

# DEPTH ONLY MONITORING UTILIZED BY BALTIMORE COUNTY

Presenters: Kraig Moodie Chris Korpman



### DEPTH ONLY MONITORING TECHNOLOGY

- WHAT TECHNOLOGY IS USED FOR DEPTH ONLY MONITORING?
- Is it "NEW" TECHNOLOGY?
- How is it different than "Conventional Flow Monitoring"?
- How did Baltimore County use depth only monitoring?

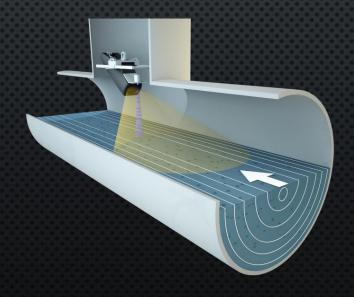


# CONVENTIONAL FLOW MONITORING

- CONTACT SENSORS
- Non-Contact Sensors
- ULTRASONIC DEPTH
- Pressure Depth
- RADAR DEPTH
- DIGITAL DOPPLER VELOCITY
- RADAR VELOCITY
- LASER VELOCITY









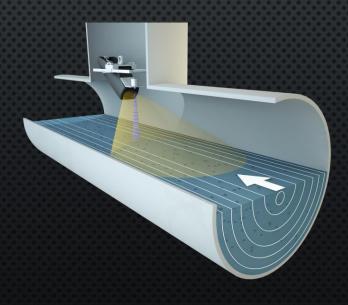


# CONVENTIONAL FLOW MONITORING

- I/I QUANTIFICATION PROJECTS
- CSO REPORTING
- CAPACITY ANALYSIS
- Model Development
- INTERJURISDICTIONAL BILLING
- REGULATORY REQUIREMENT
- WATER QUALITY ANALYSIS
- Q=A\*V











### DEPTH ONLY MONITORING

- ULTRASONIC/RADAR DEPTH
  - EASY TO INSTALL
  - SENSOR DEAD BAND
  - SIGNAL GOES TRANSMITS IN A CONE
  - DISTANCE LIMITATION
  - ACCOUNT FOR MANHOLE CONSTRUCTION
- Pressure Depth
  - Greater Range
  - NO DEAD BAND
  - CONFINED SPACE ENTRY





## DEPTH ONLY MONITORING

- APPLICATIONS
- PACKAGING
- Communications
- PRICING
- Unit Distribution
- ANALYTICS





### DEPTH ONLY MONITORING TECHNOLOGY

- WHAT IS THE PURPOSE FOR THE DATA?
  - ENGINEERING?
  - O%W3
  - NOTIFICATION?
  - BUDGET?
  - FUTURE DATA REQUIREMENTS?





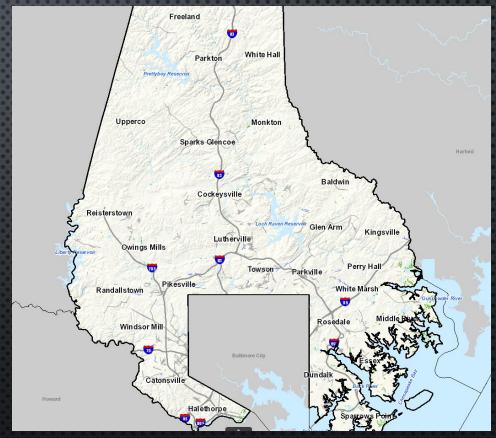
### DEPTH ONLY MONITORING TECHNOLOGY

- WHAT TECHNOLOGY IS USED FOR DEPTH ONLY MONITORING?
- Is it "NEW" TECHNOLOGY?
- How is it different than "Conventional Flow Monitoring"?
- How did Baltimore County use depth only monitoring?



# BALTIMORE COUNTY'S SEWER COLLECTION SYSTEM

- GRAVITY SEWER SYSTEM
- 8" GRAVITY SYSTEM
  - 50,030 ASSETS
  - 1,686 MILES
  - Greater than 8"
    - 9,172 ASSETS
    - 395 MILES



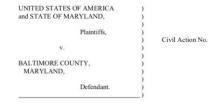
THE SYSTEM IS CURRENTLY MAINTAINED AND INSPECTED BY BOTH ON-CALL CONTRACTORS AND THE BUREAU OF UTILITIES



#### BALTIMORE COUNTY CONSENT DECREE

- Instituted in 2005
- Purpose
  - THE EXPRESS PURPOSE OF THE PARTIES ENTERING INTO THIS CONSENT DECREE IS FOR BALTIMORE COUNTY TO TAKE ALL MEASURES NECESSARY TO COMPLY WITH THE CLEAN WATER ACT AND THE REGULATIONS PROMULGATED THEREUNDER, AND THE MARYLAND WATER POLLUTION CONTROL LAWS AND THE REGULATIONS PROMULGATED UNDER SUCH LAWS, WITH THE GOAL OF ELIMINATING SANITARY SEWER OVERFLOWS.

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF MARYLAND NORTHERN DIVISION



#### CONSENT DECREE

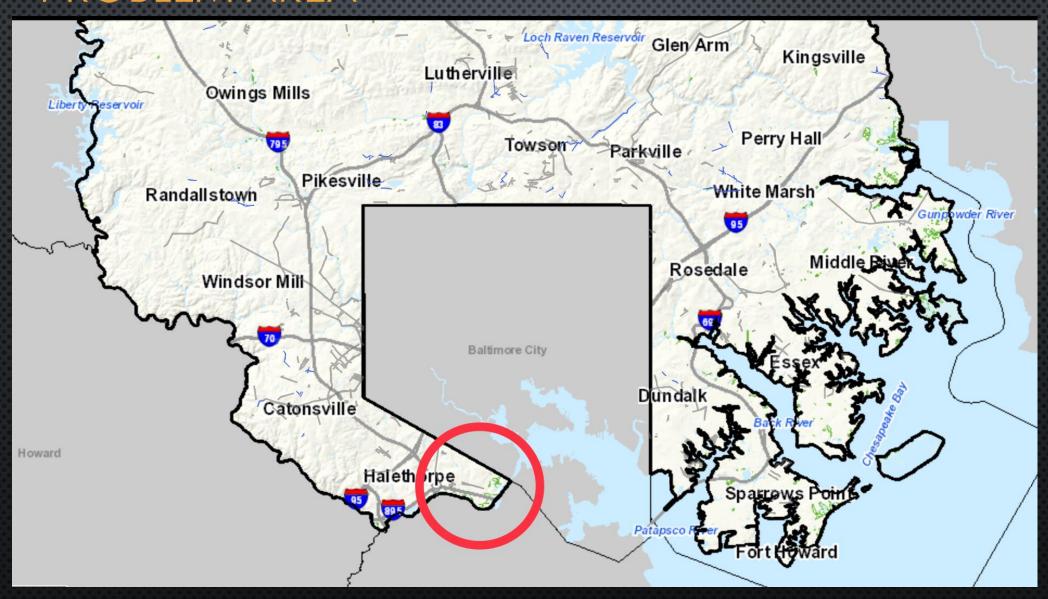
WHEREAS, Plaintiff; the United States of America ("United States"), by the authority of the Attorney General of the United States and through its undersigned counsel, acting at the request and on behalf of the Administrator of the United States Environmental Protection Agency ("EPA"), has filed the Complaint in this action seeking injunctive relief and civil penalties pursuant to Section 309 of the Clean Water Act, 33 U.S.C. § 1319, naming as defendant Baltimore County, Maryland ("Baltimore County") pursuant to Section 309(b) of the Clean Water Act, 33 U.S.C. § 1319(b);

WHEREAS, Plaintiff, the State of Maryland, Department of the Environment ("MDE"), has joined in the Complaint and seeks injunctive relief and civil penalties for Baltimore County's alleged violations of Title 9, Subtitle 3 of the Environment Article, Annotated Code of Maryland;

WHEREAS, Baltimore County operates a sanitary sewer collection system that serves most citizens of Baltimore County who live inside the urban-rural demarcation line, some citizens of Anne Arundel and Howard Counties, and the facilities located at Baltimore-Washington International Airport owned by the State of Maryland;



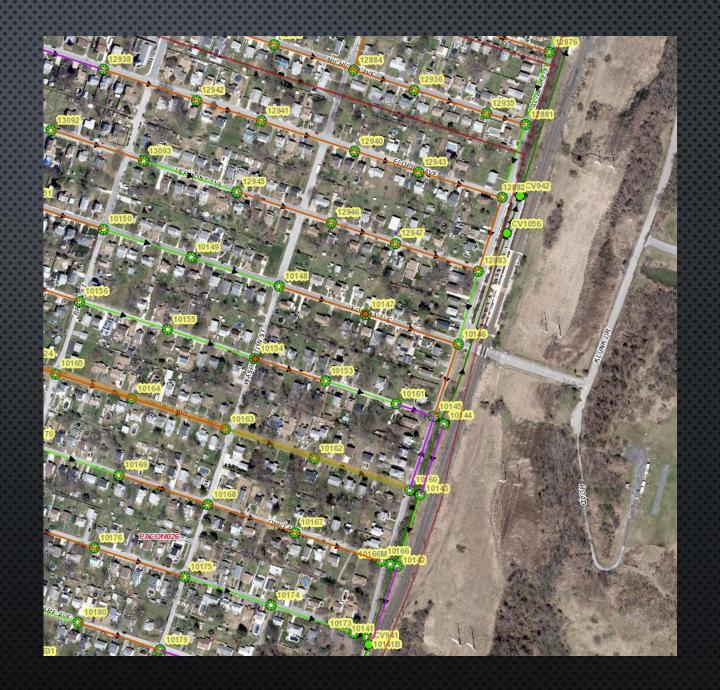
### PROBLEM AREA





# PROBLEM AREA

- BALTIMORE STREET
  - 8, 10 and 15 inch segments
  - Roots
  - GREASE
  - LOW ELEVATION
  - HIGH INFLOW & INFILTRATION
  - WET WEATHER BASEMENT BACKUPS





### DEPTH ONLY MONITORING

- PORTABLE AND EASY TO INSTALL
  - Units are small in size and mounted on spreader bar or composite manhole lid
  - NO CONFINED SPACE ENTRY FOR INSTALLATION
  - 2 MAN CREW CAN INSTALL AND SET UP IN 30 MINUTES
- REAL TIME DATA
  - Sample rates from 1 per second to 1 per 8 hours
  - Units can be programmed to upload data at pre-determined intervals
  - SEND HIGH LEVEL ALARMS
  - Record and upload during alarmed surcharge events simultaneously
- ACCURATE TO 1/10<sup>TH</sup> OF AN INCH



# DEPTH ONLY MONITORS

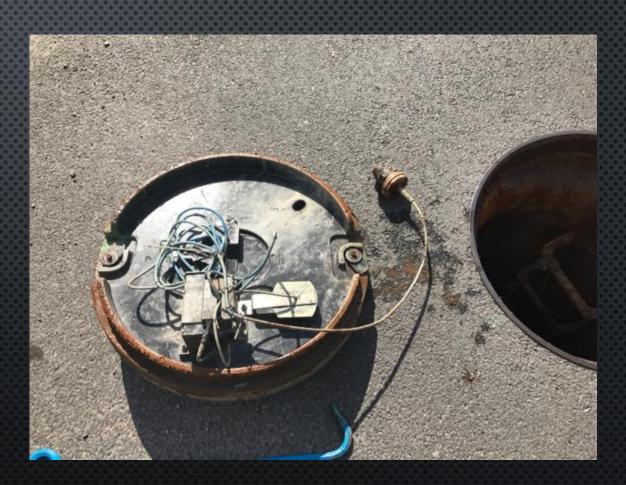






# DEPTH ONLY MONITORS

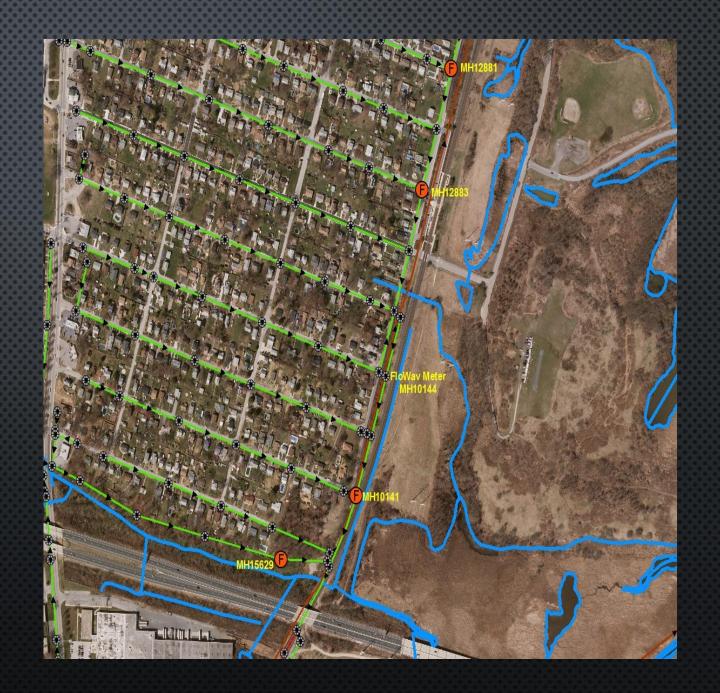






# PROBLEM AREA

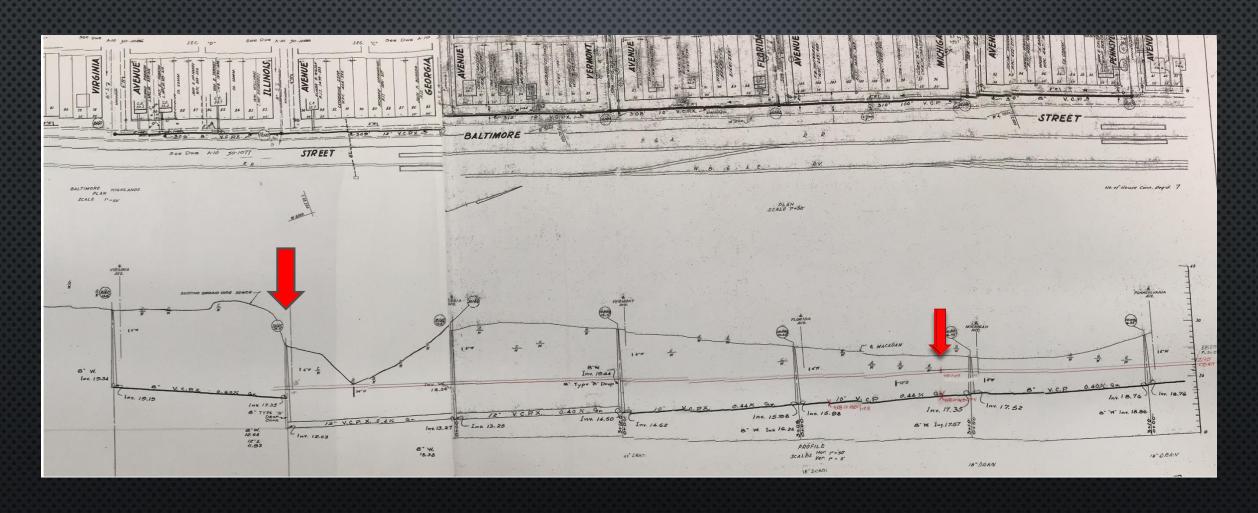
- BALTIMORE STREET
  - 8, 10, 12 AND 15 INCH SEGMENTS
  - Roots
  - GREASE
  - LOW ELEVATION
  - HIGH INFLOW & INFILTRATION
  - WET WEATHER BASEMENT BACKUPS
- METERING LOCATIONS





### **BALTIMORE STREET**

• ELEVATIONS





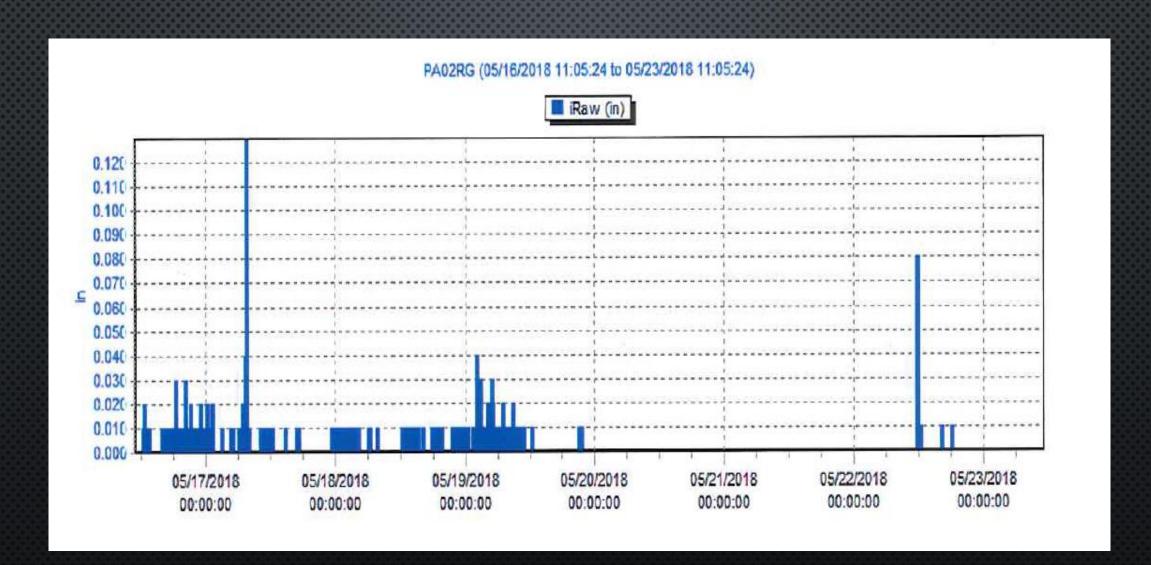
### PROBLEMS

- BASEMENT BACKUPS
  - MICHIGAN AVE
- OBSERVED SURGING
  - ILLINOIS AVE
- ROOTS AND GREASE
  - IN RIGHT OF WAY



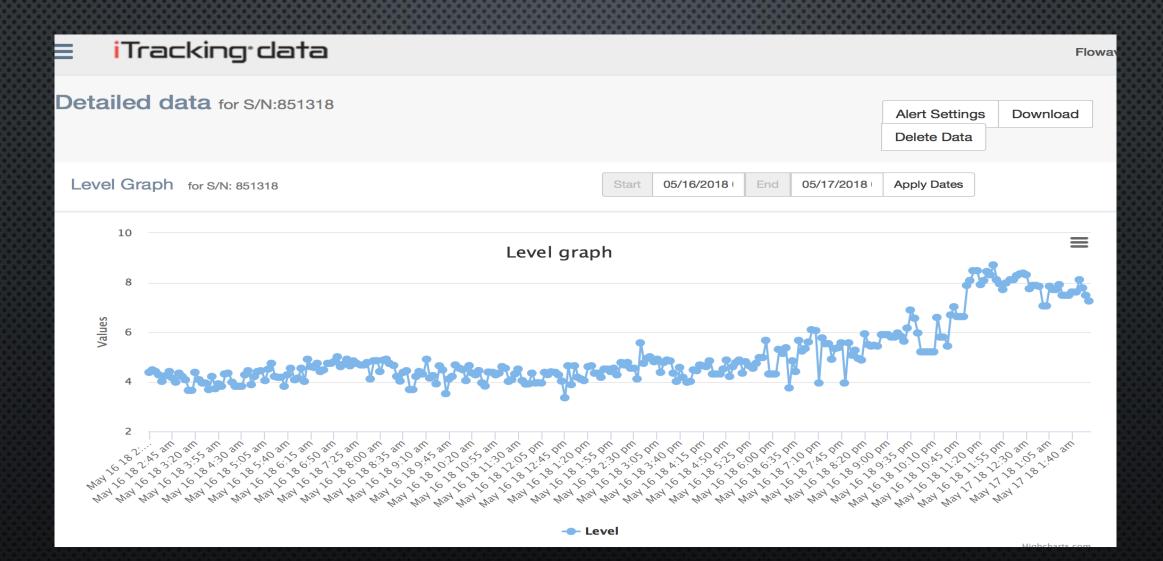


• RAIN FALL LEVELS DURING 5/16-17/2018 RAIN EVENT





Water levels during 5/16-17/2018 rain event





#### BALTIMORE STREET LESSONS LEARNED

- PROACTIVE O & M HELPS PREVENT FUTURE BASEMENT BACKUPS
- CAPACITY DOES NOT APPEAR TO BE AN ISSUE
- FLOW LEVEL MONITORING CAN HELP DETERMINE CLEANING INTERVAL
- WILL CONTINUE TO MONITOR SEGMENTS TO LOOK FOR DATA OUTLIERS AND SURGING
- APPROPRIATE APPLICATION OF TECHNOLOGY WORKS CONVENTIONAL AND DEPTH ONLY
- RELIABLE CELLULAR COMMUNICATION IS CRITICAL



### OTHER PROBLEM AREAS

- | & | COMPARISONS
- SLOPE AND RESTRICTION ANALYSIS
- LEVEL VS. ODOR AND HYDROGEN SULFIDE ANALYSIS
- COMMERCIAL DISCHARGE MONITORING.
- LEVEL ALARMS IN PROBLEM AREAS

# QUESTIONS?



Chris Korpman 32233324562 ckorp@yourplace.com



Kraig Moodie (717)580-0123 kmoodie@flowav.com