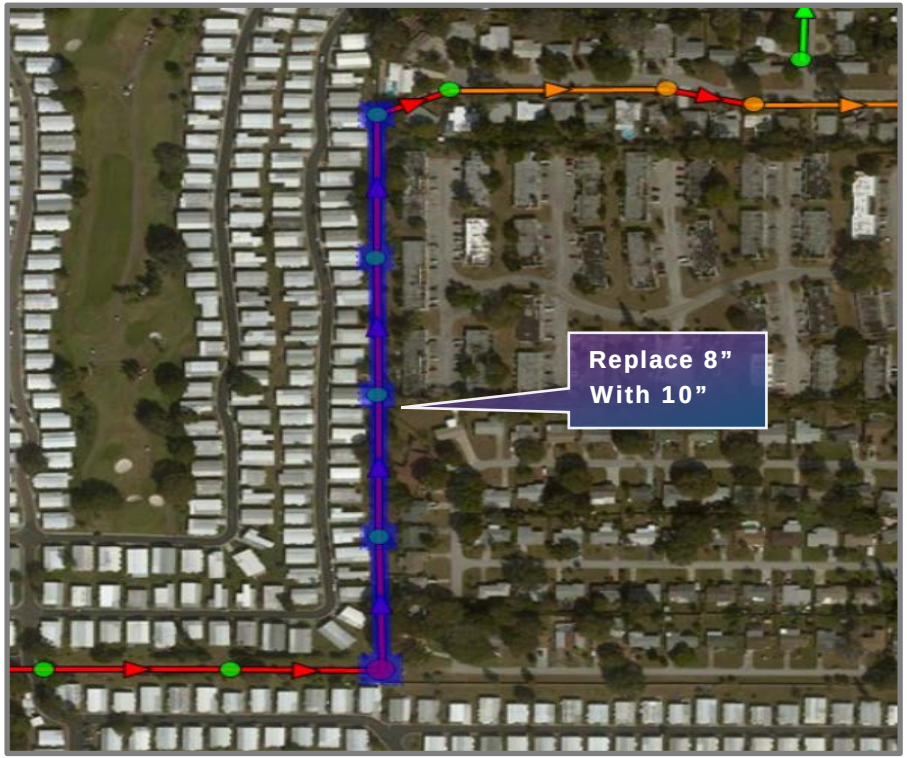

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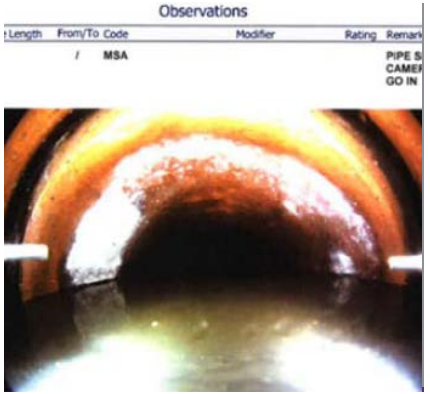
I&I IDENTIFICATION AND ABATEMENT



MANHOLE INSPECTIONS

- Level 1 and 2 Inspections
- 1,175 Manholes Inspected
- 623 identified for repair
  - 86 Priority 1
  - 435 Priority 2
  - 102 Priority 3
- Estimated Repair Costs - $1.3M

SMOKE TESTING

- 242,300 LF Tested
- 35 Dye Water Tests Conducted
- 350 Defects Detected
  - 3 Private-side Defects
  - 1 Catch Basin Cross Connection

NIGHT FLOW ISOLATIONS

- 550 Night Flow Isolations Performed

CCTV

- 60,330 LF of CCTV
- Estimated Repair Costs - $3.3M

MANHOLE INSPECTIONS

1

Pre-populate Level 1 Inspection pdf forms with existing GIS attribute data Utilize existing GIS and previously developed cloud mapping to locate each structure

2

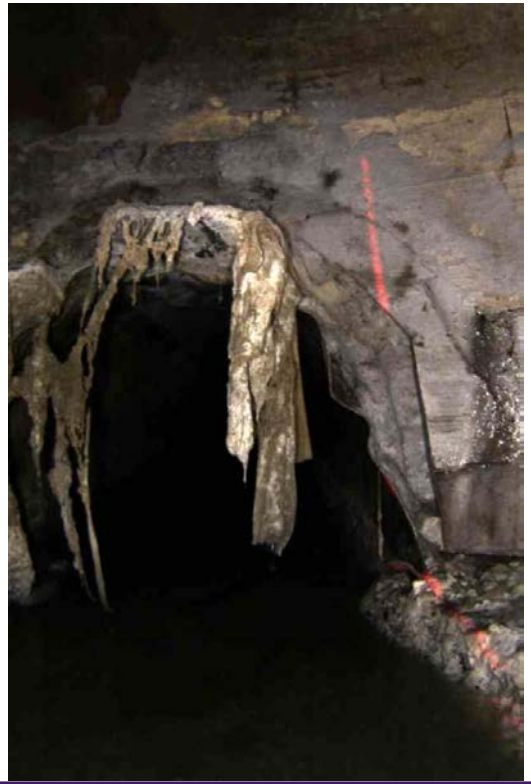
Trimble R1 receiver will be blue-toothed to Samsung tablet and verify existing GIS attribute data and existing fields will be modified as necessary(Use ESRI ‘Survey 1-2-3’) (Transfer Level 1 Form From ‘Survey 1-2-3’ to ESRI ‘Collector’)

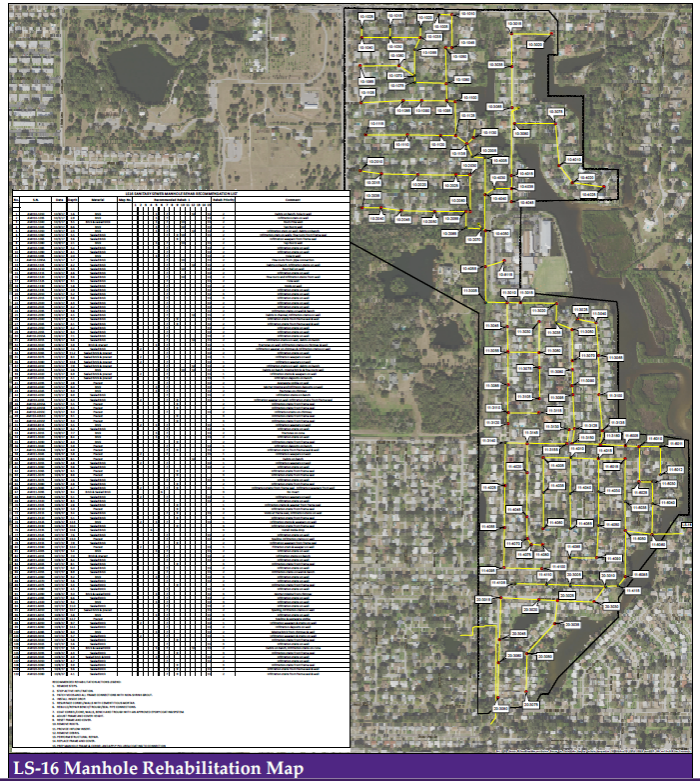
3

If Structure Receives MACP Grade of 3/4/5 Conduct 3D scan of each structure using ‘CleverScan

CLEVERSCAN INSPECTION

INSPECTION OBSERVATIONS





LS-16 Manhole Rehabilitation Map

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INFLOW SOURCE INVESTIGATIONS (Smoke Testing)

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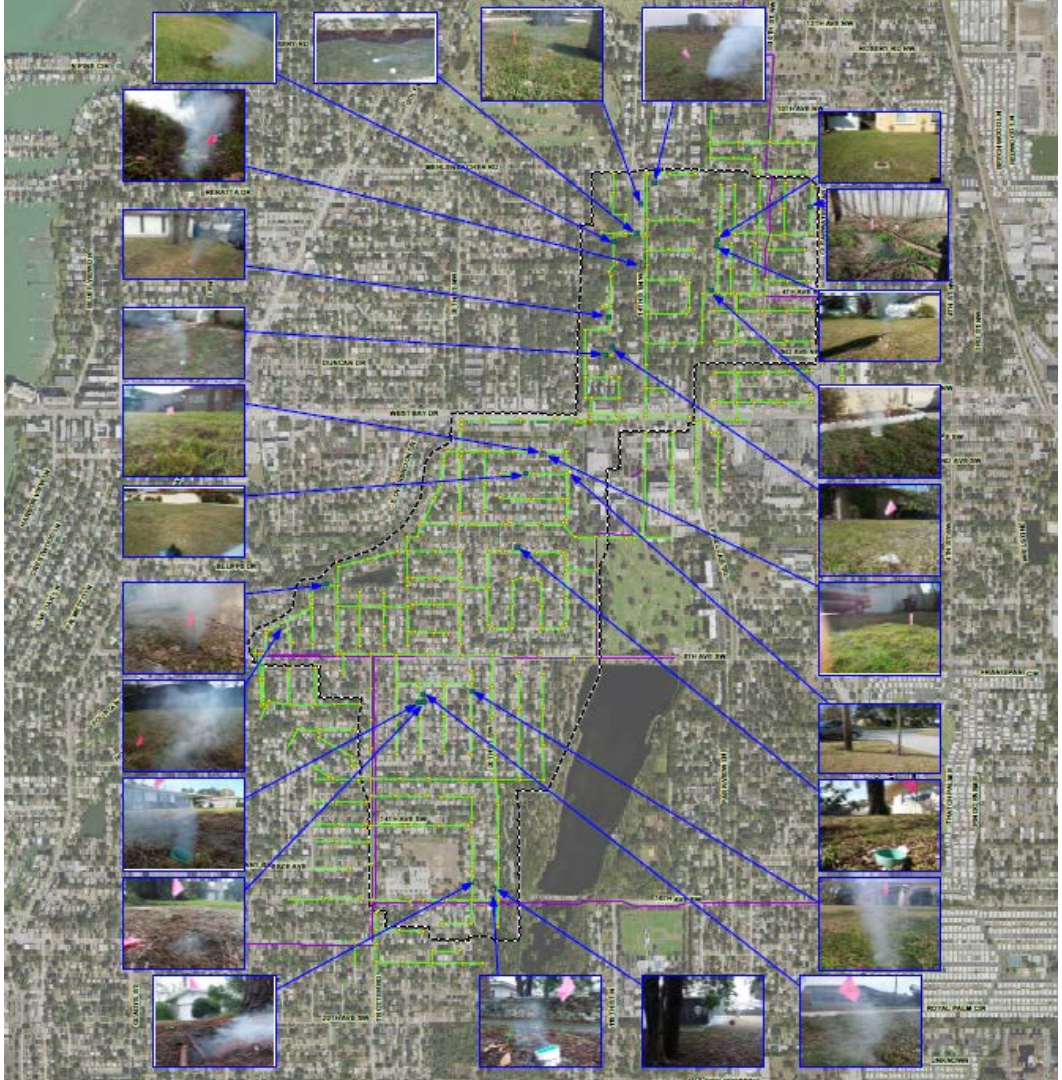

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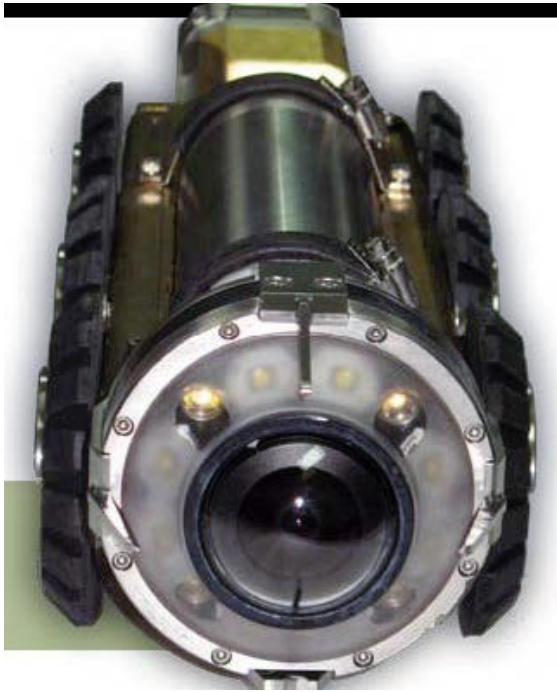
INFILTRATION SOURCE INVESTIGATIONS (Night Flow Isolations)

Night Flow Isolations Completed to Identify Infiltration Volumes

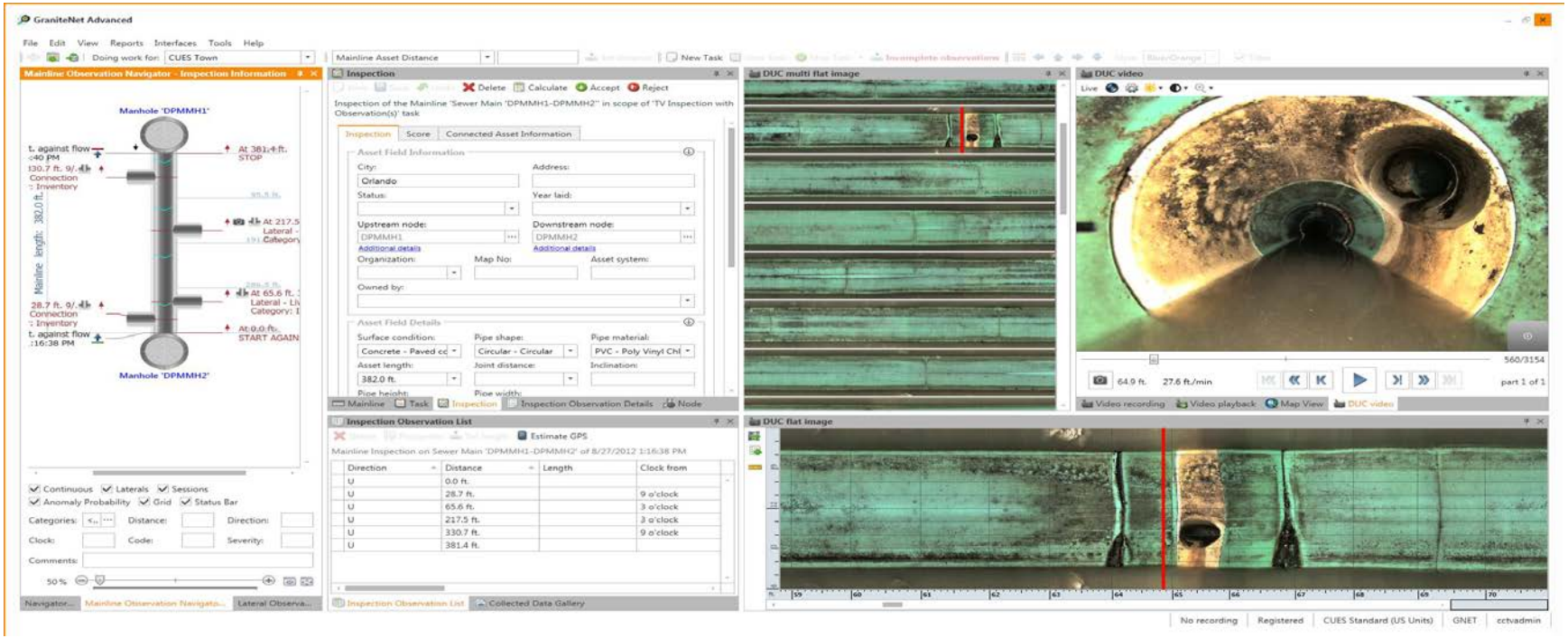
Completed Using Pre-Calibrated Weir Plates

CCTV Inspections Completed on Gravity Piping Determined to Have High Infiltration Volumes

PROJECT APPROACH



CCTV OUTPUT MUST BE PACP DATABASE COMPLIANT



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PROJECT APPROACH

JetScan
for 8-15"

JetScan Mini
for 6-10"

JetScan
(with rollers)
for 15-24"

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DESIGN, PERMITTING, & CONSTRUCTION

DESIGN

- Seven Bottleneck Areas Identified
- Abbreviated Design Process

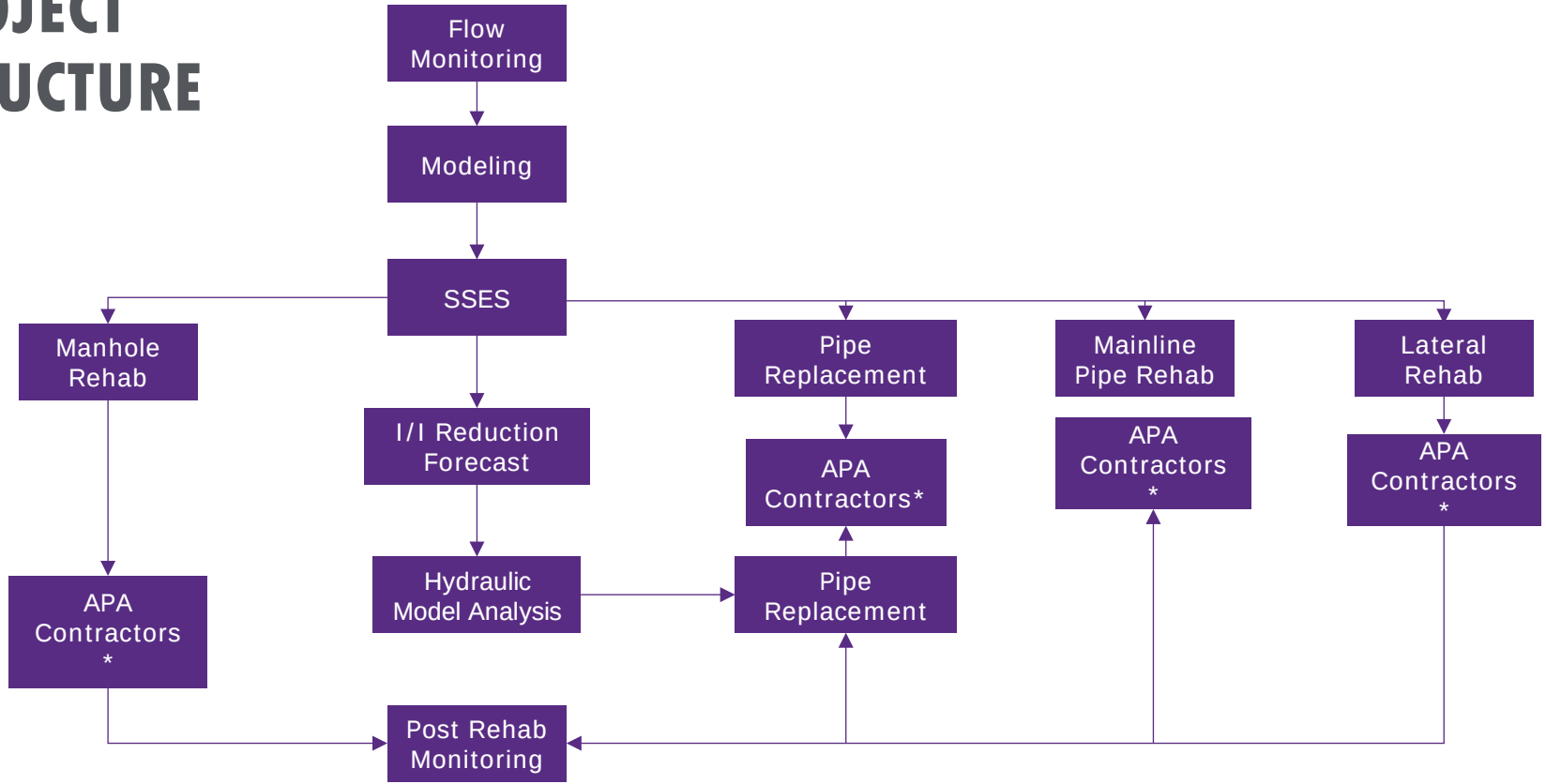
PERMITTING

- FDEP Permits
- ROW Permits

CONSTRUCTION

Pre-approved Contractors

PROJECT STRUCTURE



*Note: Annual Services Contracts In-Place

Thank you for the opportunity.

QUESTIONS