



# Successful Implementation of Interim Control Measures (ICM) for PFAS Treatment from SW at Selfridge Air National Guard Base, MI

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# Agenda

- 01 Project Setting and Background
- 02 507 ICM System
- 03 508 ICM System
- 04 Continued Remedial Investigation/Options
- 05 Lessons Learned



01

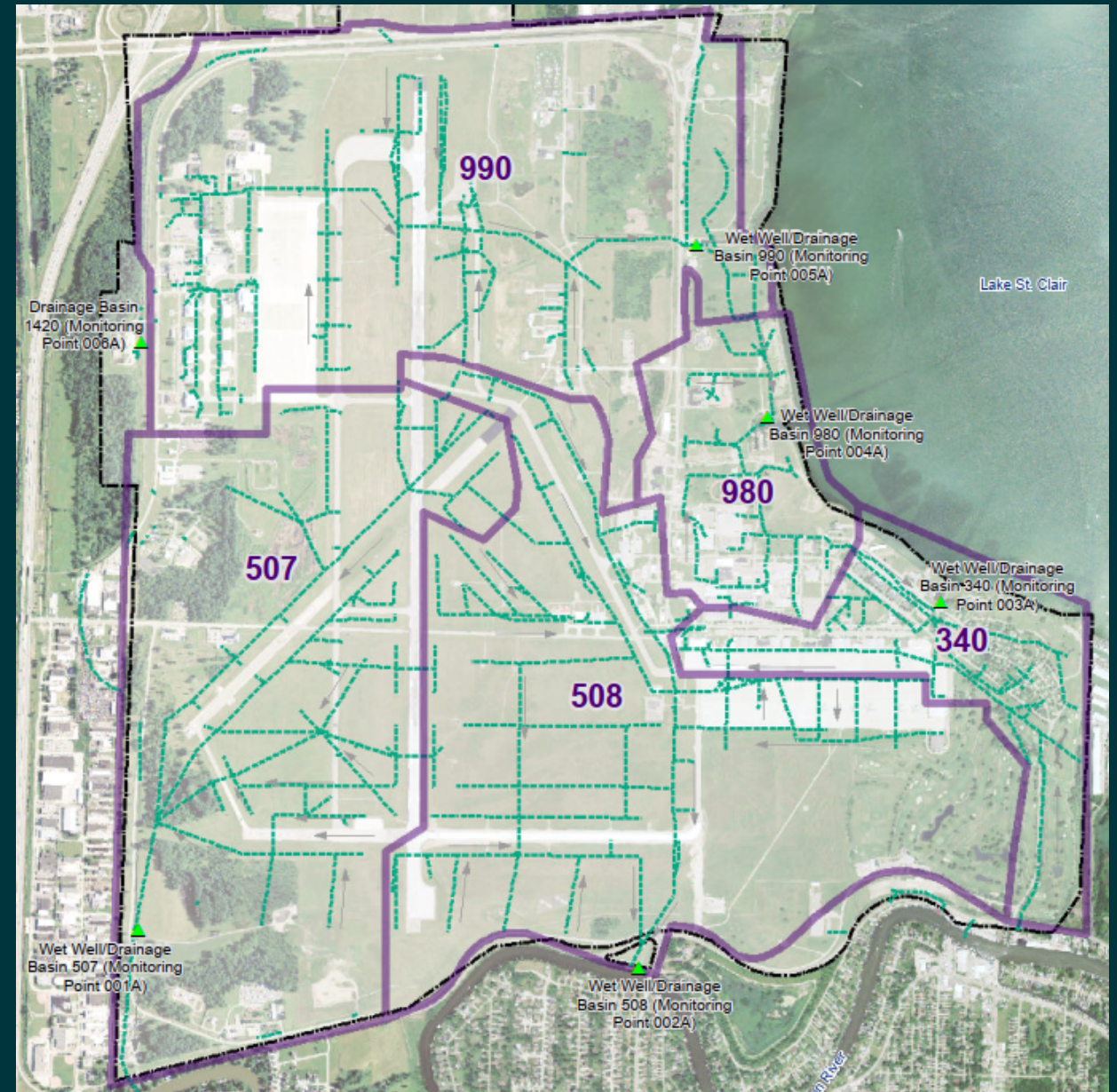
# Project Setting and Background

# Project Setting



Lake St. Clair

- Six drainage basins discharge to Clinton River and/or Lake St. Clair
- Outfall discharges are regulated through NPDES permit



# Project Background

- PFAS in the form of AFFF used in military training exercises and fire suppression systems

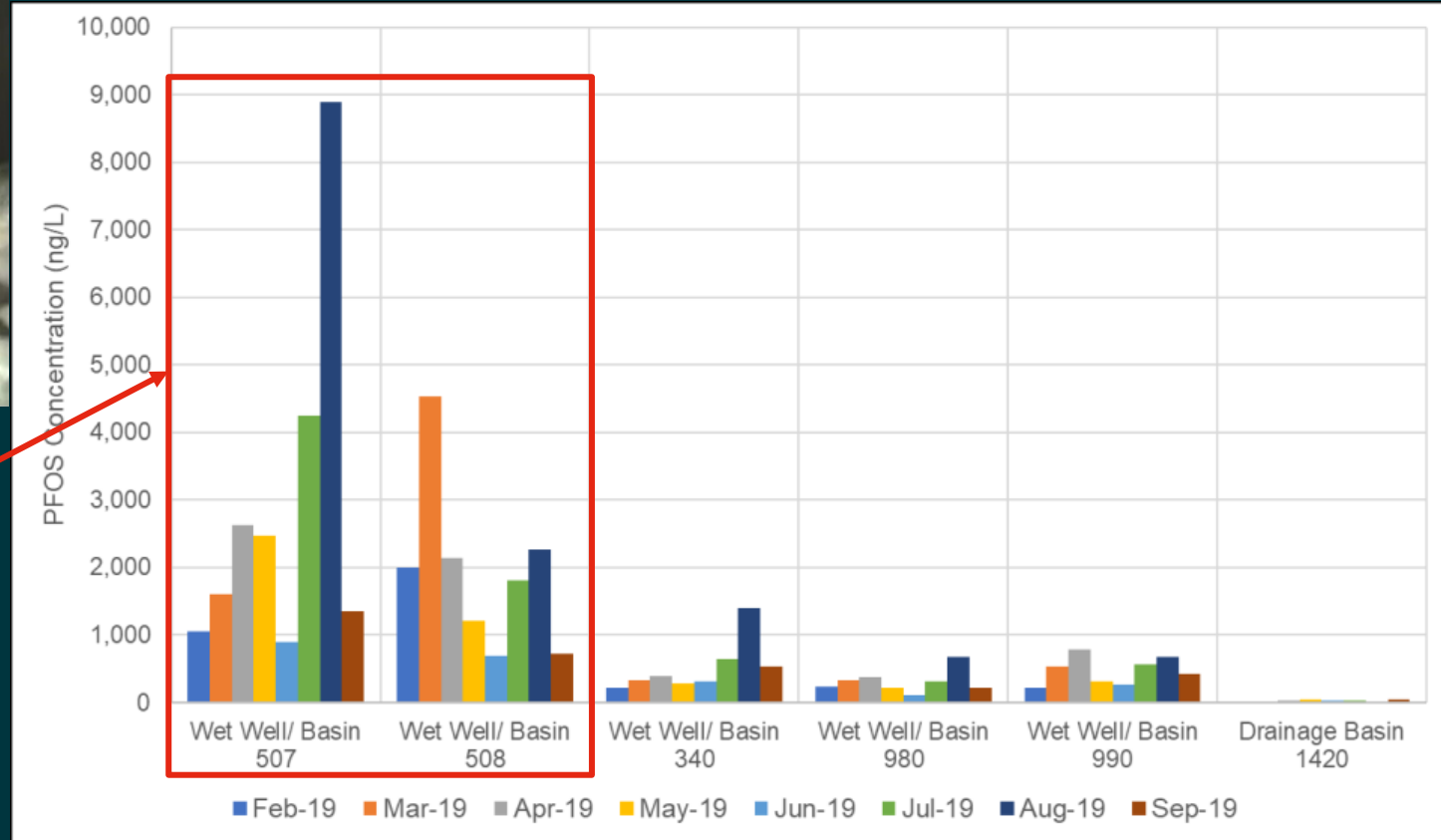
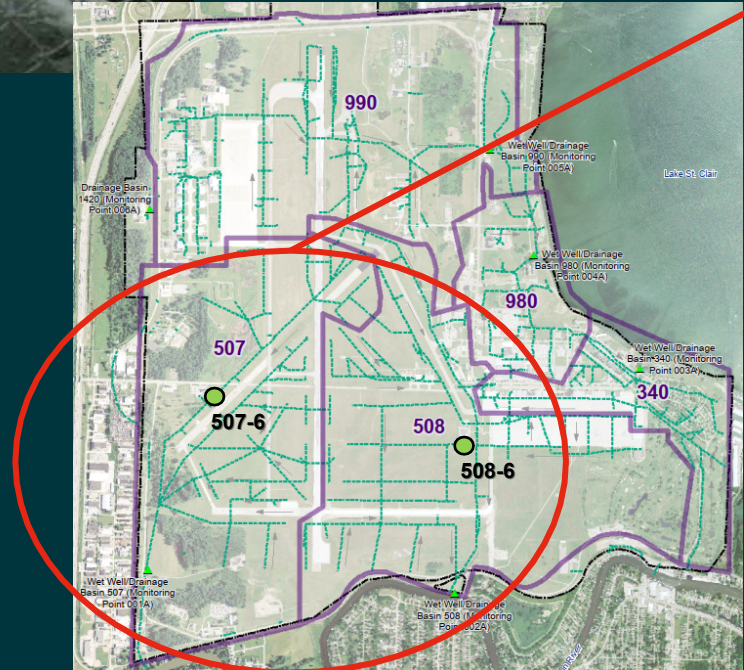


# Timeline of Events

*A problem is identified and a solution is implemented...*



# Highest PFOS Concentrations Detected in 507 and 508 Outfalls



Storm water discharges from all outfalls above MI Water Quality Standard for PFOS (11 ng/L).

507 and 508 Outfalls identified as highest impacts.

02

507 ICM System



# 507 ICM Treatment System



Mobile PFAS treatment system placed at manhole 507-6 in Drainage Basin 507

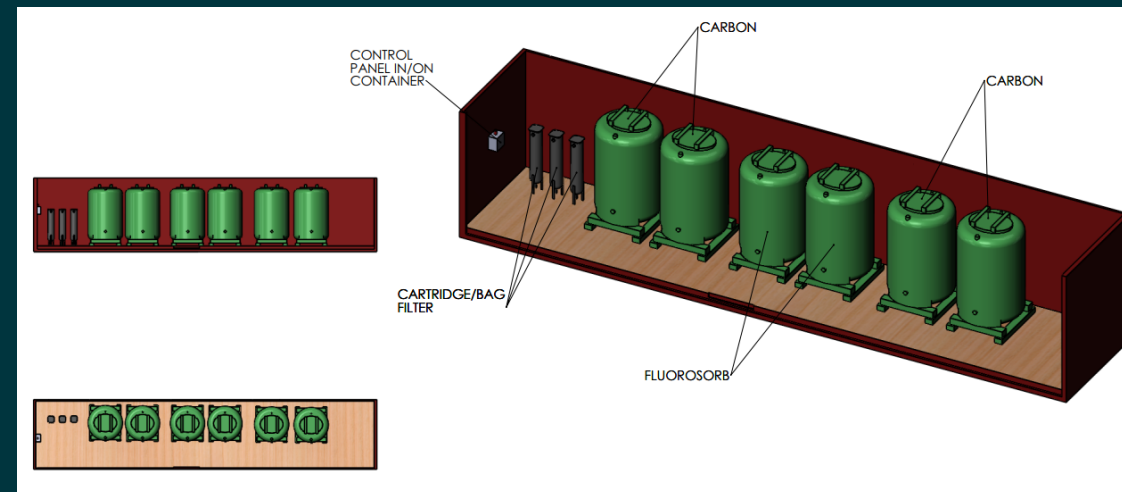
Began operation on 3 Jan. 2020

Flows between 13 to 92 gpm

Raw water PFOS Concentration ranging from: 483 to 15,600 ppt

Three different media:

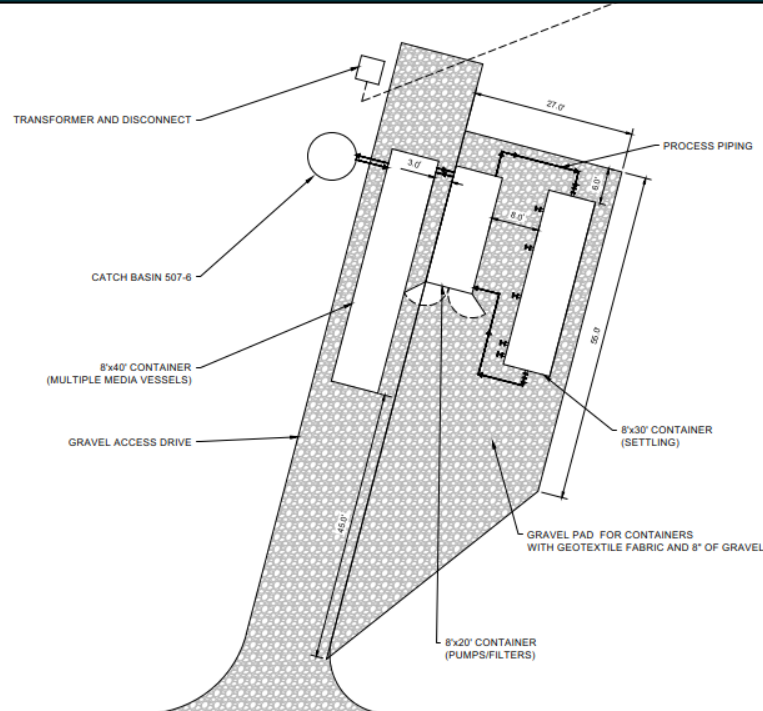
- Calgon Filtrasorb F400
- AC-PF Oxpure™ 1240
- CETCO Fluorosorb®



# 507 ICM Treatment System

System includes:

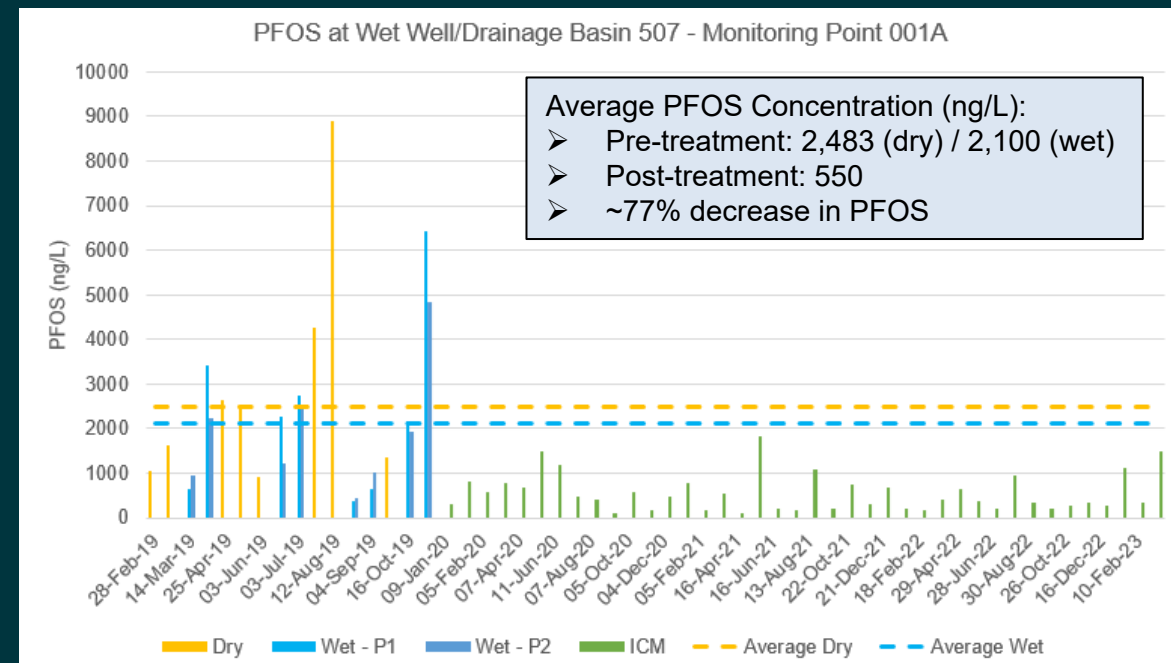
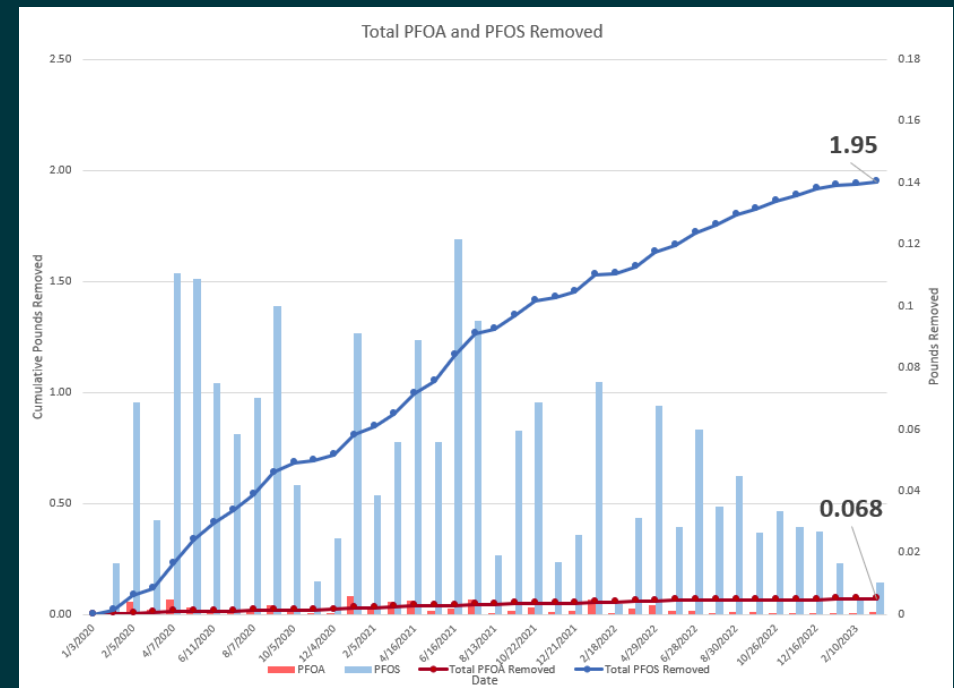
- Weir and Sump Pumps
- Settling Tank
- Discharge Pumps
- Particulate Prefilter
- Media Vessels



# 507 ICM Treatment System

## PFOS Removal Performance

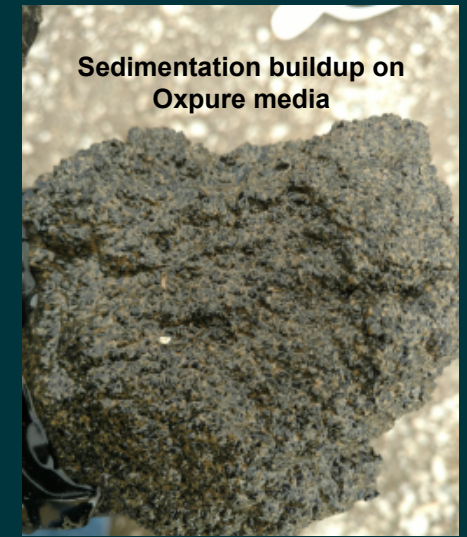
- GAC (F400 and Oxpure 1240) and Fluorosorb Works
- Total Water Treated to date: 43.1 million gallons
- Total PFOS mass removed to date: **1.95 lbs**
- **~77%** PFOS reduction at Outfall Discharge (from 2,375 ppt to 550 ppt).
- For this specific project, F400 was carried forward:
  - Fluorosorb 200 had early flow impacts (11 gpm vs 19 gpm for GAC)
    - Changed to Fluorosorb 400 and flow was similar to GAC (~17 gpm)
  - Oxpure and Fluorosorb would have to be managed for disposal
  - Calgon provided regeneration services for spent F400 GAC
  - F400 was most practical for use



# 507 ICM Treatment System

## Operational Observations and Challenges

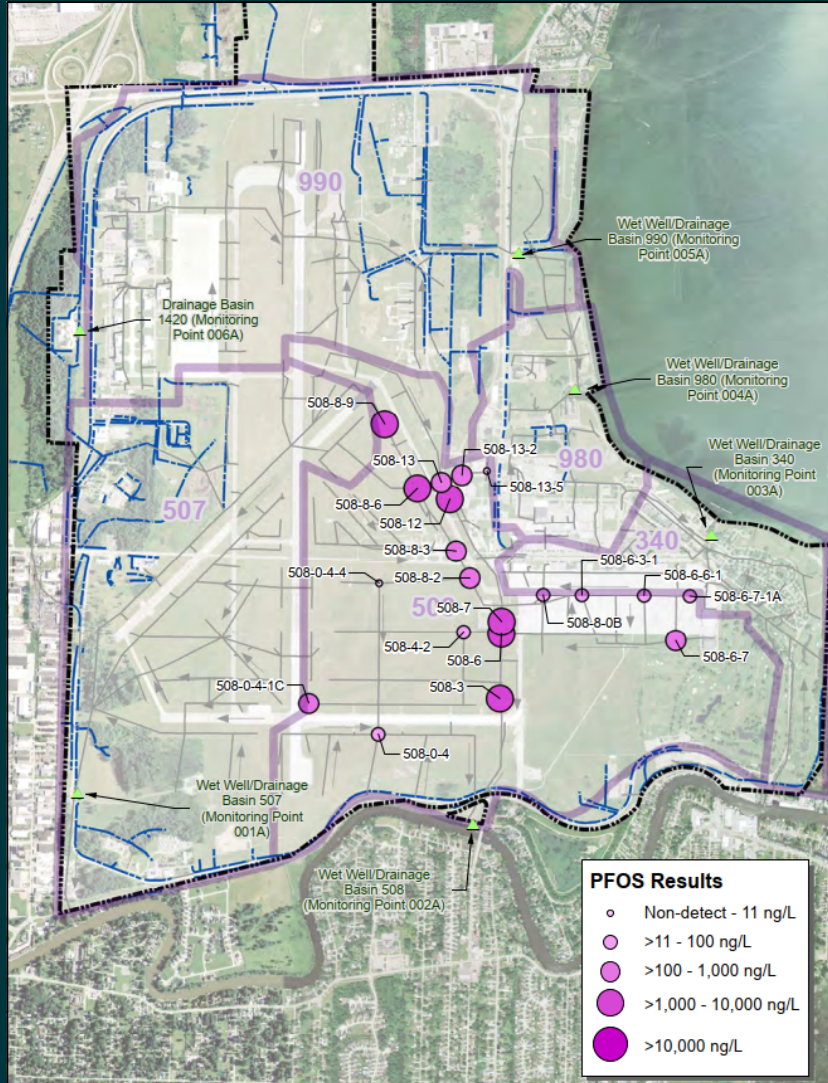
- Stormwater causes flow fluctuations
- Water quality is poor/variable
  - Particulates
  - Other solids/organisms (i.e. crayfish)
  - Biological growth
- Non-PFAS items impact flow and possibly media performance



**03**

**508 ICM System**

# 508 ICM Treatment System



Mobile PFAS treatment system placed at manhole 508-6 in Drainage Basin 508

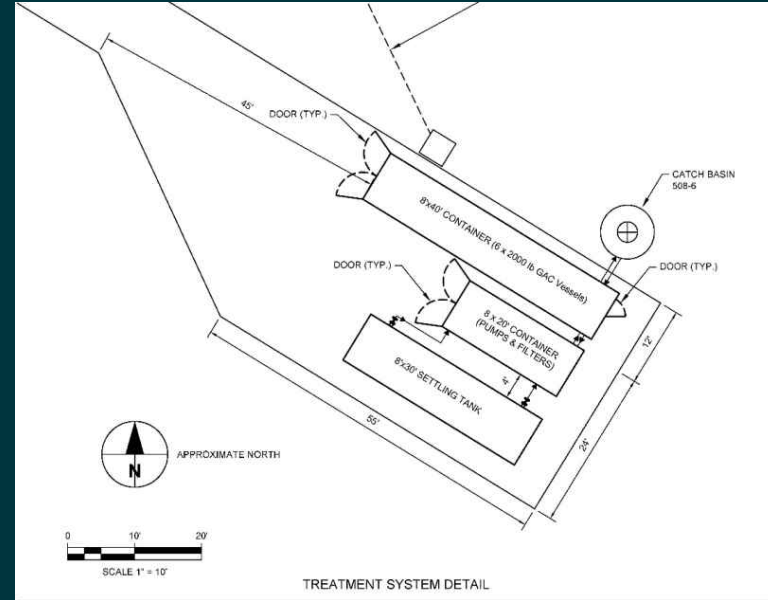
Began operation on 2 Nov. 2021

Flows between 20 to 130 gpm

Design based on 507 system

Calgon Filtrasorb F400 media only

Increased pumping and more advanced controls to 507 system



# 508 ICM Treatment System

System includes:

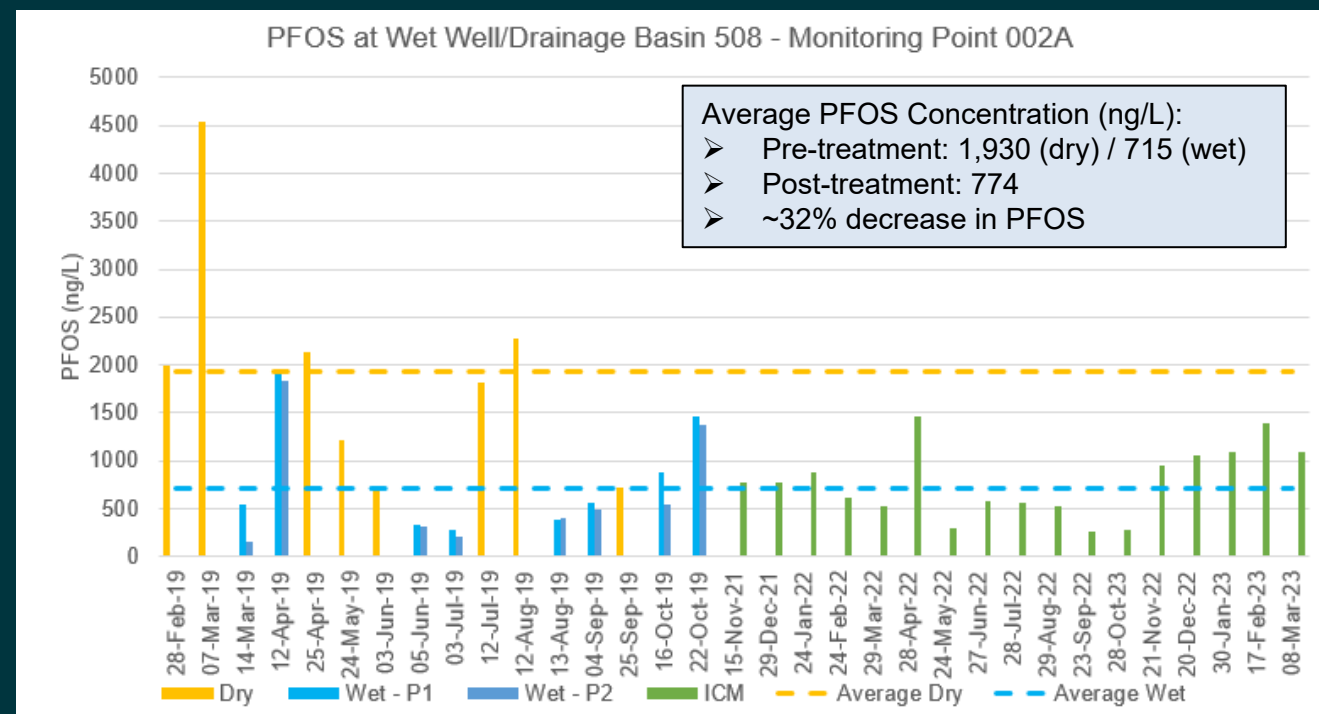
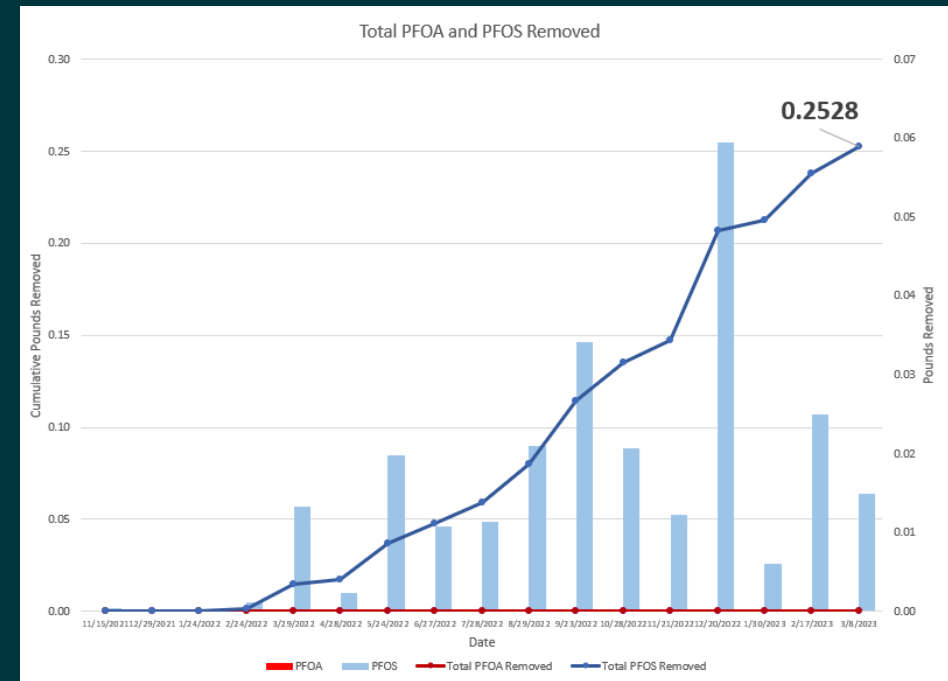
- Sump pumps
- Settling Tank
- Discharge Pumps
- Particulate Prefilter
- Media Vessels



# 508 ICM Treatment System

## PFOS Removal Performance

- With the learnings from 507 ICM, F400 was used for all media vessels
- Total Water Treated to date: 35.2 million gallons
- Total PFOS mass removed to date: **0.25 lbs**
- ~**32%** PFOS reduction at Outfall Discharge (from 1,130 ppt to 774 ppt)





# 508 ICM Treatment System

## Operational Observations and Challenges

- Storm water causes flow fluctuations
  - Using existing storm water infrastructure (manhole and SW pumps etc.) is a limiting factor
- Water quality is poor/variable
  - Particulates
  - Biological growth (flow rates quickly reduce from 100+ gpm to <20 gpm)
- Non-PFAS items impact flow and possibly media performance



04

# Continued Remedial Investigation/Options

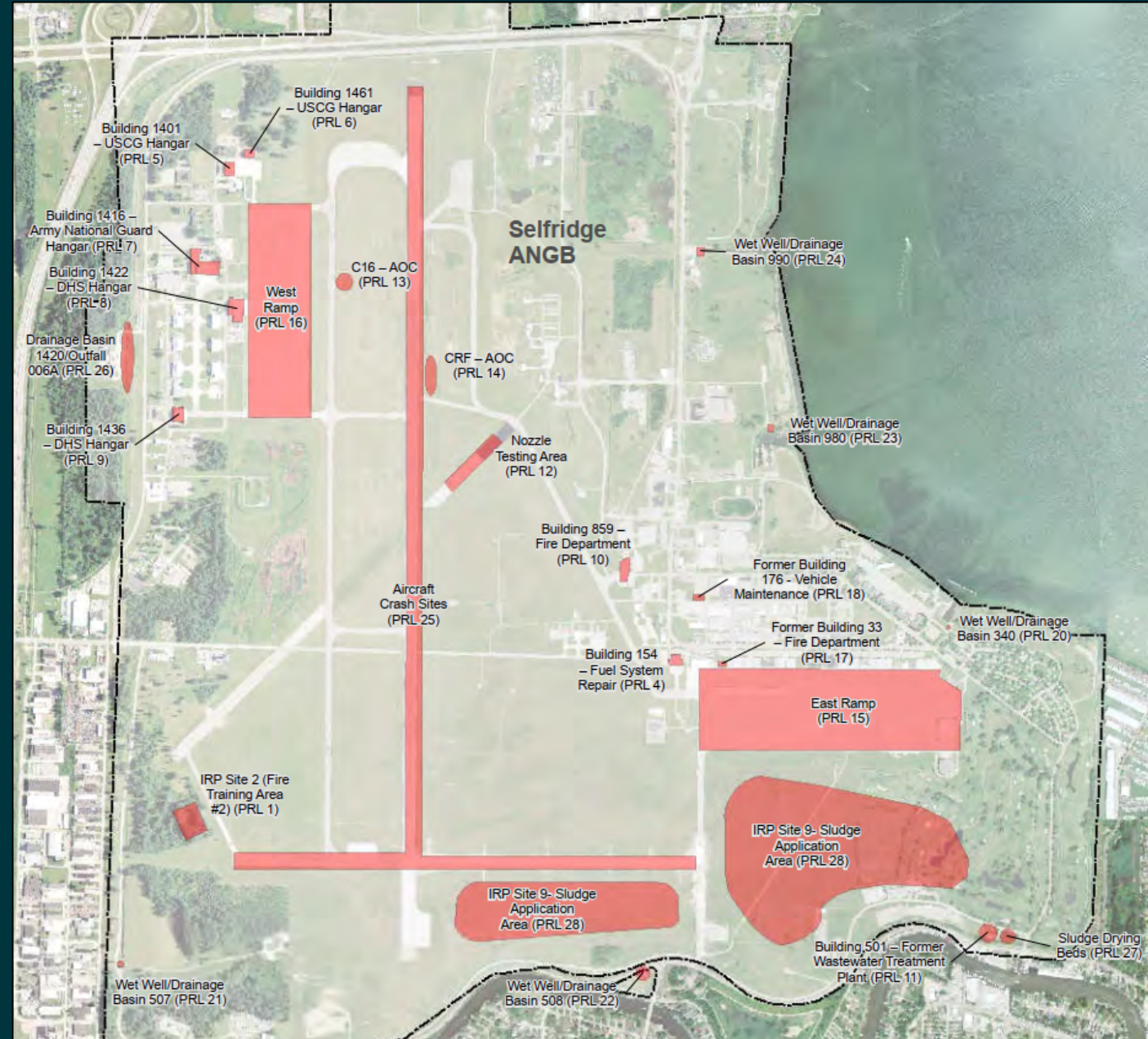
# On-going Remedial Investigation

16 Potential Release Areas will be investigated during Remedial Investigation

Look at sources in soil, groundwater, and stormwater

Nozzle Testing Area source area

- Upstream source that feeds into both 507 and 508 ICM systems



05

Lessons Learned

# Lessons Learned

- ICM was successful in reducing PFOS by 32% to 77%
- Storm water is a difficult environmental media to treat and ICM treatment system can be easily deployed for temporary applications
- Understand existing site conditions and site limitations
- Pilot and evaluate treatment media/technologies
- Storm water treatment comes with challenges
  - Flow
  - Biofouling
- Further evaluation/design needed for scaling to full flow capacity
- Continue holistic source and remedy investigation for direct/alternative treatment to minimize storm water impacts



# Thank You!

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