

Project Background

Harbor Island has been used for industrial purposes and waste disposal for over 100 years. These operations have resulted in environmental impacts that the City of Grand Haven is addressing in cooperation with Michigan's Department of Environment, Great Lakes, and Energy (EGLE) and adhering to additional rules and regulations. The ultimate goal is creating a plan to mitigate the health and environmental risks on Harbor Island.

Challenging Site

Harbor Island is located prominently in the center of the Grand River as it flows into Lake Michigan. Over the previous hundred years, the island has served a variety of industrial purposes; all of which have compounded, creating the environmental concern as it stands today with issues of co-mingled Coal Combustion Residuals (CCR) materials and Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS).

Harbor Island has been subject to environmental impacts from decades of using dredged materials as fill, the historical dumping of municipal and industrial waste, and the operations of a coal fired power plant.



A Healthy Harbor Island Starts with a Plan

- » Following public engagement within the community, the future of Harbor Island is likely one serving its citizens as a destination site within the city.
- » Visitors to the island should be safe to enjoy all that Harbor Island has to offer, making environmental remediation vital to future use.



Community Treasure

Harbor Island has been, and still is, a critical asset and treasure to our community and all those that visit!



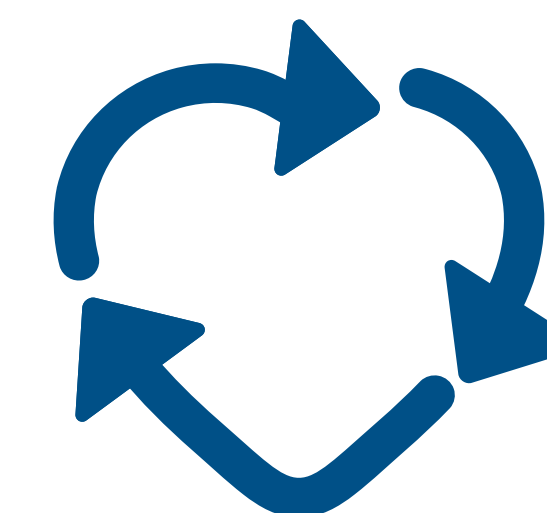
Committed to a Healthier Island

The City is committed to long term health of the island and its ecosystem.



Committed to Health and Safety

The City is committed to protecting the health and safety of those visiting the island and surrounding areas.



Committed to Remediation

The City is committed to remediation of Harbor Island in a manner that meets regulations.

Project Background: Site Layout

Former J.B. Sims
Generating Station
City of Grand Haven

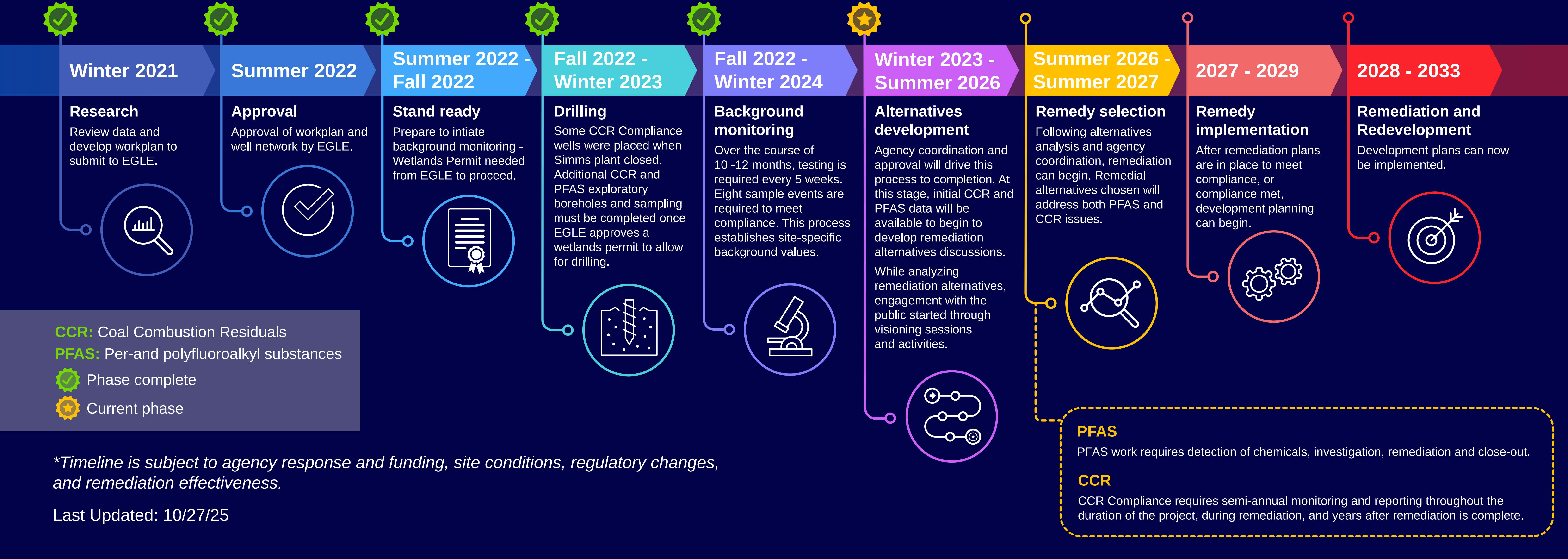


Timeline

**Renew
Harbor Island**
Work today, protect tomorrow.



Anticipated Timeline*



**Timeline is subject to agency response and funding, site conditions, regulatory changes, and remediation effectiveness.*

Last Updated: 10/27/25



PFAS Roadmap

PFAS Roadmap

Plan

Where does the strategy start?

- Address areas where PFAS-contaminated groundwater may be discharging to surface water (i.e. Grand River, South Channel, and wetlands) above regulatory criteria to mitigate potential human health exposure pathways.

We Are Here

Assess

What is the risk level?

- No drinking water wells are located on Harbor Island.
- Intake for municipal supply is located in Lake Michigan south of the mouth of the Grand River. The City of Grand Haven tests its drinking water at a higher rate than Michigan regulations require and no PFAS has been detected above the current Michigan maximum contaminant levels (MCLs).

Implement

How do we mitigate?

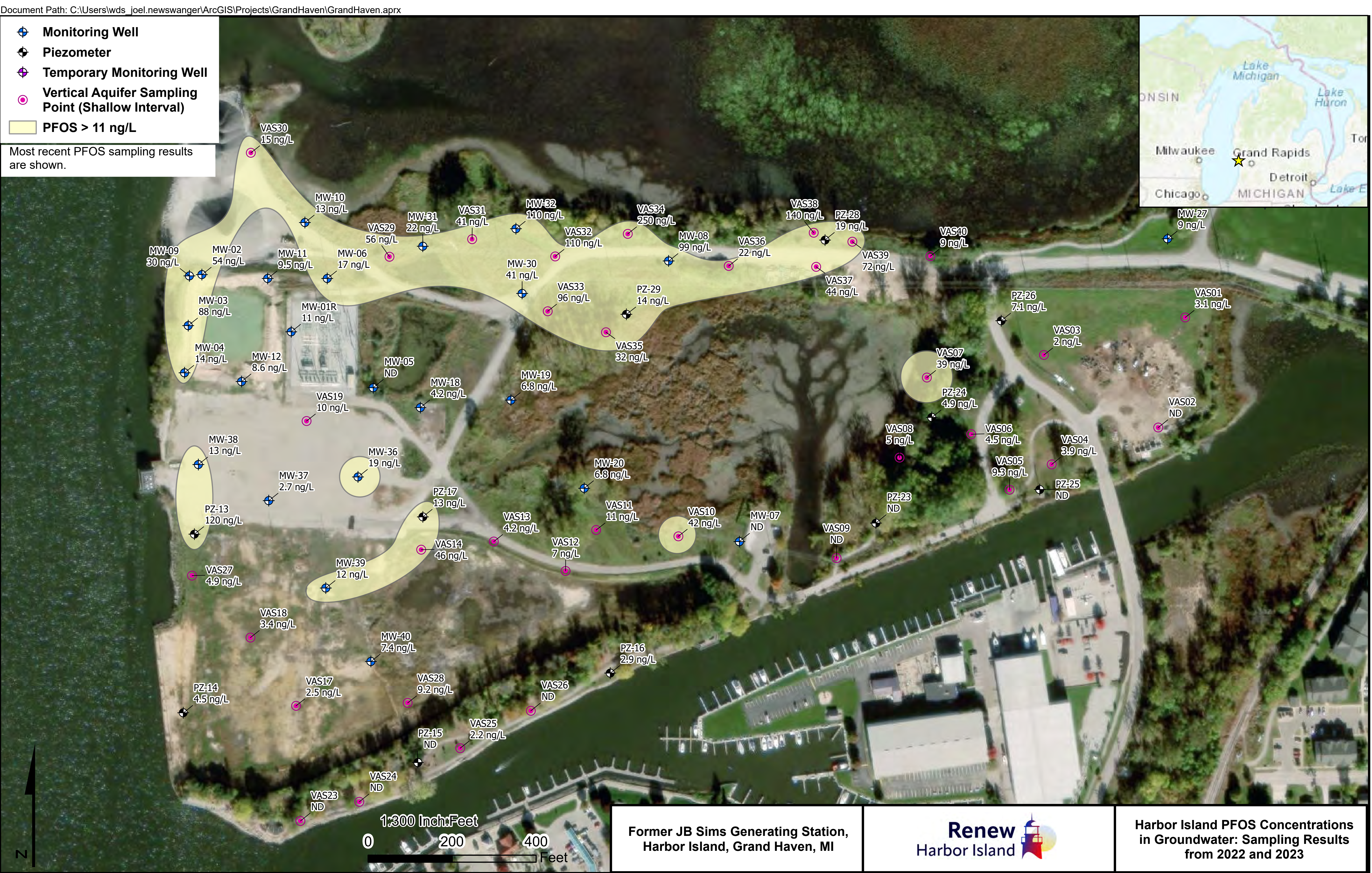
- Utilize tiered approach to mitigate highest risks for potential human health exposure first.
- Groundwater flow control to prevent PFAS-contaminated groundwater from discharging to surface water above regulatory criteria with potential treatment of extracted groundwater prior to discharge.
- Evaluate feasibility of localized source removal.

Maintain

Can we stay ahead of changing regulations?

- Operate, maintain, and monitor (OMM) groundwater remedy to meet cleanup objectives.
- Routinely evaluate groundwater remedy performance.
- Modify objectives and routinely evaluate OMM plan to optimize and improve the groundwater remedy effectiveness and comply with changing regulations.

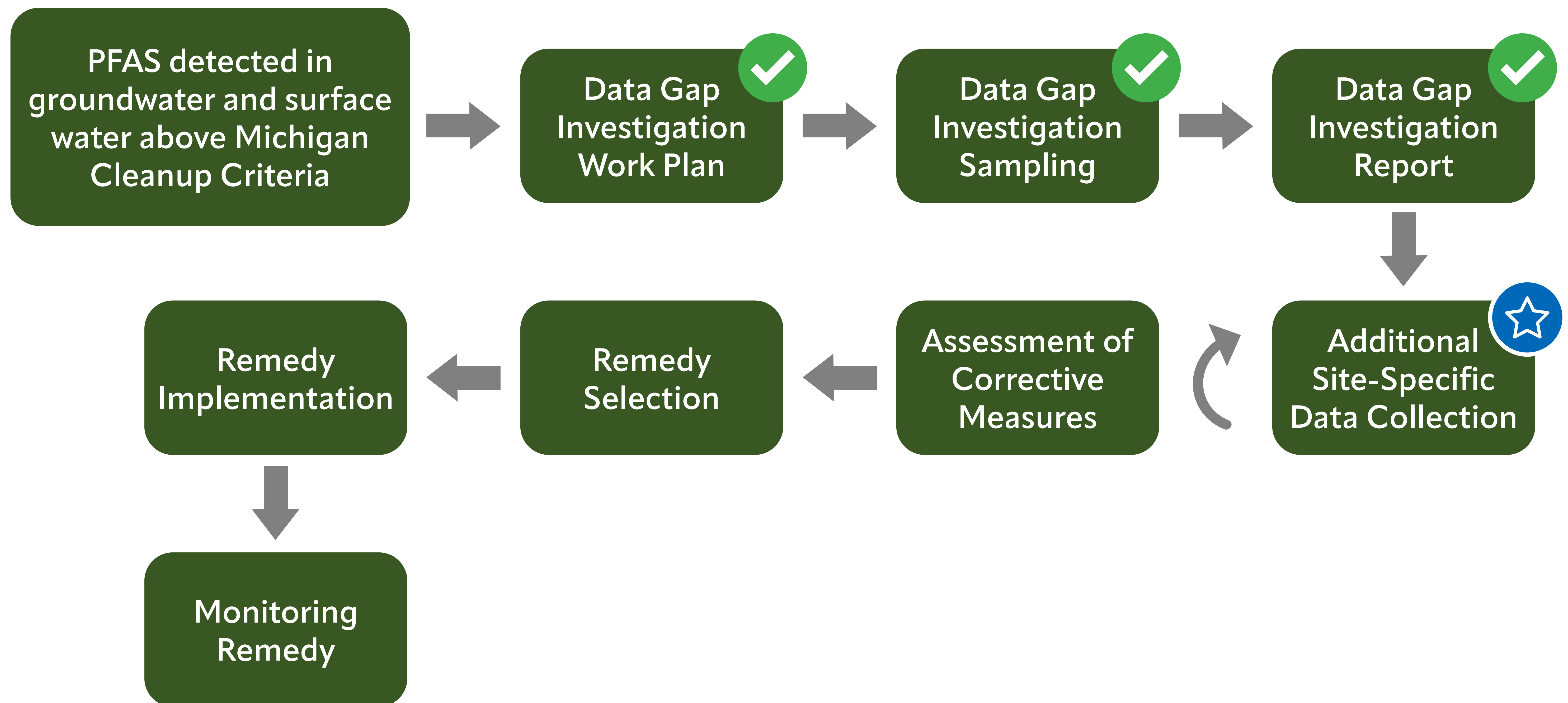
PFAS: Heat Map (PFOS)



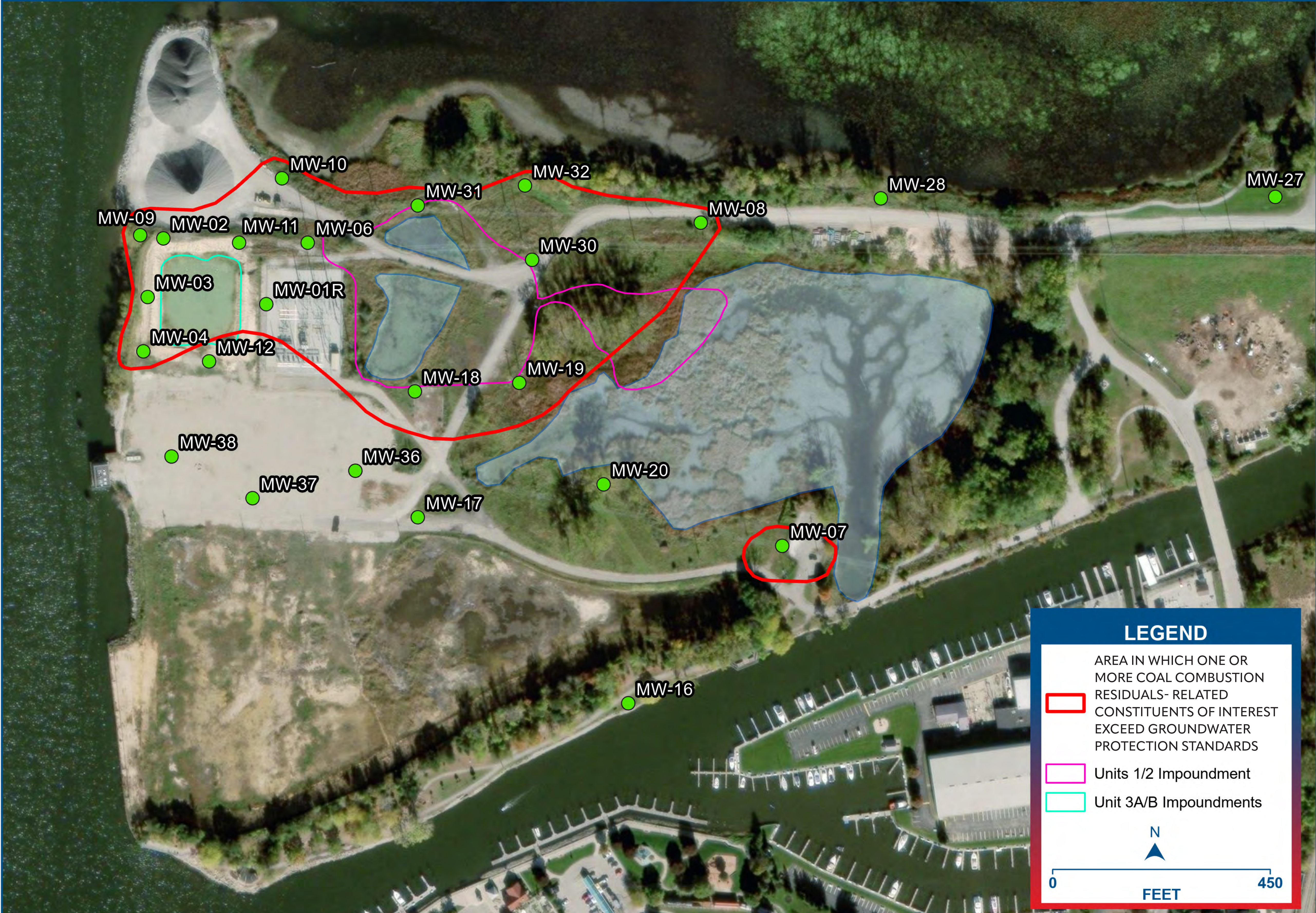
PFAS



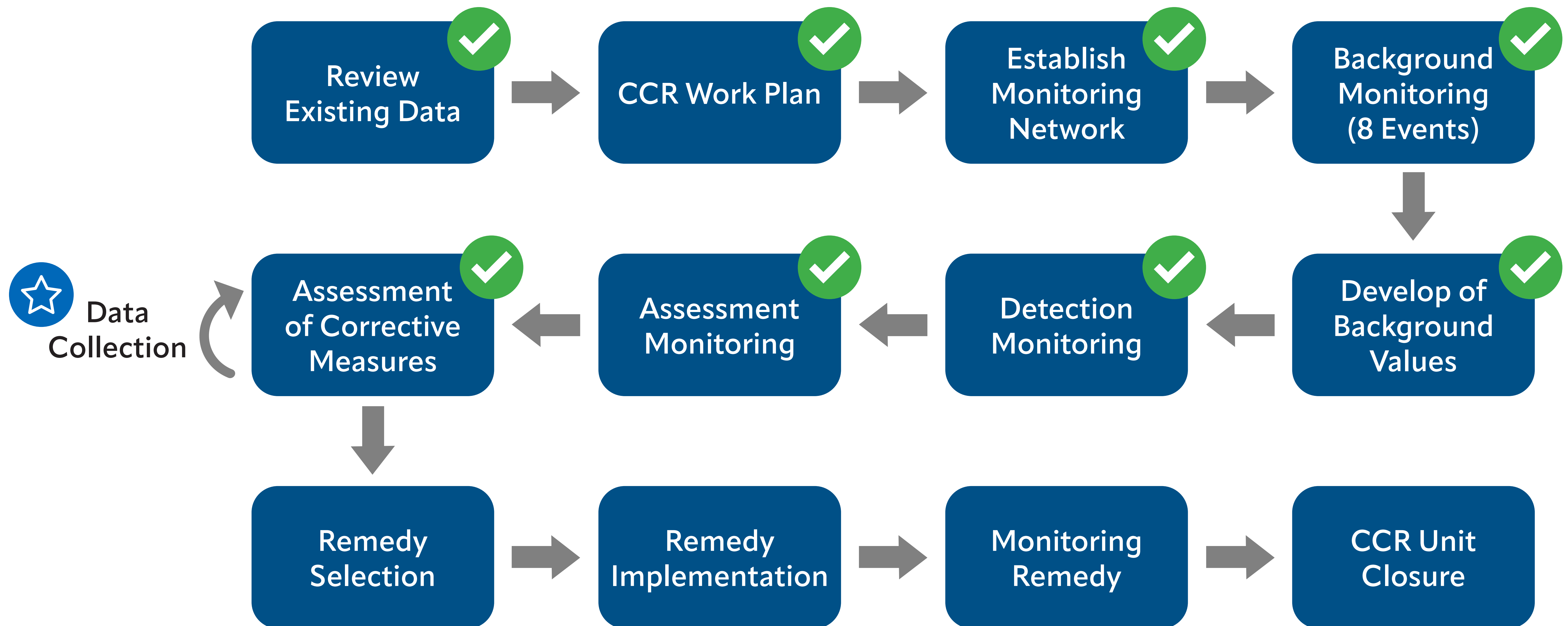
PFAS: Flow Chart



CCR: Plume Map



CCR: Flow Chart



Former Coal Pile

2025 Site Pictures

A birds-eye view of the coal pile project area, now vitalized with newly planted grass cover.



*Pending Regulatory Approval

Former Coal Pile

2025 Site Pictures



Full site view of coal pile project area, looking east.



Full site view of the coal pile project area, looking west.

*Pending Regulatory Approval

Remediation Alternatives

Alternatives being considered

Alternative 1: Source Control - Removal and In-Situ Stabilization in combination with additional measures

Alternative 2: Slurry Wall in combination with additional measures

Alternative 3: Groundwater Extraction and Treatment in combination with additional measures

Alternative 4: Capping in combination with additional measures

Eliminated from consideration

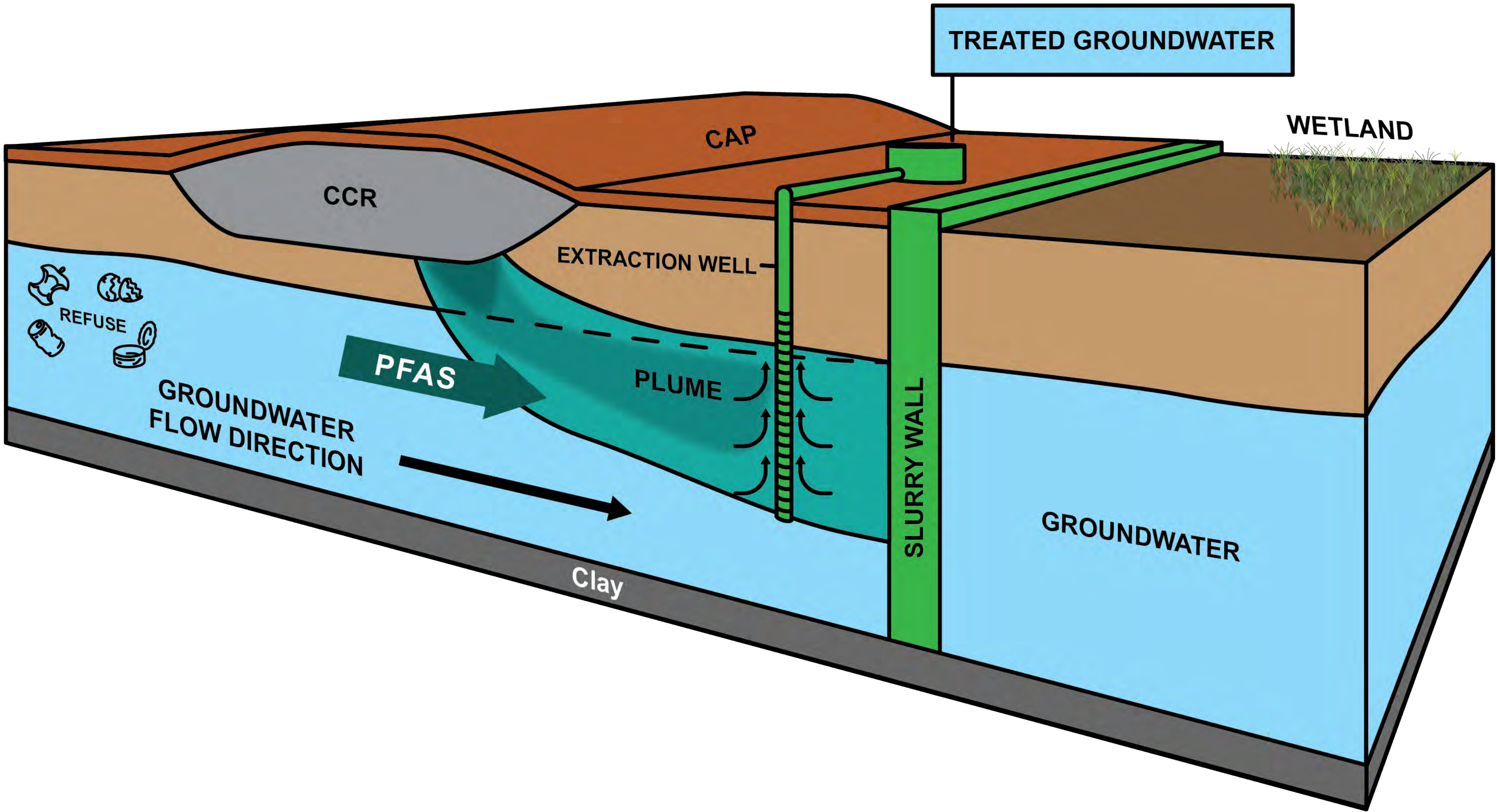
Alternative 5 – Monitored Natural Attenuation – Does not address PFAS

Alternative 6 – In-situ Treatment by injection or Permeable Reactive Barrier - No proven technology for PFAS in-situ

Why We are Collecting Remediation Data

Slurry Wall, Cap, Long-term Pumping

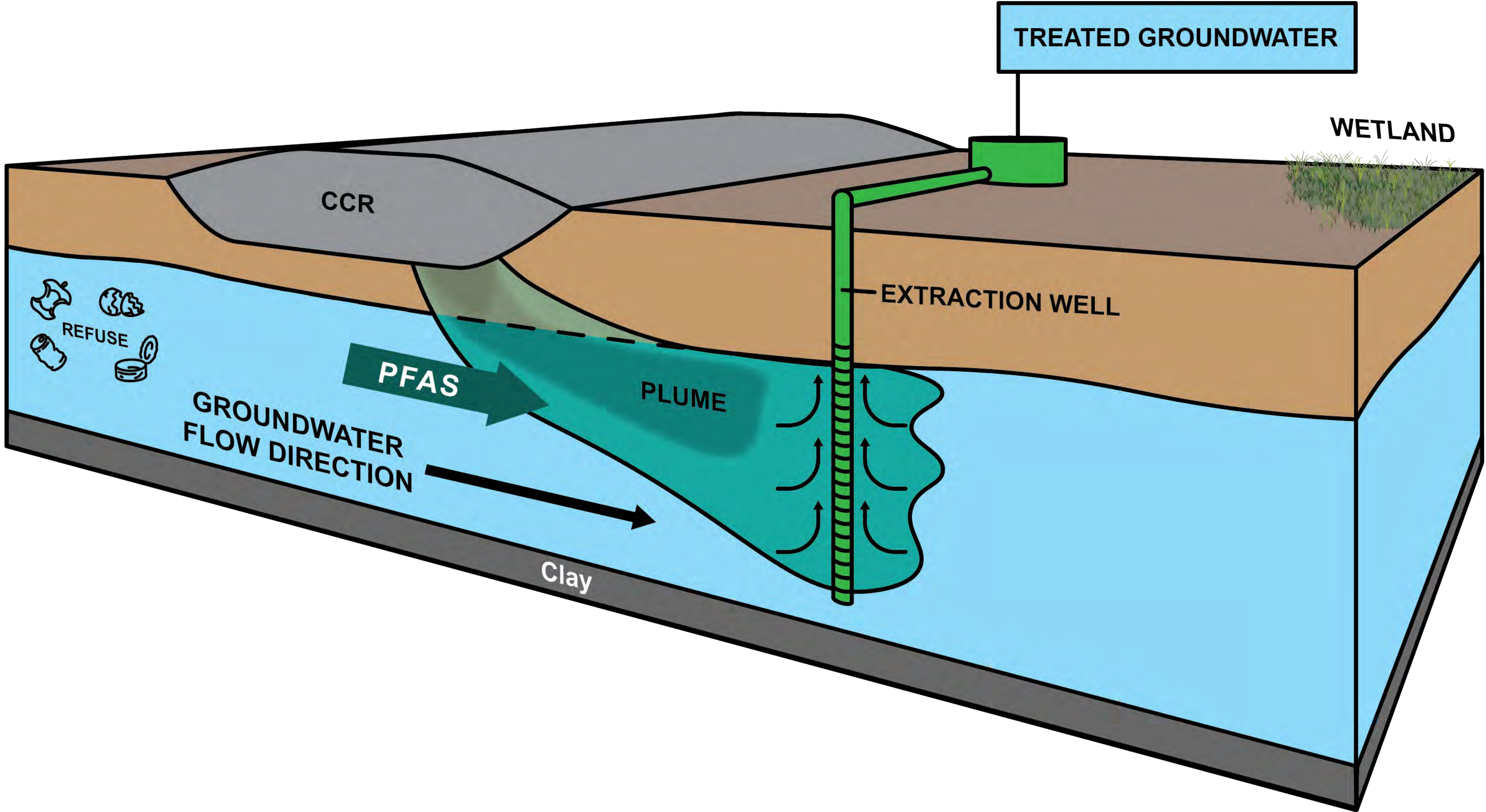
Why the Data is Needed	Data to be Collected
• Effectiveness • Cost estimate for a slurry wall (length and depth)	• Permeability of the clay • Elevation of the clay • Refine PFAS plume • Delineate legacy coal ash • South Channel depth
• Flow rate • Discharge alternatives • Cost estimate for long-term groundwater pumping • Required regulatory comparison of remedial alternatives	• Pump test and analysis • Groundwater flow model to test pumping rates and impact on groundwater
• Volume of cover and backfill • Cost estimate for cover and backfill • Required regulatory comparison of remedial alternatives	• Topography • Bathymetry
• Cost estimate to permit and mitigate wetland impacts	• Wetland function assessment
• Design around or replace existing infrastructure	• Subsurface utility locations



Why We are Collecting Remediation Data

Groundwater Extraction and Treatment

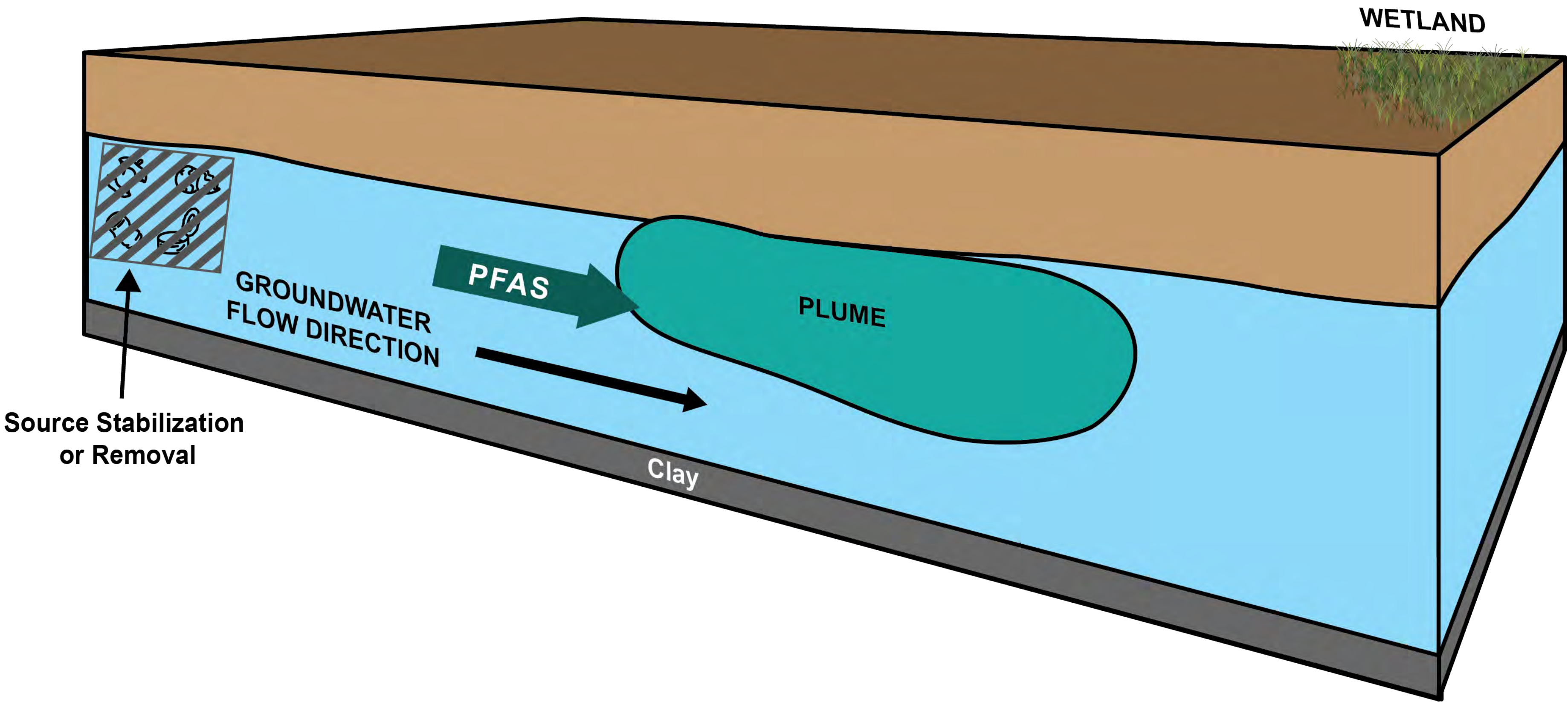
Why the Data is Needed	Data to be Collected
• Flow rate • Discharge alternatives • Cost estimate for long-term groundwater pumping • Required regulatory comparison of remedial alternatives	• Pump test and analysis • Groundwater flow model to test pumping rates and impact on groundwater



Why We are Collecting Remediation Data

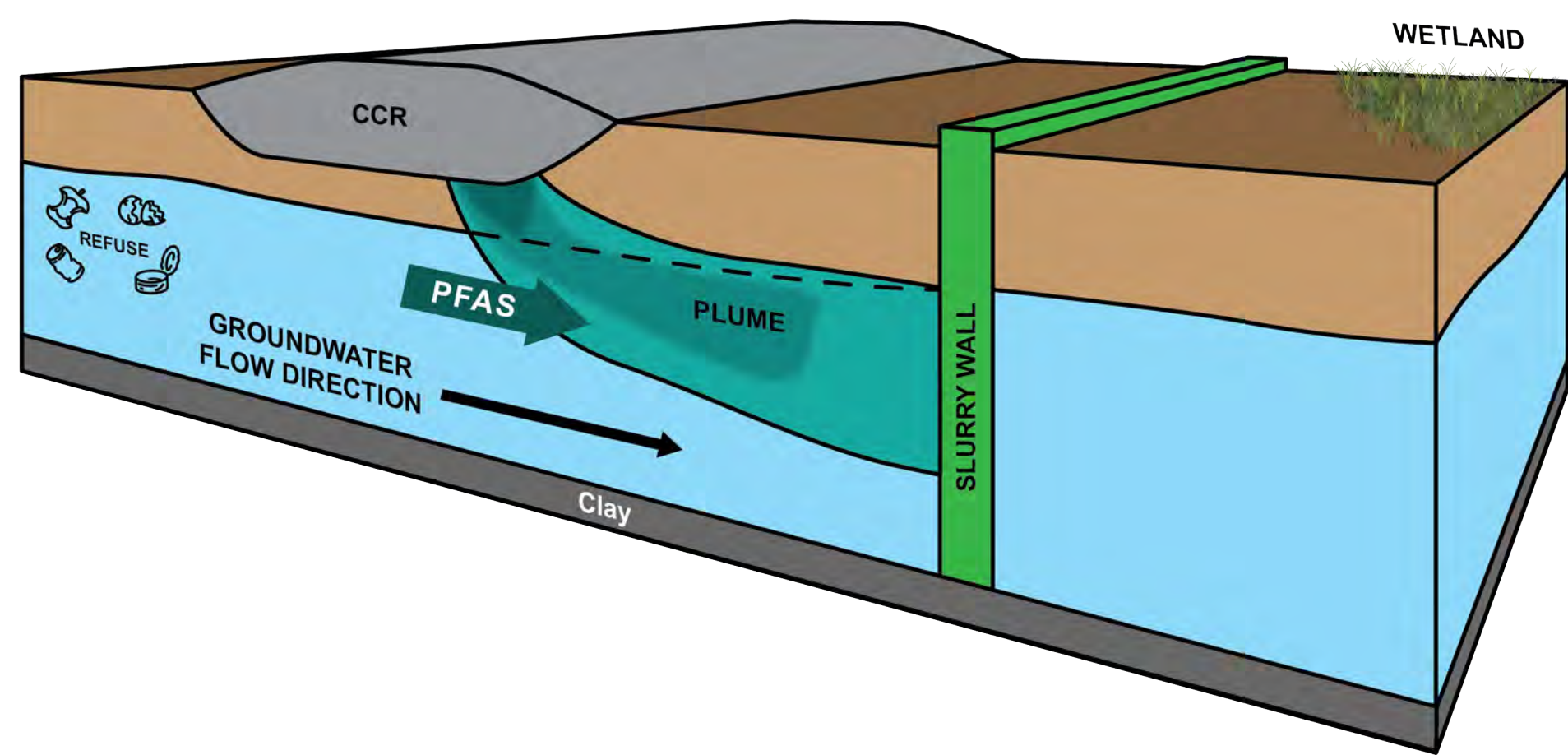
Source Control

Why the Data is Needed	Data to be Collected
• Define PFAS & CCR source areas • Cost estimate for source area removal or stabilization • Required regulatory comparison of remedial alternatives	• Additional well sampling and analysis to refine PFAS source area • Facility Evaluation Report parts 1 and 2 to define all CCR areas
• Flow rate for any construction dewatering required • Discharge alternatives • Cost estimate for short-term groundwater pumping for dewatering	• Pump test and analysis • Groundwater flow model to test pumping rates and impact on groundwater
• Volume of cover and backfill • Cost estimate for cover and backfill • Required regulatory comparison of remedial alternatives	• Topography • Bathymetry
• Cost estimate to permit and mitigate wetland impacts	• Wetland function assessment
• Ash and soil and refuse characterization for design requirements for in-situ stabilization via cement • Cost estimate to stabilize CCR and/or PFAS source areas	• Geotechnical bench testing for in-situ stabilization • Analytical data to establish closure criteria

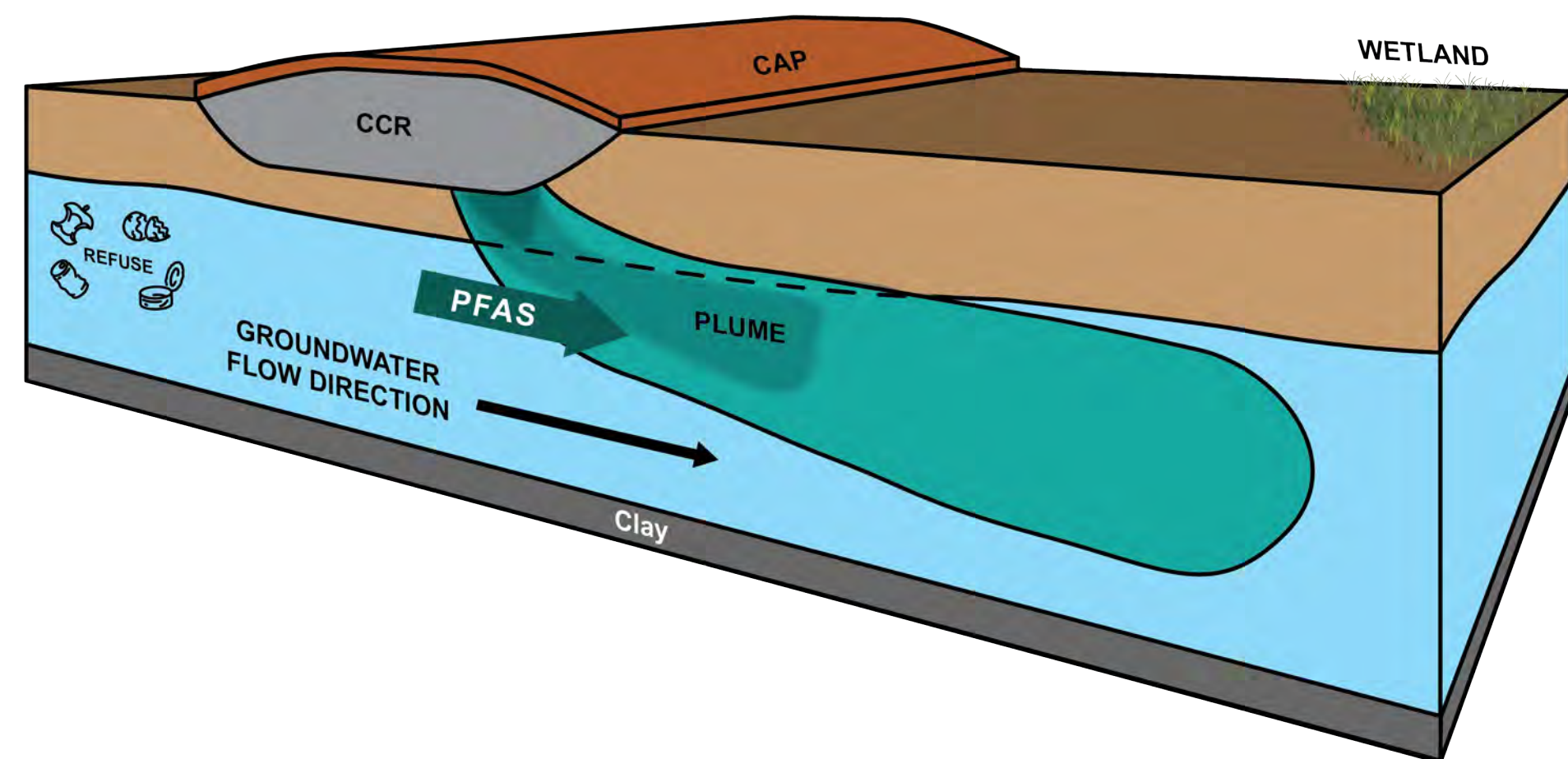


Combination of Remedial Alternatives

Slurry Wall



Cap



Groundwater Extraction and Treatment

