SAYING GOODBYE TO THAT LAST SSO

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FAIRFIELD BACKGROUND

- Established 1955
- Rapid Population Growth
  - 1960: 9,726
  - 1970: 14,680
  - 1980: 30,777
  - 1990: 39,729
  - 2000: 42,091
  - 2010: 42,510

WASTEWATER SYSTEM HISTORY

- New 2 MGD treatment plant and interceptors constructed in 1967
- Plant expansion to 5 MGD and additional interceptors constructed in 1977
- Minor plant improvements and expansion to 6 MGD – Late 1980s
- Plant expansion to 10 MGD constructed in mid 1990s

- WET WEATHER FLOW ISSUES BECOME SIGNIFICANT – Mid 1980s

WET WEATHER FLOW ISSUES

- Sanitary Sewer Overflows (SSOs)
- Sewer Line Surcharging
- Basement Flooding
- Bypass Flows at Wastewater Plant
- Illegal Connections

FAIRFIELD PRO-ACTIVE APPROACH

- Collection system I/I mitigation (late 1980s)
- Public awareness program – brochures and video
- Unauthorized connection program
- Sewer line cleaning
- Sewer line video inspection
- Annual sewer line rehab contracts
- GIS mapping and data collection

PLANNING TO MITIGATE WET WEATHER

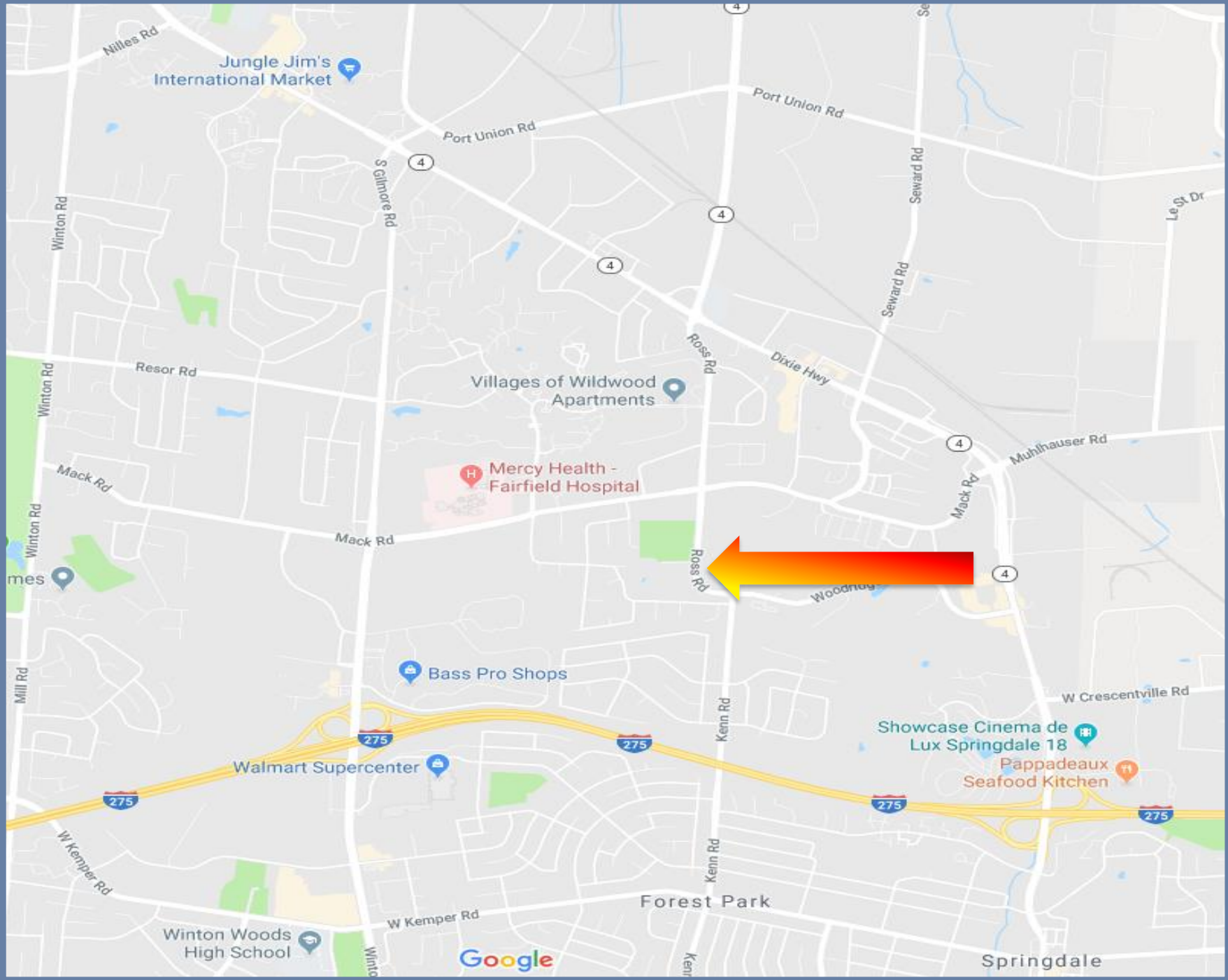
- Flow monitoring studies 1990 and 1993
- Wastewater system expansion studies
- Alternatives analysis
  - Construct parallel interceptors, wet weather storage at plant
  - Construct wet weather relief interceptors, pump to plant, wet weather storage at plant
  - Construct parallel interceptors, in system wet weather storage and pumping

WET WEATHER PROGRAM DESIGN

- Wet weather relief sewers
  - 3.2 miles of sewers
- 25 MGD wet weather pumping station
  - Dry weather / low flow pumps and 16” force main
  - Wet weather pumps and 36” force main
  - 4.6 miles of force main
- 9 MG wet weather storage at WWTP – flow equalization

$25 Million Improvements

AND NOW THE LAST SSO


Nilles Rd
Jungle Jim's International Market
Port Union Rd
Port Union Rd
S Gilmore Rd
Winton Rd
Seward Rd
Seward Rd
Le St Dr
Ross Rd
Dixie Hwy
Resor Rd
Winton Rd
Villages of Wildwood Apartments
Muhlhauser Rd
Mack Rd
Mercy Health - Fairfield Hospital
Mack Rd
Mack Rd
Winton Rd
mes
Ross Rd
Woodhoo
Bass Pro Shops
Mill Rd
W Crescentville Rd
Kenn Rd
Showcase Cinema de Lux Springdale 18
Pappadeaux Seafood Kitchen
275
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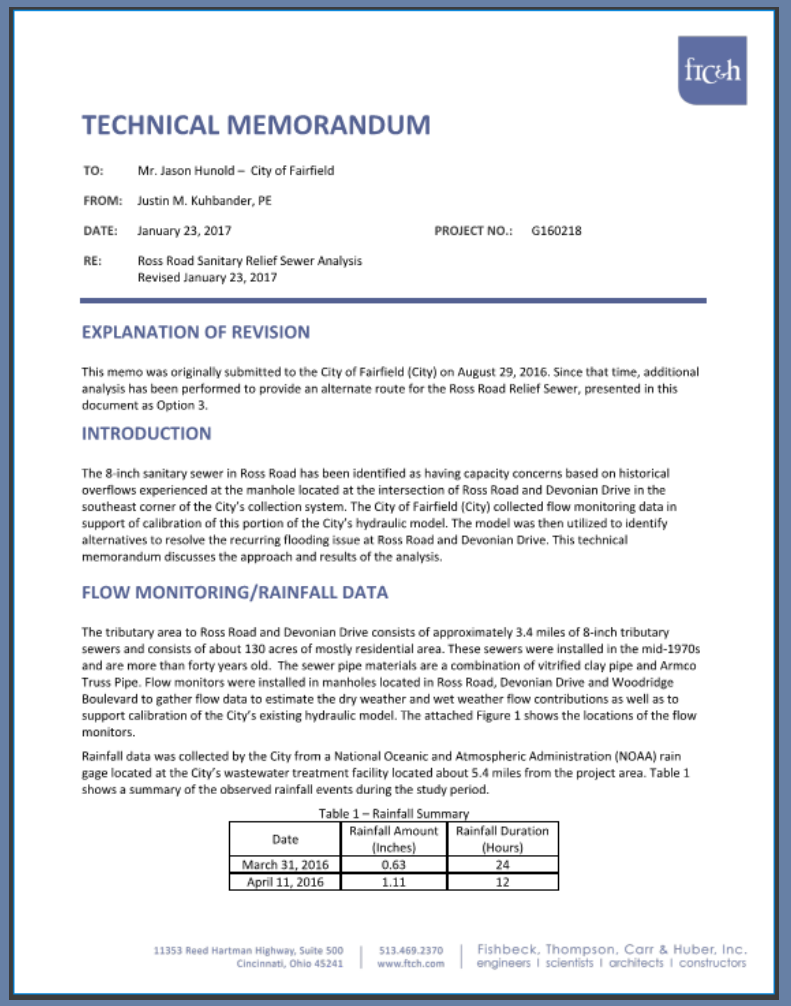
275
Walmart Supercenter
W Kemper Rd
Kenn Rd
Forest Park
W Kemper Rd
Winton Woods High School
Google
Springdale

STUDY PHASE

1. Review Existing Data
2. Flow Monitoring
3. Calibrate Hydraulic Model
4. Develop and Evaluate Alternatives
5. Select Best Alternative Solution



TECHNICAL MEMORANDUM

TO: Mr. Jason Hunold – City of Fairfield

FROM: Justin M. Kuhbander, PE

DATE: January 23, 2017 PROJECT NO.: G160218

RE: Ross Road Sanitary Relief Sewer Analysis
Revised January 23, 2017

EXPLANATION OF REVISION

This memo was originally submitted to the City of Fairfield (City) on August 29, 2016. Since that time, additional analysis has been performed to provide an alternate route for the Ross Road Relief Sewer, presented in this document as Option 3.

INTRODUCTION

The 8-inch sanitary sewer in Ross Road has been identified as having capacity concerns based on historical overflows experienced at the manhole located at the intersection of Ross Road and Devonian Drive in the southeast corner of the City's collection system. The City of Fairfield (City) collected flow monitoring data in support of calibration of this portion of the City's hydraulic model. The model was then utilized to identify alternatives to resolve the recurring flooding issue at Ross Road and Devonian Drive. This technical memorandum discusses the approach and results of the analysis.

FLOW MONITORING/RAINFALL DATA

The tributary area to Ross Road and Devonian Drive consists of approximately 3.4 miles of 8-inch tributary sewers and consists of about 130 acres of mostly residential area. These sewers were installed in the mid-1970s and are more than forty years old. The sewer pipe materials are a combination of vitrified clay pipe and Armco Truss Pipe. Flow monitors were installed in manholes located in Ross Road, Devonian Drive and Woodridge Boulevard to gather flow data to estimate the dry weather and wet weather flow contributions as well as to support calibration of the City's existing hydraulic model. The attached Figure 1 shows the locations of the flow monitors.

Rainfall data was collected by the City from a National Oceanic and Atmospheric Administration (NOAA) rain gage located at the City's wastewater treatment facility located about 5.4 miles from the project area. Table 1 shows a summary of the observed rainfall events during the study period.

Table 1 – Rainfall Summary

Date	Rainfall Amount (Inches)	Rainfall Duration (Hours)
March 31, 2016	0.63	24
April 11, 2016	1.11	12

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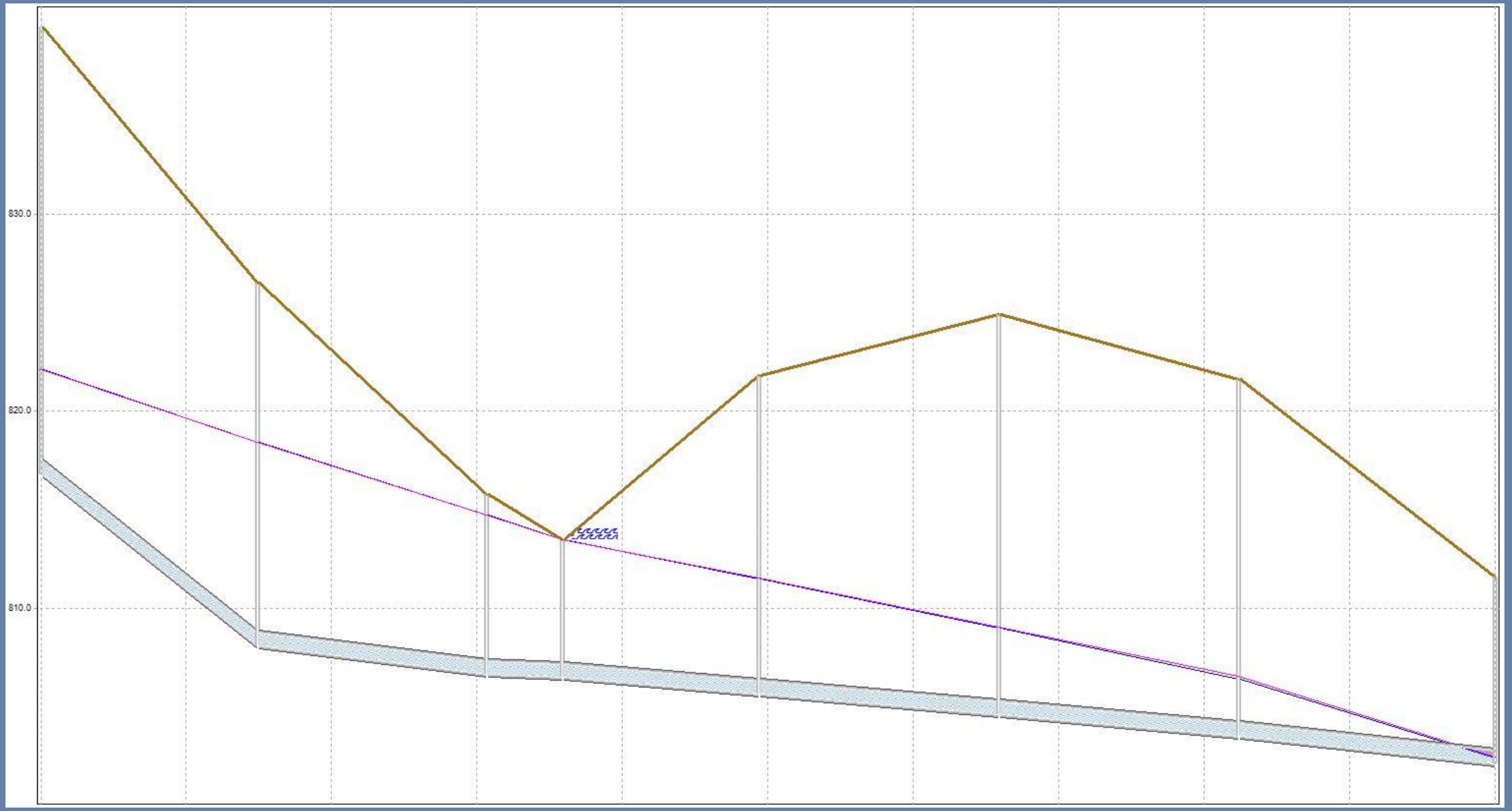
REVIEW EXISTING DATA



FLOW MONITORING

FLOW MONITORING

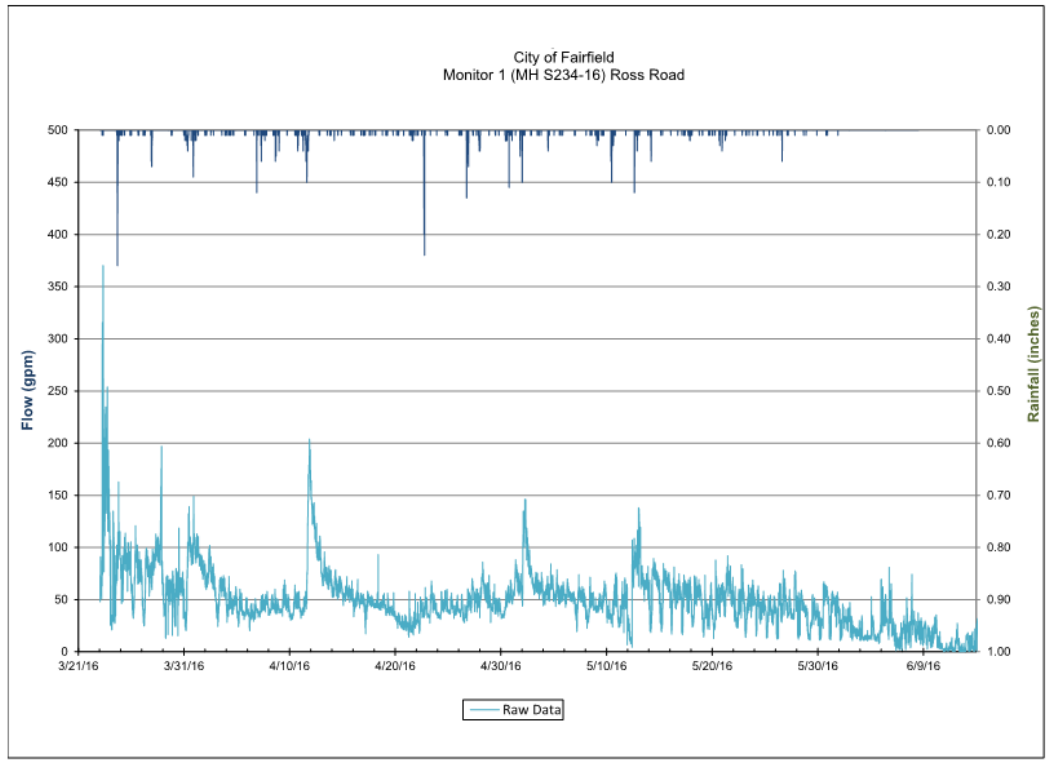
Flow Monitoring Data Summary

Monitor Location	Average Daily Dry Weather Flow (gpm)	Peak Hourly Wet Weather Flow (gpm)	Wet Weather Peaking Factor
Monitor 1 – Ross	44	196	4.5
Monitor 2 – Devonian	11	60	5.5
Monitor 3 – Woodridge	132	219	1.7

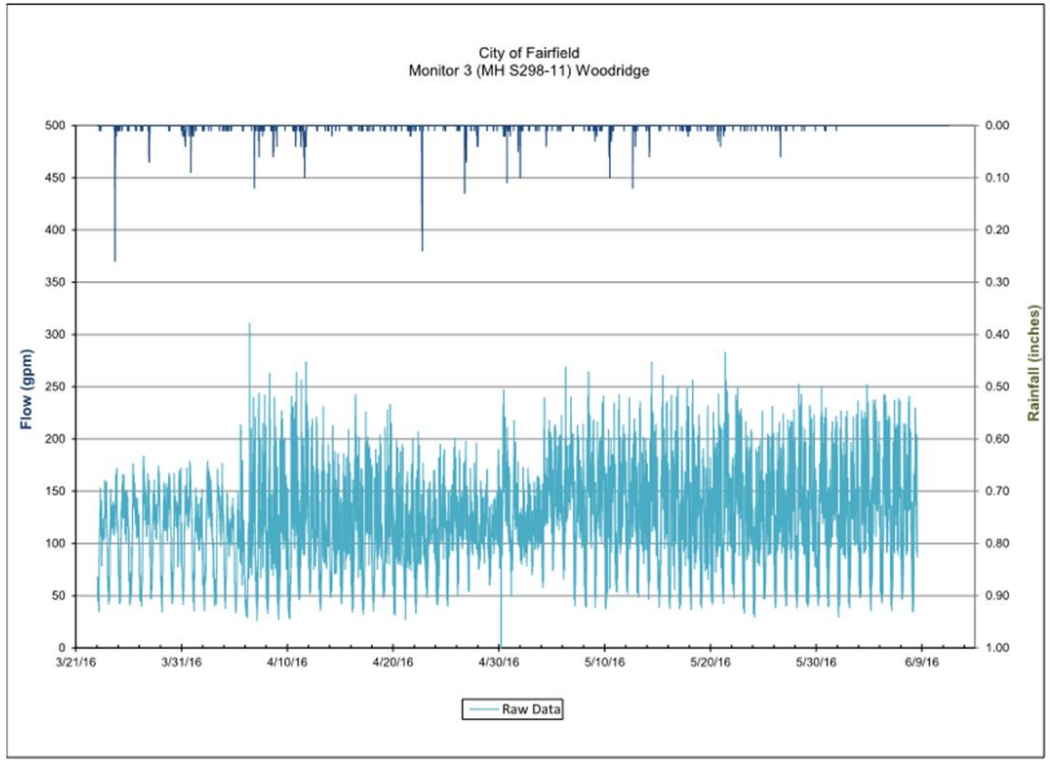
Rainfall Summary

Date	Rainfall Amount (Inches)	Rainfall Duration (Hours)
March 31, 2016	0.63	24
April 11, 2016	1.11	12
April 22, 2016	0.65	1.5
May 2, 2016	0.31	6
June 15, 2016	0.95	1.5

FLOW MONITORING

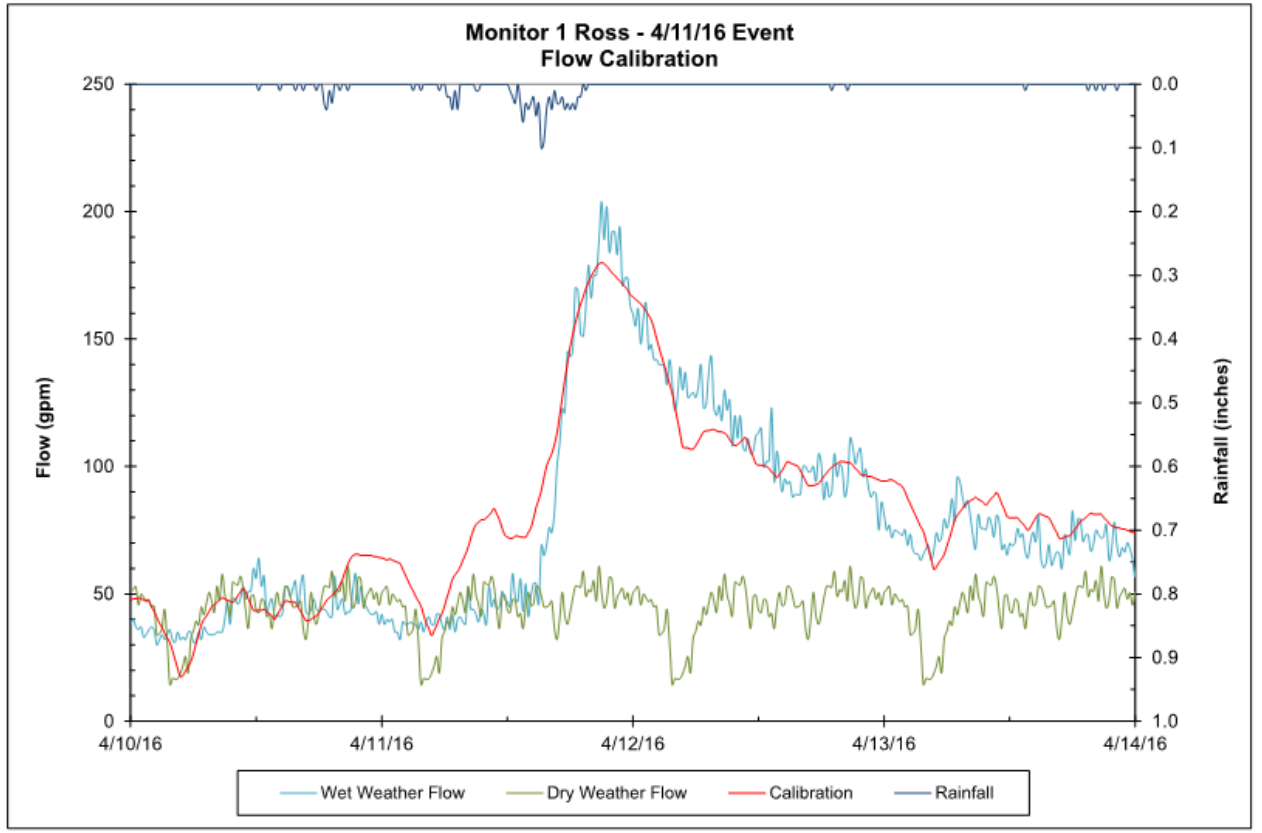


Ross Road Sanitary Relief Sewer Analysis

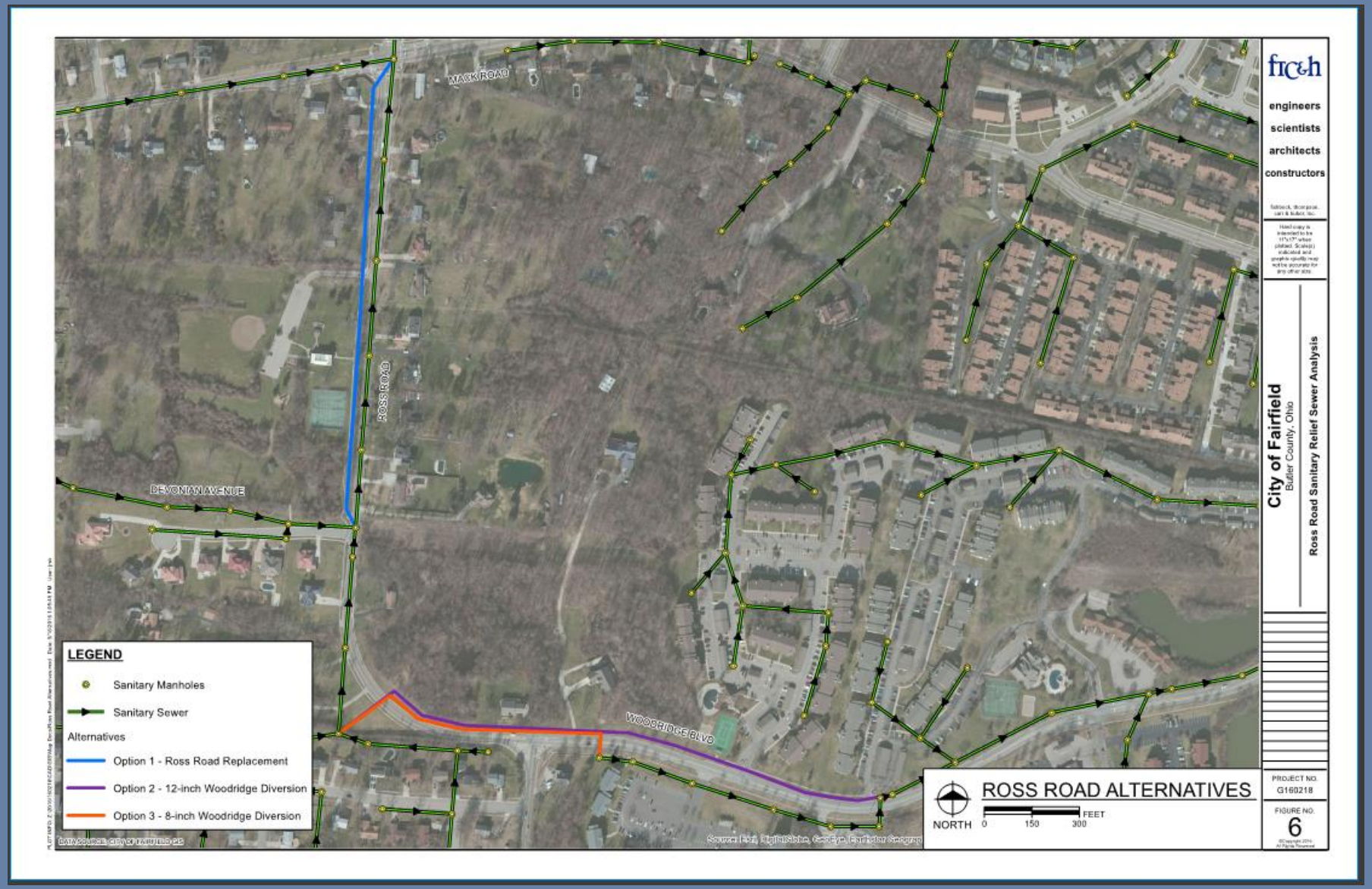


Ross Road Sanitary Relief Sewer Analysis

CALIBRATE HYDRAULIC MODEL

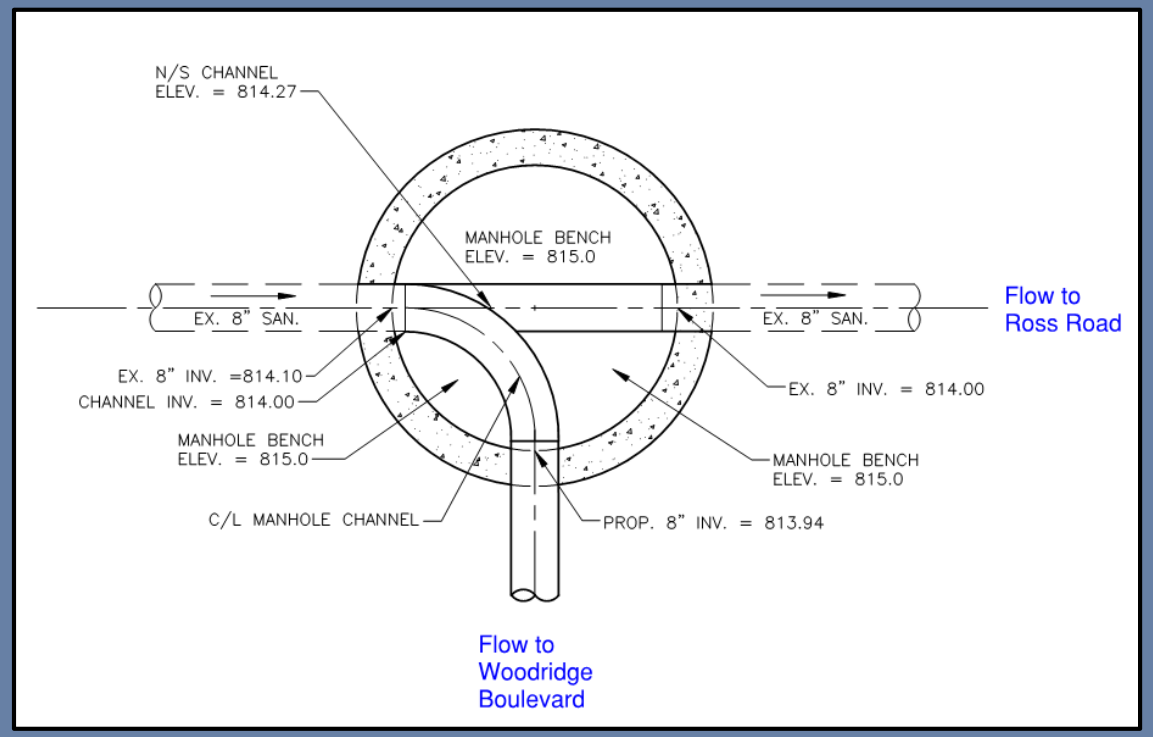


DEVELOP AND EVALUATE ALTERNATIVES

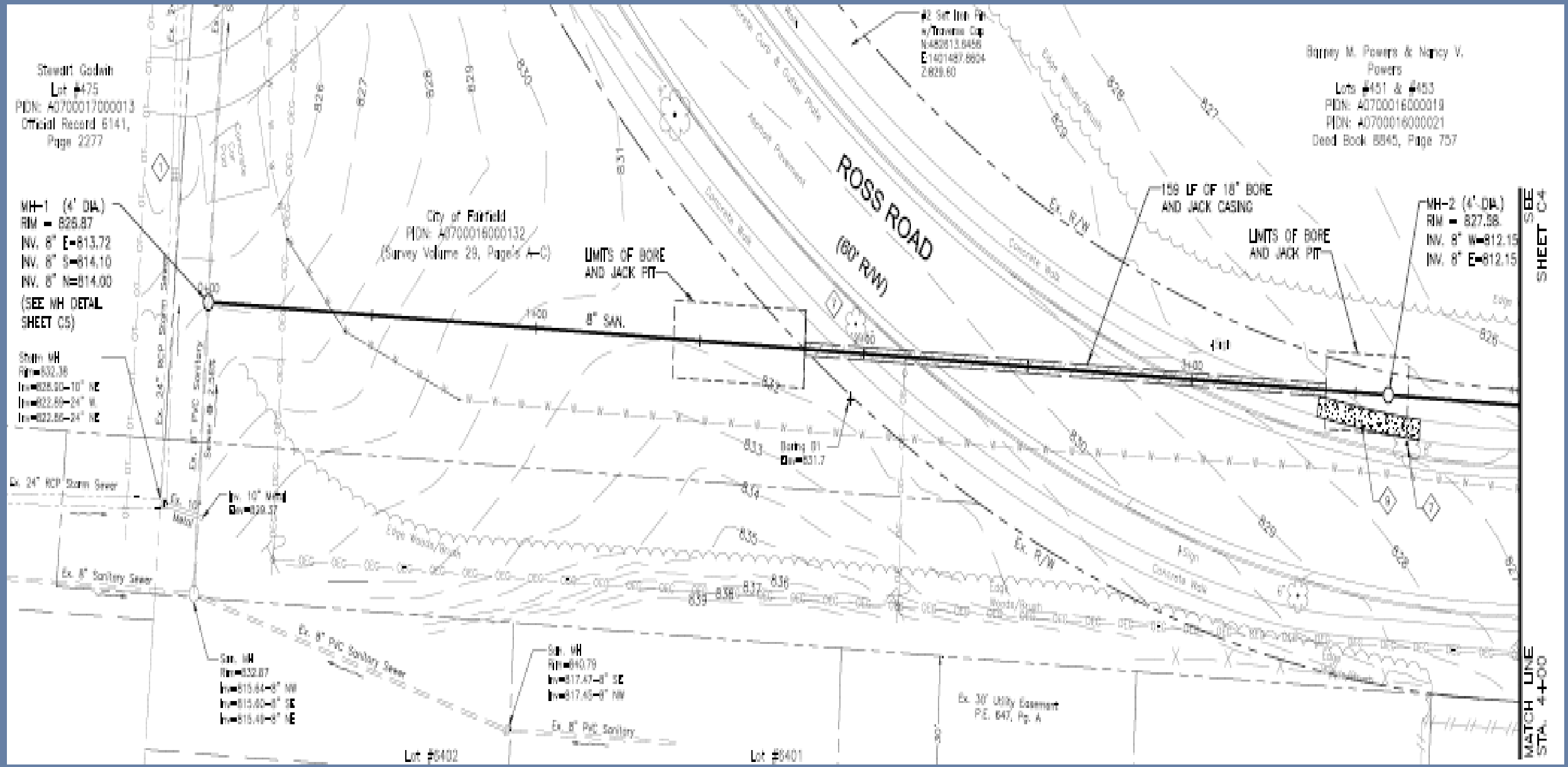


SELECT OPTION 3

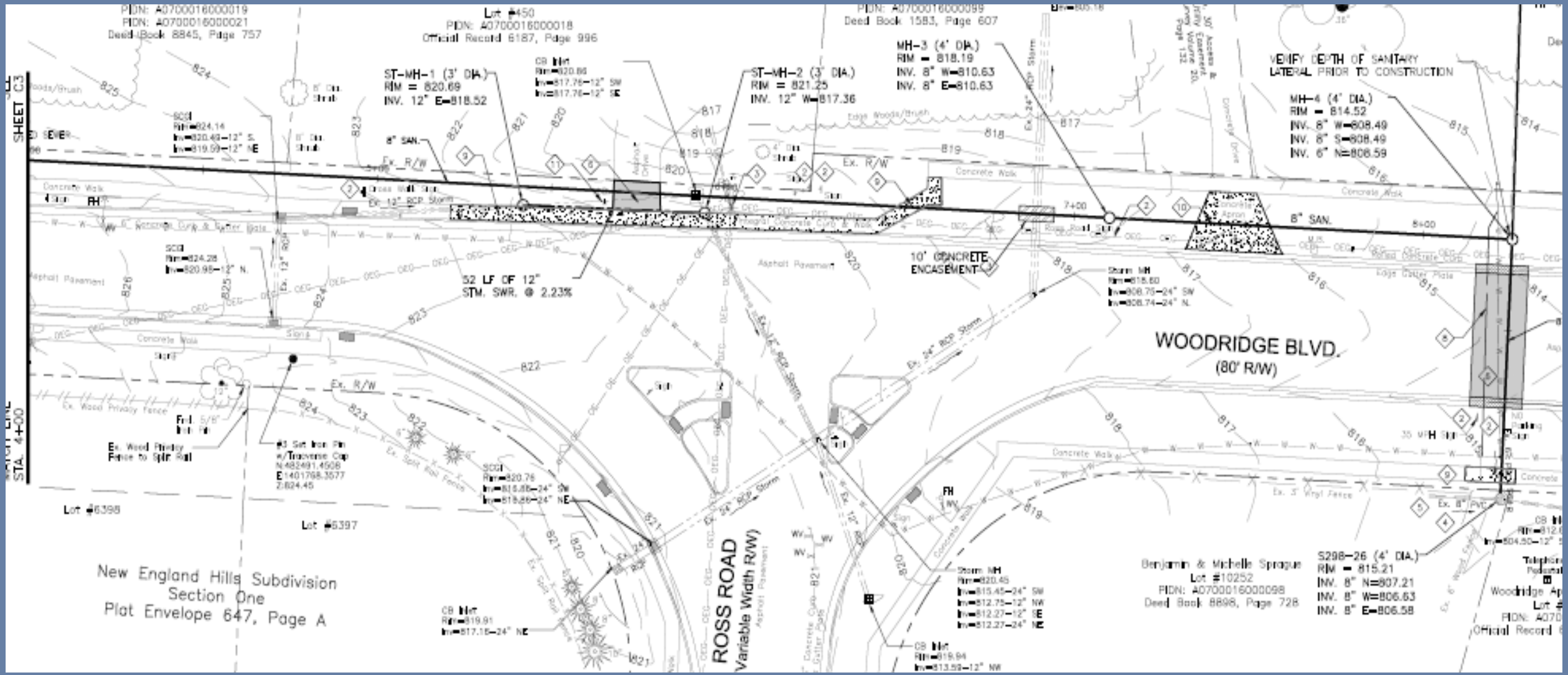
1. Construct diversion manhole upstream of existing SSO
2. Dry weather flow to be diverted to Woodridge Boulevard
3. Wet weather flow to be split between Woodridge Boulevard and Ross Road sewers



DIVERSION MH (1) TO MH 2 – INCLUDING BORE & JACK



MH 3 TO MH 4 TO TIE-IN POINT – INCLUDING ROAD CROSSING



CONSTRUCTION

CONSTRUCTION

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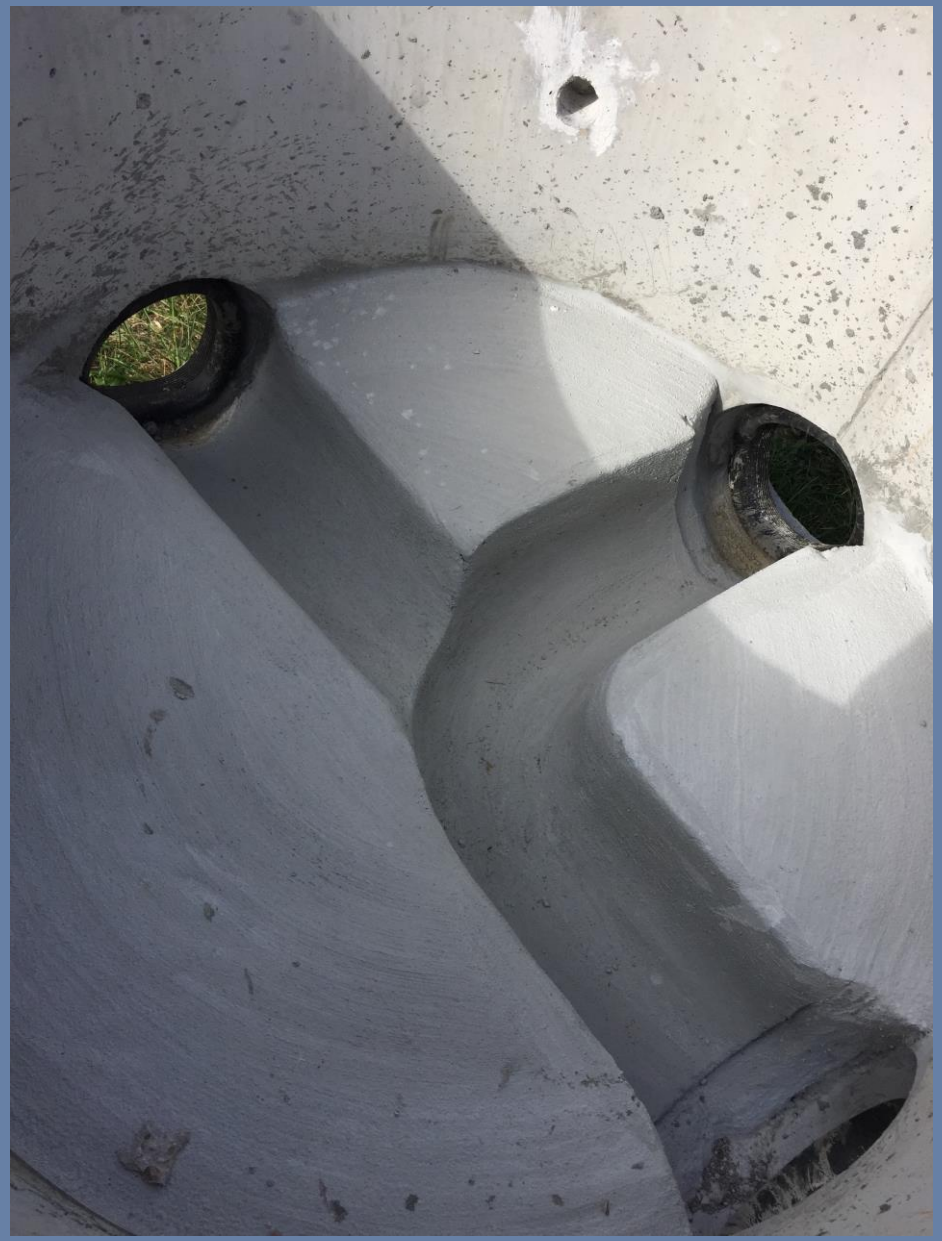

CONSTRUCTION

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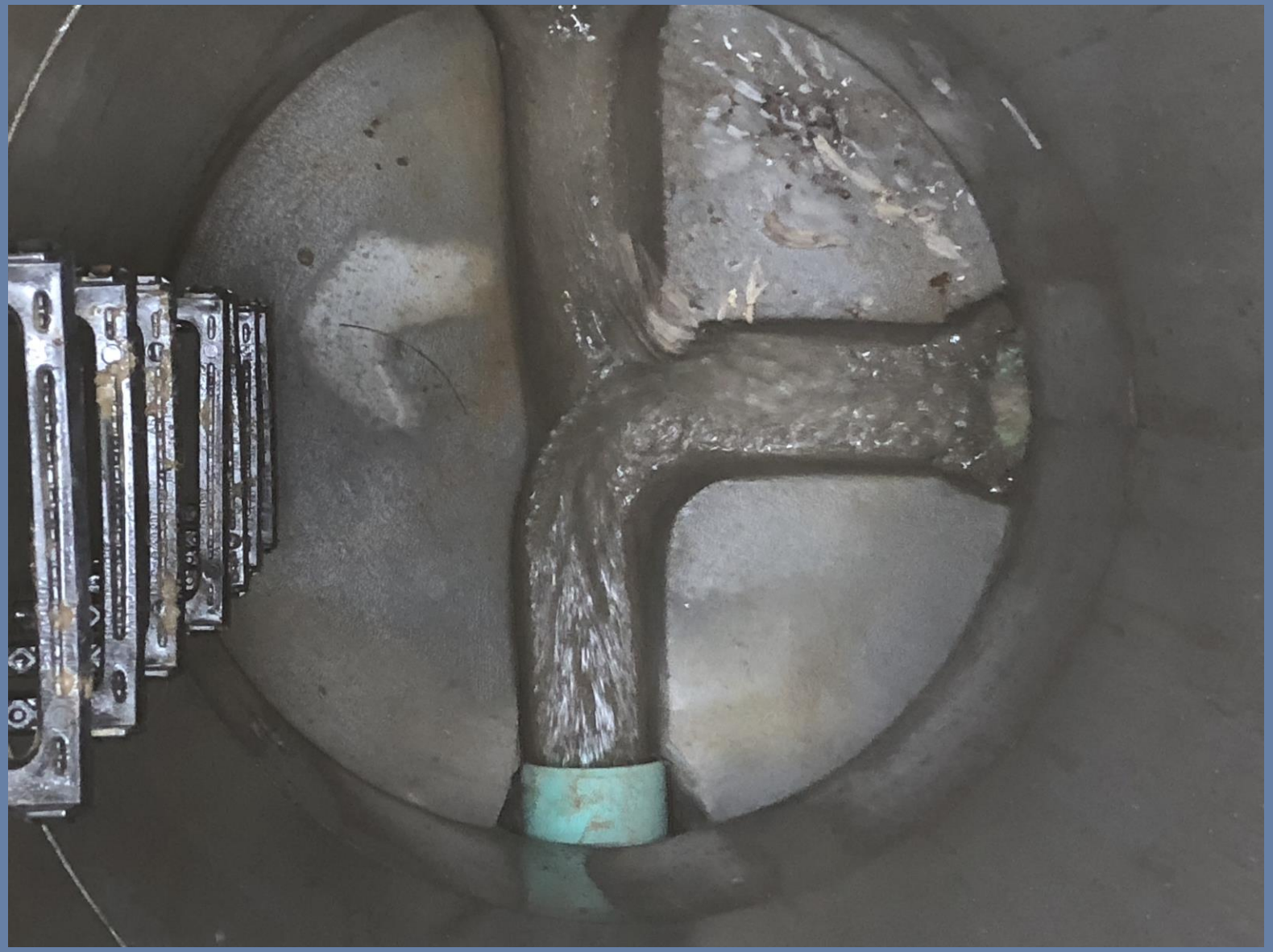

Videos:

- Normal flow operation
- High flow operation
- November 5, 2017
  - Approximately 2.25-inches over 4.5 hours
- No reported issues February 20-25, 2018

COSTS & BENEFITS

- Modeling; Alternative evaluation; Design; Permitting:
  - $57,000
- Construction:
  - $215,000

- Benefits:
  - Elimination of last known SSO; protection of public health and the environment; demonstration of commitment to compliance

THANK YOU

FISHBECK, THOMPSON, CARR & HUBER

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