

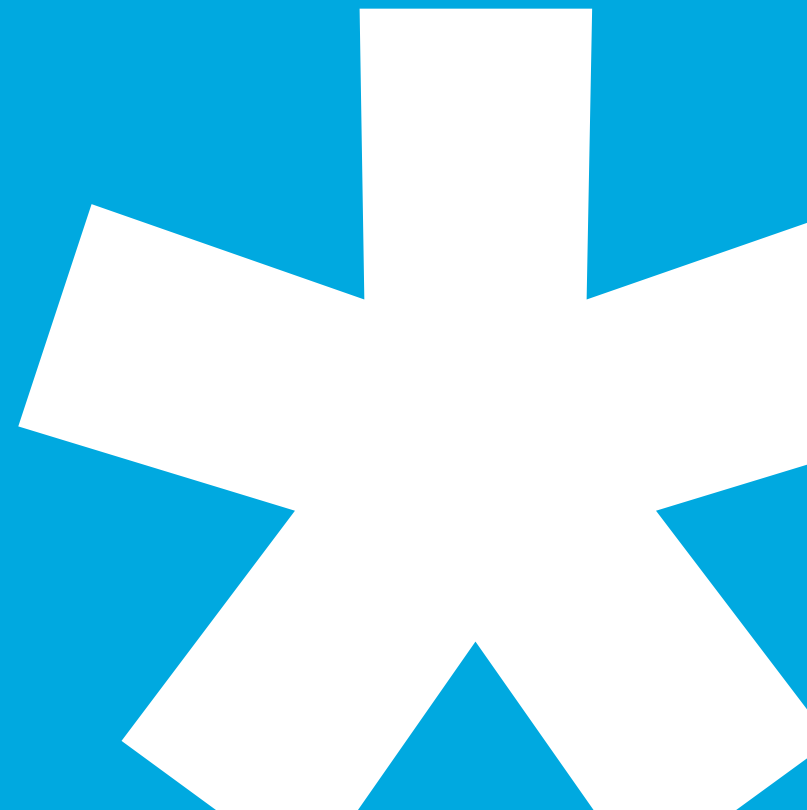


A Siemens Healthineers Company

REVISED PHASE III REMEDIAL ACTION PLAN PHASE IV REMEDIAL IMPLEMENTATION PLAN, PART 1

**Public Involvement Plan (PIP) Meeting
Former Varian Facility (Site 3-0485)
150 Sohier Road
Beverly, Massachusetts**

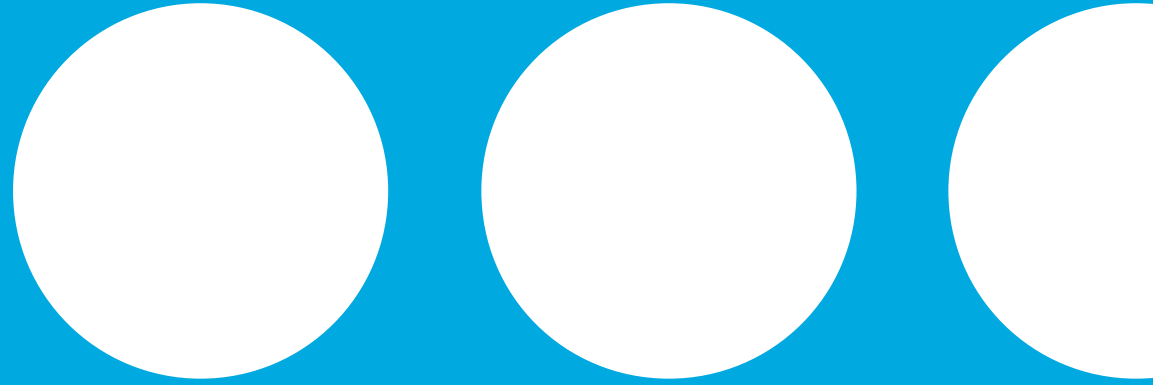
**June 7, 2023
Beverly High School
Beverly, MA**





Agenda

1. Introduction
2. Project Overview and Massachusetts Contingency Plan (MCP) Process
3. Proposed Remedial Actions
Revised Phase III Remedial Action Plan
4. Phase IV Remedy Implementation Plan,
Part 1
5. Next Steps
6. Questions



Project Overview and Massachusetts Contingency Plan (MCP) Process

Generalized Massachusetts Contingency Plan (MCP) Process

Phase I: Initial Investigation

- Initial investigations
- Implement preliminary response actions where needed

Phase II: Comprehensive Site Assessment

- Determine nature and extent of contamination
- Evaluate potential risk to determine if cleanup plan is needed

Phase III: Remedial Action Plan

- **Evaluate cleanup options using MCP criteria: effectiveness, reliability, difficulty, cost, risk, and timeliness**

Phase IV: Remedy Implementation

- **Complete cleanup design and plans**
- **Begin treatment**

Phase V: Operation and Maintenance

- Verify that cleanup continues to operate as planned
- Monitor remedy effectiveness

Permanent or Temporary Solution Statement

- Determination that remedial measures, when implemented, will maintain a temporary or permanent solution

PUBLIC INVOLVEMENT PROCESS

Phase II Results

➤ Purpose

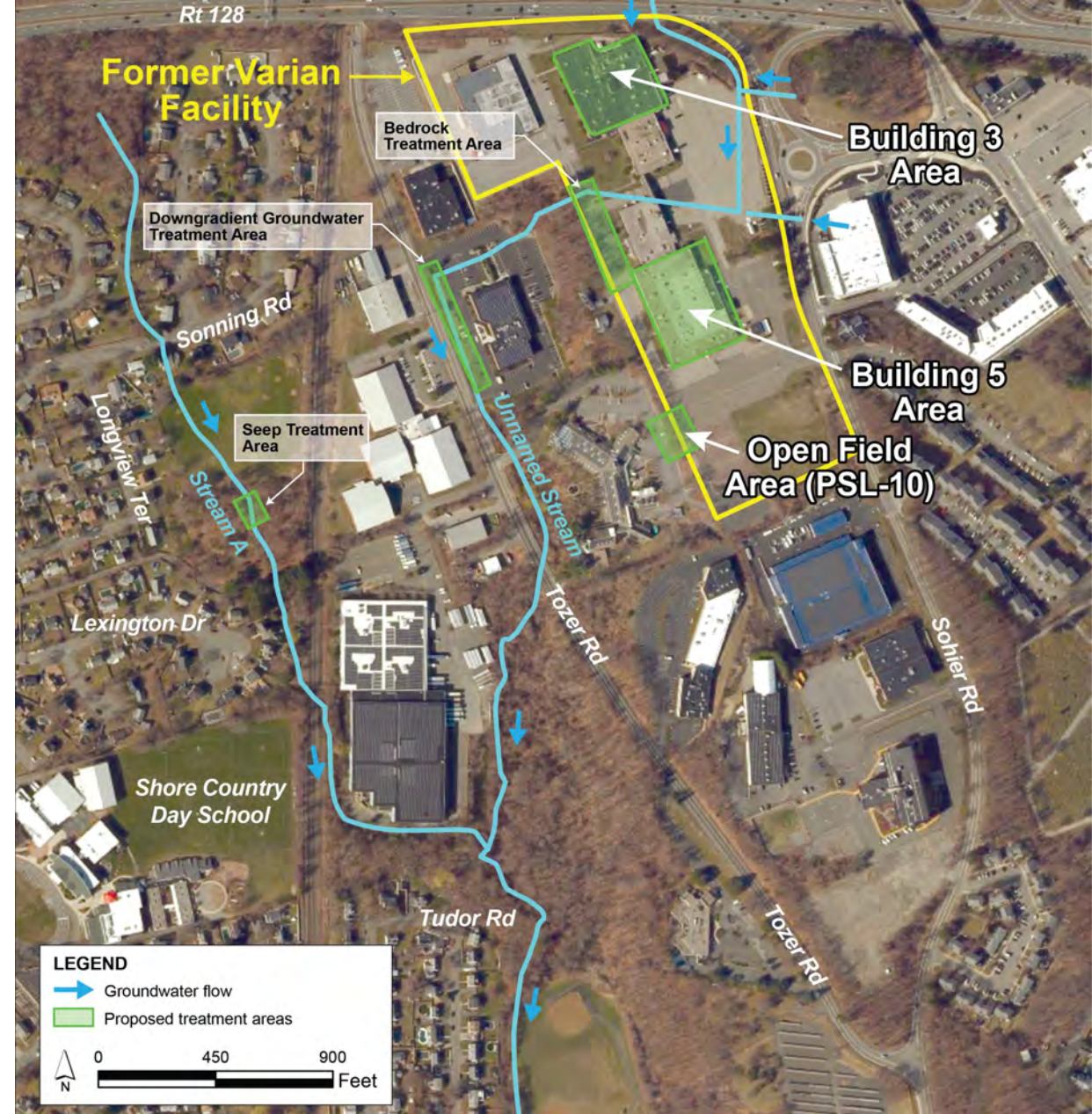
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- Evaluate potential risk to determine if cleanup plan is needed

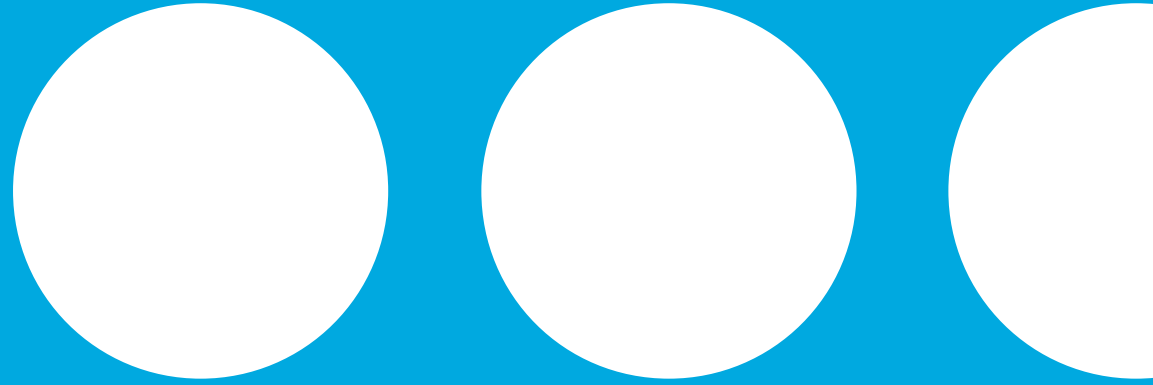
➤ No “Significant Risk” for all current workers and residents

- No current exposure to VOCs above risk levels
- Groundwater is not a drinking water source

➤ Purpose of Treatment

- Address potential future risk
- Source and migration control





Proposed Remedial Actions Revised Phase III Remedial Action Plan

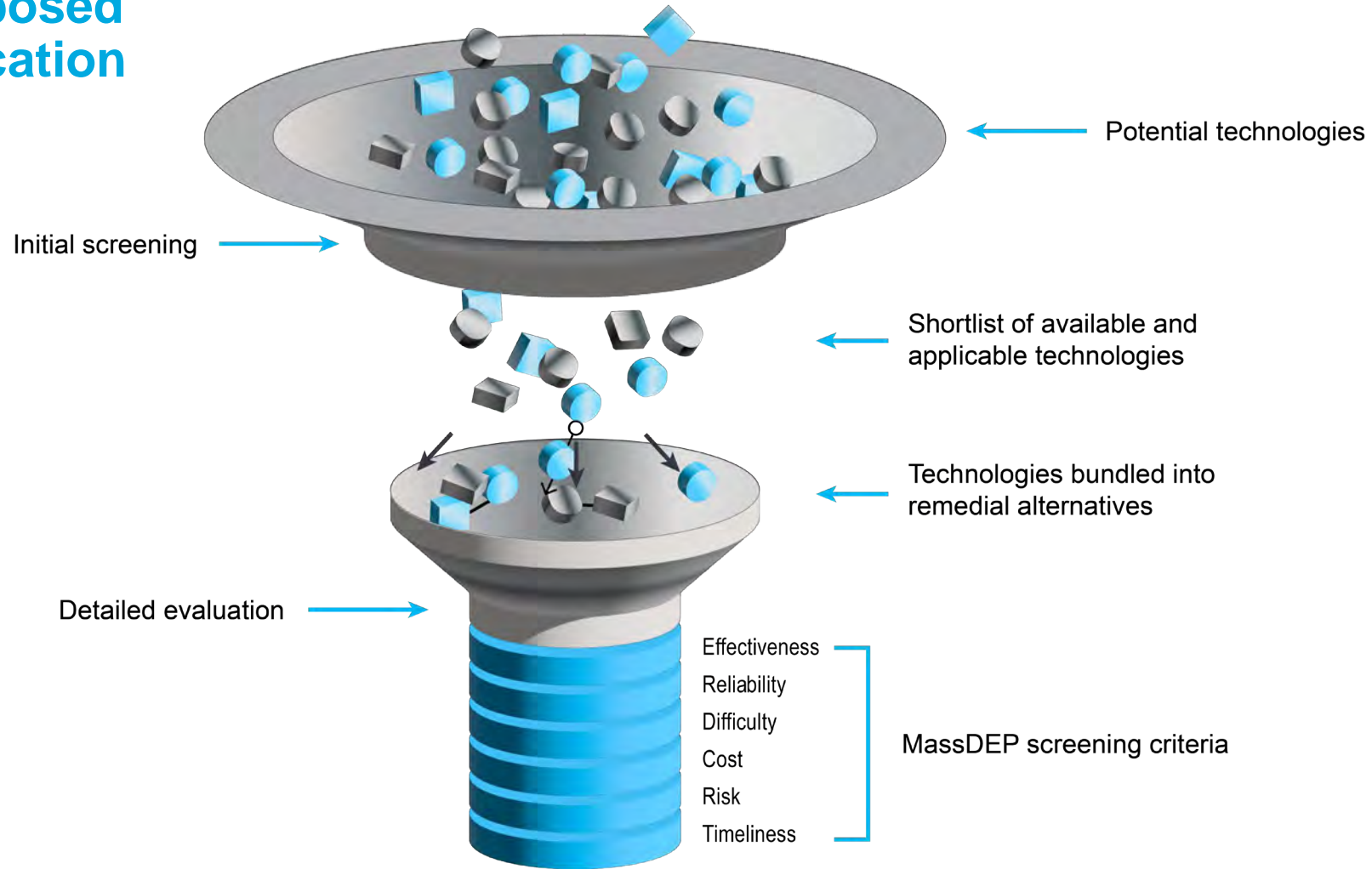
Why a Revised Phase III?

- Purpose: To evaluate and propose cleanup options using MCP criteria
 - Draft Phase III Remedial Action Plan submitted Dec 2022; public meeting held Jan 2023
- MassDEP and public comments identified additional items to be addressed in the Phase III document for three treatment areas:
 - PSL-10 (Open Field Area)
 - Building 5 source area overburden
 - Bedrock
- New data received after Dec 2022 submittal affected analysis of alternatives for PSL-10
- Three treatment areas advanced to Phase IV, Part 1:
 - Building 3 source area overburden
 - Tozer Road groundwater
 - Stream A seeps



MassDEP Process for Selecting Treatment Alternatives in Phase III

For Each Proposed Treatment Location



Ranked Remedial Alternatives



Open Field Area (PSL-10)

Selected Treatment:

- ❖ In situ chemical oxidation (ISCO)
- ❖ Permeable treatment zone

- More active remedy proposed after receipt of public comments and additional groundwater monitoring data
 - Original draft Phase III proposed monitored natural attenuation
- Prior treatment has measurably reduced contaminant concentrations
 - VOC concentrations have rebounded in one monitoring well (CL10-DO)
- Similar evaluation scores for in situ chemical oxidation and permeable treatment zone
- Permeable treatment zone may be:
 - Permeable adsorptive zone, which uses injected colloidal activated carbon to capture VOCs, *and/or*
 - Permeable reactive zone, using a reactive material such as zero-valent iron



Other alternatives evaluated:

- Monitored Natural Attenuation

- Pre-design investigations will be conducted to confirm the final treatment to be implemented

Building 5 Source Area Overburden

Selected Treatment:

- ❖ In situ bioremediation
- ❖ Continued soil vapor extraction

- In situ bioremediation (ISB) is the most appropriate technology based on the magnitude of the VOC concentrations
- ISB was previously successful at Building 5; treatment will be expanded to new locations and will use new application methods (e.g., high-pressure or pulsed injections) to address deep overburden beneath the building
 - Adaptive implementation approach – enables treatment approach to be modified or further expanded
 - Green benefits
- The current soil vapor extraction system will continue to protect current workers until remedial objectives are attained



Other alternatives evaluated:

- In situ thermal treatment without building access and continued soil vapor extraction
- In situ chemical oxidation without building access and continued soil vapor extraction

Bedrock

Selected Treatment:

❖ In situ chemical oxidation (ISCO)

- Elevated VOC concentrations are found in potentially isolated bedrock fractures with the possible presence of DNAPL
- In situ thermal remediation alternative was added as a potential treatment alternative and evaluated
 - Effectiveness limited in bedrock fractures - thermal treatment requires capture of VOC vapors and groundwater
 - ISCO destroys VOCs in place – better suited for bedrock fractures
- In situ chemical oxidation selected given elevated groundwater concentrations and potential presence of DNAPL
 - Treatment will use new application methods (e.g., push/pull injection)
 - Increased post-injection monitoring period to verify long-term remedy effectiveness



Other alternatives evaluated:

- In situ chemical reduction using sulfidated microscale zero-valent iron
- In situ bioremediation
- In situ thermal remediation

Proposed Treatment Carried Forward to Phase IV, Part 1

Building 3 Source Area Overburden:

- ❖ In situ thermal treatment
- ❖ In situ bioremediation polish
- ❖ Continued soil vapor extraction



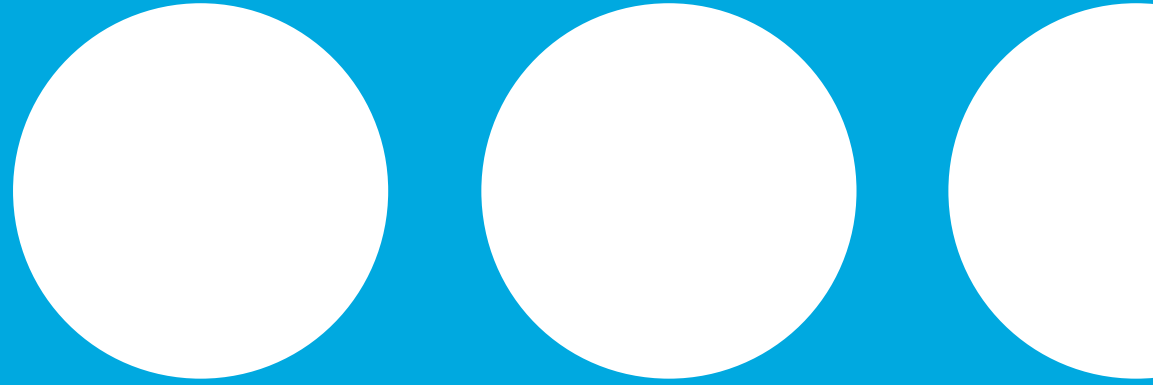
- Determined to be the most effective, reliable, and timely for removing VOCs in the overburden
- Bioremediation will harness the benefits of the heat from thermal treatment and drive continued reductions in contaminant concentrations
- Current soil vapor extraction system will continue to protect current workers

Downgradient Groundwater and Seeps:

- ❖ Tozer Road – Permeable reactive and/or adsorptive barrier
- ❖ Seep Areas – Permeable adsorptive barrier



- **Tozer Road:** A permeable reactive (and/or adsorptive) barrier will reduce VOC levels along the groundwater flow pathway, resulting in decreases in concentrations west and south of Tozer Road
- **Seep:** A granular activated carbon permeable adsorptive barrier (reactive core mat) will capture contaminants before discharge to the stream



Phase IV Remedial Implementation Plan, Part 1

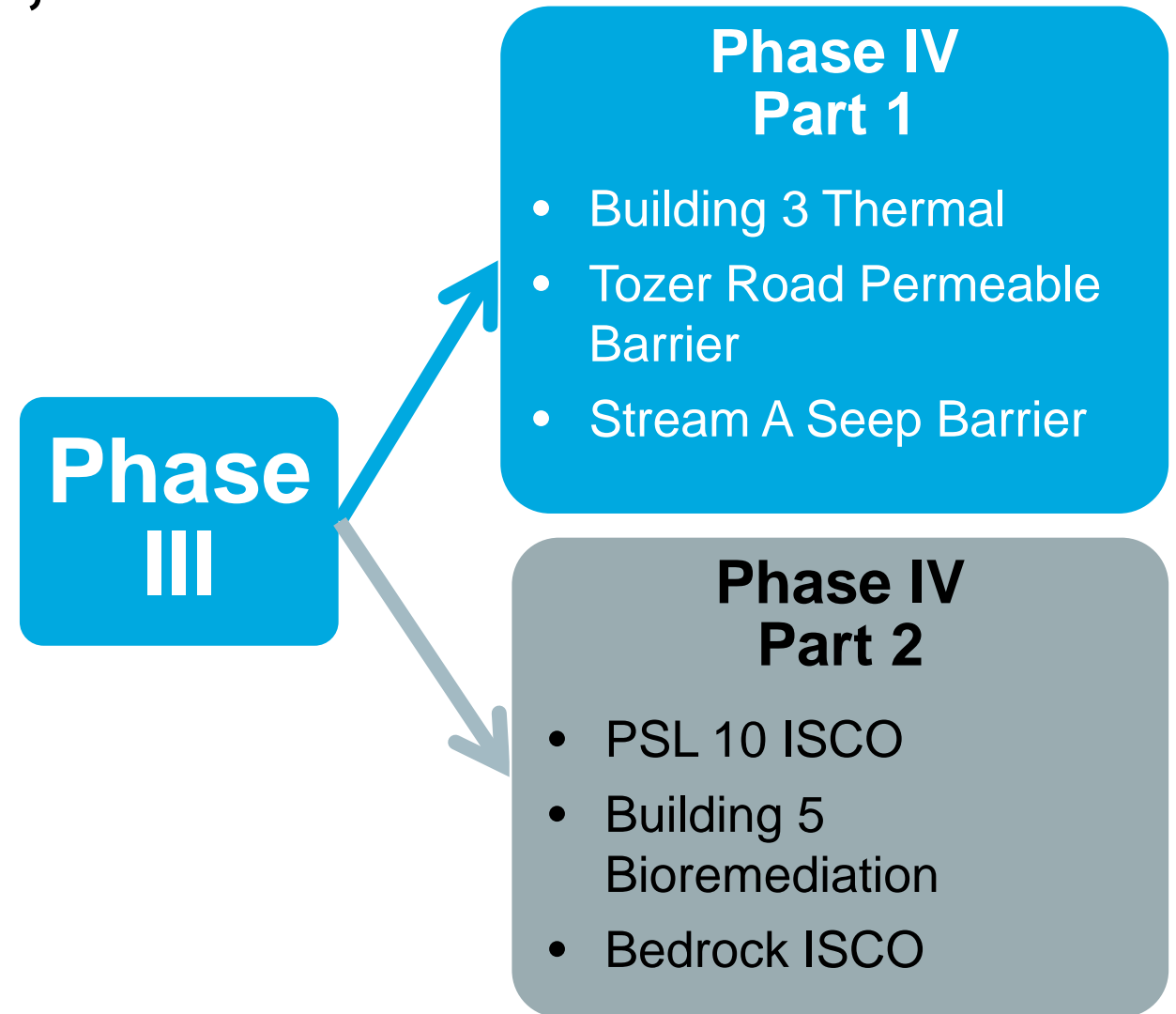
Remedial Implementation Plan, Part 1

➤ Phase IV purpose:

- Provide information and plans related to design, construction, implementation, operation and monitoring of the selected remedial alternatives to support implementation
- Identify appropriate monitoring to be performed to assure the selected cleanup plan meets design and performance specifications

➤ Presents design and implementation plans for:

- **Building 3 Overburden** – in situ thermal remediation, followed by in situ bioremediation polish, and continued operation of the soil vapor extraction system
- **Tozer Road Groundwater** - permeable reactive and/or adsorptive barrier using sulfidated microscale zero-valent iron and colloidal activated carbon
- **Stream A Seep Areas** - permeable adsorptive barrier using granular activated carbon

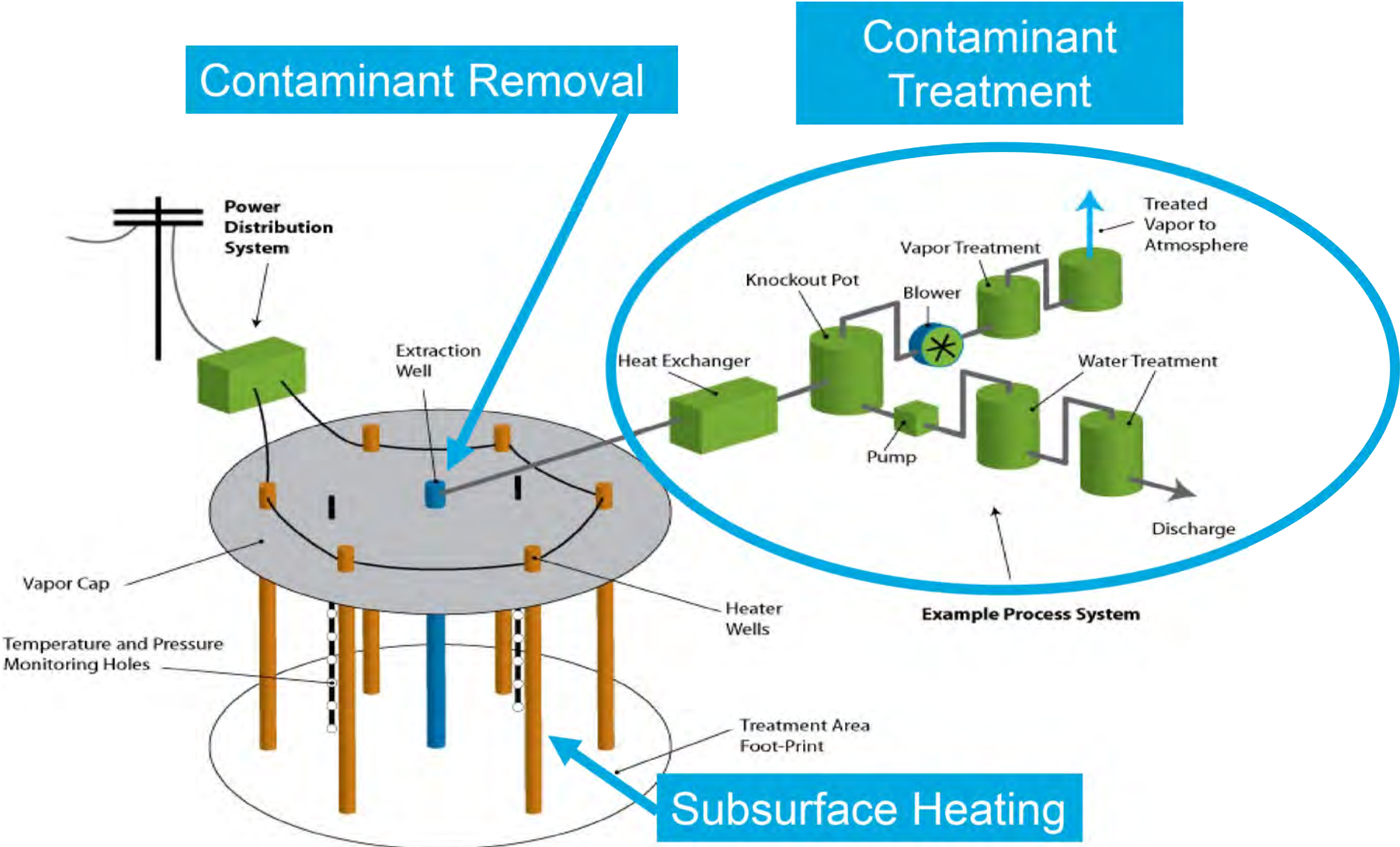


Building 3 Thermal Treatment

- Components of the treatment system include:
 - Vertical and angled borings for subsurface electrical heating equipment installation
 - Steam injection wells to potentially supplement operation of the subsurface electrical heating system
 - Sensors to measure subsurface temperatures in and around the treatment zone
 - Subsurface pressure monitoring points to document vapor capture
 - Extraction wells to remove contaminants as vapors and liquids
 - Equipment to treat extracted vapors and liquids
 - Continued operation of the existing soil vapor extraction system

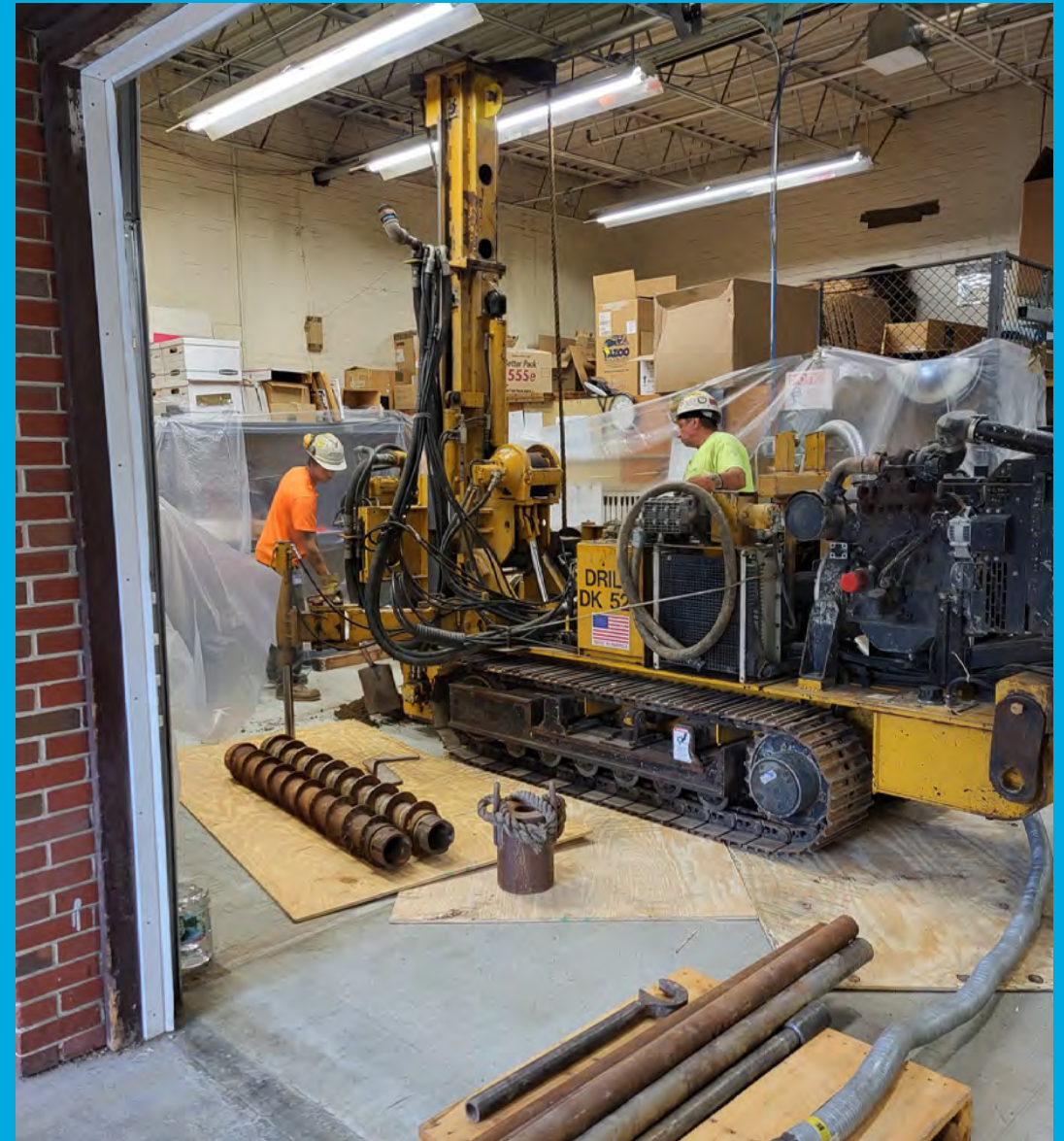


Building 3 – Conceptual In Situ Thermal Treatment Schematic

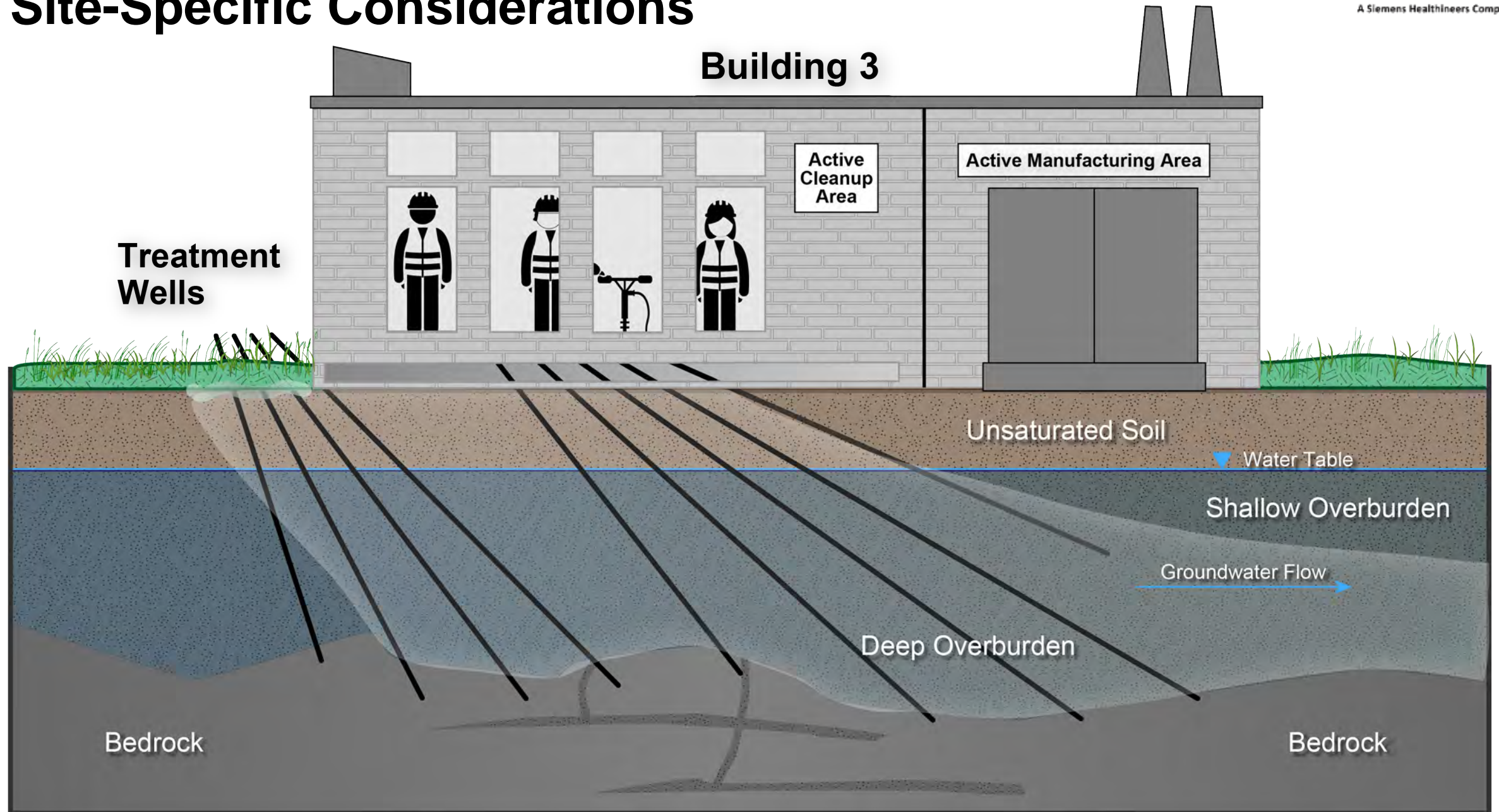


Site-Specific Considerations

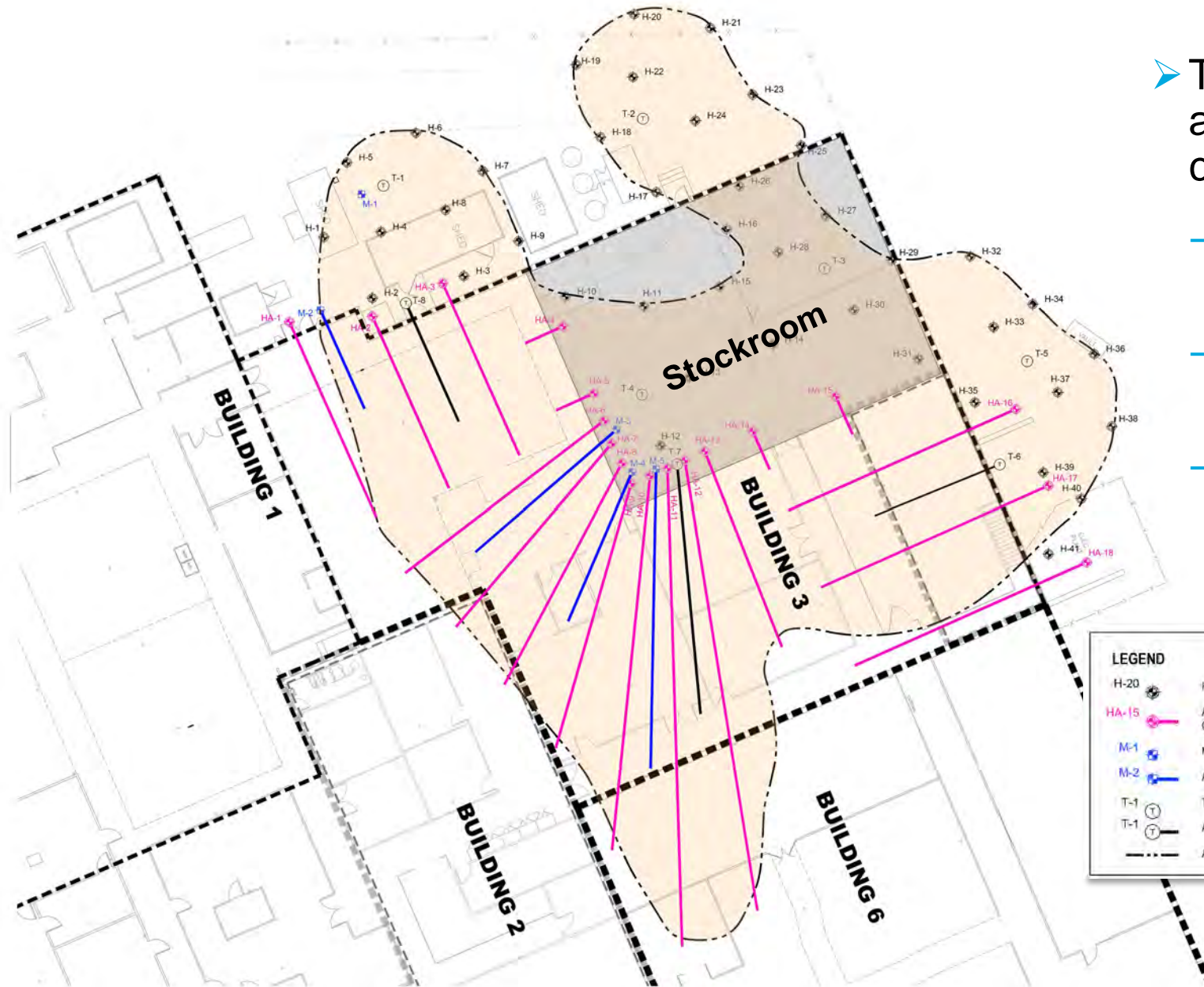
- The Building 3 source area is below an active commercial manufacturing operation
 - Selected facility activities will be relocated for CPI to continue manufacturing operations during construction and treatment
 - Treatment components will temporarily occupy a stockroom in the building during construction and treatment
- Contamination beneath Building 3 will be accessed by an array of heaters, wells and sensors installed at various angles from inside CPI's existing components stockroom
 - Building preparation for drilling equipment access is ongoing
 - Relocation efforts for stockroom components are underway



Site-Specific Considerations



Building 3 Area: Preliminary Design Well Field Layout

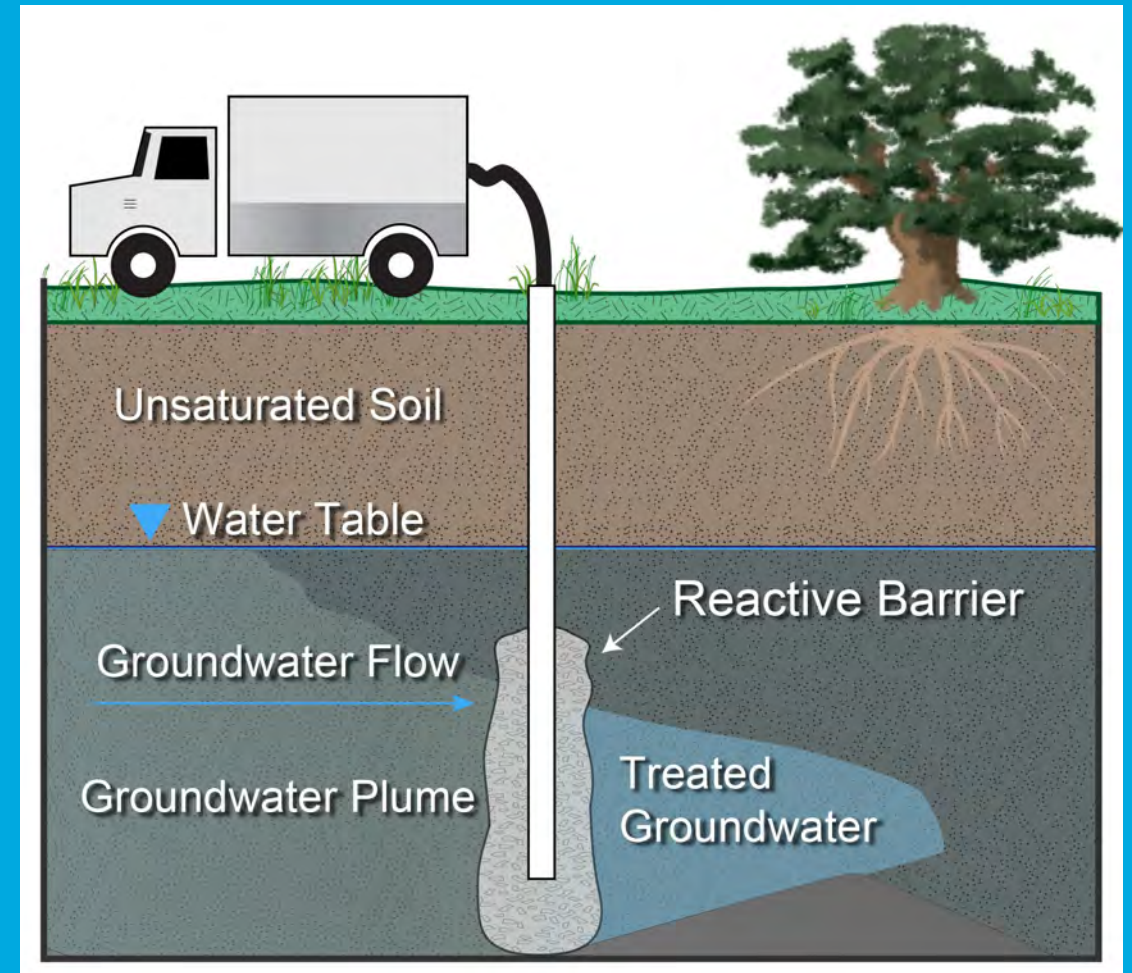


- The indoor treatment area is only accessible through the Northeast corner of Building 3
- Heating requires vertical and angled equipment installation
- 92 subsurface heating electrodes currently estimated
- Heating equipment will be placed 13 to 17 feet apart

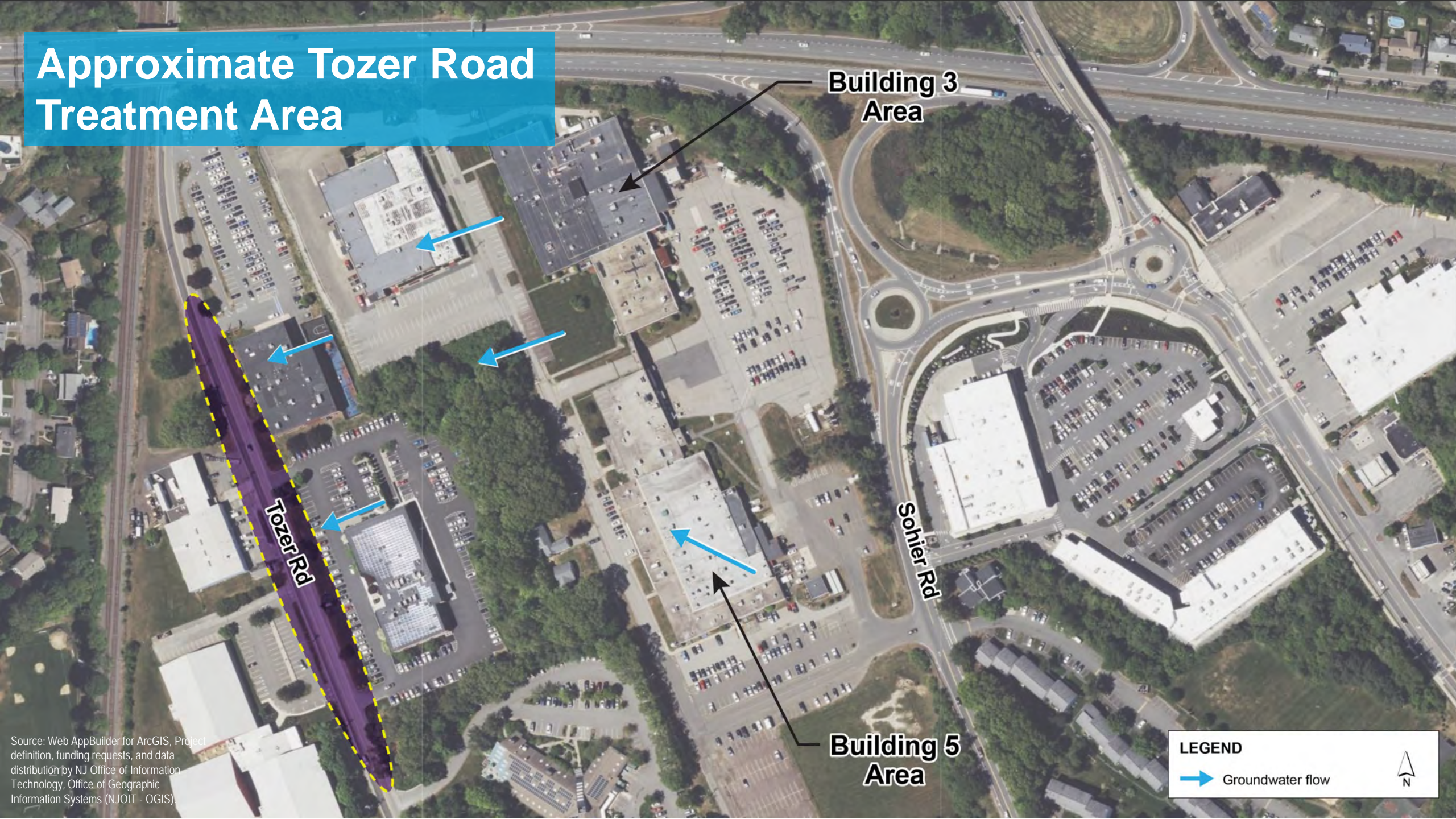
LEGEND	
H-20	HEATERS VERTICAL TOTAL OF (41)
HA-15	ANGLED HEATERS (SINGLE AND CLUSTERS) TOTAL OF (51) HEATERS AT 18 LOCATIONS
M-1	MULTIPHASE EXTRACTION WELLS (M)(1)
M-2	ANGLED MULTIPHASE EXTRACTION WELLS (M)(4)
T-1	TEMPERATURE MONITORING POINTS (T)(5)
T-1	ANGLED TEMPERATURE MONITORING POINTS (T)(3)
- - -	APPROXIMATE THERMAL TREATMENT ZONE (ITZ)

Tozer Road Groundwater Treatment Barrier

- Installation of permeable reactive and/or adsorptive barrier using sulfidated microscale zero-valent iron and colloidal activated carbon
- Remedial activities will include:
 - Investigation to provide additional high-resolution data to help refine the design
 - Installation of new monitoring wells upgradient and downgradient of the treatment area
 - Baseline groundwater sampling
 - Injection of treatment amendments to form a permeable treatment zone
 - Monitoring during injection
 - Post-remediation monitoring to assess performance



Approximate Tozer Road Treatment Area



Building 3 Area


Tozer Rd

Sohier Rd

Building 5 Area

LEGEND

➔ Groundwater flow

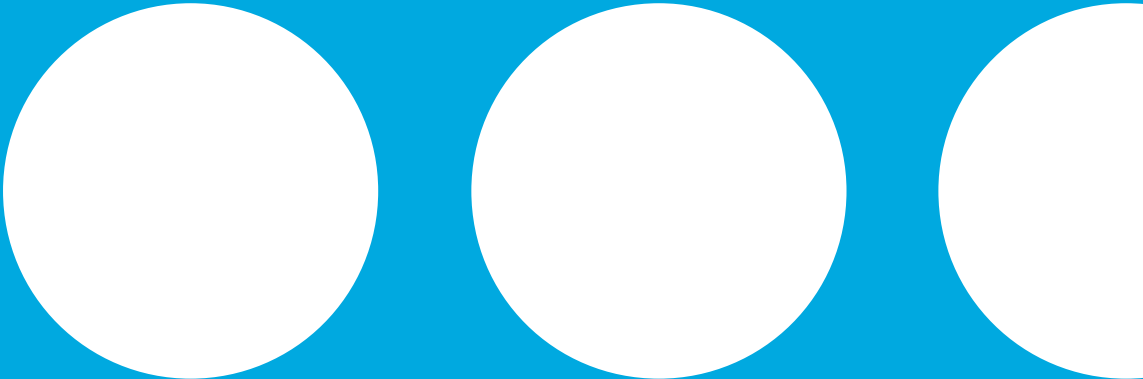


Source: Web AppBuilder for ArcGIS, Project definition, funding requests, and data distribution by NJ Office of Information Technology, Office of Geographic Information Systems (NJ OIT - OGIS)

Seeps in Stream A Groundwater Treatment

- Installation of a granular activated carbon permeable adsorptive barrier
 - Three layers of a permeable, granular activated carbon core mat to intercept each of two identified seeps and capture contaminants before water discharges to the stream
- Wetland Permitting with Beverly Conservation Commission
 - Notice of Intent submitted May 2, 2023
 - Conservation Commission hearing held on May 16, 2023
 - Wetland permit issued on May 17, 2023





Sampling for Per- and Polyfluoralkyl Substances (PFAS)

Sampling for PFAS

What are PFAS?

- A family of manufactured chemicals widely used since the 1950s in many common household products
- An emerging contaminant found globally in air, water, soil, animals, plants, and people
- Persistent in the environment
- People are most likely exposed to these chemicals by consuming PFAS-contaminated water or food, using products made with PFAS, or breathing air containing PFAS.*



Carpets



Non-stick cookware



Cosmetics



Food packaging



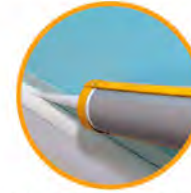
Furnishings



Outdoor gear



Clothing



Adhesives and sealants



Protective coating



Carpets cleaning products



Carseats



Firefighting foam

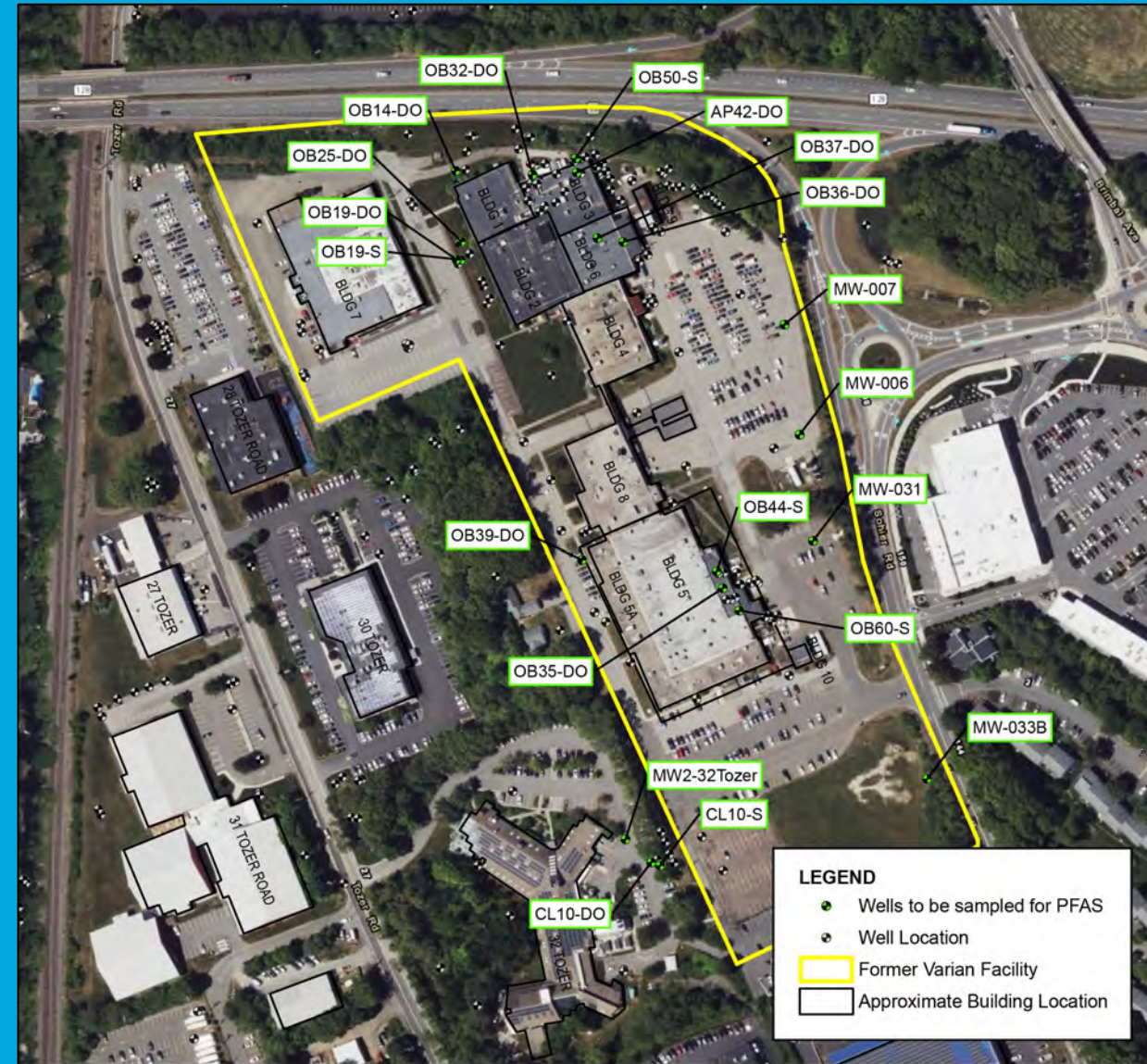
Why Sample for PFAS?

- **No known or suspected health risk associated with PFAS at the Beverly site**
- Need to consider for thermal treatment and other designs
- Needed for permitting

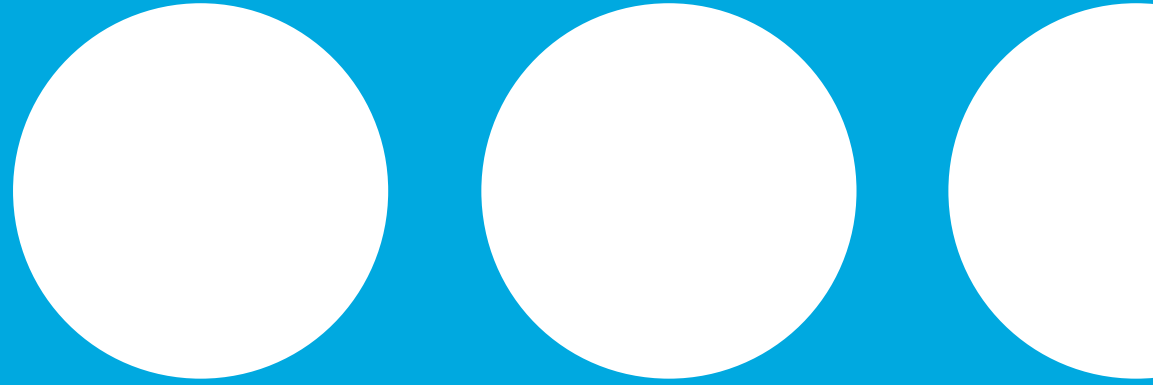
* Source: National Institute of Environmental Health Sciences

PFAS Sampling Plan

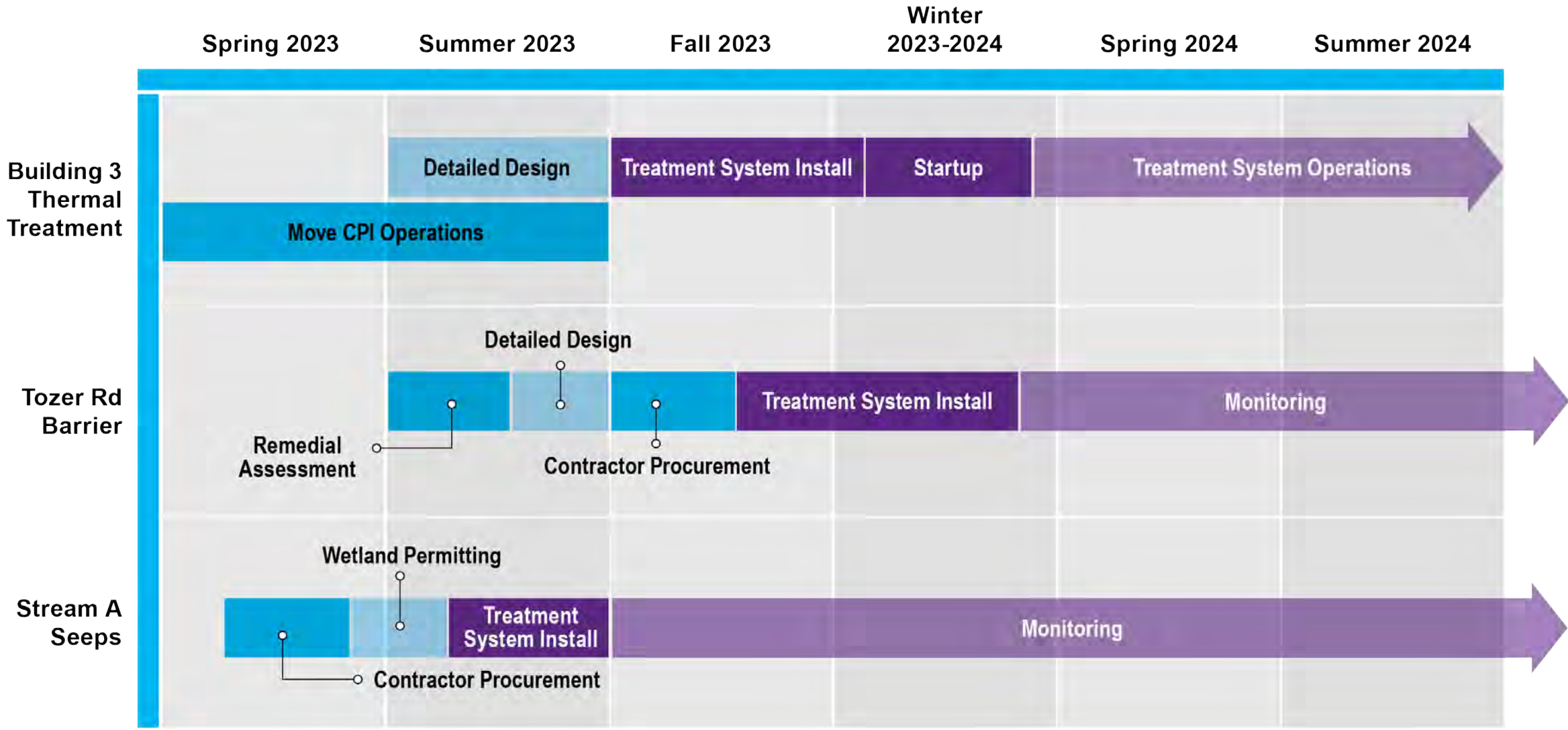
- Plan has been posted on MassDEP's website for public comment as an attachment to the Phase IV Plan, Part 1
- Testing in VOC source areas where treatment is planned and potential upgradient sources (historical Beverly Landfill that extended onto the property)
- Sample groundwater in each area:
 - Sample several depths and well locations
 - Test for a list of 40 PFAS



Next Steps



Milestones



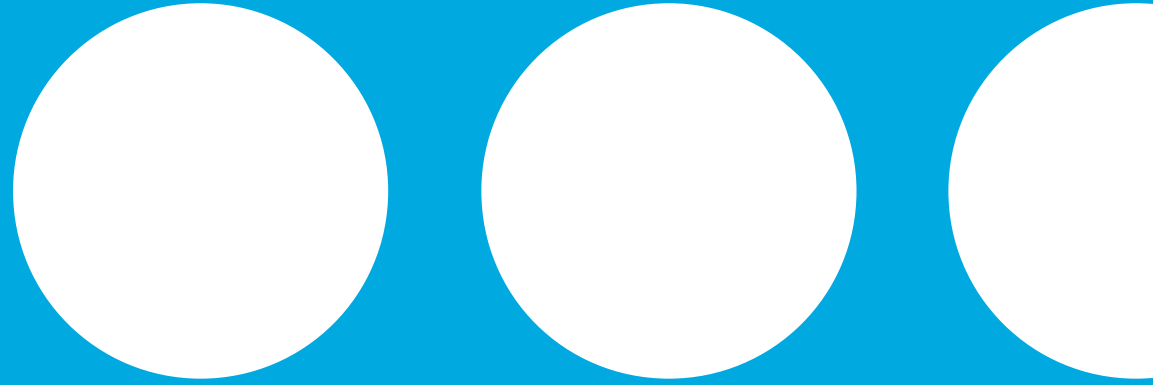
Documents for Public Review

- Documents Available for Public Review
 - Revised Phase III Remedial Action Plan
 - Phase IV Remedy Implementation Plan, Part 1
 - PFAS Sampling Plan (Phase IV Appendix)
- Hard copy: Beverly Public Library Reference Desk
 - Space constraints
- Online:
<https://eeaonline.eea.state.ma.us/EEA/fileviewer/Default.aspx?formdataid=0&documentid=717608>
- Phase IV, Part 2
 - To be issued late summer, followed by PIP meeting and public comment period

Public Comment Period June 8-27

- Complete comment sheet at welcome table
- Submit comments to Raymond Cadorette
 - Online: <https://beverlysitecleanup.com/public-involvement>
 - Email: Raymond.Cadorette@jacobs.com
 - Mail: Jacobs Solutions
Attn: Raymond Cadorette
120 St. James Avenue, 5th Floor
Boston, MA 02116
- Please comment on:
 - Revised Phase III Remedial Action Plan
 - Phase IV Remedy Implementation Plan, Part 1
 - PFAS Sampling Plan (Phase IV Appendix)
 - Hard copies in library

Questions



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