



# **PUBLIC INFORMATIONAL MEETING**

**Leachate Treatment System Project**

**County Wide Landfill (CWLF) Site**

**DSC McLouth Steel Gibraltar Superfund Site**

**Gibraltar, Michigan**

**November 29, 2023**

# Introductions: Project Team and Presenters



- **Michigan Department of Environment, Great Lakes, and Energy (EGLE)**
  - EGLE is Funding the Project and Owner of the Leachate Treatment System
  - Samantha Belisle, EGLE Project Manager
  - Courtney Fung, EGLE Senior Project Manager
- **Arcadis of Michigan, LLC (Arcadis)**
  - Arcadis is the professional services contractor for EGLE
  - Ted Kremer, PE, CCCA, Engineer of Record for the Project
  - Robert Prigge, Staff Environmental Engineer
    - Previously located at the Arcadis Treatability Lab, North Carolina
  - Additional engineers and project team members including:
    - Chris Peters, CPG, Certified Project Manager
    - Corey Theriault, PE, Technical Expert
    - Baxter Miatke, PE, Project Engineer

**Arcadis.** Improving quality of life.



# DSC McLouth Steel Gibraltar Plant Superfund Site Countywide Landfill

---

Samantha Belisle  
Superfund Project Manager  
(517) 290-0686  
[belisles1@michigan.gov](mailto:belisles1@michigan.gov)

Courtney Fung  
Senior Superfund Project Manager  
(517) 242-0008  
[funcg@michigan.gov](mailto:funcg@michigan.gov)

# Agenda

1. PFAS Overview - EGLE
2. Site History and Background – EGLE
3. Treatment System - Arcadis
  - a) PFAS Water Treatment Technologies
  - b) Feasibility Study, Bench Testing, and Pilot Testing
  - c) Site and Building Design Drawings
  - d) Permitting and Proposed Schedule

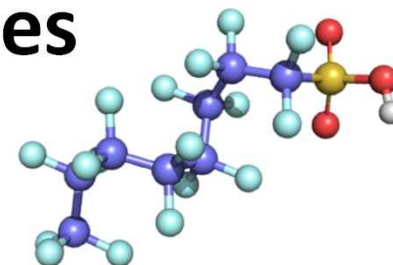
# Michigan PFAS Action Response Team (MPART)

- Created by Executive Directive in 2017
- Enduring body under Executive Order 2019-03
- Unique multi-agency approach
- Leads coordination and cooperation among all levels of government
- Directs implementation of State's strategy

[www.Michigan.gov/PfasResponse](http://www.Michigan.gov/PfasResponse)



# Per- and Polyfluoroalkyl Substances (PFAS)



## What are they?

- Strong Carbon-Fluorine Bonds
- Surfactants
- Highly Stable
- Repel Water, Oil, Fat, and Grease
- Began Developing in 1940s
- Thousands of Compounds Today

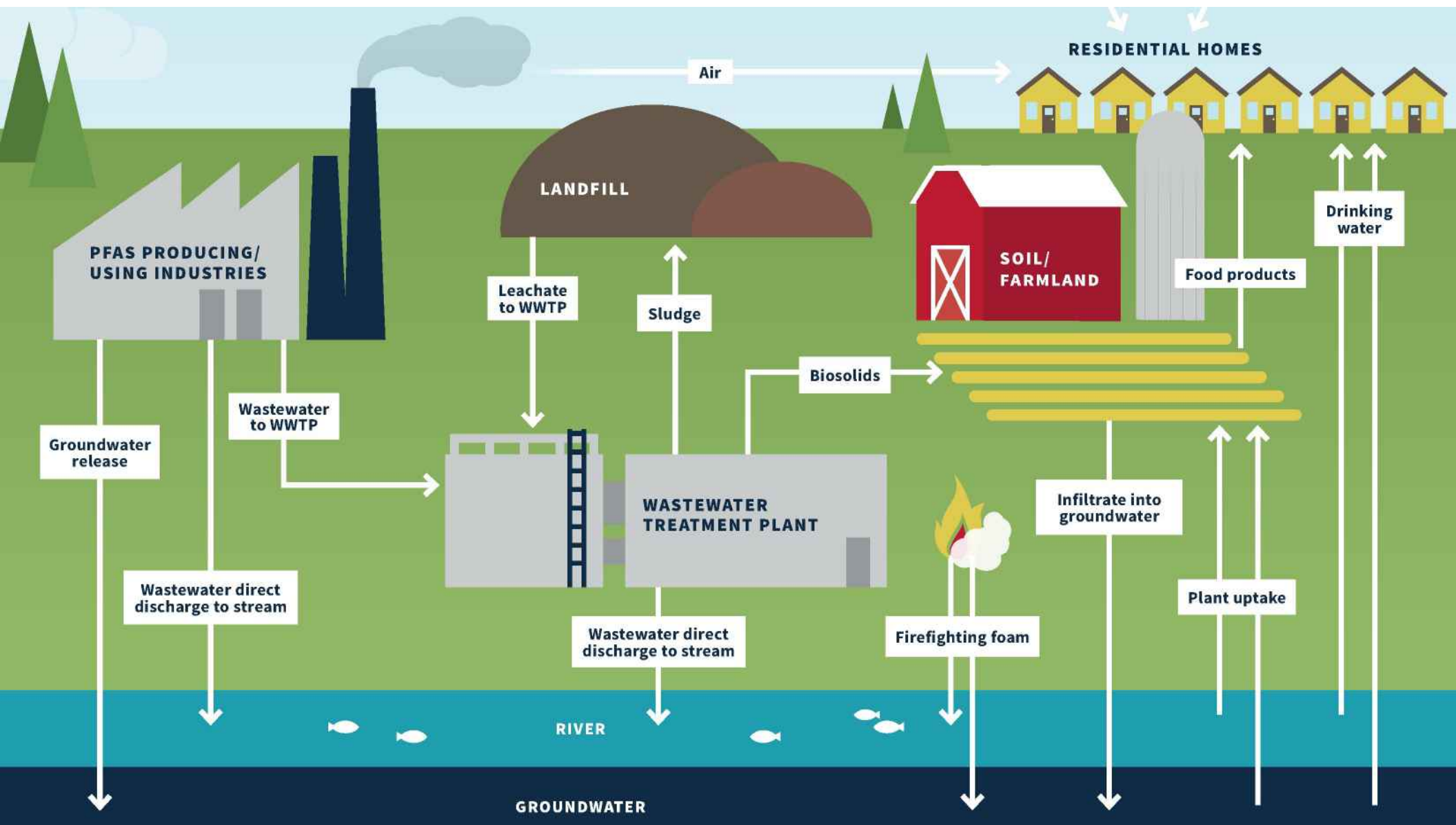
## Why the concern?

- Widespread through the ecosystem
- Don't Break Down Easily - Hard to Get Rid of
- Bioaccumulate – Build Up in Our Bodies
- Some PFAS May Affect Health
- Some emerging science/information
- Lack of Federal Standards

# PFAS Uses



<https://www.sixclasses.org/videos/pfas>





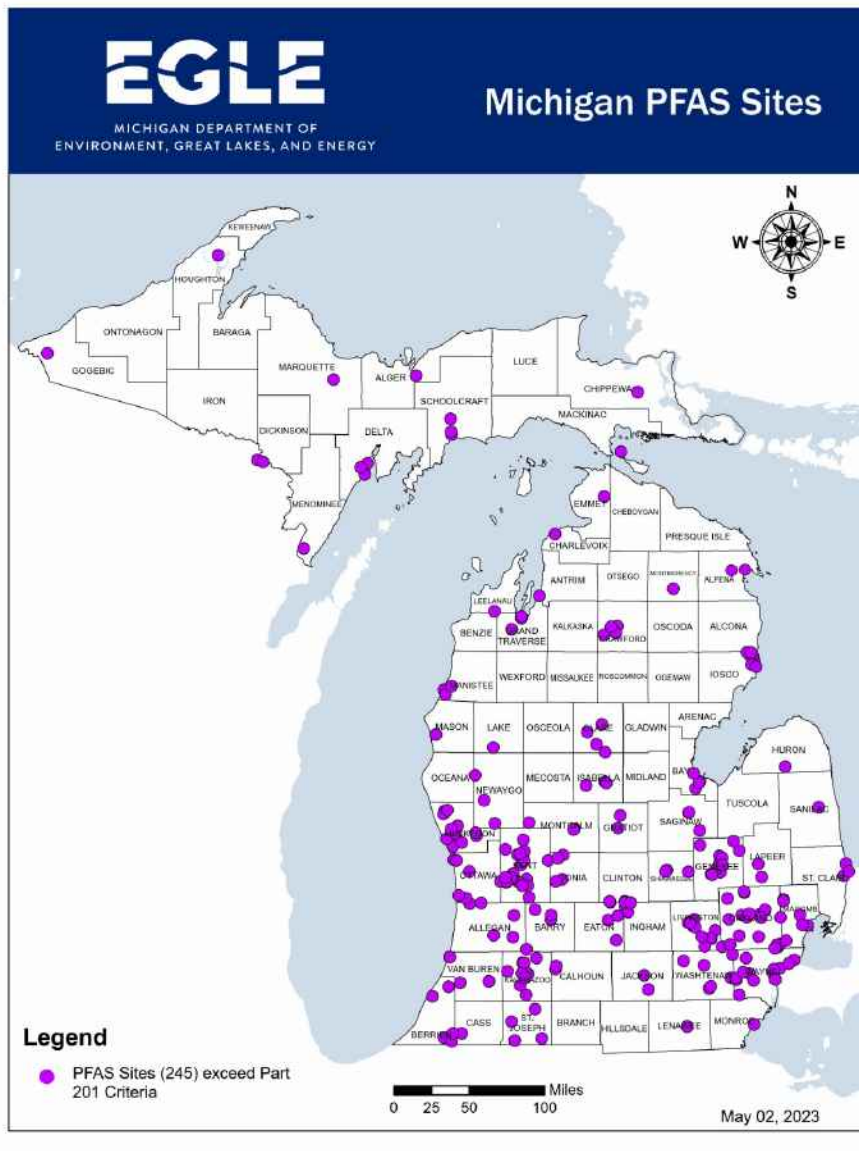
## Michigan's Drinking Water and Groundwater Cleanup Standards

Compound	Standards
PFNA	6 ppt
PFOA	8 ppt
PFOS	16 ppt
PFHxS	51 ppt
GenX (HFPO-DA)	370 ppt
PFBS	420 ppt
PFHxA	400,000 ppt

## Michigan Surface Water Quality Values

Compound	Water Quality Value
<b>PFOA</b>	170 ppt
<i>If Drinking Water Source</i>	<i>66 ppt</i>
<b>PFOS</b>	12 ppt
<i>If Drinking Water Source</i>	<i>11 ppt</i>
<b>PFBS</b>	670,000 ppt
<i>If Drinking Water Source</i>	<i>8,300 ppt</i>
<b>PFHxS</b>	210 ppt
<i>If Drinking Water Source</i>	<i>59 ppt</i>
<b>PFNA</b>	30 ppt
<i>If Drinking Water Source</i>	<i>19 ppt</i>

*Michigan's Rule 57 Water Quality Values  
apply to NPDES discharges*



## Sites Being Investigated

- Prioritized Investigations Based on Known or Suspected Sources, Potential for Exposure
- Protect Drinking Water Pathway
- Multiple Other Investigations Underway
- DSC McLouth Gibraltar was added to MPART's PFAS site list in May 2023
  - Link to the site's MPART page: [DSC McLouth Steel-Gibraltar Plant \(Gibraltar, Wayne County\) \(michigan.gov\)](#)

# Gibraltar Area: Public Water Supply

- The vicinity of the DSC McLouth Gibraltar site is served by the Great Lakes Water Authority (GLWA) community water supply Southwest Water Treatment Plant:
  - Drinking water comes from the Detroit River and is treated at the treatment plant
  - Compliance results have been non-detect for all tested PFAS
  - Currently on annual sampling for PFAS compliance

# To Avoid PFAS

- After drinking water, the food you eat is the next most common risk of being exposed to PFAS
- EGLE partners with MDHHS to sample fish throughout Michigan water bodies for PFAS, heavy metals, mercury, and PCBs
  - The recommendations based on these samples can be found in the Eat Safe Fish Guide <https://www.michigan.gov/mdhhs/safety-injury-prev/environmental-health/topics/eatsafefish/guides>



# Agenda

1. PFAS Overview - EGLE
2. Site History and Background – EGLE
3. Treatment System - Arcadis
  - a) PFAS Water Treatment Technologies
  - b) Feasibility Study, Bench Testing, and Pilot Testing
  - c) Site and Building Design Drawings
  - d) Permitting and Proposed Schedule

# DSC McLouth Steel Gibraltar - Site History

- Three closed landfills with ineffective leachate control systems
  - Countywide Landfill
  - Landfill A & B
- Historically accepted steel production waste
- Countywide Landfill also accepted construction and demolition debris





# DSC McLouth Steel Gibraltar - Site History Continued

- Added to the National Priority List (aka Superfund) in 2015
- EPA leads the site work, EGLE supports
- EPA has been completing a Remedial Investigation since 2016
- EPA remedial project manager for the site:
  - Nilia Moberly Green
  - Email: [green.nilia@epa.gov](mailto:green.nilia@epa.gov)
  - Phone Number: (312) 353-6713

# PFAS in Groundwater

- In June 2022, EPA sampled on-site wells for PFAS
- PFOA and/or PFOS were detected above criteria in 3 of the 29 wells sampled





# Background - Countywide Landfill

- Leachate collection system
  - Installed by EPA in 2010
  - Managed by EGLE
  - Hauled off-site for disposal
- PFAS detected in the leachate in 2018
  - *Currently no PFAS criteria for leachate*



# Background - Countywide Landfill

- In 2019, EGLE hired Arcadis to complete a Feasibility Study, Bench Testing, and Pilot Study
- In 2022, EGLE hired Arcadis to design a full-scale on-site leachate treatment system



# Agenda

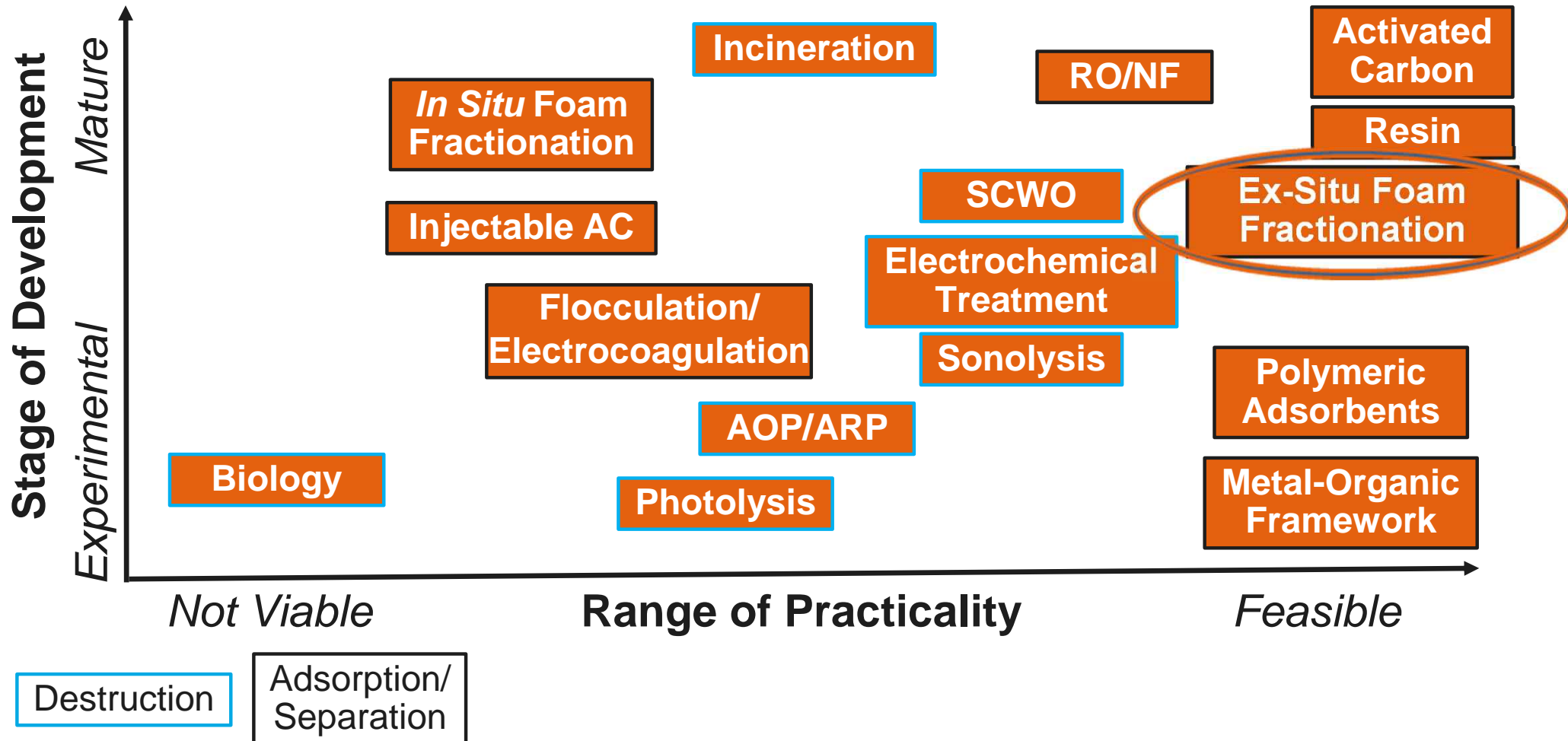
1. PFAS Overview - EGLE
2. Site History and Background – EGLE
3. Treatment System - Arcadis
  - a) PFAS Water Treatment Technologies
  - b) Feasibility Study, Bench Testing, and Pilot Testing
  - c) Site and Building Design Drawings
  - d) Permitting and Proposed Schedule

# PFAS Experience

- **Arcadis** has a long history of management and remediation of **PFAS** impacts
- Over **19 years** of experience with our first projects in Belgium, Germany and the UK
- **Arcadis** now has more than **1,000 PFAS projects in 17 countries**
- Our expert team consists of over 100 innovators, including chemists, toxicologists, hydrogeologists, geologists, environmental risk assessors, and remediation engineers
- Our Michigan project team members have also been supporting one of the largest PFAS sites in the Midwest since 2017



# PFAS Water Treatment Technologies



# Feasibility Study Recommended Treatment Trains for Bench Testing

## Alternative One

- Fractionation
  - Resin

## Alternative Two

- Coagulation
  - Granular Activated Carbon (GAC)
    - Resin

## Alternative Three

- Membranes: Reverse Osmosis (RO) or Nano Filtration (NF)
  - Resin



# Bench-Scale Testing Conclusions



**Highlighted benefits of ozone fractionation optimization versus air only**

**Volume of foam significant differentiator for price point**

**The two-pass ozone also appears to have removed more total PFAS mass**

**Other treatment technology bench tests screened out: UF, NF, RO, Coagulation, GAC RSSCT**



# Ozone Fractionation Process - OCRA

(OCRA- Ozofractionative Catalyzed Reagent Addition)

ARCADIS



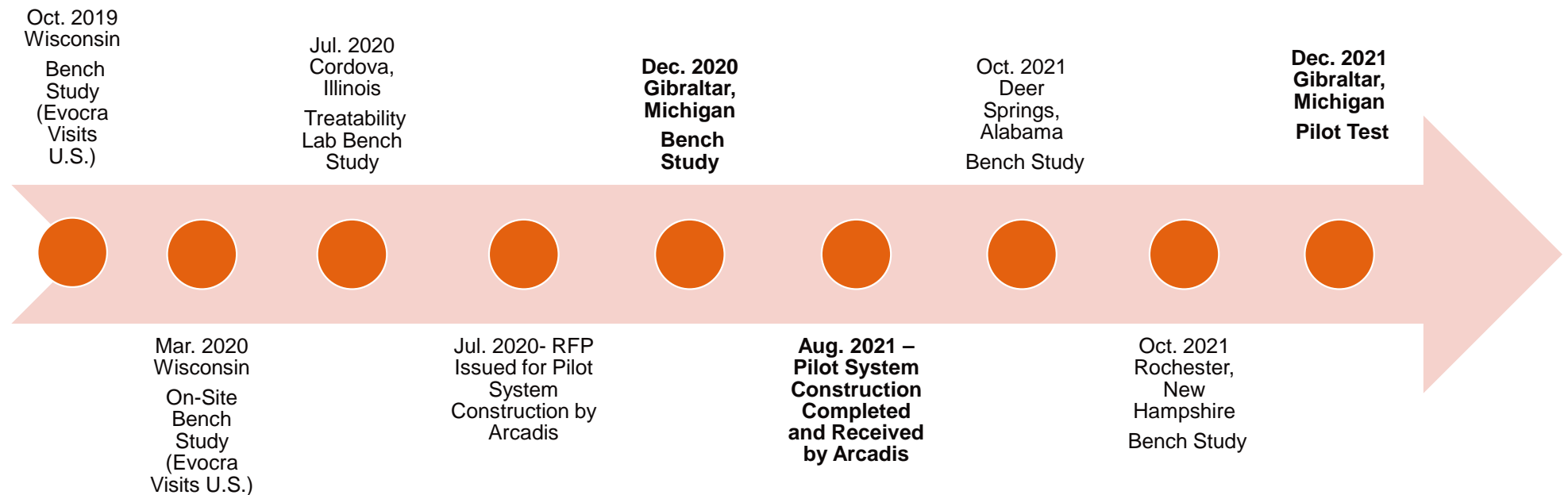
- Patented process by EVO CRA an Australian company that pioneered this treatment process prior to 2011
- Uses ozone bubbles in a multiphase process to extract PFAS
- Reagent can be added to increase efficiency of process
- PFAS removed is collected as a concentrate “foam”
- Volume of foam target is **less than 1%** of the raw influent (will vary depending upon initial water quality)
- Potential for significant cost savings in disposal volumes
- Additional foam reduction via subsequent processing



Target Structural Collapsing Foam –  
Optimized Fractionate Flow



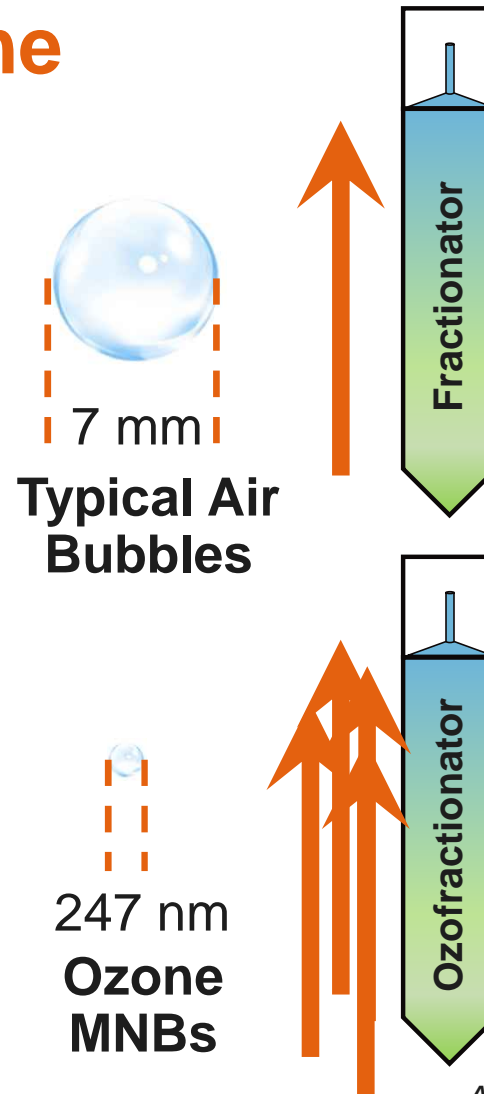
# Ozone Fractionation U.S. Development Timeline



**\*Bold: CWLF Related**

# Fractionation and Ozone

- Fractionation uses bubbles to separate PFAS from the aqueous solution
- Ozone creates micro-nano-bubbles (MNBs) ranging from 10s nm to 10s  $\mu\text{m}$
- Micro nano-bubbles (MNBs) increase bubble quantity and available surface area for treatment
- Ozone bubbles have a high zeta potential which lessens bubble coalescence and improves stability



**Typical Air:**  
 $2.1 \times 10^6$  bubbles/100 gal  
3,400  $\text{ft}^2$ /100 gal

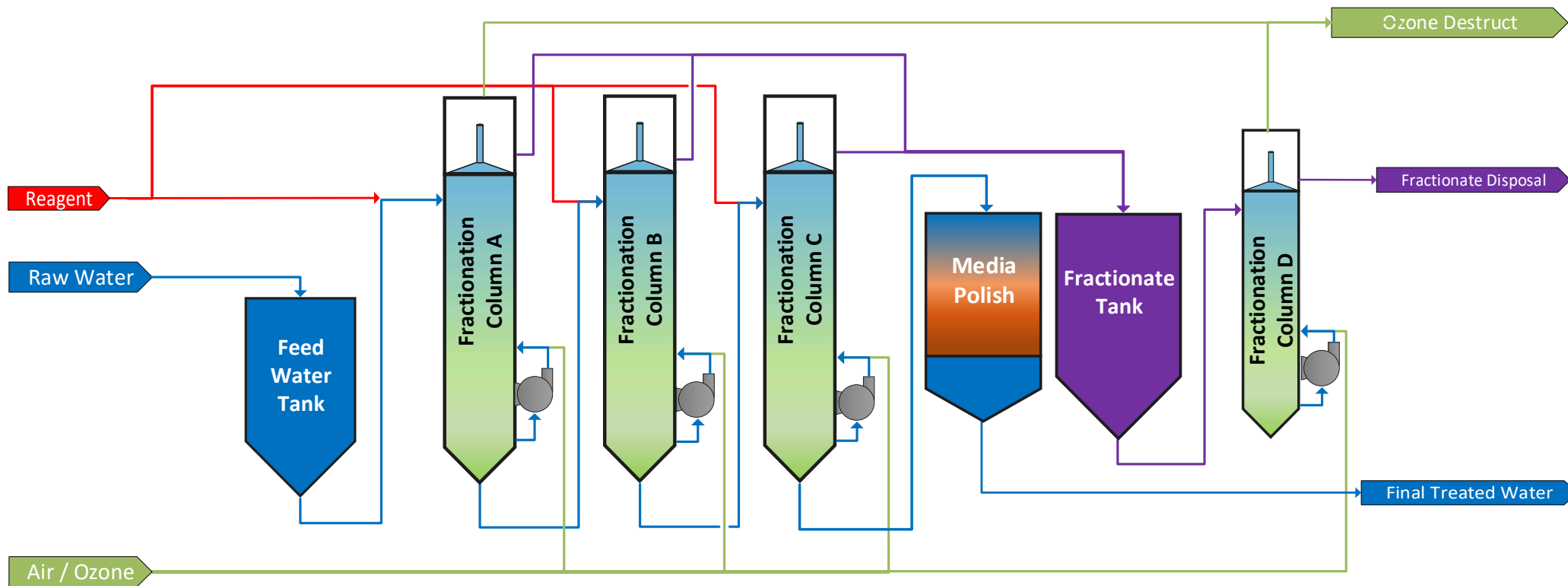
**>28,000,000% surface area increase, less incidence of coalescence; more stability**

**Ozone MNBs:**  
 $4.8 \times 10^{22}$  bubbles/100 gal  
 $9.9 \times 10^8$   $\text{ft}^2$ /100 gal

# Fractionation Process

ARCADIS

evocra



COPYRIGHT EVOCRA Pty Ltd, AUSTRALIAN PATENT No. 2012289835  
COPYRIGHT EVOCRA Pty Ltd, UNITED STATES PATENT No. 2014/0190896

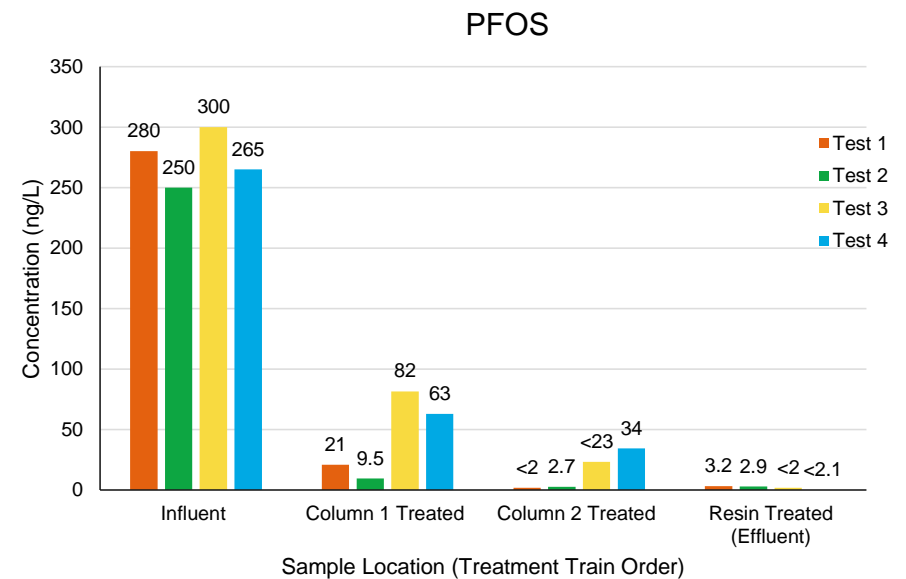
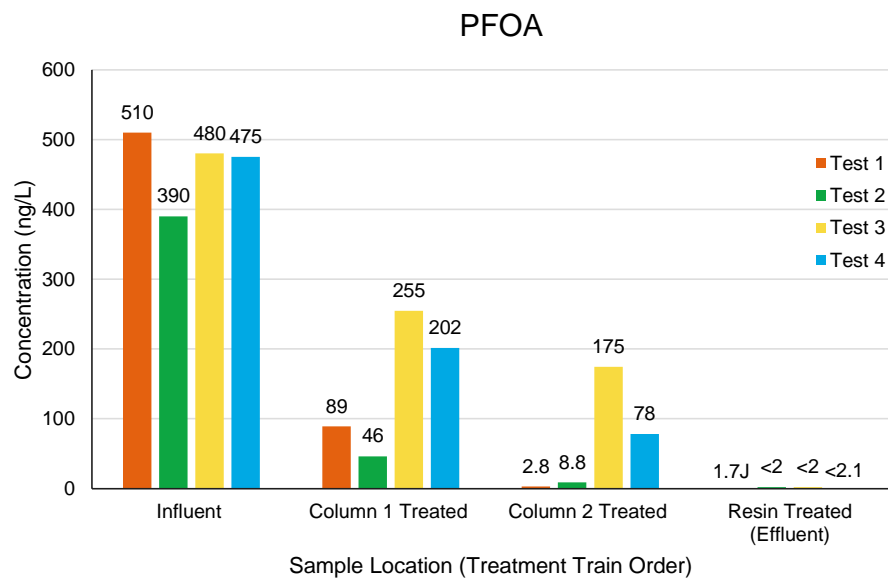
# Pilot Testing: Ozone Fractionation – December 2021

- System contains 3 main fractionation columns (OCRA A, B, C), but only 2 operated for this test
- Column D is concentrating column for further waste reduction (OSCAR)
- Media polish - Purolite PFA694 Resin
- Reactivated Granular Activated Carbon (TS8X30CPR) was added later during the test in front of the resin
  - Removal of milky coloration from effluent
- Ammonia pretreatment : breakpoint chlorination during select tests
- 4 Scenarios of testing:

Test	Pretreatment	OCRA Column A	OCRA Column B
1	No	Air	Ozone
2	No	Ozone	Ozone
3	Yes	Air	Ozone
4	Yes	Ozone	Ozone



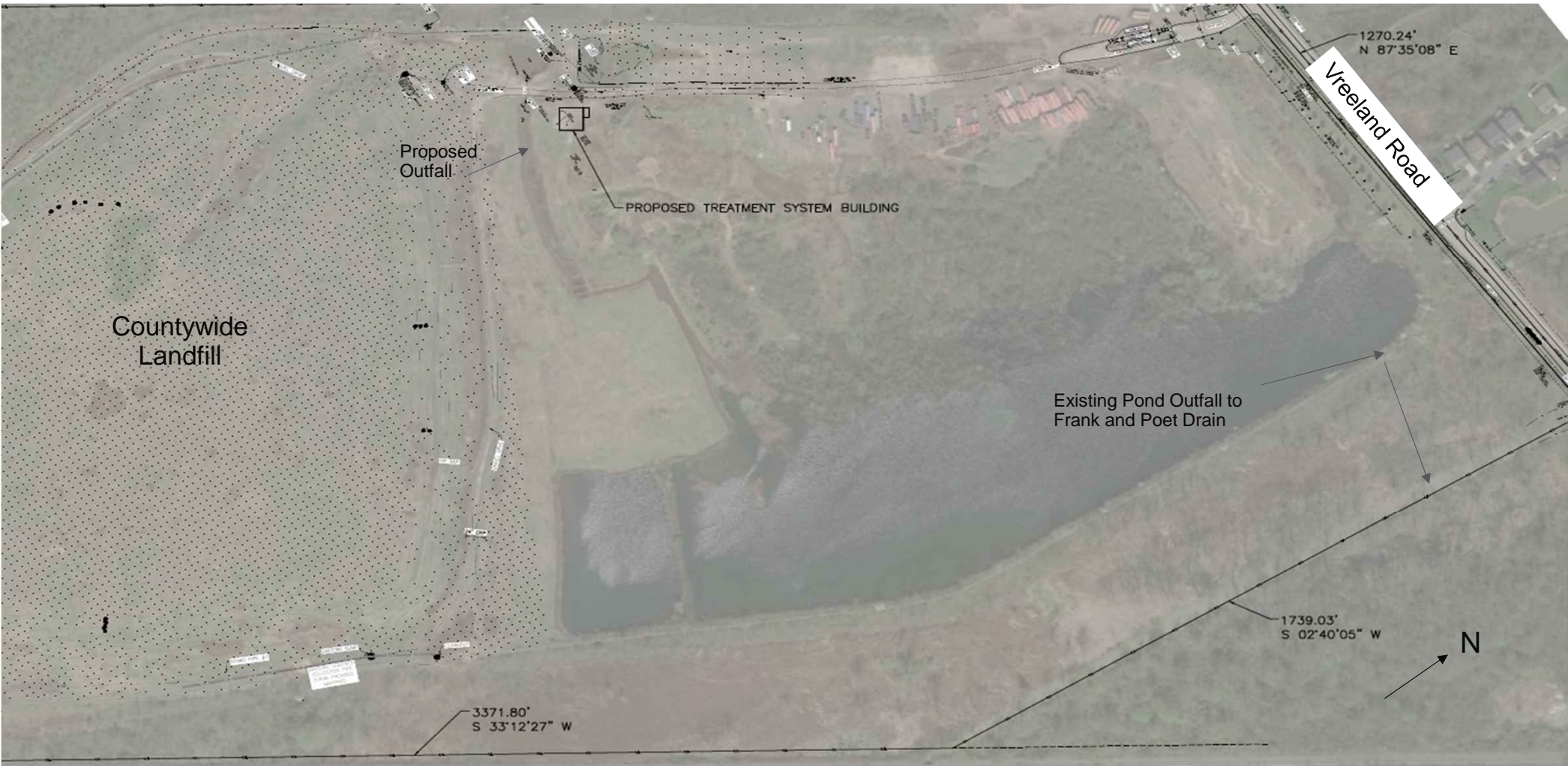
## Pilot Test Results for PFOA and PFOS



- Surface Water Targets, PFOA – 170 ng/L, PFOS – 12 ng/L
- PFOA and PFOS significantly removed through 2 fractionation columns for each test
  - Resin polish significantly treated to non-detect levels post-fractionation

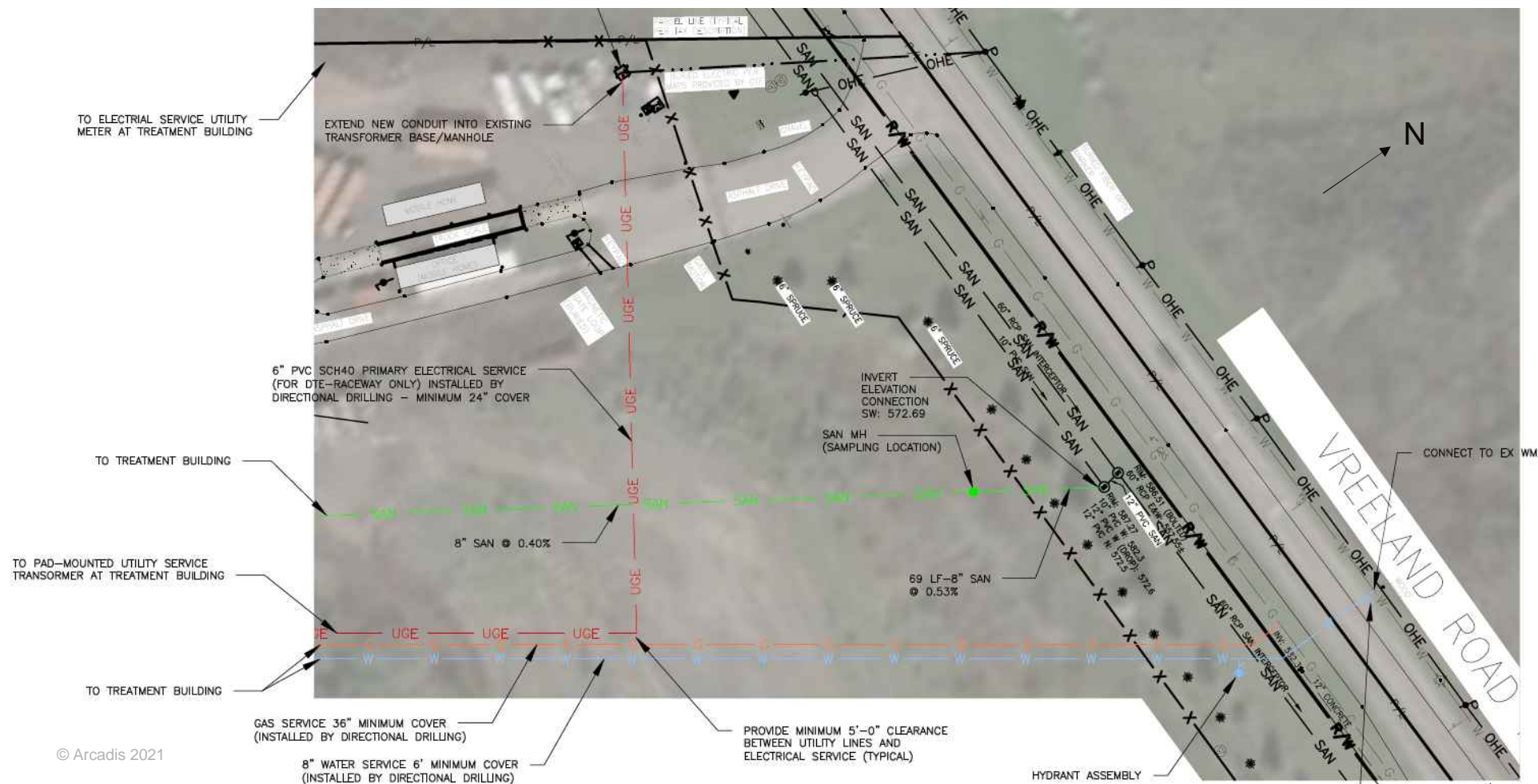
# Site and Building Drawings

# CWLF Parcel: Overall Site Plan



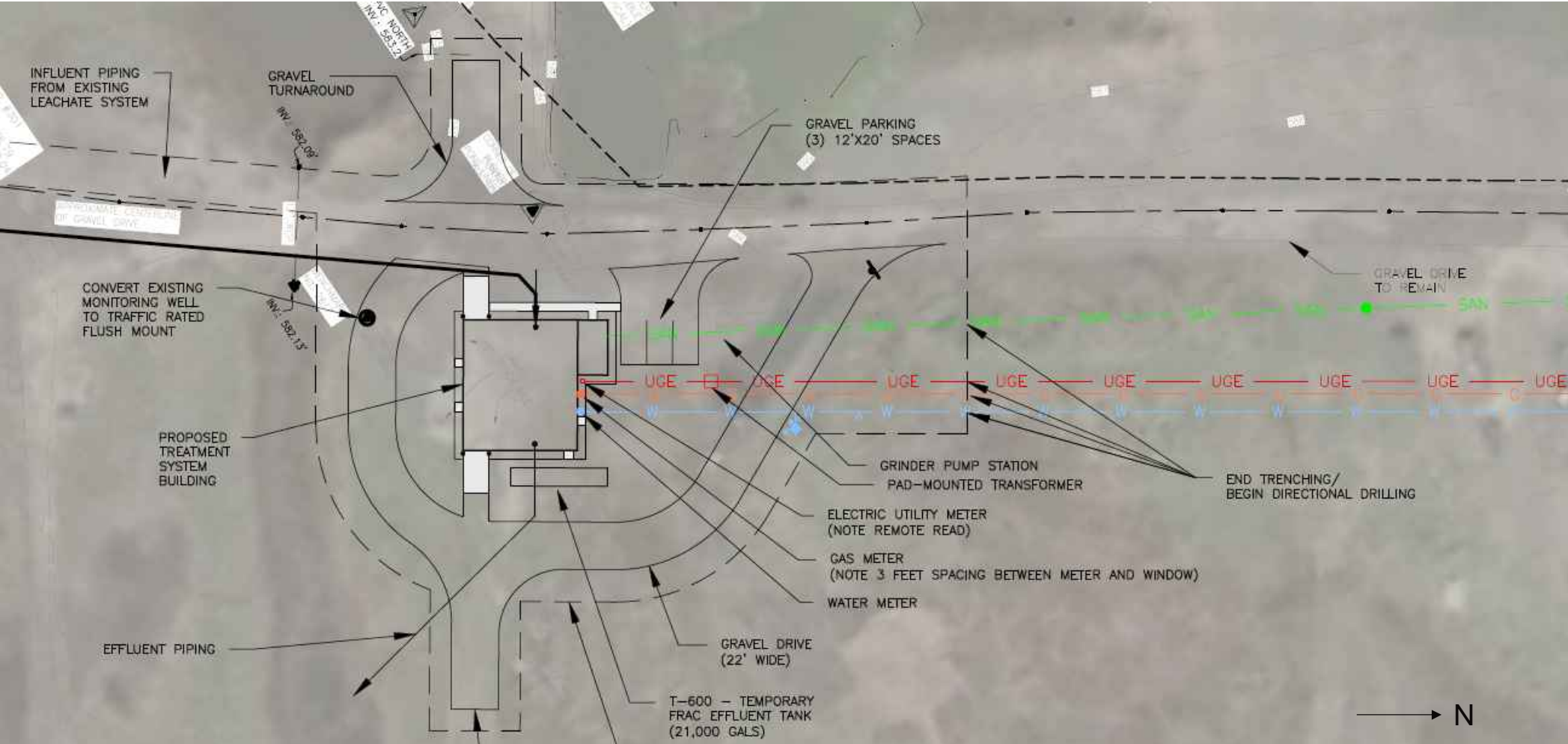


# Vreeland Road Utilities Site Plan

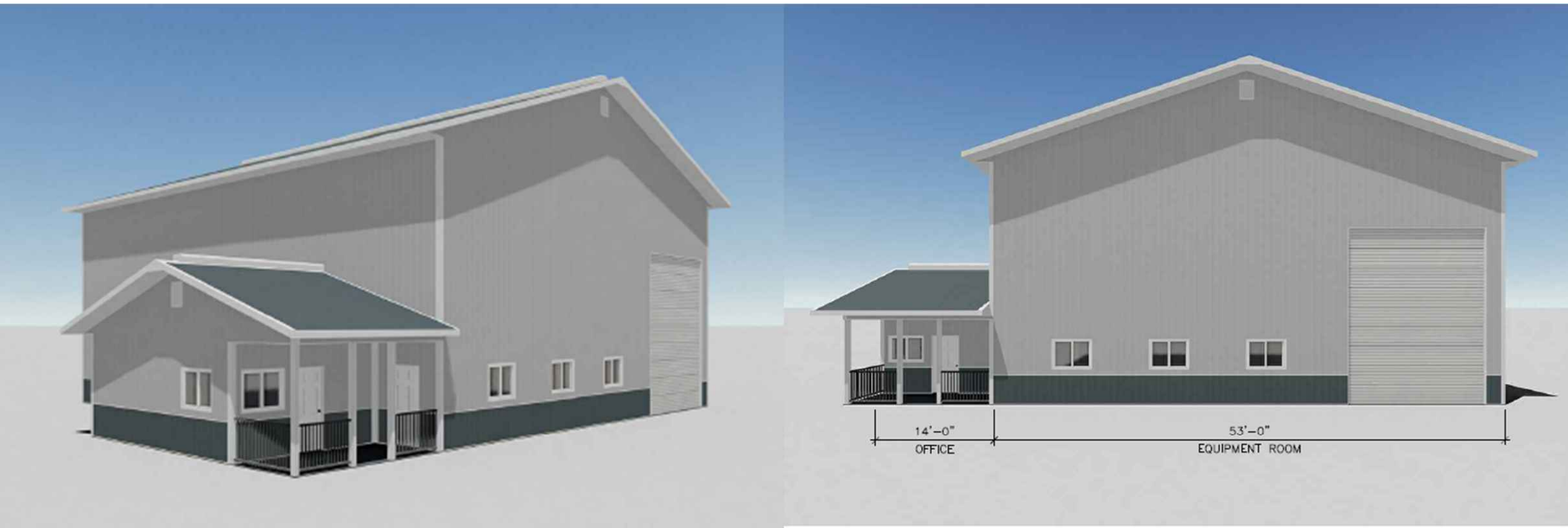




# Treatment System Building Site Plan



# Treatment System Building Architectural Rendering



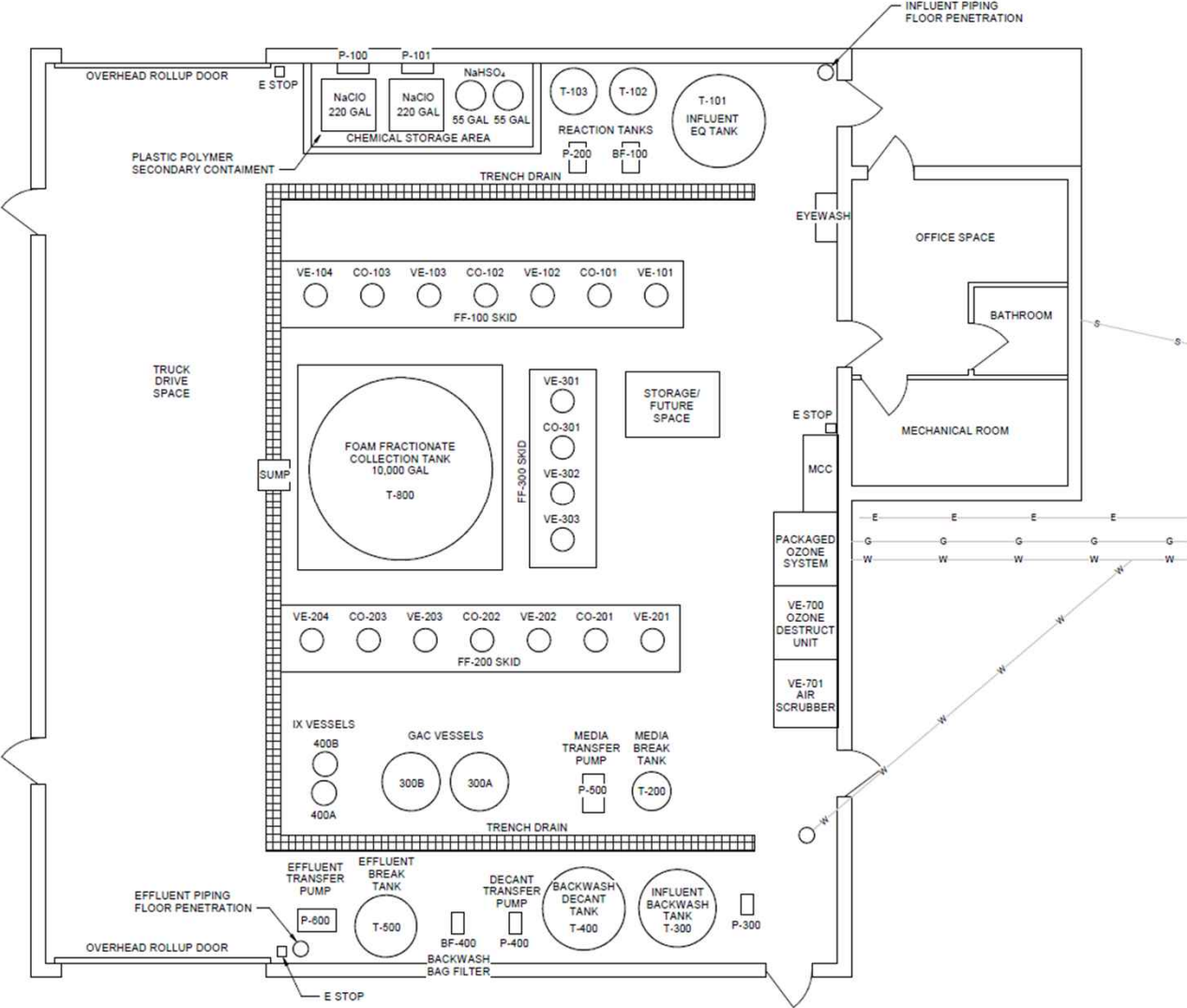
PERSPECTIVE

NOT TO SCALE

WEST

0 4' 8' 16'  
SCALE: 1/8" = 1'-0"

# Treatment System Plan View



# Permitting and Proposed Schedule

# Local Permitting



- Local Permits Include:
  - Site Plan Review Application with the City of Gibraltar: **In Progress**
    - Initial review meeting and site visit occurred July 18, 2023
    - EGLE coordinating agreement for water main extension with the City of Trenton
  - Building, Electrical, and Mechanical Permits by Contractor: **Construction Phase**
  - Domestic Sewer Utility Extension Permit: **In Progress with Southern Huron Valley Utility Authority (SHVUA)**
  - Coordination with DTE/Michcon for Extension of Electrical and Natural Gas Utilities: **In Progress**
  - Wayne County Construction Stormwater and SESC Permits: **Submitted and In Progress**

# State and Federal Permitting



- State Permits Include Equivalencies for Superfund Projects:
  - Soil Erosion and Sedimentation Control (SESC) Plan Review by DTMB: **In Progress**
  - Air Discharge Permit: **In Progress**
  - Surface Water National Pollutant Discharge Elimination System (NPDES) Permit: **In Progress**
    - Targets for surface water discharge (Rule 57 Non-DW)
      - PFAS: 12 ppt PFOS, 30 ppt PFNA, 170 ppt PFOA, 210 ppt PFHxS, 670,000 ppt PFBS
      - Ammonia-N: 3.2 mg/L winter, 1.2 mg/L summer (FCV, Final Chronic Value)
      - Volatiles and Semi-Volatiles: under Rule 57
      - Metals: under Rule 57
- Federal Permits exempted for Superfund Projects

## Path Forward

### Permitting

- Site Plan Review Approval from City of Gibraltar
- SESC & SW Permits with Wayne County
- SHUVA Sewer Permit
- City of Trenton Water Main Extension Agreement

### Contractor Bidding

- Forecasted Spring 2024
- Publicly Bid Thru State of Michigan's SIGMA System

### Construction

- Summer 2024 Construction
- Start-up Q4 – 2024

*Thank You!*

*Questions?*