THIRD FIVE-YEAR REVIEW REPORT FOR
SAVAGE MUNICIPAL WATER SUPPLY SUPERFUND SITE
HILLSBOROUGH COUNTY, NEW HAMPSHIRE

SEPTEMBER 2021

Prepared by

U.S. Environmental Protection Agency
Region 1
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On behalf of Bryan Olson, Director
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Date

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LIST OF ABBREVIATIONS & ACRONYMS

1,1,1-TCA	1,1,1-Trichloroethane
1,1-DCA	1,1-Dichloroethane
AGQS	Ambient Groundwater Quality Standard
ALM	Adult Lead Methodology
AMSL	Above Mean Sea Level
ARAR	Applicable or Relevant and Appropriate and Requirement
AS	Air Sparging
AUR	Activity and Use Restriction
BLL	Blood Lead Level
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
DNAPL	Dense Non-Aqueous Phase Liquid
EMP	Environmental Monitoring Program
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
GMZ	Groundwater Management Zone
gpm	Gallons per Minute
HA	Health Advisory
HI	Hazard Index
HQ	Hazard Quotient
IC	Institutional Control
ICL	Interim Cleanup Level
IEUBK	Integrated Exposure Update Biokinetic
ISCO	In Situ Chemical Oxidation
LCR	Lifetime Cancer Risk
MCL	Maximum Contaminant Levels
MCLG	Maximum Contaminant Level Goals
mg/kg	Milligram per Kilogram
µg/dL	Micrograms per Deciliter
µg/L	Micrograms per Liter
MOM	Management of Migration
MNA	Monitored Natural Attenuation
ng/L	Nanogram per Liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NHANES	National Health and Nutrition Examination Survey
NHDES	New Hampshire Department of Environmental Services
NPL	National Priorities List
O&M	Operation and Maintenance
OLEM	Office of Land and Emergency Management
OU	Operable Unit
PCE	Tetrachloroethene
PFBS	Perfluorobutanesulfonic Acid
PPRTV	Provisional Peer Reviewed Toxicity Value
ppb	Part per Billion
ppt	Part per Trillion
PRB	Permeable Reactive Barrier
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RfC	Reference Concentration

RfD	Reference Dose
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SD	Settling Defendant
SLERA	Screening Level Ecological Risk Assessment
SVE	Soil Vapor Extraction
TBC	To Be Considered
TCE	Trichloroethene
TI	Technical Impracticability
trans-1,2-DCE	Trans-1,2-Dichloroethene
USGS	United States Geological Survey
VISL	Vapor Intrusion Screening Level
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) has prepared this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the third FYR for the Savage Municipal Water Supply Superfund site (the Site). The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

The Site consists of two operable units (OUs). OU1 addresses the source area groundwater plume, referred to as the OK Tool Source Area. OU2 addresses the extended plume area. A remedial investigation for a potential OU3 (deep bedrock groundwater contamination) was completed in 2014.

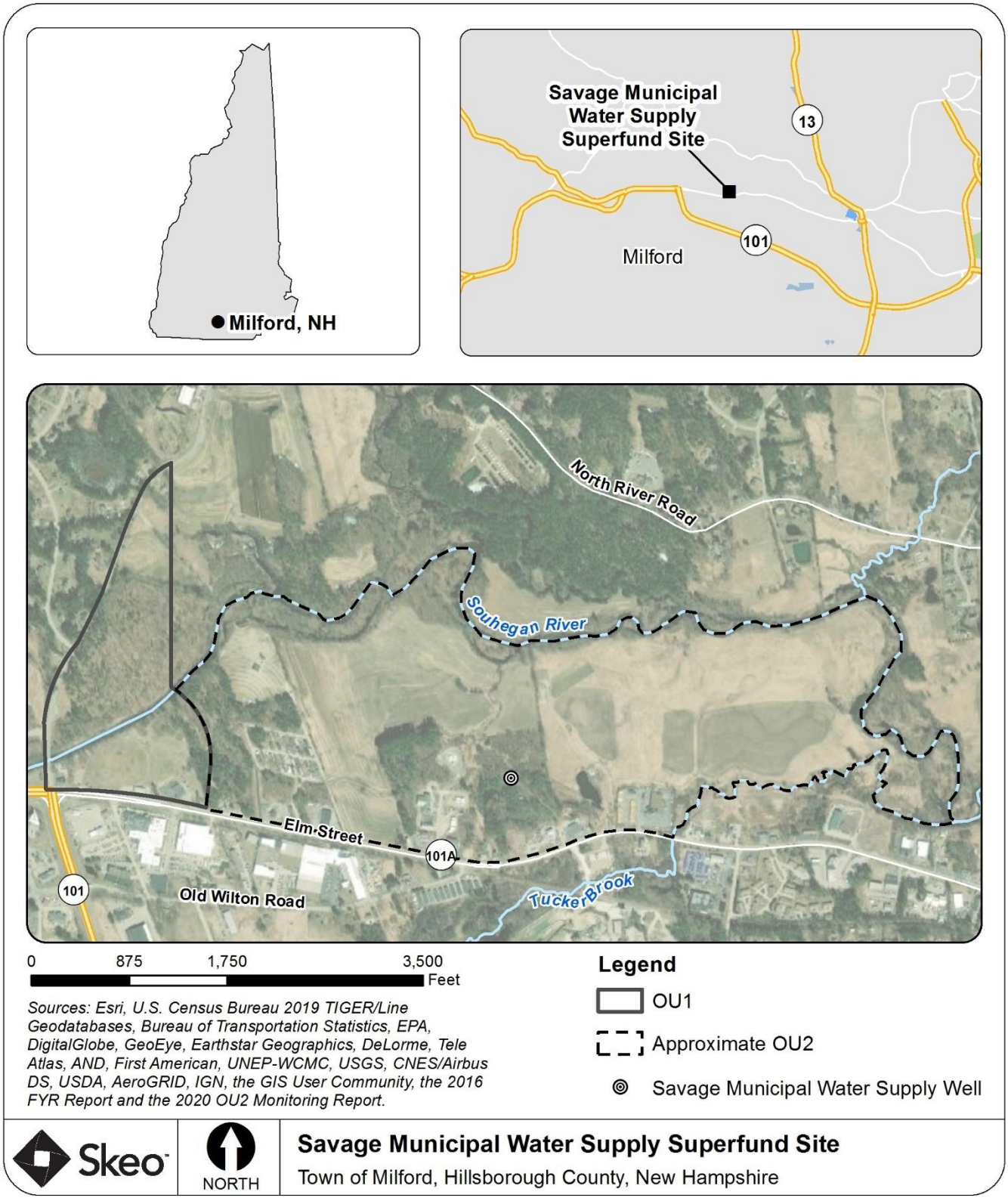
EPA remedial project manager (RPM) Gerardo Millán-Ramos led the FYR. Participants included EPA ecological risk assessor TaChalla Gibeau, EPA human health risk assessor Paulina Do, New Hampshire Department of Environmental Services (NHDES) project manager Robin Mongeon and Kirby Webster and Johnny Zimmerman-Ward from EPA support contractor Skeo. The potentially responsible parties (PRPs) were notified of the initiation of the FYR. The review began on 1/27/2021. Appendix A lists the site-related resources referenced during the development of this FYR Report. Appendix B provides the Site's chronology of events.

Site Background

The Site is in the town of Milford, New Hampshire, about 2 miles west of the center of town. The Site includes a more-than-50-acre area that includes a groundwater plume that generally extends east about 6,000 feet from the intersection of Route 101 and Elm Street, where contamination originated. For cleanup, EPA divided the contamination into two OUs. OU1 is the concentrated plume of contaminated groundwater. OU2 is the extended plume of contaminated groundwater (Figure 1). Four major industrial plants were located west (hydrologically upgradient) of the Savage Municipal Water Supply Well, which provided potable drinking water to about 10,000 residents in Milford. From the 1940s to the 1980s, operators of these four industrial facilities released untreated process waters and wastes to the ground or surface waters flowing through the Site. In February 1983, volatile organic compounds (VOCs) above drinking water standards were found in the Savage Municipal Well. The well was closed.

The Site and surrounding area are generally flat. Land uses in the area include residential, agricultural, industrial, and commercial uses. There are residences north of OU1 along North River Road, and along Elm Street and Old Wilton Road. Within OU2, there is a mobile home community north of Elm Street and the Milford Drive-In Movie Theater. Most of the remaining area between Elm Street and the Souhegan River is used for agriculture. Industrial and commercial uses extend along Elm Street and south of Elm Street. A baseball field is also located on site. It is used by the Town of Milford and private baseball clubs.

Figure 1: Site Vicinity



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

The Site is in the floodplain of the Souhegan River and the dominant groundwater flow direction is to the east. Site geology consists of a 50-to-110-foot-thick, highly transmissive sand and gravel glacial outwash and a relatively thin discontinuous till unit overlying fractured crystalline bedrock. Groundwater is present in a shallower overburden high yield aquifer. The overburden is connected to a deeper bedrock aquifer. Municipal water is available south of the Souhegan River. Contamination is generally located south of the Souhegan River, with some detections north of the river.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Savage Municipal Water Supply		
EPA ID: NHD980671002		
Region: 1	**State:** New Hampshire	**City/County:** Milford/Hillsborough County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the Site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Gerardo Millán-Ramos, with additional support provided by Skeo		
Author affiliation: EPA Region 1		
Review period: 1/27/2021 – 9/14/2021		
Date of site inspection: 5/18/2021		
Type of review: Statutory		
Review number: 3		
Triggering action date: 9/14/2016		
Due date *(five years after triggering action date)*: 9/14/2021		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action and Initial Response

In February 1983, as part of the first routine sampling of water supplies for organic compounds mandated by the Safe Drinking Water Act, the New Hampshire Water Supply and Pollution Control Commission found VOCs above drinking water standards in samples from the Savage Municipal Water Supply Well (Savage Well). They included 1,1,1-trichloroethane (1,1,1-TCA), trichloroethene (TCE), trans-1,2-dichloroethene (trans-1,2-DCE), tetrachloroethene (PCE) and 1,1-dichloroethane (1,1-DCA). PCE, TCE, 1,1,1-TCA, and trans-1,2-DCE were also

detected in the well supplying a nearby mobile home community. Use of both water supply wells was discontinued. A replacement well for the town of Milford was drilled outside the affected area. EPA added the Site to the Superfund program's National Priorities List (NPL) in September 1984.

In March 1983, an emergency removal action by EPA supplied bottled water to residences in the Milford Mobile Home Trailer Park. In May 1983, the mobile home community's water distribution system was connected to the municipal water supply system.

The PRPs completed the Site's remedial investigation and feasibility study (RI/FS) in June 1991. The 1991 RI Report identified an industrial area west of the Savage Well as the source of contamination. The industrial area included the former OK Tool Company, Hendrix Wire and Cable Company (Hendrix), Hitchiner Manufacturing (Hitchiner), and New England Steel Fabricators. The former OK Tool facility was identified as the principal source of contamination.

The human health risk assessment concluded that the risks at the Site are almost solely attributable to ingestion of PCE-contaminated groundwater. Risks from exposure to other media were within EPA's risk range for carcinogenic compounds and met the hazard index (HI) goal of 1 for compounds with noncarcinogenic effects.

During this FYR, Region 1 ecological risk assessors found a gap in information in the ecological risk conclusions noted in the 2016 FYR. The 2016 FYR referenced a 2014 Screening Level Ecological Risk Assessment (SLERA) prepared by EPA to reflect updated surface water and sediment benchmarks, however only a draft risk memorandum prepared by the previous risk assessor was available. After further research and evaluation of documentation that was available, the current R1 ecological risk assessors determined that the 2016 FYR conclusions on ecological risk still stand. The 2016 FYR conclusions were that despite exceedances of surface water and sediment benchmarks, there is no significant ecological risk to benthic invertebrates or other aquatic life in the drainage between the mobile home complex (where the confluence of the former discharge stream and an unnamed brook was located) and the former discharge stream confluence with the Souhegan River, because permitted discharges from the Hendrix facility were ceased and the discharge stream no longer exists as aquatic habitat. The available evidence supports the 2016 FYR conclusion that ecological risks are unlikely for aquatic receptors. Since the former aquatic habitat in the lower drainage swale is now terrestrial habitat, a screening using soil benchmarks was performed using Ecological Soil Screening Levels. A few exceedances of no-effect benchmarks were noted. Therefore, the potential for risk to terrestrial ecological receptors is low. However, a very limited assessment of current conditions would allow for a more definite conclusion on this point.

Remedy Selection

In the Site's 1991 Record of Decision (ROD), EPA selected a remedy for the entire Site to address contaminated groundwater. The sitewide remedial action objectives (RAOs) were:

- Prevent ingestion of contaminated groundwater that would pose an unacceptable risk to human health.
- Restore groundwater quality to meet federal and state applicable or relevant and appropriate requirements (ARARs).

The selected remedy included:

- Extraction and treatment of the concentrated plume of contaminated groundwater (later defined as OU1).
- Extraction and treatment of a part of the extended plume of contaminated groundwater (later defined as OU2).
- Natural attenuation of contaminated groundwater.
- Use of institutional controls such as deed restrictions and zoning ordinances to restrict the use of contaminated groundwater.
- Implementation of an environmental monitoring program, including monitoring of groundwater, surface water, sediments and household wells obtaining drinking water from the aquifer.

In 1996, EPA issued an Explanation of Significant Differences (ESD) detailing changes to the selected remedy in part of the plume of contaminated groundwater. The 1996 ESD divides the remedy into two OUs. OU1, the OK

Tool Source Area, is the part of the groundwater plume where levels of groundwater contamination are highest, and investigations indicated dense non-aqueous phase liquid (DNAPL) is present. The OK Tool Source Area is specifically defined in the 1994 Consent Decree governing cleanup at the Site. OU2 is the extended plume of contaminated groundwater, as defined in the Consent Decree. OU1 is fund-lead and managed by EPA and NHDES; the settling defendants (SDs) are responsible for the OU2 remedy.

OU1

Per the 1991 ROD and 1996 ESD, the OU1 remedy includes:

- Subsurface slurry wall (constructed of soil bentonite slurry) to isolate areas with the highest concentrations of contaminants of concern (COCs) identified in the 1991 ROD.
- Groundwater extraction wells (two wells inside and two wells outside the slurry wall) to provide hydraulic containment and accelerate remediation of groundwater outside the wall.
- Treatment of extracted groundwater via air stripping and carbon adsorption.
- Soil vapor extraction (SVE) with air sparging (AS) to remove near-surface sources within the slurry wall.
- Reinjection of treated groundwater via two injection wells and a recharge pit.
- Groundwater monitoring.
- Institutional controls.

Due to ongoing performance issues with the implemented OU1 remedies (the Status of Implementation section below provides more information) EPA issued a ROD Amendment in 2016. The ROD Amendment modified the OU1 remedy as follows:

- Incorporated a Technical Impracticability (TI) Waiver within the TI Zone (Figure C-1 in Appendix C).
- Included more in situ chemical oxidation (ISCO) in overburden and bedrock to reduce source material.
- Included ISCO in the bedrock near the TI Zone compliance boundary, implemented as a management of migration (MOM) component to mitigate contaminant migration beyond the TI Zone compliance boundary and eliminate further contaminant migration from OU1 as a potential source for OU2 groundwater effects.
- A permeable reactive barrier (PRB) gate placed into the slurry wall (Figure C-2 in Appendix C), intended to provide passive treatment via ISCO for contaminated groundwater exiting the barrier and allow pumping and treatment for OU1 to be discontinued. Without this modification, pumping and treatment would need to continue to remove groundwater inside the slurry wall.
- Within the Groundwater Cleanup Area (the area outside of the TI Zone), long-term monitoring to track the natural attenuation of the groundwater until it achieves groundwater cleanup standards.
- Institutional controls, including an environmental deed restriction on the OU1 site property, to prevent groundwater use and disturbance of the remedy.

The 2016 ROD Amendment assumes that MOM ISCO injections near the TI Zone boundary will occur annually for about 30 years and that after 30 years, the source area ISCO program upgradient of the MOM area will have significantly reduced contaminant concentrations in the groundwater migrating into the MOM area. As part of the 2016 ROD Amendment, EPA changed some ARARs and To Be Considered (TBC) guidelines in the 1991 ROD and 1996 ESD. The ROD Amendment presented groundwater standards for the Groundwater Cleanup Area shown in Table 1 that are also performance standards for monitoring at the boundary of the TI Zone.

The revised RAOs in the 2016 ROD Amendment developed for the TI Zone are:

- Prevent ingestion of groundwater that exceeds ARAR standards and/or exhibits a total HI greater than 1 and/or a total lifetime cancer risk (LCR) greater than EPA's acceptable range of 10^{-6} to 10^{-4}.
- Prevent migration of contaminants beyond the boundary for the TI Zone, thereby preventing expansion of the area affected by site-related contaminants at concentrations that exceed ARARs standards and/or would result in an HI greater than 1 or an LCR greater than EPA's acceptable range of 10^{-6} to 10^{-4}.
- Remove and/or contain DNAPL and other groundwater contaminants, to the extent practicable, as a source control measure to inhibit contaminant migration from the TI Zone.

- Prevent potential future inhalation exposure to vapor contamination that exceeds a total HI greater than 1 and/or a total LCR greater than EPA's acceptable range of 10^{-6} to 10^{-4}.

The 2016 ROD Amendment modified the RAOs for the groundwater cleanup area:

- Restore groundwater quality to beneficial use.
- Prevent ingestion of groundwater until groundwater cleanup standards are achieved.

OU2

In 2017, EPA issued an ESD for OU2. It:

- Updated the RAOs in the 1991 ROD to be consistent with current EPA guidance standards for groundwater remedies. The OU2 RAOs are now:
    - Restore groundwater quality to beneficial use.
    - Prevent ingestion of groundwater until groundwater cleanup standards are achieved for OU2.
- Determined that ongoing monitoring of the natural attenuation component of the remedy in OU2 and the observed reduction in groundwater contamination is consistent with the remedy meeting the standards to be designated a monitored natural attenuation (MNA) remedy.
- Provided a change to terminology regarding groundwater cleanup levels. Specifically, interim cleanup levels identified in the 1991 ROD are now considered groundwater cleanup levels.
- Clarified the approach for determining that groundwater cleanup levels have been attained, the groundwater restoration remedy is protective, and determining that groundwater restoration is complete.
    - The determination that groundwater cleanup levels have been met will be based on site-specific considerations. Particularly, EPA will consider historical and current monitoring data, contaminant distribution, trend analysis and the appropriateness of the compliance monitoring program (i.e., locations, frequency of monitoring, sampling parameters). When this determination is made, EPA will provide a complete description of this technical evaluation documenting attainment of groundwater cleanup levels.
    - After all groundwater cleanup levels have been met, as determined by EPA consistent with Agency guidance available at the time, EPA will perform a risk evaluation. The risk evaluation will consider additive risk from remaining COCs, considering all potential routes of exposure to document the residual risk based on exposure to groundwater at the Site. The residual risk evaluation will document the potential risk associated with the concentrations of COCs remaining in groundwater at the Site (if detected).
- Updated groundwater cleanup levels for several COCs for which the New Hampshire Ambient Groundwater Quality Standard (AGQS) values have changed or for which new standards have been promulgated (Table 1).
- Updated ARARs identified in the 1991 ROD to add revised and newly promulgated state and federal standards. The updated ARARs are included in Attachment 1 of the ESD.
- Added EPA guidance addressing the implementation of groundwater remedies, specifically guidance establishing procedures for the designation and implementation of MNA remedies.

Table 1: OU1 and OU2 Groundwater COC Cleanup Levels

Groundwater COC	OU1[a] (µg/L)	OU2[c] (µg/L)
1,1-DCA	200	81[e]
trans-1,2-DCE	100	100
cis-1,2-DCE	70	70
1,1-DCE	7	7
Benzene	5[b]	5
1,1,1-TCA	200	200

Groundwater COC	OU1[a] (µg/L)	OU2[c] (µg/L)
Methylene chloride	5[b]	5
PCE	5	5
TCE	5	5
Antimony	3[b]	6
Arsenic	50[b]	10
Beryllium	1[b]	4
Chromium	100[b]	100
Lead	15[b]	15
Nickel	100[b]	100
1,4-dioxane	--	3[e,f]

Notes:

a. From the 2016 OU1 ROD Amendment (pdf page 63), unless otherwise noted.
b. From Table 1 of the 1991 ROD
c. From Table 1 of the 2017 OU2 ESD
d. Based on federal Maximum Contaminant Levels (MCLs), unless otherwise noted.
e. Based on the state AGQS.
f. The 2017 ESD added 1,4-dioxane to the list of OU2 COCs.

-- = no cleanup standard for contaminant.

Status of Implementation

OU1

Slurry Wall/PRB: Construction of the slurry wall finished in 1998. In 2019, NHDES produced the design of the PRB (Figure C-2). The PRB remedial design efforts have been reviewed by EPA's Optimization Team, which has recommended against the construction of the PRB and instead recommends further assessment of the contamination in the deep bedrock. EPA Region 1 is in discussions with NHDES and USGS as to how to proceed with the OU1 remedy, considering the EPA Optimization Team's review.

Groundwater Pumping and Treatment: Operation of the groundwater extraction, treatment and reinjection system began in 1999. The remedial system was designed to maintain hydraulic containment of contaminated groundwater inside the slurry wall and within the underlying shallow bedrock via groundwater extraction from two interior wells (IW-1 and IW-2) screened across the deep overburden aquifer. Treated groundwater was injected inside the area enclosed by the slurry wall to accelerate flushing of the contamination and to prevent formation of stagnation zones within the barrier. Use of the exterior groundwater extraction wells was discontinued in 2007 when contaminant concentrations in overburden monitoring wells outside the slurry wall approached the 1991 ROD cleanup levels. The shallow interior extraction wells remain in use at OU1.

AS/SVE: The AS/SVE system operated intermittently from 1999 through 2008 because of high groundwater elevation conditions that limited the thickness of the unsaturated zone and thereby the effectiveness of the SVE system. Use of the AS/SVE was permanently discontinued in 2008 and replaced with ISCO.

In 2008 and 2009, 2,000 to 3,000 cubic yards of shallow unsaturated soil was excavated, placed in an on-site treatment cell, and treated with chemical oxidation (ozone and peroxide) and SVE.

ISCO: A pilot study program implemented between 2003 and 2010 targeted deep overburden areas with elevated concentrations of COCs and geologic lenses with lower hydraulic conductivities, which would receive less

treatment via the groundwater extraction system. The deep overburden was targeted for ISCO treatment to reduce contaminant mass and provide a passive treatment barrier between the overburden and bedrock aquifers within the area encompassed by the slurry wall. Overburden areas with lower hydraulic conductivity were targeted to reduce the potential for reverse diffusion of contaminants. During the ISCO program, pumping of groundwater from inside the slurry wall was switched from deep overburden pumping to shallow overburden pumping and continued to minimize the risk that contaminated groundwater from inside the slurry wall would migrate to areas outside the slurry wall.

To minimize the risk that permanganate-containing groundwater inside the wall would be drawn into the deep groundwater extraction wells, two new shallow overburden extraction wells (IW-1A and IW-2A) were installed within the slurry wall in 2008. The new wells are screened above the zones where permanganate was injected. They replaced deep overburden extraction wells IW-1 and IW-2, which were screened in the ISCO treatment zone. A third shallow extraction well (IW-3A) was installed in 2012 because of recurrent permanganate in the treatment system influent during low groundwater elevation. The permanganate fouled the treatment process equipment. The additional well provided better hydraulic control in the area enclosed by the slurry wall and reduced the intake of permanganate. Extraction wells IW-1A, IW-2A, and IW3A remain in service, extracting about 25 gallons per minute (gpm) to maintain inward gradients across the slurry wall and upward gradients between the overburden and bedrock inside the area enclosed by the wall.

OU2

The extraction and treatment system was constructed in early to mid-2004. It began operating in October 2004. The system operated until December 2015, when extraction and treatment activities at OU2 were suspended. A temporary suspension of groundwater extraction and treatment activities at OU2 was initiated to assess potential rebound after influent concentrations stabilized at low concentrations, to determine the effect on groundwater elevations and to evaluate opportunities for optimizing the system. Before suspension of the extraction and treatment activities, baseline groundwater sampling was conducted in September and October 2015.
The SDs have conducted 25 rounds of groundwater elevation and quality monitoring to assess OU2 remedy progress. The OU2 treatment and extraction system has operated effectively but has reached a point of substantially diminished contaminant mass removal. Although substantial progress has been made improving OU2 overburden groundwater quality, areas of higher PCE concentrations (greater than 100 micrograms per liter, or µg/L) persist in some deep overburden areas of OU2. The SDs are performing the ongoing temporary suspension test to gather more information and data on the causes of elevated PCE concentrations in the deep overburden, and to develop recommendations for optimizing the OU2 remedy.

Parts of the extended plume outside the extraction and treatment system's capture zone rely on natural physical, chemical, and biological processes to attenuate contaminants in groundwater. The 1991 ROD specified that the groundwater monitoring component of the remedy would monitor natural attenuation of contamination in groundwater outside the capture zone. As part of the environmental monitoring program (EMP), the SDs monitor and evaluate attenuation of the contaminant plume in OU2 due to advection, dispersion, and degradation. The temporary suspension also includes periodic monitoring for geochemical tracers and other parameters to assess natural attenuation. In March 2019 EPA completed an Optimization Study of OU2 and the SDs submitted a formal request to transition the entire remedy to MNA. EPA is in the process of evaluating this request to transition to MNA.

Institutional Control (IC) Review

The 1991 ROD required institutional controls to reduce the risk to public health from consumption of groundwater. The 1991 ROD stated that institutional controls may include deed restrictions and zoning ordinances to restrict the use of contaminated groundwater. Institutional controls shall be imposed in the area where the risk to public health is outside EPA's acceptable risk range.

OU1

The 2016 OU1 AROD required institutional controls for both the TI Zone and the Groundwater Cleanup Area. It stated that permanent institutional controls will be put into place to prohibit the use of the contaminated overburden and bedrock groundwater. It also stated that a well restriction zone will also be established in the area outside of the TI Zone to prohibit installation and pumping of wells that may pull the contaminated groundwater across the boundary of the TI Zone. Additionally, the AROD stated that institutional controls will also either require evaluation of vapor intrusion risks above the contaminant plume within the TI Zone, if any structures are to be constructed over the plume or allow protective vapor mitigation measures, as approved by EPA and NHDES, to be installed in any new or reoccupied structures in lieu of conducting a risk evaluation. OU1 encompasses all or part of eight lots of record in Milford (Figure 2). EPA and NHDES are working to implement appropriate institutional controls. A Sitewide Groundwater Management Zone (GMZ) via a Town Ordinance has been proposed to the Town of Milford. Please see Figure 3 which shows the location of the GMZ boundary and the parcels that it would encompass.

On July 17, 2017, a notice of activity and use restriction (AUR) was recorded for the Town of Milford Property at 589 Elm Street, Map 13, Lot 5. The AUR restricts:

- Extraction of groundwater for purposes other than carrying out the remedy specified in the ROD and ESD by EPA and/or the state.
- Any activity, including soil excavation and groundwater extraction, interfering with the remedy established in the ROD and ESD, or subsequent remedy decision documents.
- Any use of the property for residential or day care purposes.

The AUR also outlines obligations and conditions to be undertaken and/or maintained at the property as set forth in the AUR, including the requirement for all occupied structures to have a sub-slab depressurization system. The full AUR is included in Appendix K.

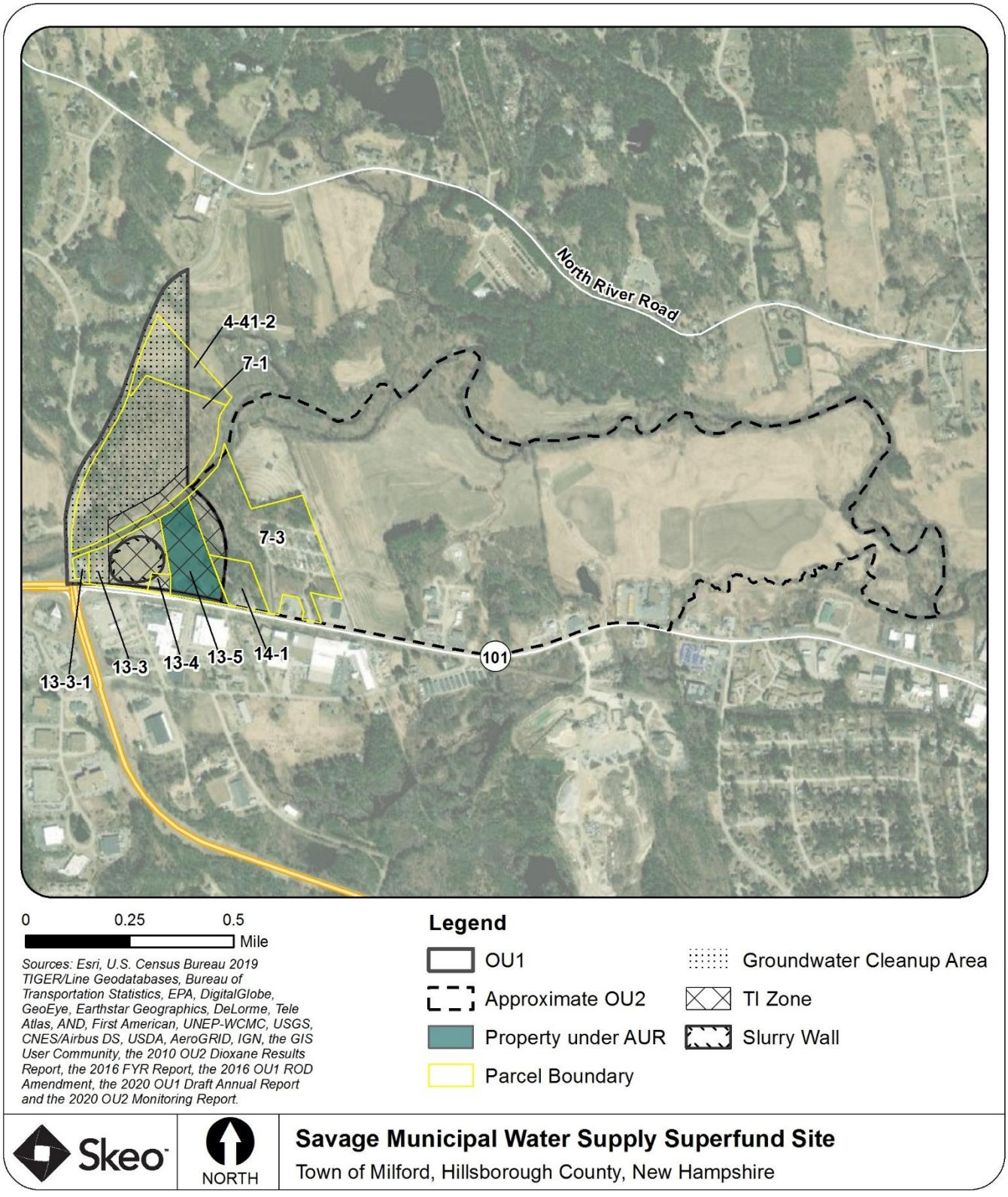
OU2

The 2017 OU2 ESD clarified that "*even after OU2 groundwater cleanup standards are achieved and OU2 groundwater institutional controls can be terminated, there may be an area within OU2 that lies within a well restriction zone established for OU1 as an institutional control to prevent the drawing of contaminated groundwater from OU1 to OU2.*" EPA, NHDES, and the OU2 Settling Defendants are working to implement an appropriate institutional control in this area. A Sitewide GMZ via a Town Ordinance has been proposed to the Town of Milford. Please see Figure 3 which shows the location of the GMZ boundary and the parcels that it would encompass.

Table 2: Summary of Planned and/or Implemented Institutional Controls (ICs)

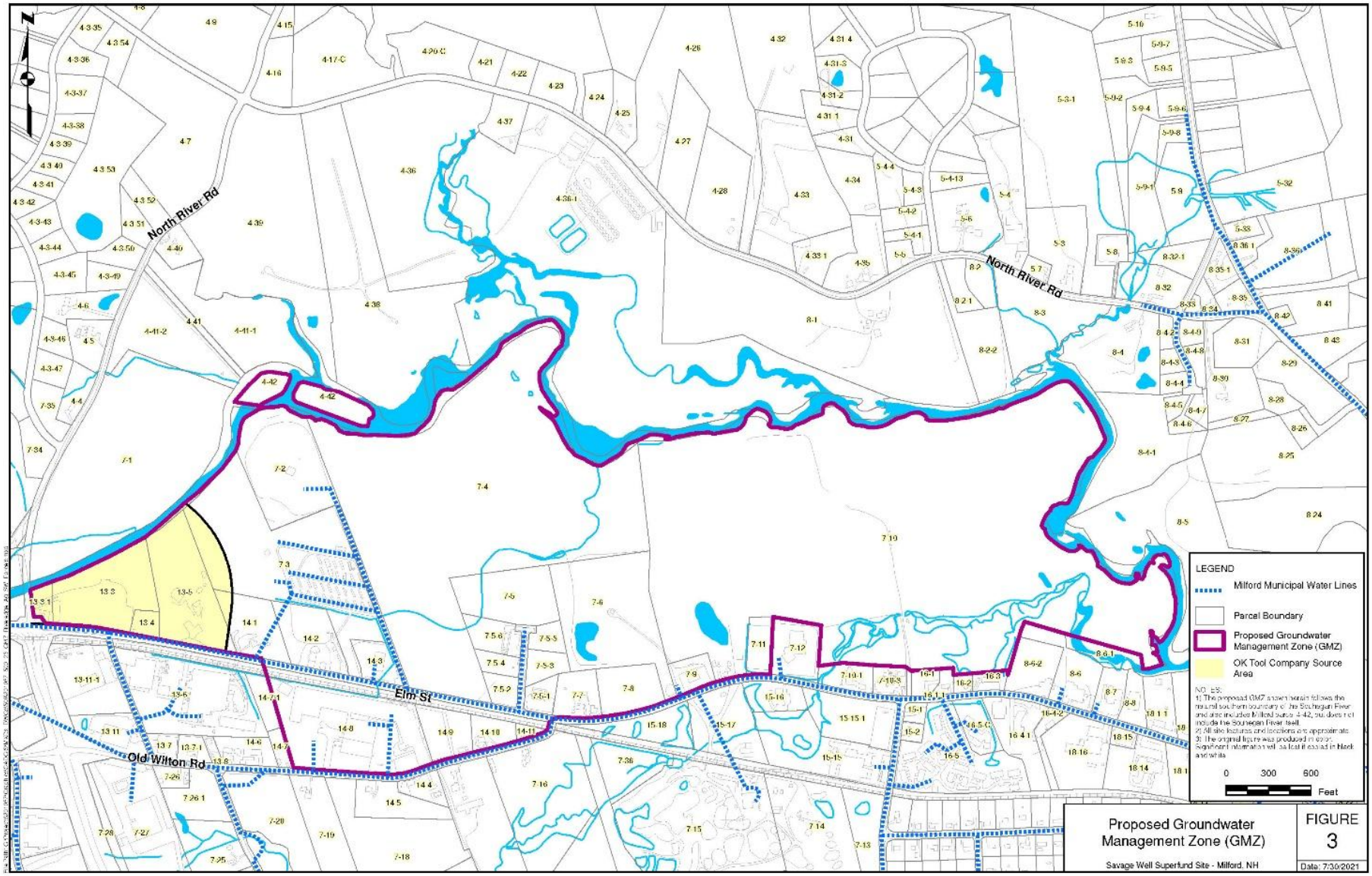
Media, Engineered Controls, and Areas That Do Not Support unlimited use and unrestricted exposure Based on Current Conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
OU1 Groundwater (TI Zone) and Remedial Components	Yes	Yes	7-1 4-41-2 13-3-1 13-3 13-4 7-3 14-1	To prevent groundwater use and disturbance of the remedy.	EPA and NHDES are working to implement appropriate institutional controls. Planned date: 9/30/2022
			13-5	To prevent groundwater use and disturbance of the remedy.	AUR; July 17, 2017
OU1 and OU2 Groundwater	Yes	Yes	4-42 7-2 7-3 7-4 7-5 7-5-1 7-5-2 7-5-3 7-5-4 7-5-5 7-5-6 7-6 7-7 7-8 7-9 7-10 7-11 13-3 13-3-1 13-4 13-5 14-1 14-2 14-3 14-8 14-9 14-10 14-11	To prevent groundwater use and disturbance of the remedy	GMZ via Town Ordinance Planned date: 9/30/2022

Figure 2: Institutional Control Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure 3: Proposed Groundwater Management Zone



Source: Figure 3 of the Proposed Groundwater Management Zone Presentation, given on August 9, 2021.

Systems Operations/Operation and Maintenance (O&M)
Operation and maintenance (O&M) activities are being adjusted as remedy components are designed and implemented.

OU1 O&M
Current O&M activities include weekly site inspections and extraction and treatment of groundwater from three interior extraction wells (IW-1A, IW-2A and IW-3A). Treated water is discharged to the infiltration gallery. Treatment system influent and effluent quality monitoring is conducted monthly with annual groundwater sampling and biannual permanganate monitoring. Monitoring includes biannual groundwater level monitoring and annual residential well sampling

OU2 O&M
Current O&M activities include biannual and annual groundwater sampling and quarterly reports.

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the previous FYR Report as well as the recommendations from the previous FYR Report and the status of those recommendations.

Table 3: Protectiveness Determinations/Statements from the 2016 FYR Report

OU #	Protectiveness Determination	Protectiveness Statement
1	Short-term Protective	*The remedy at OU1 currently protects human health and the environment because there is no contact with or consumption of contaminated groundwater, and the ROD remedy is being implemented as intended. The groundwater extraction and treatment system, in conjunction with the barrier wall, are operating so as to maintain an inward gradient in order to prevent the migration of contamination. However, in order for the OU1 remedy to be protective in the long-term, the revised remedy established in the OU1 AROD needs to be implemented, including establishing institutional controls to limit exposure to contaminated groundwater.*
2	Short-term Protective	*The remedy at OU2 currently protects human health and the environment because there is no contact or consumption of contaminated groundwater, and the remedy is being implemented as intended. However, in order for the OU2 remedy to be protective in the long-term, institutional controls to limit exposure to contaminated groundwater and additional monitoring to measure the level of contamination and to assess the extent of natural attenuation of contaminants in groundwater in the bedrock aquifer need to be implemented The groundwater cleanup levels for 1,4-dioxane, vinyl chloride, cis-1,2-DCE, manganese, and arsenic in OU2 need to be revised/established through a future OU2 CERCLA decision document. ARARs for OU2 remedy also need to be updated/revised due to a significant number of ARARs identified in the ROD either no longer existing or being subject to federal/state statutory/regulatory changes.*

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Short-term Protective	*Overall, the combined remedies of the Site currently protect human health and the environment because there is no contact with or consumption of contaminated groundwater and the remedy is being implemented as intended. However, actions need to be undertaken in order for the remedy to be protective in the long term.* *In order for the remedy to be protective in the long-term, the following actions are recommended:* • *Implement institutional controls to prevent potential exposure to groundwater at both OU1 and OU2. EPA, in consultation with state and town officials, and the OU2 settling defendants (for OU2 only), will implement institutional controls to limit exposure to contaminated groundwater by instituting a groundwater management zone, town ordinance, and/or deed restriction at properties with impaired groundwater from the Site.* • *Implement additional monitoring in OU2 to measure the level of contamination and to assess the extent of natural attenuation of contaminants in groundwater in the bedrock aquifer.* • *Revise ARARs and groundwater cleanup standards for the OU2 remedy.* • *Implement the revised OU1 remedy selected in the OU1 AROD.*

Table 4: Status of Recommendations from the 2016 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
Sitewide	No institutional controls or deed restrictions are in place to regulate development or prevent installation of water supply wells.	Implement institutional controls: Establish GMZ, Town Ordinance, Zoning and/or Deed Restriction.	Ongoing	EPA, NHDES, and the OU2 Settling Defendants are working to implement appropriate institutional controls.	NA
OU2	Inadequate monitoring of groundwater in the bedrock aquifer.	Implement additional monitoring in OU2 to measure the level of contamination and to assess the extent of natural attenuation of contaminants in groundwater in the bedrock aquifer.	Under Discussion	Conversations are ongoing to determine how the bedrock aquifer will be monitored.	NA

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
OU2	The groundwater cleanup levels for 1,4-dioxane, vinyl chloride, cis-1,2- DCE, manganese, and arsenic in OU2 need to be revised/established.	Issue a future CERCLA decision document to revise the OU2 remedy.	Completed	The 2017 ESD updated cleanup levels for chemicals of concern for which New Hampshire AGQS values have been changed or for which new standards have been promulgated. These included 1,4-dioxane, cis-1,2-DCE and arsenic. The 2017 OU2 ESD did not establish a cleanup goal for vinyl chloride or manganese.[a]	9/28/2017
OU2	ARARs for OU2 remedy also need to be updated/revised due to a significant number of ARARs identified in the ROD either no longer existing or being subject to Federal/State statutory/regulatory changes.	Issue a future CERCLA decision document to revise the OU2 remedy.	Completed	The 2017 ESD updated ARARs identified in the ROD to include revised state and federal standards and to identify more standards not specifically identified in the ROD.	9/28/2017

Notes:

a. While the 2017 ESD did not establish cleanup goals for vinyl chloride and manganese, it included the manganese health advisory as a TBC in the Revised ARARs Attachment 1 (pdf page 30). It also identifies that the Safe Drinking Water Act "Establishes MCLs for common organic and inorganic contaminants applicable to public drinking water supplies. Used as relevant and appropriate cleanup standards for aquifers and surface water bodies that are potential drinking water sources." (pdf page 30).

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was made available by a press release, on 2/25/2021. Appendix E provides a copy of the press release.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date**.** The interviews are summarized below and included in Appendix F.

Interviewees seem generally comfortable with the status of the remedy. Interviewees expressed concern about contamination in the deep bedrock aquifer in the source area, downgradient and contaminated groundwater migration on the north side of the Souhegan River where municipal water is not available. The NHDES project manager expressed that there is no bedrock remedy in place at the site. The 2016 ROD Amendment included a bedrock component, but the revised remedy has not yet been implemented. The NHDES project manager said that it is important to note that the highest concentrations of the primary contaminant of concern, PCE, has been detected in deep bedrock and that properties north of the Souhegan River rely on bedrock groundwater for their drinking water as there is no municipal water north of the river. The OU2 Settling Defendants (SDs) have significant concerns that the proposed amended OU1 remedy will mobilize contaminant mass from OU1 into OU2. The owner of 589 Elm Street would like to have fencing related to site operations removed or relocated from his property, the AUR removed from the property, well heads in the baseball field made flush mounted or removed, and manholes related to the discharge gallery made flush with the ground. The Town Administrator requested a vegetated buffer such as trees along the frontage of the treatment facility and Site along Elm Street.

Data Review

Remedial actions to date have made progress reducing the extent of contamination in overburden groundwater and lowering the risk to potential receptors. During this FYR period, EPA has signed decision documents adjusting the OU1 and OU2 groundwater remedies. This data review summarizes the status of groundwater contamination in OU1 and OU2 while decisions are being made based on the new decision documents.

OU1

Groundwater monitoring is ongoing for COCs. PCE is the main contaminant exceeding cleanup goals, with concentrations highest inside the slurry wall. The current extent of the PCE plume in OU1 by depth are shown in Figures C-3 through C-7. Figures C-8 and C-9 show historical plume maps. Groundwater pumping and treatment is ongoing. The PRB remedial design efforts have been reviewed by EPA's Optimization Team, which has recommended against the construction of the PRB and instead recommends further assessment of the contamination in the deep bedrock. EPA Region 1 is in discussions with NHDES and USGS as to how to proceed with the OU1 remedy, considering the EPA Optimization Team's review. Figure C-2 shows the proposed location for the PRB.

Treated effluent from the groundwater treatment plant is reinjected into the overburden aquifer northwest of the slurry wall via a recharge chamber. Monthly measurements of VOC effluent concentrations have been below detections limits during this FYR period, with the exception of PCE in September 2019 (9.7 µg/L).[1] Since 2009, water levels in select well clusters near the slurry wall were measured weekly to verify inward/upward hydraulic gradients along the slurry wall.[2] The six wells monitored weekly are PW-02D, PW-02R, PW-05D, PW-05R, PW-10D and PW-11D. When one or more hydraulic gradients at the Site became neutral or reversed, the extraction rates from interior extraction wells were manually adjusted to maintain the preferred gradients without causing the well pumps to cycle excessively or draw permanganate into the treatment plant. Figures C-10 and C-11 show the groundwater potentiometric maps from 2020. Residual permanganate persists in the deep overburden aquifer within the slurry wall from previous ISCO applications at the Site. Because of this, groundwater extraction within the slurry wall has focused only on the shallow extraction wells since 2008.

Limited monitoring occurs in the Groundwater Cleanup Area. MW-02R, a shallow bedrock well north of the Souhegan River (Figure 4), has consistently exceeded the TCE cleanup goal during this FYR period (Table 5). Additional well monitoring, statistical evaluation, and lines of evidence in the Groundwater Cleanup Area may be necessary to adequately assess the groundwater attenuation remedy in the Groundwater Cleanup Area. Residential wells to the north of this well are discussed below.

[1] Due to this exceedance on September 4, 2019, another sample was collected on September 24, 2019, to demonstrate compliance with the facility discharge limits. PCE was not detected in the September 24, 2019 sample.

[2] Prior to 2009 the USGS had a continuous monitoring program to measure gradients in a network of wells inside and outside of the slurry wall. The results of that work helped determine the location of the extraction wells and the necessary extraction rates to maintain the desired flow of groundwater. See USGS OFR 2001-338 and USGS OFR 2005-1303 reports for more details.

Table 5: TCE Concentrations in MW-02R (µg/L)

	Cleanup Level	2016	2017	2018	2019	2020
MW-02R	5	2 U	**26**	**16**	**56**	**28**

Notes:
U = indicates the compound was not detected above the identified laboratory reporting limit.
Bold = indicates exceedance of cleanup level.

Sources:
Table 4-2 of the 2016 OU1 Annual Report (pdf page 128).
Table 4-2 of the 2017 OU1 Annual Report (pdf page 129).
Table 4-3 of the 2018 OU1 Annual Report (pdf page 127).
Table 4-4 of the 2019 OU1 Annual Report (pdf page 128).
Table 4-4 of the 2020 OU1 Annual Report (pdf page 129).

Residential Wells

During this FYR period, drinking water samples were collected annually from seven residential water wells from six addresses (Figure C-12). One groundwater sample was collected from the Milford Fish Hatchery. All samples were non-detect for VOCs during this FYR period.

OU2

The OU2 groundwater extraction system has been suspended while the SDs await EPA approval for a transition from the groundwater pump-and-treat remedy to MNA. Semi-annual groundwater monitoring of VOCs is conducted to monitor natural attenuation at well locations shown in Figure 5. Figure 6 shows annual monitoring locations. The 2017 ESD determined that ongoing monitoring of the natural attenuation component of the remedy in OU2 and the observed reduction in groundwater contamination levels is consistent with the remedy meeting the standards to be designated a MNA remedy. The most recent groundwater sampling took place in July 2020. During the July 2020 sampling, more groundwater wells north of the Souhegan River that had not been sampled recently (MW-34 and MW-113A) were sampled. MW-34 and MW-113A did not have any detected VOC exceedances of groundwater cleanup goals.

Table 6 shows contaminants detected above their cleanup goals. PCE is the most prevalent COC in OU2 groundwater in December 2020. The OU2 Monitoring Report includes PCE time-series plots for select wells, which indicate PCE is generally declining or concentrations have remained consistent with levels observed while the pump-and-treat remedy was active (Appendix D). In July 2020, field personnel attempted to sample well FH-30, the easternmost sampling location (Figure 5) north of the Souhegan River, but it was filled in and could not be sampled. In December 2020, field personnel could not sample monitoring well PZ-B3 due to damage and an obstruction below the ground surface. In December 2020, contaminants sampled for in monitoring wells FH-27, MW-115B and MW-118B (Figure 6) were not detected or detected below the cleanup goals, suggesting groundwater contamination of contaminants that are currently being sampled for are generally delineated. Contamination exists in MW-14 south of the Souhegan River (Table 6) and in MW-114 north of the river (well locations in Figures 4, 5 and 6).

In 2009, 1,4-dioxane was sampled for in OU2. The AGQS of 3 µg/L was exceeded in six monitoring wells: MW-116A, MW-14B, MW-14R, MW-198, MW-20B and MW-24A. The highest detected value, 8.73 µg/L, was recorded at MW-14R (Figure C-13). 1,4-Dioxane has not been sampled for in OU2 since 2009. It is unclear if 1,4-dioxane has traveled north of the river where municipal water is not available.

There has been very limited bedrock sampling during this review period. Only wells MW-11R, MW-14R, and MW-19B which are shallow bedrock well, have been tested

Table 6: OU2 Groundwater Contaminants Detected Above Cleanup Levels in December 2020

Groundwater COC	1,1-DCE (µg/L)	PCE (µg/L)	TCE (µg/L)
Cleanup Goal	*7*	*5*	*5*
MI-31		**5.9**	
MW-10B		**5.4**	
MW-11R		**140**	**23**
MW-14A		**46**	**23**
MW-14B		**34**	
MW-14R		**37**	**14**
MW-19B		**13**	
MW-20B		**62**	**8.5**
MW-102		**6.9**	
MW-101C		**42**	
MW-103		**230**	**19**
MW-104A		**8.3**	
MW-104		**24**	
MW-105		**56**	
MW-107A		**6.1**	
MW-107C		**42**	
MW-108A		**40**	**37**
MW-109A		**23**	
MW-109B		**56**	
MW-110A		**16**	
MW-110B		**190**	**30**
MW-111C		**9.4**	**49**
MW-114		**18**	**14**
MW-116A	**11**	**26**	**10**
MW-120C		**160**	**14**

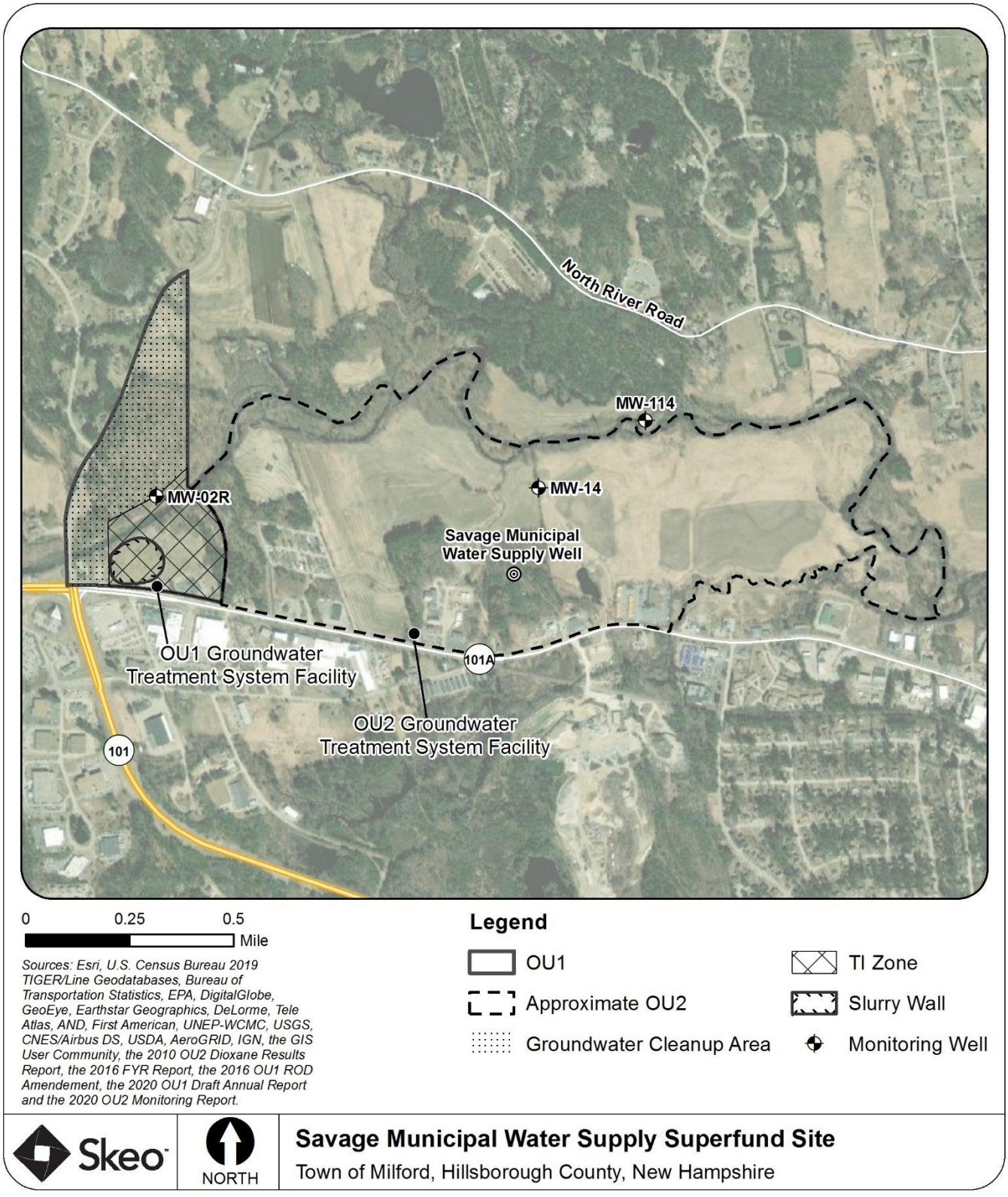
Notes:
Bold = exceeds cleanup level.
Blank = contaminant does not exceed cleanup level at this monitoring well.

Source: Table 1 of the 2020 December OU2 Monitoring Report, March 18, 2021.

Residential Wells

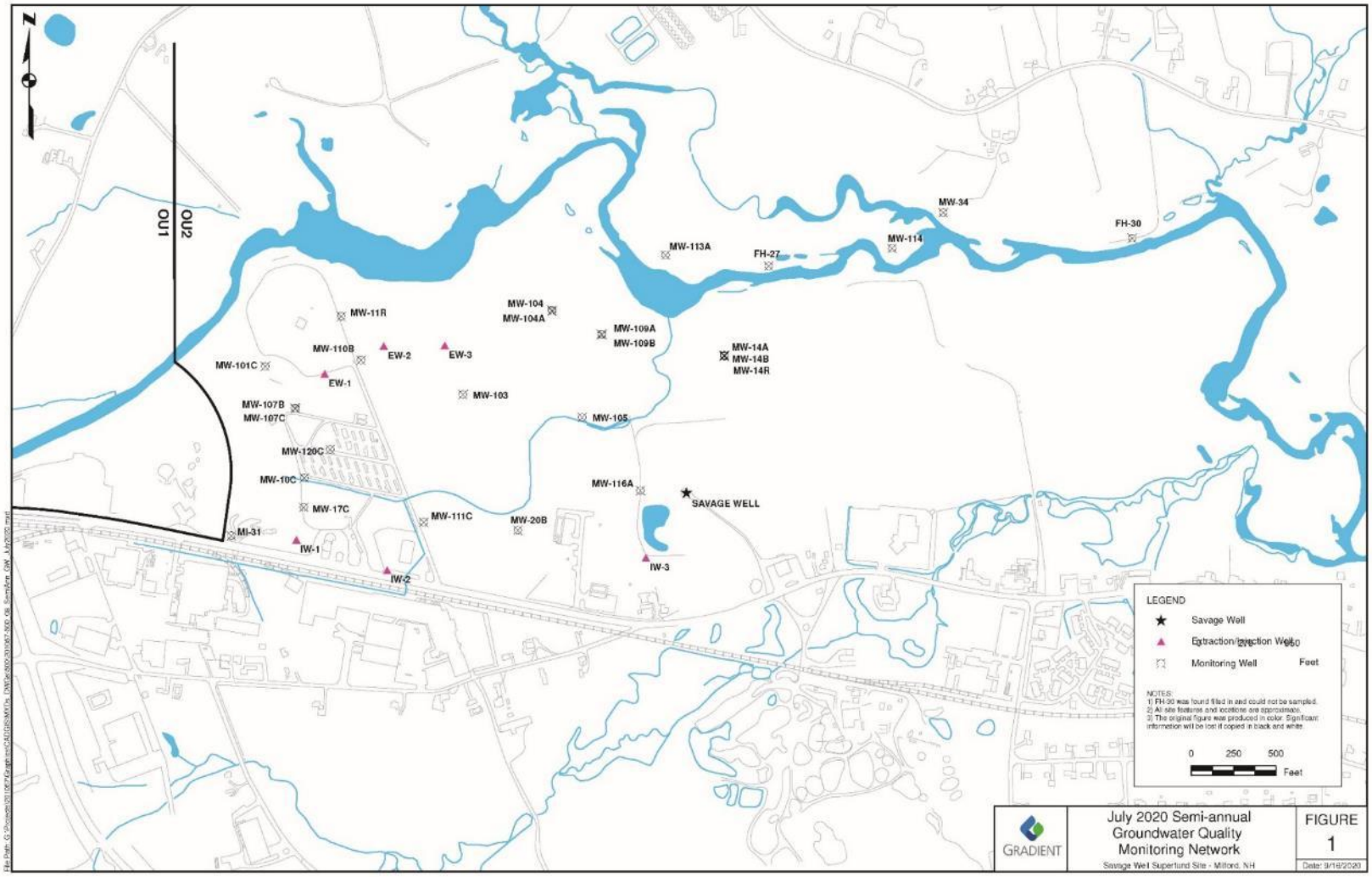
In May 2021, NHDES conducted potable well sampling at three locations on the north side of the Souhegan River as part of the current ongoing work to implement institutional controls. Locations included the Fish Hatchery potable well, and two residences on North River Road. All samples were non-detect for VOCs during this FYR period.

Figure 4: Detailed Site Map, including Select Wells



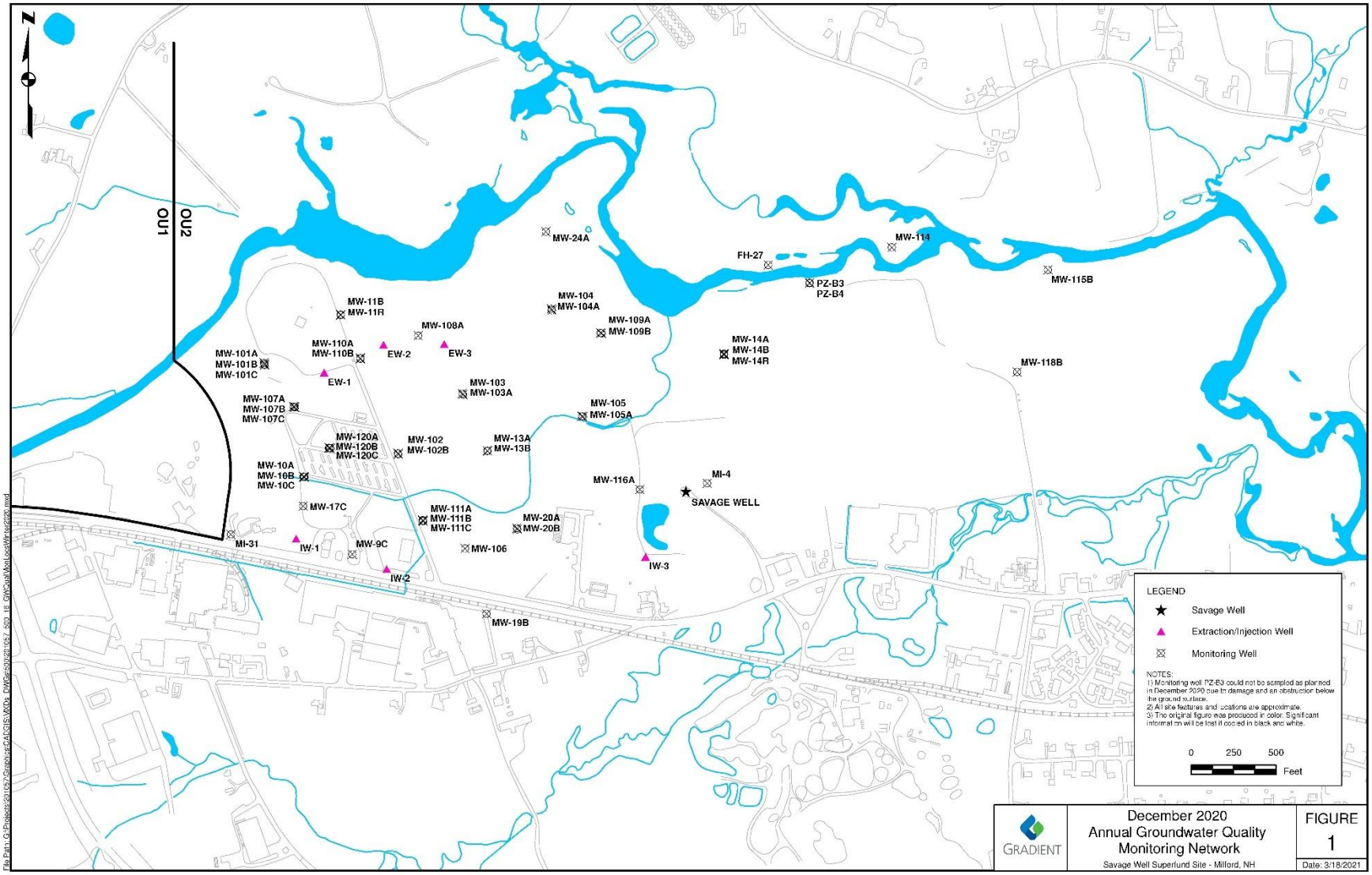
Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site.

Figure 5: OU2 Groundwater Sampling Locations – July 2020



Source: Figure 1 of the OU2 July 2020 Monitoring Report.

Figure 6: OU2 Groundwater Sampling Locations – December 2020



Source: Figure 1 of the OU2 December 2020 Monitoring Report.

Site Inspection

The site inspection took place on 5/18/2021. Participants included Robin Mongeon from NHDES, Justin Warrington from Weston, Tim Sullivan from Hitchiner Manufacturing, Robin Staszak from ABB Installation Products, Inc., Jim Rice and Anthony Janes from Gradient, and Kirby Webster and Johnny Zimmerman-Ward from EPA FYR contractor Skeo. The purpose of the inspection was to assess the protectiveness of the remedy. Appendix G includes the site inspection checklist. Appendix H includes the site inspection photographs.

Site inspection participants met at the OU1 groundwater treatment plant, located at 605 Elm Street. Justin Warrington provided an overview of activities to date at OU1 and a tour of the treatment plant. The treatment plant is well maintained and continues to operate effectively. Justin reported that there have not been any issues with vandalism or trespassing at the treatment plant or within the fence that surrounds the slurry wall.

OU1 has signage indicating that it is part of a Superfund Site. The groundwater treatment plant and slurry wall are contained within a locked fence. The fence is in good condition. The infiltration gallery and monitoring wells on the neighboring property, 589 Elm Street, all appear to be in good condition. The Souhegan River is used mainly for fishing, with trout stocked from the Milford Fish Hatchery.

Site inspection participants viewed the OU2 groundwater treatment plant, which has not operated since 2015. The building is in disrepair and needs to be fixed. Site inspection participants observed the mobile home park located on site, the Milford Drive-In Movie Theater, and parcel 7-10, where a developer recently purchased the property. The developer has plans to continue the agricultural use and use it for hunting and fishing. A stocked fishpond was observed on this property.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Monitoring indicates the remedy is generally functioning as intended by remedy components described in decision documents that have been implemented. However, as indicated in the 2014 RI Report, the existing remedy is not effective at treating or containing contamination within the bedrock and cleanup levels may not be able to be achieved in a reasonable timeframe. Remedy components identified in newer decision documents, such as the OU1 PRB and additional ISCO injections and an official change to MNA in OU2, have not been implemented. Therefore, an assessment of those components is not possible.

Remedial Action Performance

OU1

The OU1 groundwater extraction and reinjection system currently operates and is functioning as designed. The extraction system maintains the inward and upward gradient while the slurry wall facilitates the containment of the highest concentrations of groundwater contamination in OU1. Based on ongoing monitoring and investigations conducted including the 2014 RI, the interior and exterior areas of the slurry wall are hydraulically connected through fractured bedrock. Significant reductions of contaminant concentrations have been observed, via pumping and treatment and ISCO injections, with an observed 99% decrease in concentrations in the overburden outside the slurry wall since implementation of the remedy (see Figure C-14 for initial groundwater contamination plume). For example, both B95-13 and PW-02M (OU1 monitoring wells located outside of the slurry wall) had concentrations of PCE over 1,000 µg/L prior to remedy implementation and concentrations of PCE are currently (as of 2020) below the MCL of 5 µg/L.

However, due to increasing VOC concentration trends observed in shallow bedrock monitoring wells within the OU1 slurry wall, supplemental investigations conducted between 2010 and 2014 (Remedial Investigation Report,

Weston 2014) have determined that the current remedy is not effective at treating or containing contamination within the bedrock. The amended cleanup approach described in the 2016 AROD calls for combining PRB and ISCO technology to treat contaminated groundwater in the TI zone and manage the migration of contaminants outside of the OU1 boundary. A TI Zone encompasses the most highly contaminated groundwater, where it is technically impracticable from an engineering perspective to achieve federal and state groundwater cleanup standards. A PRB was proposed in the downgradient side of the containment barrier (slurry wall) to treat groundwater and prevent groundwater levels from rising after cessation of the pump-and-treat system. The PRB remedial design efforts have been reviewed by EPA's Optimization Team, which has recommended against the construction of the PRB and instead recommends further assessment of the contamination in the deep bedrock. EPA Region 1 is in discussions with NHDES and USGS as to how to proceed with the OU1 remedy, considering the EPA Optimization Team's review.

OU2
The OU2 groundwater extraction system has not operated during this FYR period. The system was suspended in 2015 to evaluate the causes of elevated PCE concentrations in the deep overburden and develop recommendations for optimizing the OU2 extraction and treatment system. As described in the *Status of Implementation* section of this FYR, the groundwater treatment and extraction system reached a point of substantially diminished contaminant mass removal. In March 2019, EPA completed an Optimization Study of OU2 and the SDs submitted a formal request to transition the entire remedy to MNA. EPA is in the process of evaluating this request to transition to MNA.

System Operations/O&M

Current O&M activities in place are working in a manner that supports the current remedies in place. However, O&M activities are being adjusted as remedy components are designed and implemented. Limited monitoring occurs in both OU1 and OU2 and need further assessment on the addition of monitoring wells to better detail the extent of contaminant attenuation.

OU1
Limited monitoring occurs in the Groundwater Cleanup Area. MW-02R, a shallow bedrock well north of the Souhegan River (Figure 4), has consistently exceeded the TCE cleanup goal during this FYR period (Table 5). Additional well monitoring, statistical evaluation, and lines of evidence in the Groundwater Cleanup Area may be necessary to adequately assess the groundwater attenuation remedy in the Groundwater Cleanup Area.

Further investigations are needed in the deep bedrock to determine the extent of contamination. Open boreholes should be converted to monitoring wells and additional wells installed as needed to properly characterize deep bedrock groundwater and to further determine what remedies may be considered.

OU2
Contamination exists in MW-14 south of the Souhegan River and in MW-114 north of the river, but the location of contaminants currently sampled for is generally delineated. In 2009, 1,4-dioxane was sampled for in OU2. The AGQS of 3 µg/L was exceeded in six monitoring wells: MW-116A, MW-14B, MW-14R, MW-198, MW-20B and MW-24A. The highest detected value, 8.73 µg/L, was recorded at MW-14R. 1,4-Dioxane has not been sampled for in OU2 since 2009. It is unclear if 1,4-dioxane has traveled north of the river where municipal water is not available.

Very limited monitoring is currently being conducted in the OU2 bedrock aquifer. Monitoring wells MW-11R and MW-14R are sampled semi-annually, while MW-11B is sampled annually.

Implementation of Institutional Controls and Other Measures

An AUR is in place for one of the OU1 properties. More institutional controls to prevent groundwater use for OU1 and OU2 are under discussion.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

Question B Summary:
No. There have been changes in toxicity values, exposure assumptions, exposure pathways and methods of evaluating risk, potential standards, and TBCs since the 1991 ROD was issued, as discussed below. The changes as described below are not expected to alter the protectiveness of the remedy because the changes have been addressed by subsequent decision documents and there are currently no known completed exposure pathways to the remaining groundwater contamination. During this FYR, Region 1 ecological risk assessors found a gap in information in the ecological risk conclusions noted in the 2016 FYR. The 2016 FYR referenced a 2014 SLERA prepared by EPA to reflect updated surface water and sediment benchmarks, however only a draft risk memorandum prepared by the previous risk assessor was available. After further research and evaluation of documentation that was available, the current R1 ecological risk assessors determined that the 2016 FYR conclusions on ecological risk still stand. Even though a few exceedances of no-effect benchmarks for soil were noted, the potential for risk to terrestrial ecological receptors is low. However, a very limited assessment of current conditions would allow for a more definite conclusion on this point.

Changes in Standards and TBCs
New standards should be considered during the FYR process as part of the protectiveness determination. Under the NCP, if a new requirement is promulgated after the ROD is signed, and the requirement is determined to be an ARAR, the new requirement must be attained only if necessary to ensure that the remedy is protective of human health and the environment.

EPA guidance states:

> *Subsequent to the initiation of the remedial action new standards based on new scientific information or awareness may be developed and these standards may differ from the cleanup standards on which the remedy was based. These new … [standards] should be considered as part of the review conducted at least every five years under CERCLA §121(c) for sites where hazardous substances remain on-site. The review requires EPA to assure that human health and the environment are being protected by the remedial action. Therefore, the remedy should be examined in light of any new standards that would be applicable or relevant and appropriate to the circumstances at the site or pertinent new [standards], in order to ensure that the remedy is still protective. In certain situations, new standards or the information on which they are based may indicate that the site presents a significant threat to health or environment. If such information comes to light at times other than at the five-year reviews, the necessity of acting to modify the remedy should be considered at such times.* (See CERCLA Compliance with Other Laws Manual: Interim Final (Part 1) EPA/540/G-89/006 August 1988, p. 1-56.)

- **PFAS**

In May 2016, EPA issued final lifetime drinking water health advisories (HAs) for PFOA and PFOS. The EPA HA for PFOA and PFOS is 70 nanograms per liter (ng/L) (parts per trillion [ppt]), individually or combined. See also EPA's Interim Recommendations to Address Groundwater Contaminated with Perfluorooctanoic Acid and Perfluorooctanesulfonate [OSWER DIRECTIVE 9283.1-47, Dec. 19, 2019] which establishes a screening level of 40 ng/L (ppt) for PFOA and PFOS individually. Using the standard Superfund approach, an unacceptable noncancer risk may be triggered by an exceedance of a Hazard Quotient (HQ) of 1. EPA's HA of 70 ng/L (ppt) equates to an HQ of less than 1 (approximately 0.1-0.2). Should data indicate PFAS levels have

reached or exceeded 40 ng/L (ppt) for either PFOA or PFOS, EPA recommends that further evaluation be conducted.

In July 2020 New Hampshire promulgated State MCLs for the following four specific PFAS, individually or combined, into the State's Safe Drinking Water Act:

- PFOA: 12 ppt
- PFOS: 15 ppt
- PFHxS: 18 ppt
- PFNA: 11 ppt

In June 2016, the discharge water from each of the three shallow overburden extraction wells in OU1 were sampled for six PFAS compounds which included PFOA, PFOS, PFNA, PFBS, PFHpA and PFHxS to assess whether these compounds were present at the Site. The samples were sent to the EPA Region 1 Laboratory and analyzed following EPA Method 537. None of the PFAS was detected in any of the three extraction wells.

At this time EPA has made no determination of whether these new standards will be adopted for this Site. For purposes of this five-year review, EPA has evaluated the PFAS data collected against EPA's PFOA/PFOS health advisory for drinking water of 70 ng/L(ppt) and the State's MCLs for PFAS. EPA's health advisory of 70 ng/L (ppt) equates to a Superfund non-cancer risk of less than a HQ of 1, which is below EPA's acceptable non-cancer risk range of HQ of 1. Thus, the existing remedy remains protective, and the remedy does not need to be modified to the new MCLs for PFAS at this time. Monitoring for PFAS should continue to ensure the remedy remains protective. A second round of sampling with lower detection limits for the four specific PFAS compounds promulgated by NH as State MCLs may be appropriate to confirm the absence of PFAS compounds given the current lower detection limits.

- **1,4-dioxane**

Using 2013 updated IRIS toxicity information and the standard Superfund risk assessment approach, EPA's carcinogenic risk range of 10^{-6} to 10^{-4} for 1,4-dioxane equates to a concentration range of 0.46 µg/L to 46 µg/L (parts per billion [ppb]). In September 2018, NHDES modified its AGQS for 1,4-dioxane from 3.0 µg/L (ppb) to 0.32 µg/L (ppb). The current site groundwater cleanup level of 3.0 µg/L (ppb) for 1,4-dioxane equates to a carcinogenic risk of 6.5 x 10^{-6}, which is still well within EPA's acceptable 10^{-6} to 10^{-4} risk range. Thus, the existing cleanup goal remains protective. The remedy does not need to be modified to the new AGQS of 0.32 µg/L (ppb) for 1,4-dioxane at this time.

In 2009, 1,4-dioxane was sampled for in OU2. The AGQS of 3 µg/L was exceeded in six monitoring wells: MW-116A, MW-14B, MW-14R, MW-198, MW-20B and MW-24A, and the highest detected value, 8.73 µg/L, was recorded at MW-14R (Figure C-13). This concentration equates to a carcinogenic risk of 1.9 x 10^{-5}, which is within EPA's acceptable risk range and it should be noted that this groundwater is not being used as a source of drinking water. 1,4-Dioxane has not been sampled for in OU2 since 2009. It is unclear if 1,4-dioxane has traveled north of the river where municipal water is not available. Monitoring wells need to be tested to determine whether the contaminant is present and has migrated to areas north of the river.

Changes in Toxicity and Other Contaminant Characteristics

Since the 2016 FYR, there have been changes to the toxicity for the site COC trans-1,2-dichloroethylene. The emergent contaminant PFAS were tested to evaluate whether these compounds were present at Site. However, as discussed above, the six PFAS compounds tested were undetected. In addition, EPA has issued an updated policy addressing lead in soil.

- ***2020 Trans-1,2-dichloroethyl non-cancer toxicity value***

In November 2020, EPA finalized a new reference concentration (RfC) for trans-1,2-dichloroethylene based on a new EPA provisional peer reviewed toxicity value (PPRTV). There previously was no RfC for trans-1,2-dichloroethylene. This chemical is a COC and the ICL for it in groundwater is based on the federal MCL. As there is not a complete groundwater consumption pathway, this toxicity change does not call the protectiveness of the remedy into question.

- ***2016 PFOA/PFOS non-cancer toxicity values***

In May 2016, EPA issued final lifetime drinking water health advisories for PFOA and PFOS, which identified a chronic oral reference dose (RfD) of 2 x 10^{-5} milligrams per kilograms per day (mg/kg-day) for PFOA and PFOS (USEPA, 2016a and USEPA, 2016b). These RfD values should be used when evaluating potential risks from ingestion of contaminated groundwater at Superfund sites where PFOA and PFOS might be present based on the site's history. Potential estimated health risks from PFOA and PFOS, if identified, would likely increase total site risks due to groundwater exposure. Further evaluation of potential risks from exposure to PFOA and PFOS in other media at the Site might be needed based on site conditions and may also affect total site risks.

In June 2016, the discharge water from each of the three shallow overburden extraction wells in OU1 were sampled for six PFAS to assess whether these compounds were present at the Site. The samples were sent to the EPA Region 1 Laboratory and analyzed following EPA Method 537. None of the PFAS was detected in any of the three extraction wells.

Since PFAS including PFOA and POFS compounds were not detected in OU1, the source area of the Site, contaminated groundwater is not being used at the Site, this toxicity value change does not call the current protectiveness of the remedy into question.

- ***2021 PFBS non-cancer toxicity value***

Perfluorobutanesulfonic acid (PFBS) has a chronic oral RfD of 3E-04 mg/kg-day based on an EPA PPRTV (USEPA, 2021). This RfD value should be used when evaluating potential risks from ingestion of contaminated groundwater at Superfund sites where PFBS might be present based on-site history. Potential estimated health risks from PFBS, if identified, would likely increase total site risks due to groundwater exposure. Further evaluation of potential risks from exposure to PFBS in other media at the Site might be needed based on site conditions and may also affect total site risks.

Since PFBS were not detected in OU1, the source area of the Site, contaminated groundwater is not being used at the Site and there are some ICs prohibiting its use and others being implemented until ICLs are met, this toxicity value change has no impact in the current protectiveness of the remedy.

Lead in Soil Cleanups

EPA continues to examine the science around lead exposure. Updated scientific information indicates that adverse health effects are associated with blood lead levels (BLLs) at less than 10 micrograms per deciliter (µg/dL). Several studies have observed "clear evidence of cognitive function decrements in young children with mean or group BLLs between 2 and 8 µg/dL."

Based on this updated scientific information, EPA is including an evaluation of potential lead risks with a goal to limit exposure to residential and commercial soil lead levels such that a typical (or hypothetical) child or group of similarly exposed children would have an estimated risk of no more than 5% of the population exceeding a 5 µg/dL BLL. This is based on evidence indicating cognitive impacts at BLLs below 10 µg/dL. A target BLL of 5 µg/dL reflects current scientific literature on lead toxicology and epidemiology that provides evidence that the adverse health effects of lead exposure do not have a threshold.

EPA's 2017 Office of Land and Emergency Management (OLEM) memorandum "Transmittal of Update to the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters" (OLEM Directive 9285.6-56) provides updates on the default baseline blood lead concentration and default geometric standard deviation input parameters for the Adult Lead Methodology. These updates are based on the analysis of the National Health and Nutrition Examination Survey (NHANES) 2009-2014 data, with recommended updated values for baseline blood lead concentration being 0.6 µg/dL and geometric standard deviation being 1.8.

Using updated default Integrated Exposure Update Biokinetic (IEUBK) and Adult Lead Methodology (ALM) parameters at a target BLL of 5 µg/dL, site-specific lead soil screening levels of 200 milligram per kilogram (mg/kg) and 1,000 mg/kg are developed for residential and commercial/industrial exposures, respectively.

Given the ongoing review of information, the above screening levels are considered in this Five-Year Review for informational purposes.

Tables 9, 10, 11 and 12 in the 1991 ROD show that the average concentrations of lead detected at the Hitchiner/Hendrix area and OK Tools area were 7.5 mg/kg and 23 mg/kg, respectively. These average concentrations indicate no further remedial work is necessary.

Changes in Risk Assessment Methods

No changes in risk assessment methods since the 2016 FYR have been identified that would affect the protectiveness of the remedy.

Changes in Exposure Pathways

There have been no changes in the exposure pathways at the Site since the last FYR. However, there have been EPA updates to the exposure factors and Vapor Intrusion Screening Level calculator used during the risk assessment process. These changes however do not affect the current or future protectiveness of the remedy.

- ***2014 OSWER Directive on the Update of Standard Default Exposure Factors***

In 2014, EPA finalized a Directive to update standard default exposure factors and frequently asked questions associated with these updates (https://www.epa.gov/sites/production/files/2015-11/documents/oswer_directive_9200.1-120_exposurefactors_corrected2.pdf). Many of these exposure factors differ from those used in the risk assessment(s) supporting the ROD(s). These changes in general would result in a slight decrease of the risk estimates for most chemicals. (Reference: USEPA. 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. February 6, 2014.)

- ***2018 EPA VISL Calculator***

In February 2018, EPA launched an online Vapor Intrusion Screening Level (VISL) calculator which can be used to obtain risk-based screening level concentrations for groundwater, sub-slab soil gas, and indoor air. The VISL calculator uses the same database as the Regional Screening Levels for toxicity values and physiochemical parameters and is automatically updated during the semi-annual RSL updates. Please see the User's Guide for further details on how to use the VISL calculator: https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator.

OU1
The only building that may have a vapor intrusion concern is the former Milford Police Station in OU1, purchased by Odhner Holographics during this FYR period. An indoor air study by EPA in 2000 at the building evaluated

the vapor intrusion pathway. It identified elevated concentrations of PCE in the building that were attributed to off gassing from dry-cleaned uniforms or from soil gas. The study concluded that indoor air quality had been affected by PCE. The former police station property was sold to Odhner Holographics Inc. in August 2017. Prior to the purchase, an AUR recorded in the deed for the property required a sub-slab depressurization system for all occupied structures. After the purchase, the property owner collected summa cannister samples. The results, along with an assessment of shallow groundwater surrounding the property, resulted in NHDES determining that a sub-slab depressurization system is not necessary. Most recently, the property owner requested a number of modifications to the existing AUR. NHDES and NH Department of Justice reviewed the proposed changes and prepared a draft amendment incorporating the appropriate and applicable changes. That draft amendment was reviewed and approved by the EPA Case Team attorney and Remedial Project Manager and was sent by EPA to the property owner on June 2, 2021 for review and comment. To this date, EPA has not heard from the property owner. The AUR may be amended appropriately, pending actions from the property owner.

OU2
The 2011 FYR was deferred due to the unknown status of the vapor intrusion pathway. The 2011 FYR Addendum stated that "*since completion of the five-year review, two rounds of shallow groundwater sampling have been conducted as part of an investigation into the potential for vapor intrusion into occupied buildings at OU2. All of the groundwater samples collected and analyzed were below the current groundwater screening criteria for tetrachloroethylene (PCE) as calculated using EPA's May 2012 Vapor Intrusion Screening Level (VISL) calculator. Based on these results, EPA has concluded that no further action is necessary to investigate the potential for vapor intrusion.*"

Given that screening criteria can change, during this FYR EPA used the VISL calculator for contaminants detected in the well most proximal to the mobile homes in OU2. At monitoring well cluster MW-120, which is within the mobile home park, MW-120A (the shallowest well in the cluster) was most recently sampled in December 2020. Table 7 shows that the vapor intrusion pathway was not of concern at that time, as cancer risks are below EPA's risk management range of 1×10^{-6} to 1×10^{-4} and the noncancer HI is below 1.

Table 7: Screening-Level Vapor Intrusion Evaluation of MW-120A in OU2

COC	Groundwater Concentration December 2020 (µg/L)[a]	Residential	
		Cancer Risk[a]	Noncancer HQ[a]
Acetone	6.1	NA	0.0000003
PCE	2.8	2×10^{-7}	0.05
	Cumulative Totals:	2×10^{-7}	0.05

Notes:
a. Risk and hazard quotient calculated using EPA's May 2021 VISL calculator (https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator) assuming a residential exposure and default groundwater temperature of 25 degrees Celsius.
NA = not applicable
Source: Groundwater Quality Monitoring Data: December 2020. March 18, 2021.

Expected Progress Toward Meeting RAOs

Given the 2016 ROD Amendment and 2017 ESD remedy modifications are under discussion, it is premature to assess the expected progress toward meeting RAOs.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the FYR:
None

Issues and Recommendations Identified in the FYR:

OU(s): 1 and 2	Issue Category: Institutional Controls			
	Issue: Not all institutional controls are in place to prohibit exposures to contaminated groundwater and impacts to the existing remedies.			
	Recommendation: Implement all institutional controls as required by the Consent Decree.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State	EPA/State	9/30/2022

OU(s): 1	Issue Category: Monitoring			
	Issue: Further investigations are needed in the deep bedrock to determine the extent of contamination.			
	Recommendation: Convert open boreholes to monitoring wells and install additional wells as needed to properly characterize deep bedrock groundwater and to further determine what remedies may be considered.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State	EPA/State	9/30/2023

OU(s): 2	Issue Category: Remedy Performance			
	Issue: In OU2, 1,4-Dioxane has not been tested since 2009. It is unclear if 1,4-dioxane has traveled north of the river where municipal water is not available.			
	Recommendation: Test monitoring wells for 1,4-dioxane and determine whether the contaminant is present and has migrated to areas north of the river.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	9/30/2023

OU(s): 2	Issue Category: Remedy Performance			
	Issue: Inadequate monitoring of groundwater in the bedrock aquifer.			
	Recommendation: Implement additional monitoring in OU2 to characterize the presence of contamination within the bedrock aquifer and to assess the extent of natural attenuation.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	9/30/2023

OU(s): 2	Issue Category: Operations and Maintenance			
	Issue: The treatment plant is not being operated during the shutdown phase; however, it is in disrepair and would need to be operational should the treatment system require start up in the future.			
	Recommendation: Assess what repairs need to be performed to the treatment plant and develop a plan with a timeline for performing the necessary repairs.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	9/30/2022

OTHER FINDINGS

Several additional recommendations were identified during the FYR. These recommendations do not affect current and/or future protectiveness.

- Consider whether a second round of sampling is appropriate to confirm the absence of PFAS compounds given the current lower detection limits.
- A stocked fishpond was observed during the site inspection. Communicate with the property owner to ensure activities related to the pond are compatible with the remedy.
- EPA may visit the site to confirm conditions when travel restrictions are lifted.
- The AUR may be amended appropriately, pending actions from the property owner.
- While existing ecological evidence supports the overall conclusion that the remedy is protective of ecological receptors, a very limited assessment to confirm this determination is suggested for the next Five-Year Review to resolve an informational gap resulting from a change in site conditions in an area that was once a former discharge stream which now appears to be a terrestrial vegetated swale. This assessment may include collection of a small number of surface soil samples in the former lower discharge stream and re-screening the soil exposure pathway using more current data. For further information, please see the memorandum: *Savage Municipal Water Supply Superfund Site – Evaluation of Ecological Risk Documentation and Resolution to Information Gap between the 2014 SLERA Memorandum and the 2016 Five Year Review* (Appendix L).

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: 1	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The remedy at OU1 currently protects human health and the environment because there are no completed exposure pathways to contaminated groundwater. For the remedy to be protective over the long term, the following actions need to be taken: a) implement all institutional controls as required by the Consent Decree; and b) convert open boreholes to monitoring wells and install additional wells as needed to properly characterize deep bedrock groundwater and to further determine what remedies may be considered.	

Protectiveness Statement(s)	
Operable Unit: 2	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The remedy at OU2 currently protects human health and the environment because there are no completed exposure pathways to contaminated groundwater. For the remedy to be protective over the long term, the following actions need to be taken: a) implement all institutional controls as required by the Consent Decree; b) test monitoring wells for 1,4-dioxane and determine whether the contaminant is present and has migrated to areas north of the river; c) implement additional monitoring to characterize the presence of contamination within the bedrock aquifer and to assess the extent of natural attenuation; and d) assess what repairs need to be performed to the treatment plant and develop a plan with a timeline for performing the necessary repairs.	

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The remedy currently protects human health and the environment because there are no completed exposure pathways to contaminated groundwater. For the remedy to be protective over the long term, the following actions need to be taken: a) implement all institutional controls as required by the Consent Decree; b) convert open boreholes to monitoring wells and install additional wells as needed to properly characterize deep bedrock groundwater and to further determine what remedies may be considered; c) test monitoring wells for 1,4-dioxane and determine whether the contaminant is present and has migrated to areas north of the river; d) implement additional monitoring in OU2 to characterize the presence of contamination within the bedrock aquifer and to assess the extent of natural attenuation; and e) assess what repairs need to be performed to the treatment plant and develop a plan with a timeline for performing the necessary repairs.

VIII. NEXT REVIEW

The next FYR Report for the Savage Municipal Water Supply Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

1,4-Dioxane Analysis Results, Savage Municipal Water Supply Superfund Site, Operable Unit 2. Prepared by Gradient. February 2010.

2015 Annual Report, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 1. Prepared by Weston Solutions, Inc. April 2017.

2016 Annual Report, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 1. Prepared by Weston Solutions, Inc. December 2017.

2017 Annual Report, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 1. Prepared by Weston Solutions, Inc. April 2019.

2018 Annual Report, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 1. Prepared by Weston Solutions, Inc. 31 March 2020.

2019 Annual Report, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 1. Prepared by Weston Solutions, Inc. 18 February 2021.

Draft 2020 Annual Report, Savage Municipal Water Supply Superfund Site – Operable Unit 1. Prepared by Weston Solutions, Inc. 8 April 2021.

Addendum to Savage Municipal Water Supply Superfund Site Five-Year Review Report. EPA Region 1. October 2012.

Conceptual Design Report, Permeable Reactive Barrier, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 1. Prepared by Weston Solutions, Inc. March 2019.

Conditional Approval of Workplan for Assessing Vapor Intrusion, Savage Municipal Water Supply Site, Milford, New Hampshire, Operable Unit 2. EPA Region 1. June 2011.

Explanation of Significant Differences, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 1. EPA Region 1. December 1996.

Explanation of Significant Differences, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 2. EPA Region 1. September 2017.

Feasibility Study Report, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 1. Prepared by Weston Solutions, Inc. July 2015.

Final Technical Review. Proposed Alternative Remedy, Savage Municipal Water Supply Well Superfund Site, Operable Unit 1, Milford, NH. U.S. Environmental Protection Agency. Office of Land and Emergency Management, Office of Superfund Remediation Technology Innovation. June 15, 2021.

First Five-Year Review Report, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire. EPA Region 1. September 2011.

Groundwater Quality Monitoring Data: July 2020, Savage Municipal Supply Superfund Site, Milford, New Hampshire, Operable Unit 2. Prepared by Gradient. September 2020.

Groundwater Quality Monitoring Data: December 2020, Savage Well Superfund Site, Operable Unit 2, Elm Street, Milford, NH. Prepared by Gradient. March 18, 2021.

Memorandum. Subject: Savage Municipal Water Supply Superfund Site – Evaluation of Ecological Risk Documentation and Resolution to Information Gap between the 2014 SLERA Memorandum and the 2016 Five Year Review. To: Gerardo Millán-Ramos, EPA Remedial Project Manager. From: TaChalla Gibeau and Bart Hoskins, Ecological Risk Assessors, EPA Region 1. August 31, 2021.

NPL Site Narrative for Savage Municipal Water Supply, Milford, New Hampshire. EPA Region 1. June 1984. Preliminary Close-Out Report, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire. EPA Region 1. September 2006.

Pre-Remedial Design Investigation Report, Savage Municipal Water Supply, Milford, New Hampshire, Operable Unit 1. Prepared by Weston Solutions, Inc. March 2019.

Provisional Peer-Reviewed Toxicity Values for Perfluorobutane Sulfonic Acid (PFBS) and Related Compound Potassium Perfluorobutane Sulfonate. U.S. Environmental Protection Agency, Washington, DC, EPA/690/R-21/001F, 2021.

Record of Decision Amendment for Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 1. EPA Region 1. August 2016.

Remedial Investigation Report, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 3. Prepared by Weston Solutions, Inc. March 2014.

Report of the Remediation System Evaluation, Site Visit Conducted at the Savage Municipal Water Supply Superfund Site, March 22-23, 2001. Prepared by GeoTrans, Inc. and the United States Army Corps of Engineers. September 2001.

Results of a Monitoring Program of Continuous Water Levels, Specific Conductance, and Water Temperature at the OK Tool Facility of the Savage Municipal Well Superfund Site, Milford, New Hampshire. By Michael J. Brayton and Philip T. Harte. U.S. Department of the Interior. U.S. Geological Survey. In cooperation with the New Hampshire Department of Environmental Services, Hazardous Waste and Remediation Bureau, and the U.S. Environmental Protection Agency, Region 1, Office of Site Remediation and Restoration. 2001.

Results of a Monitoring Program of Continuous Water Levels and Physical Water Properties at the Operable Unit 1 Area of the Savage Municipal Well Municipal Well Superfund Site, Milford, New Hampshire, Water Years 2000-03. U.S. Department of the Interior. U.S. Geological Survey. Prepared in cooperation with the New Hampshire Department of Environmental Services, Hazardous Waste and Remediation Bureau, and U.S. Environmental Protection Agency, Region 1, Waste Management Division. 2005.

Second Five-Year Review Report, Savage Municipal Water Supply Superfund Site, Hillsborough County, New Hampshire. EPA Region 1. September 2016.

Shallow Bedrock Assessment, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 1. Prepared by Weston Solutions, Inc. January 2020.

Suspension Test Annual (December 2017 and January 2018) Monitoring Data. Savage Well Superfund Site (Operable Unit 2). Prepared by Gradient. March 1, 2018.

Summary of Model Sensitivity Analysis and Simulation of Transient Episodic Hydrologic Event, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire. Prepared by Weston Solutions, Inc. March 2020.

Technical Impracticability Evaluation Report, Savage Municipal Water Supply Superfund Site, Milford, New Hampshire, Operable Unit 1. Prepared by Weston Solutions, Inc. July 2015.

The State of New Hampshire Department of Environmental Services letter to Mr. Odhner. Subject: Milford – OK Tool Company (aka Savage Well) Superfund Site 621 ELM Street, DES #198505002, Project #3581, Activity and Use Restriction at 589 Elm Street, Milford, NH. November 28, 2017.

APPENDIX B – SITE CHRONOLOGY

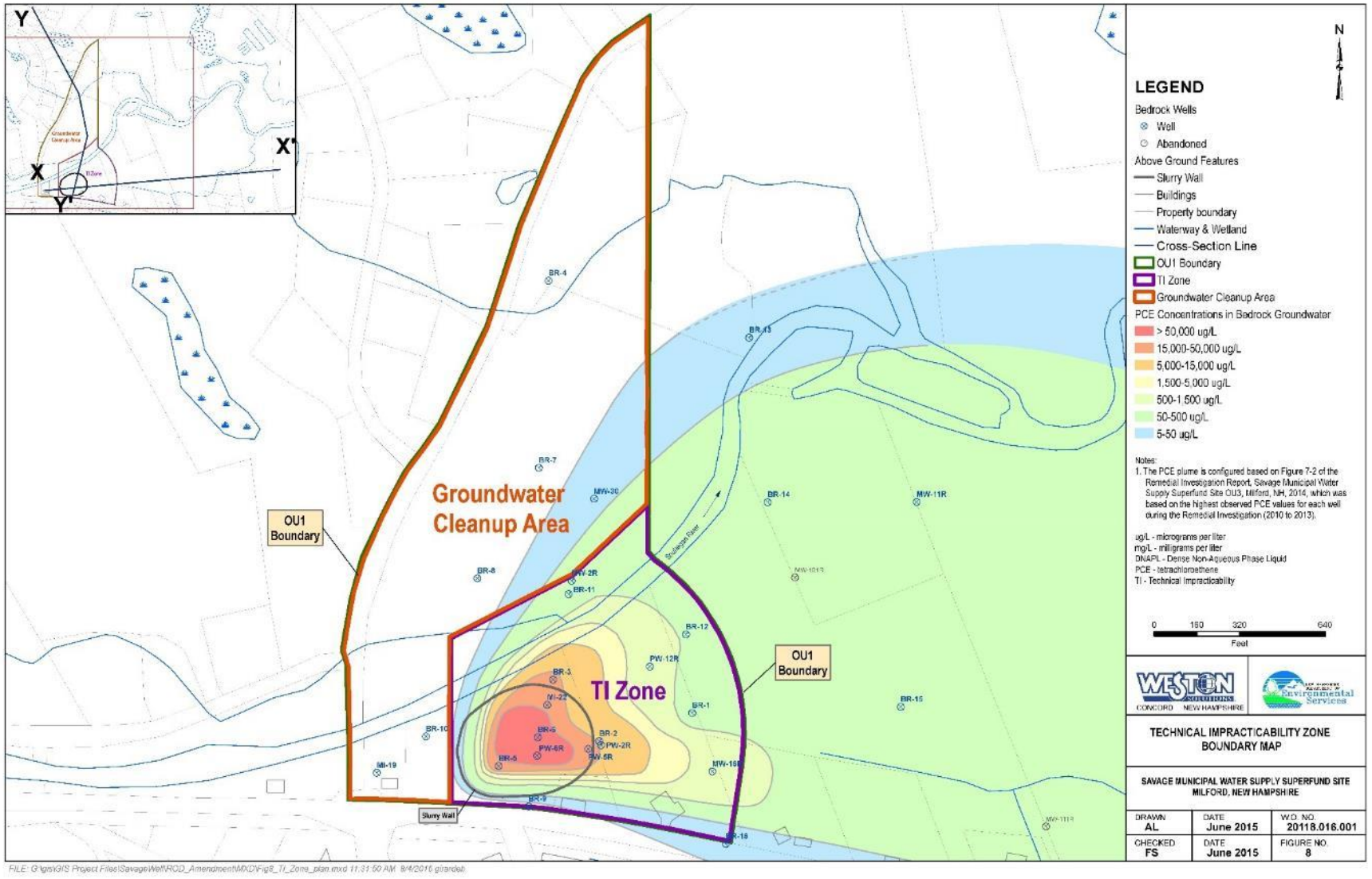
Table B-1: Site Chronology

Event	Date
Manufacturing operations at OK Tool Company produced metal cutting tools and tool hardware	1940s through 1987
VOC contamination initially discovered in Savage Municipal Well	February 1983
Inspection of OK Tool Company found potential releases to floor drains, the ground, and the Souhegan River	February 1983
EPA conducted an emergency removal action to supply drinking water to the Milford Mobile Home Park	March 1983 to May 1983
EPA listed the Site on the NPL	Proposed: September 8, 1983 Final: September 21, 1984
EPA signed Administrative Order by Consent	June 10, 1987
The RI/FS was conducted	1988 to June 1991
EPA presented Proposed Plan with preferred remedy to the public Start of public comment period	July 11, 1991
EPA signed the ROD for the Site	September 27, 1991
Consent Decree filed requiring settling parties (Hitchiner Manufacturing Company and Hendrix Wire and Cable Company) to perform the work in the extended plume (OU2)	June 27, 1994
Superfund state contract, cooperative agreement, or federal facility agreement signature (OU1)	October 1, 1994
Consent Decree filed cashing out the parties connected to the OK Tool Company	December 8, 1994
Vertical Contaminant Profiling investigation indicated DNAPL at OK Tool Company source area completed	November 1995
OU1 remedial design started	1995
OU1 remedial design completed	October 1996
ESD signed to address the discovery of DNAPL at OU1	December 19, 1996
OU1 remedial action started, NHDES contracted with Sverdrup Environmental for construction	November 1997
OU2 Remedial Design Investigation Report drafted	November 1997
OU1 remedy constructed	December 1997 to March 1999
OU1 barrier wall constructed	June 1998 to October 1998
OU1 treatment plant substantial completion date	March 23, 1999
OU1 treatment plant full operation initiated	May 1999
Indoor-air study completed for the Milford police station	August 2000
OU1 surfactant pilot testing performed	Fall 2000
OU1 remedial system evaluation conducted	March 2001
OU2 Revised Draft Remedial Design Investigation Report	May 2002
EPA approved OU2 Remedial Design Investigation Report	September 2002
OU2 remediation system construction started	February 2004
OU2 remedy initial operation	October 27, 2004
OU2 remedy shut down	December 6, 2004
OU2 remedy resumed temporary operation	September 6, 2005
EPA and NHDES inspected the OU2 remedy	November 19, 2005
NHDES granted OU2 permanent surface water discharge permit	December 30, 2005
OU2 remedy resumed full operation	January 27, 2006
EPA, NHDES and U.S. Army Corps of Engineers inspected the OU2 remedy	April 20, 2006
EPA and NHDES performed pre-final OU2 remedy inspection	June 29, 2006
OU1 and OU2 Preliminary Close-Out Report issued	September 2006
OU2 comprehensive monitoring well inspection program performed	2008

Event	Date
OU1 AS/SVE system operated intermittently from 1999 through 2008	1999-2008
OU1 ISCO treatment initiated	2008
Gradient reported groundwater 1,4-dioxane results for OU2	February 19, 2010
Deep-bedrock investigation initiated	2010
EPA signed Site's first FYR Report	September 29, 2011
Bedrock Investigation Technical Memorandum issued	July 2012
EPA signed Addendum to the first FYR Report	November 5, 2012
Supplemental bedrock investigation issued	2013
Final Deep-Bedrock Remedial Investigation Report issued	March 2014
Feasibility study initiated	2014
Feasibility study finalized; EPA presented Proposed Plan to the public	July 2015
OU2 extraction and treatment system suspended Public hearing accepted comments on the Proposed Plan	December 2015
EPA signed OU1 ROD Amendment	August 24, 2016
EPA signed Site's second FYR Report	September 14, 2016
AUR filed for the property at 589 Elm Street	July 17, 2017
EPA signed ESD to address updates to groundwater cleanup levels at OU2	September 28, 2017
NHDES prepared the final design of the PRB	March 8, 2019

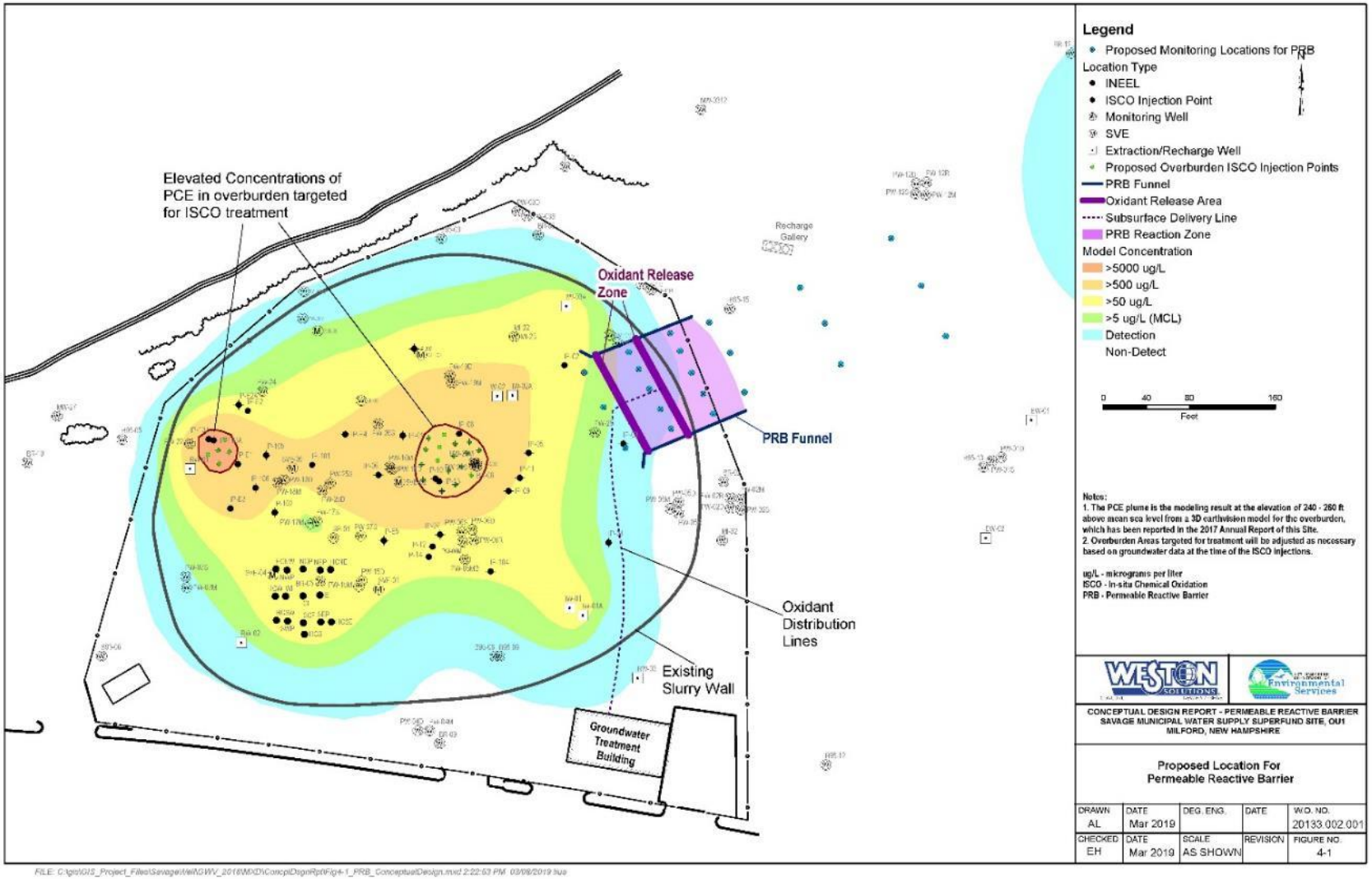
APPENDIX C – SITE MAPS

Figure C-1: TI Zone



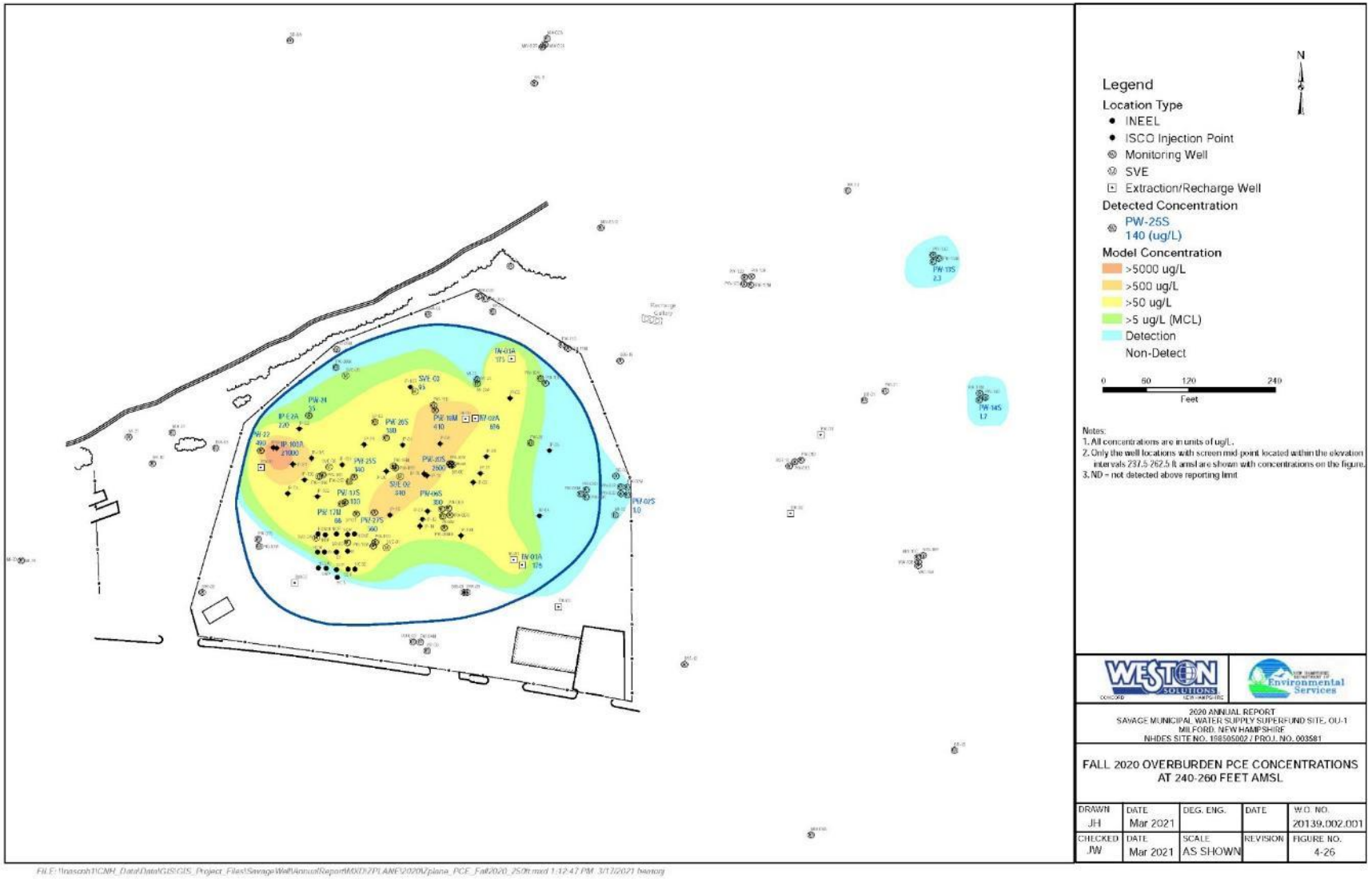
Source: Figure 8 of the 2016 ROD Amendment.

Figure C-2: Proposed PRB Location



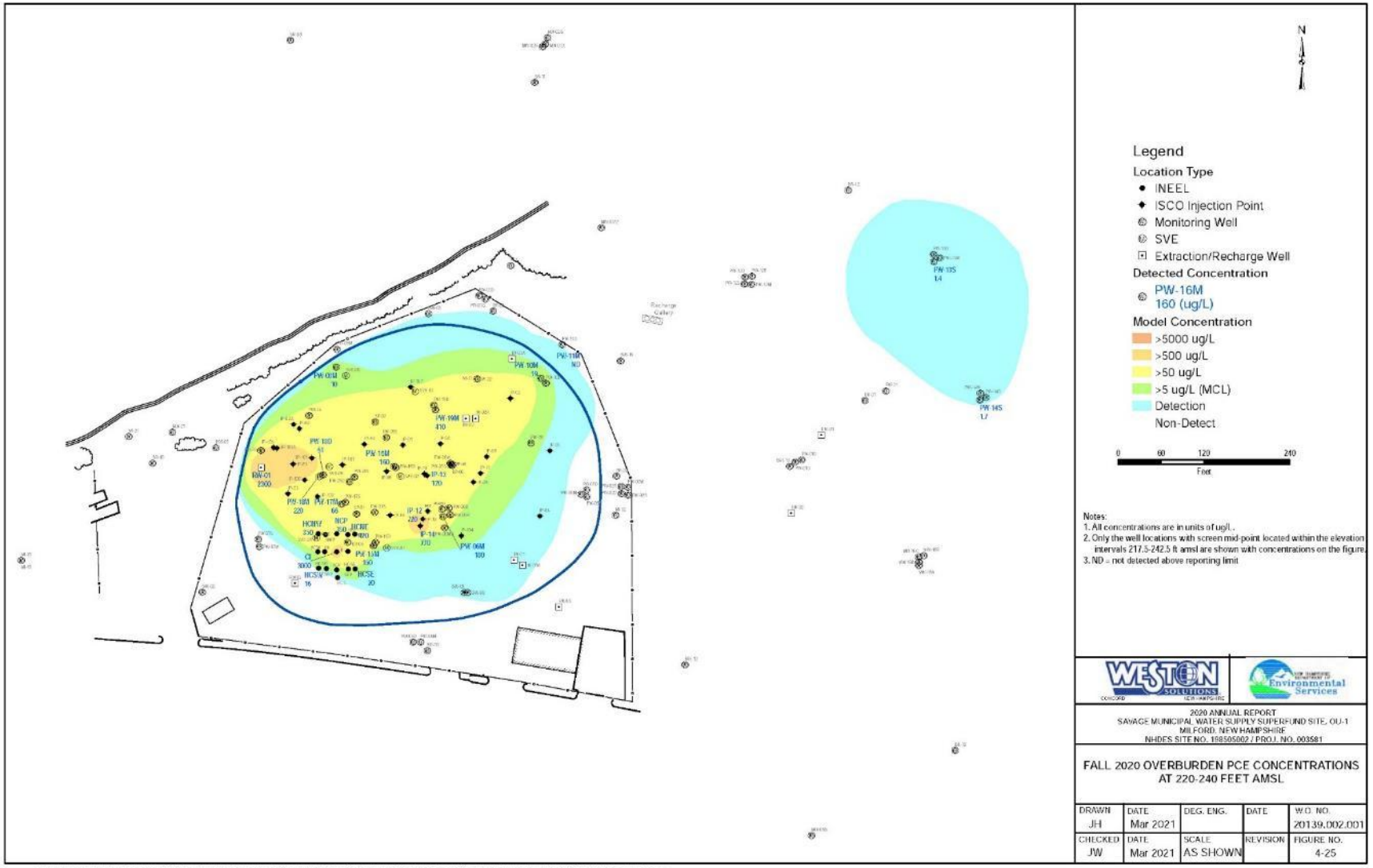
Source: Figure 4-1 of the Final Conceptual Design Report, Permeable Reactive Barrier, Savage Municipal Landfill. March 8, 2019.

Figure C-3: Overburden PCE Concentrations at 240 to 260 Feet Above Mean Surface Level (AMSL) – 2020



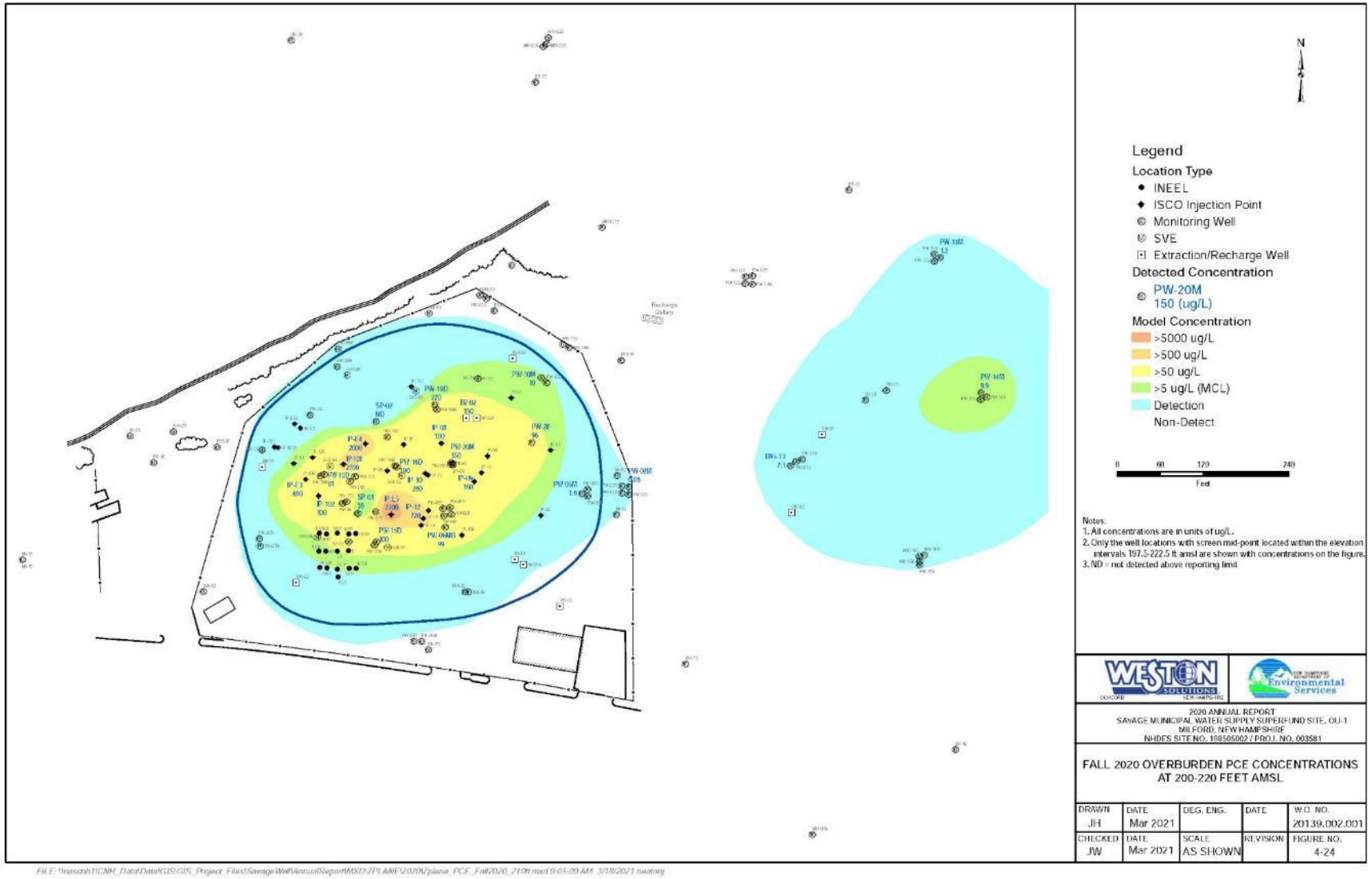
Source: Figure 4-26 of the 2020 OU1 Annual Report.

Figure C-4: Overburden PCE Concentrations at 220 to 240 Feet AMSL – 2020



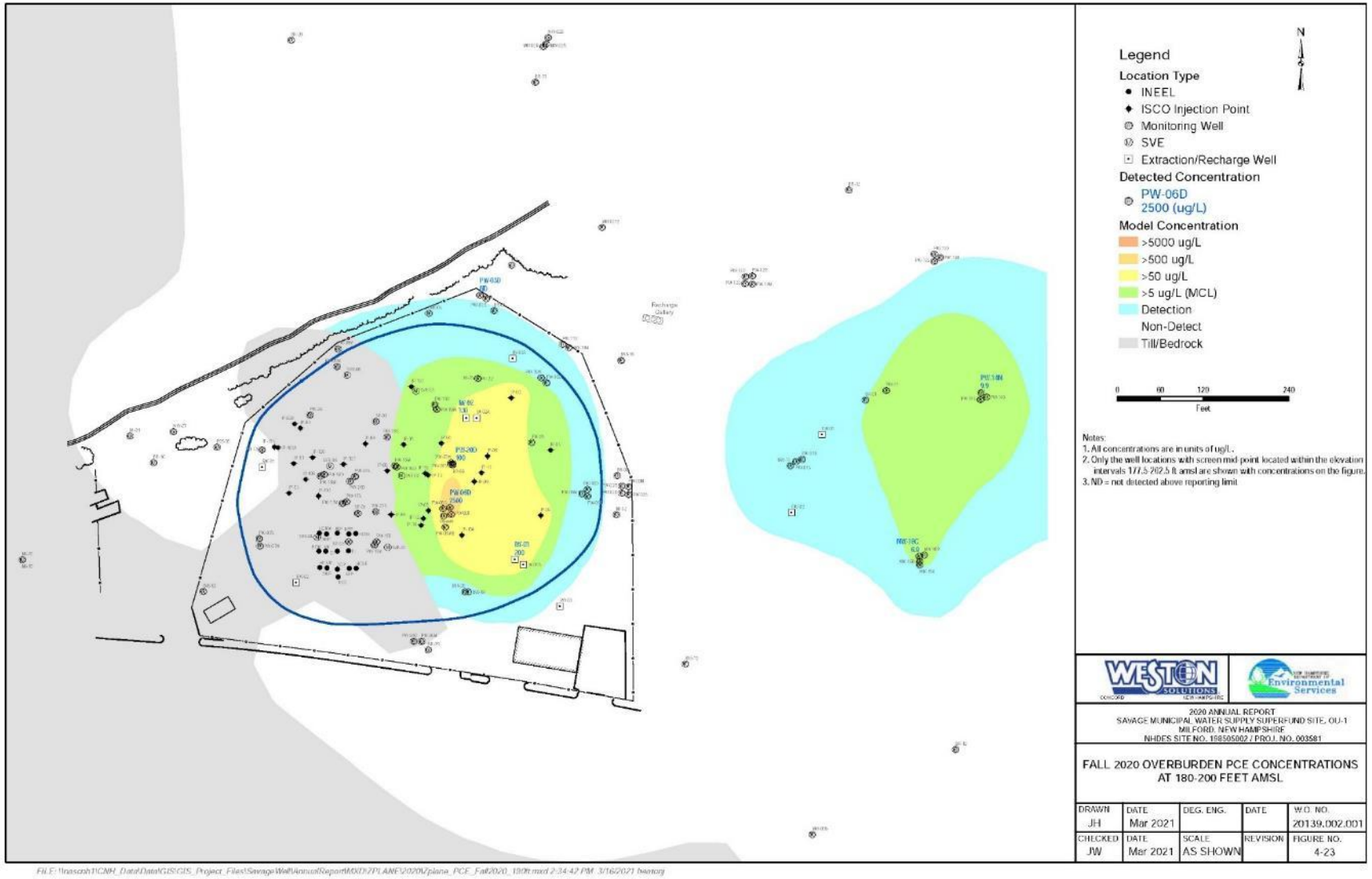
Source: Figure 4-25 of the 2020 OU1 Annual Report.

Figure C-5: Overburden PCE Concentrations at 200 to 220 Feet AMSL – 2020



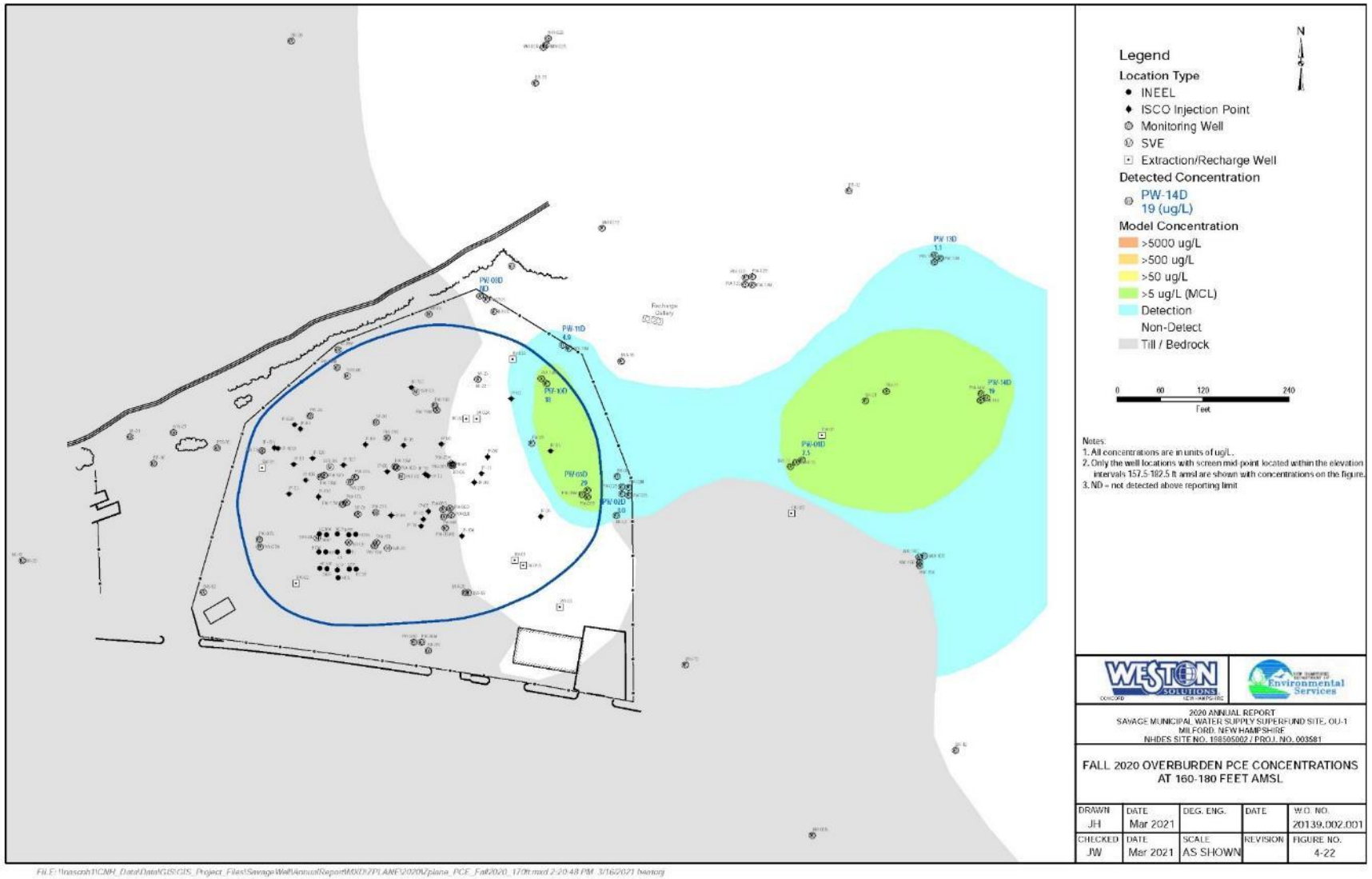
Source: Figure 4-24 of the 2020 OU1 Annual Report.

Figure C-6: Overburden PCE Concentrations at 180 to 200 Feet AMSL – 2020



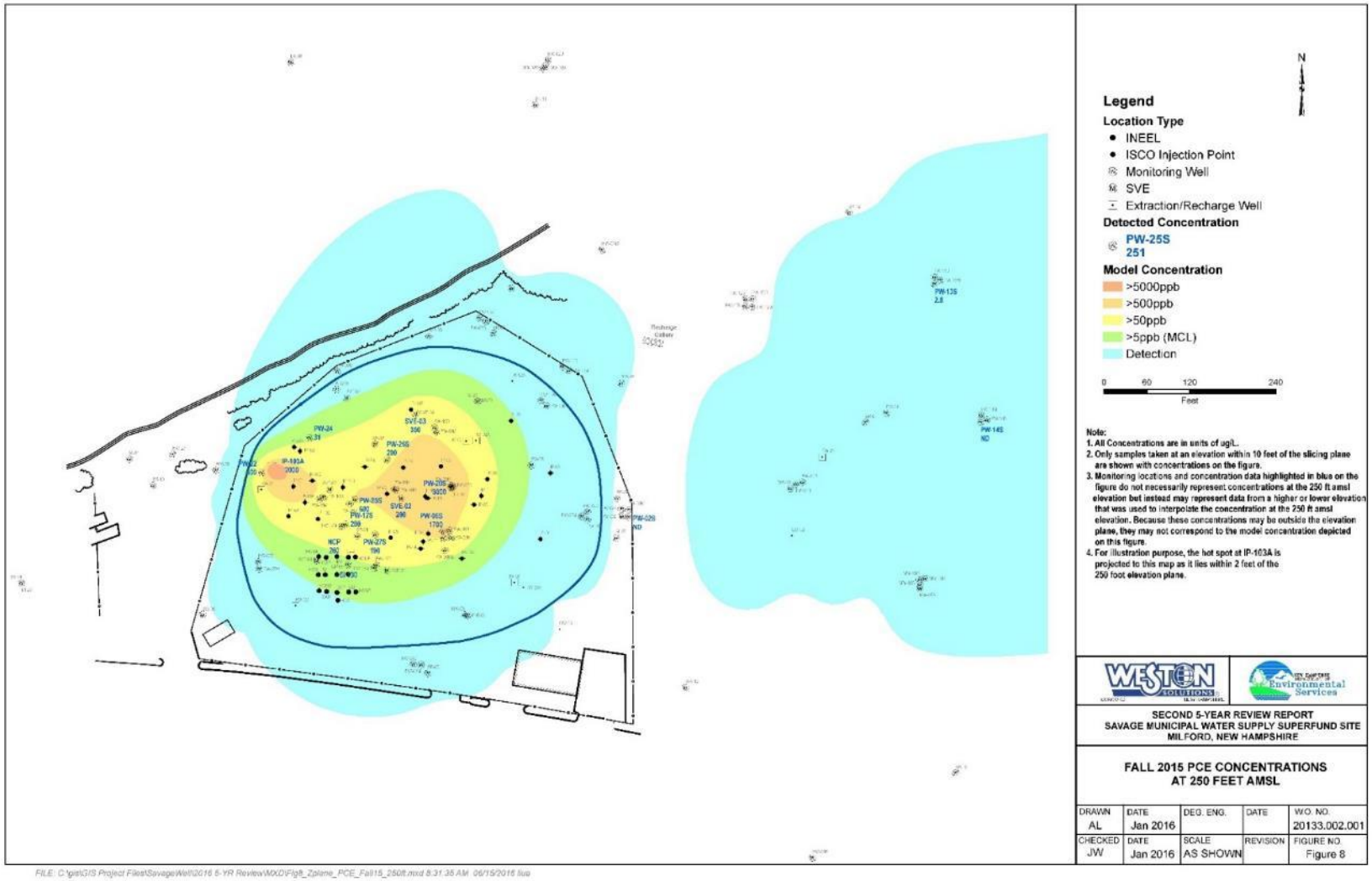
Source: Figure 4-23 of the 2020 OU1 Annual Report.

Figure C-7: Overburden PCE Concentrations at 160 to 180 Feet AMSL – 2020



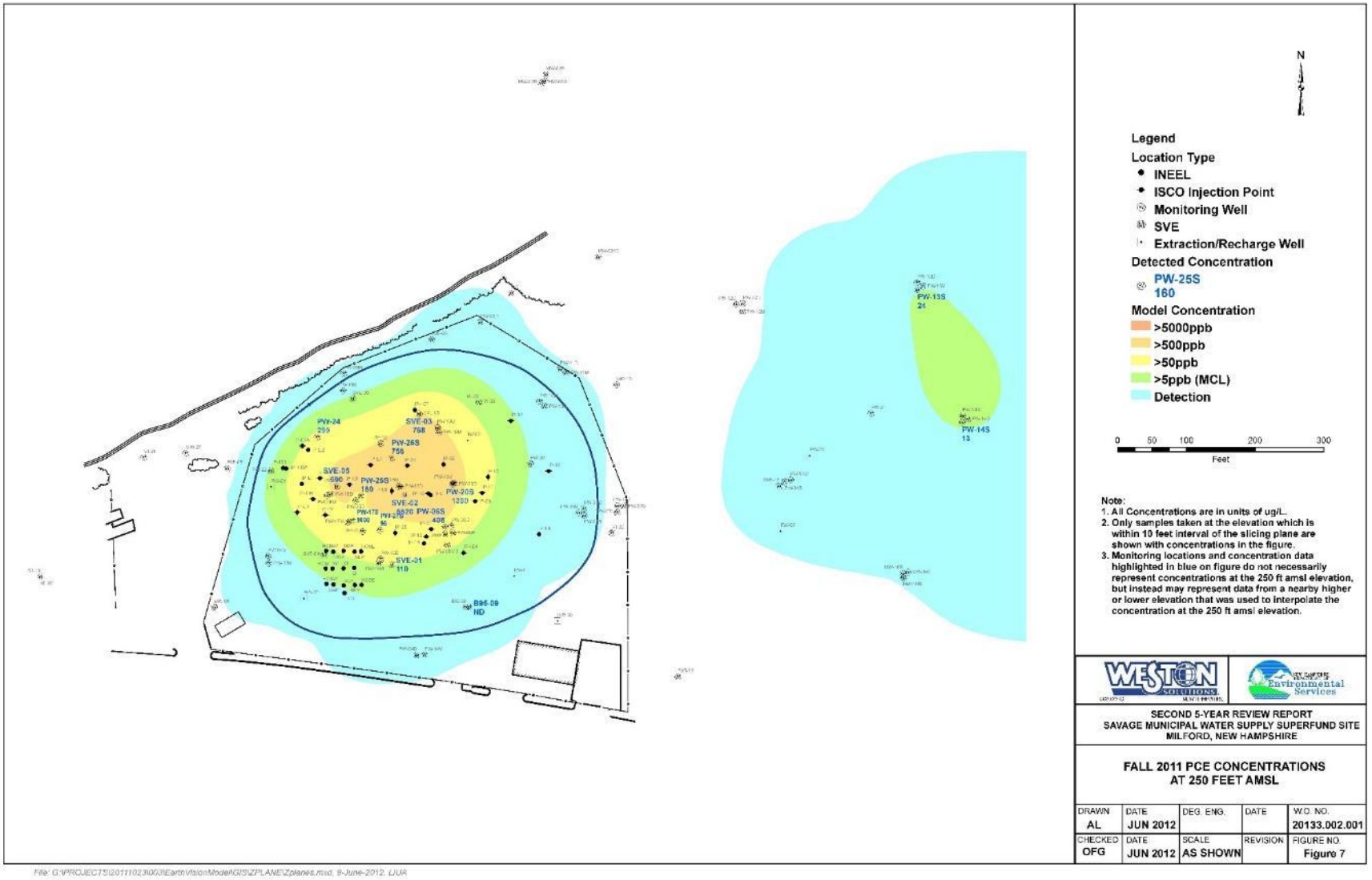
Source: Figure 4-22 of the 2020 OU1 Annual Report.

Figure C-8: PCE Concentrations at 250 Feet AMSL – 2015



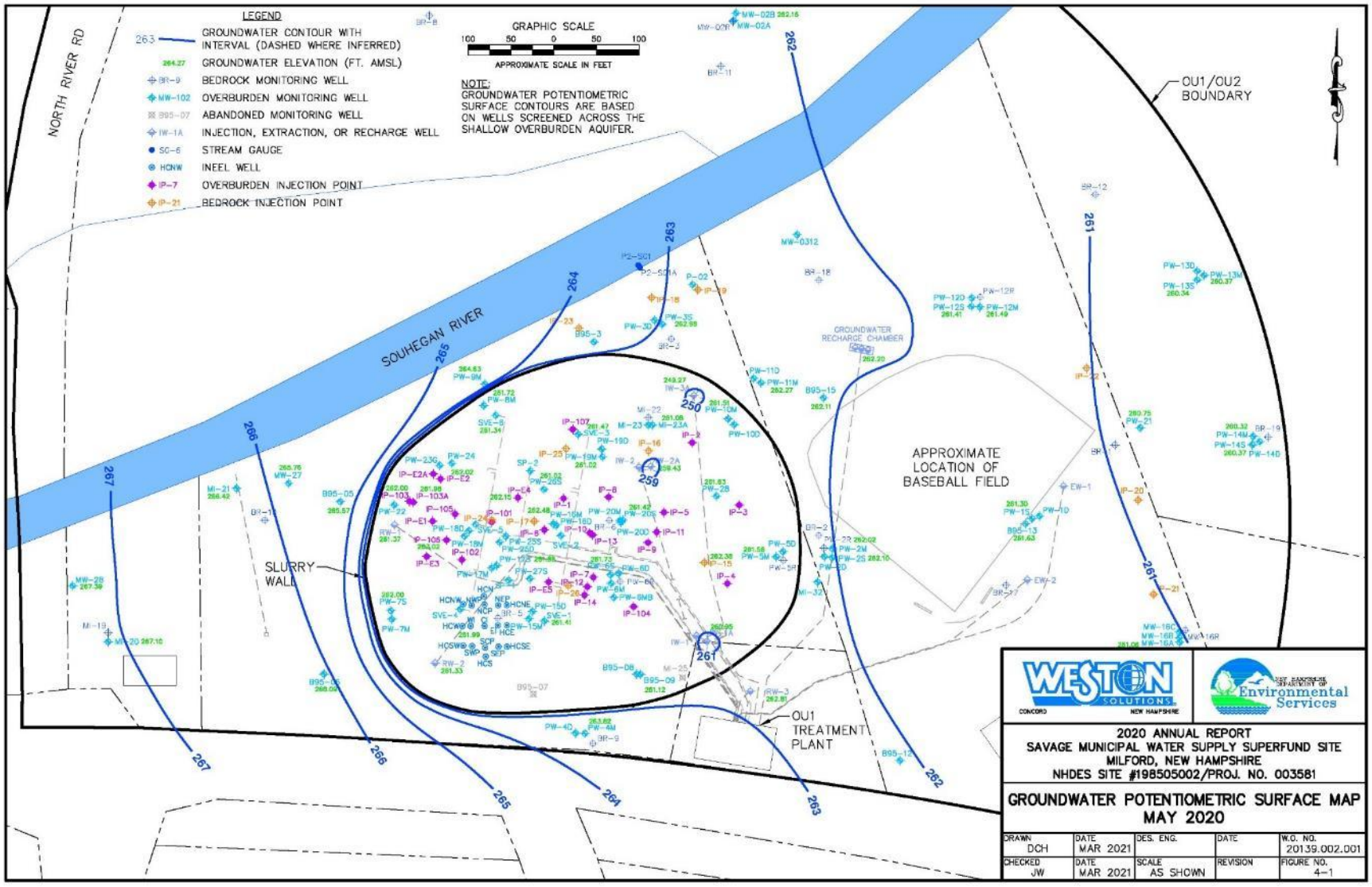
Source: Figure 8 of the 2016 FYR Report.

Figure C-9: PCE Concentrations at 250 Feet AMSL – 2011



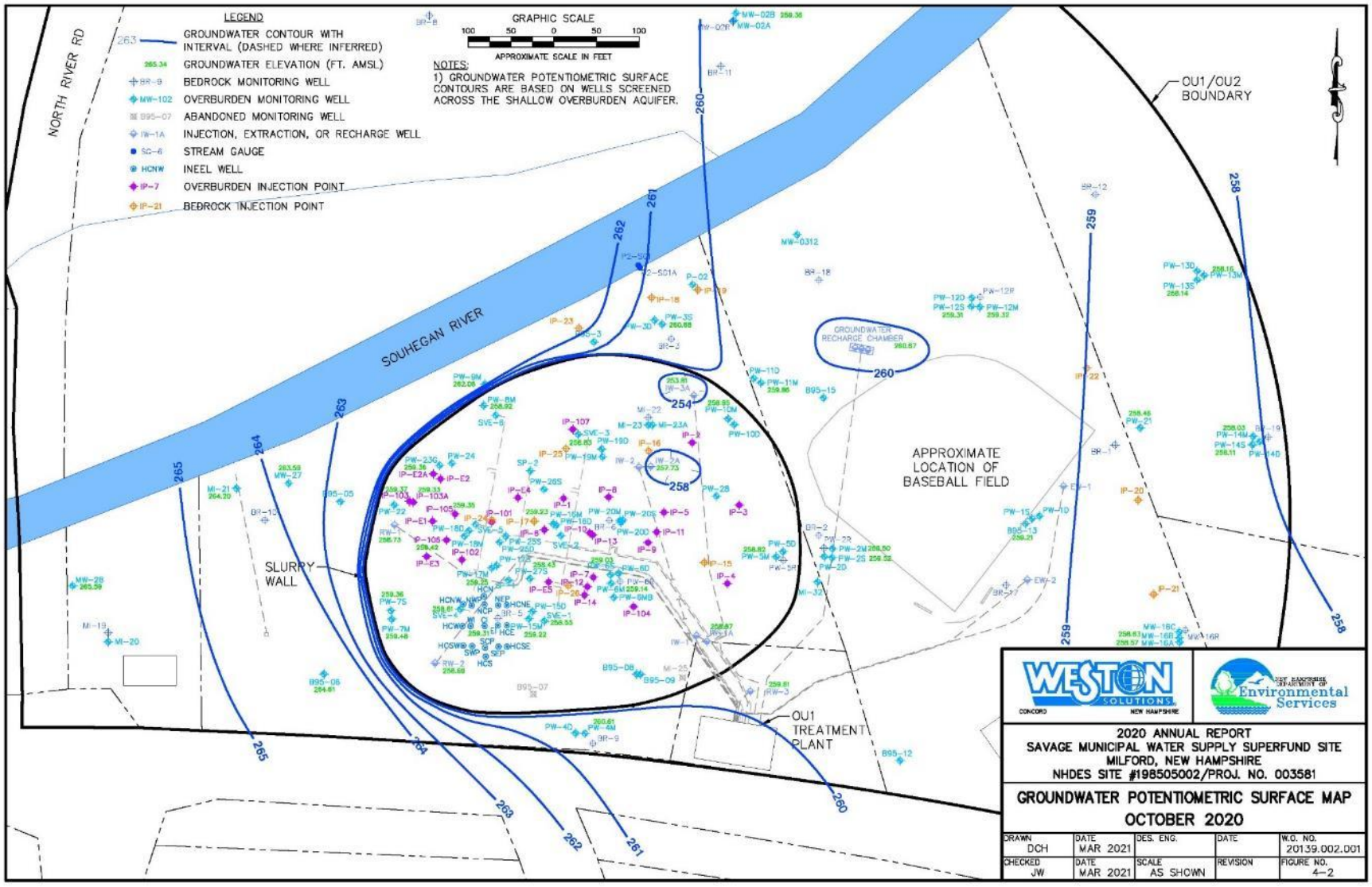
Source: Figure 7 of the 2016 FYR Report.

Figure C-10: Groundwater Potentiometric Surface Map – May 2020



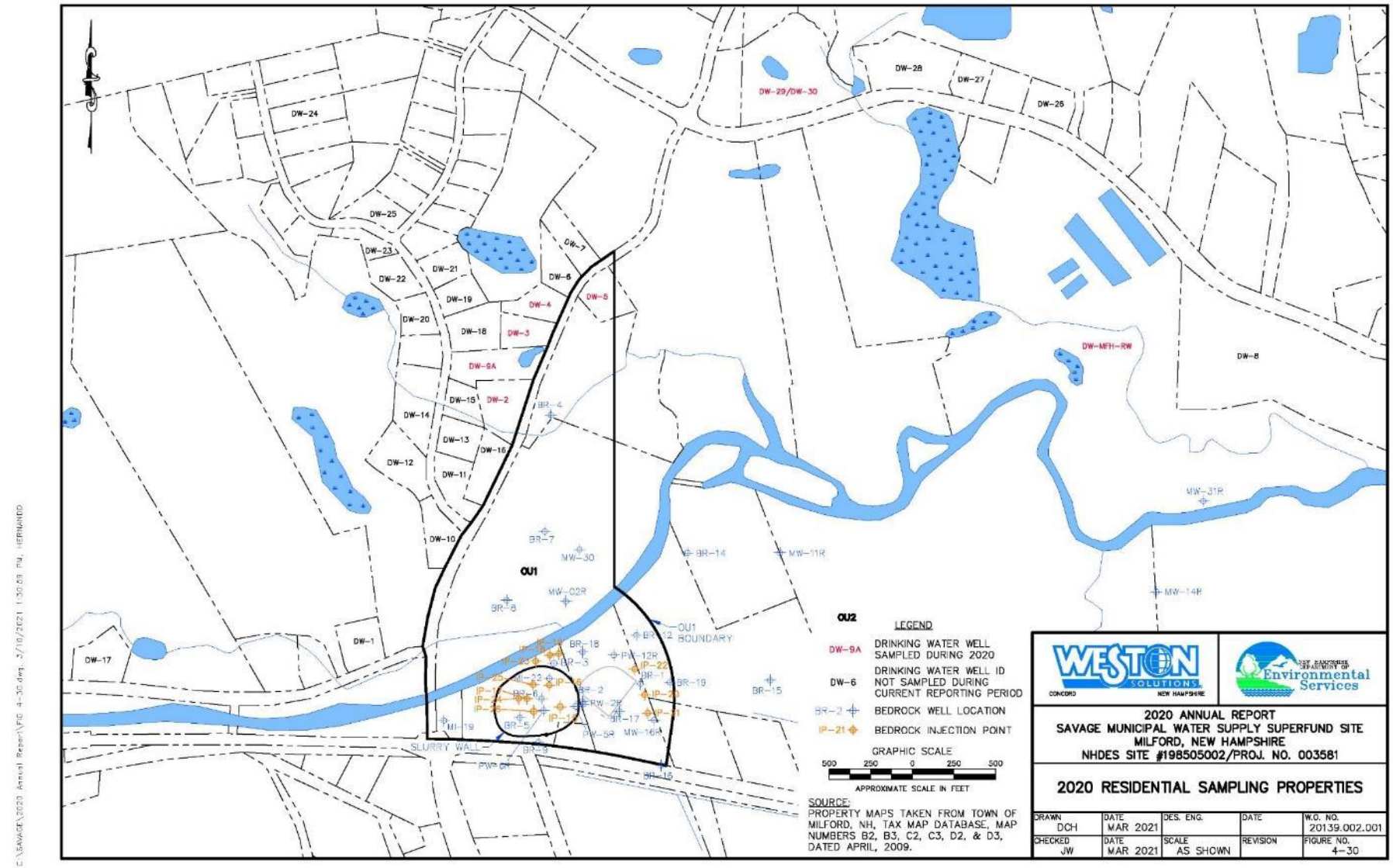
Source: Figure 4-1 of the 2020 OU1 Annual Report.

Figure C-11: Groundwater Potentiometric Surface Map – October 2020



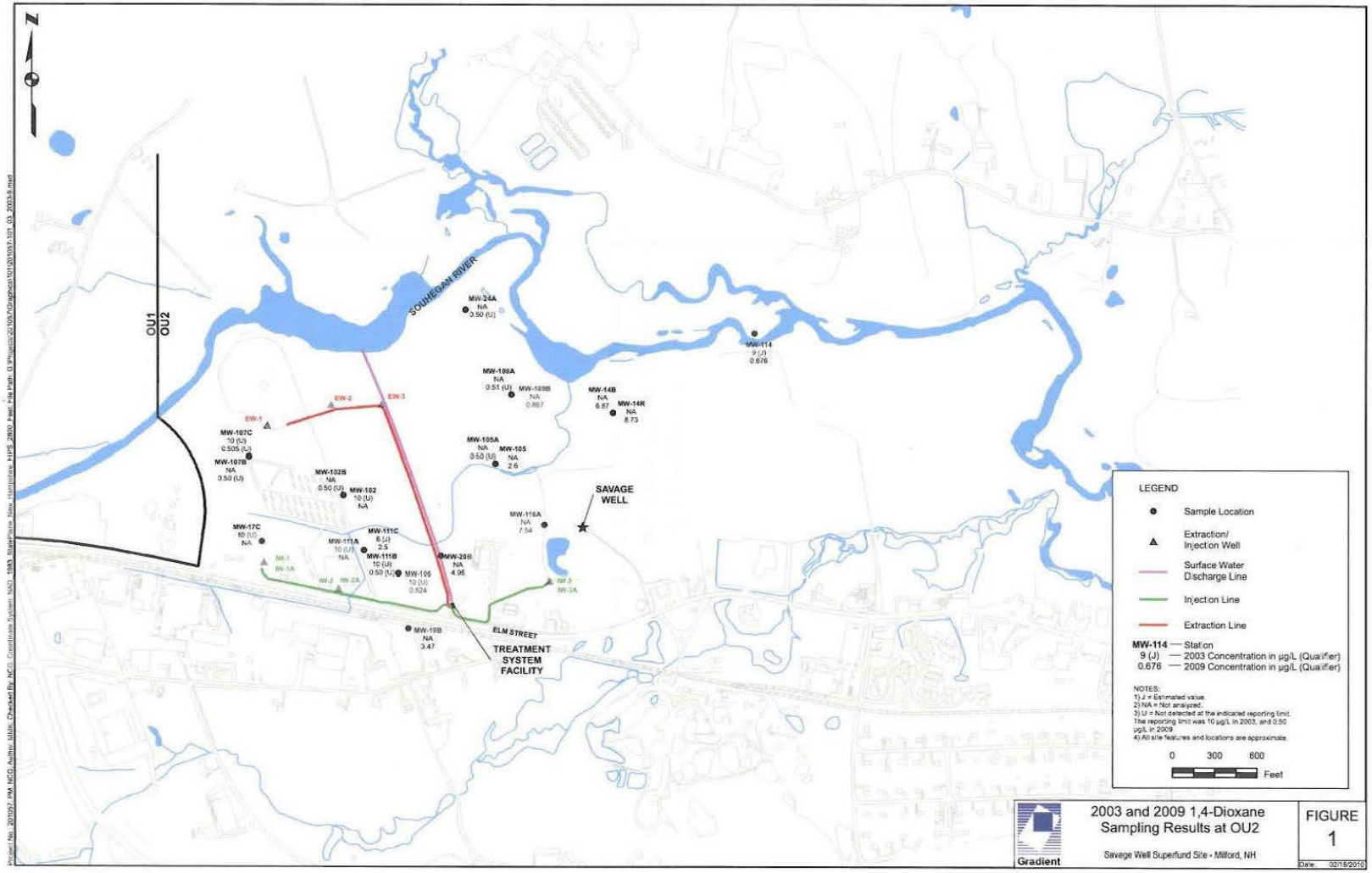
Source: Figure 4-2 of the 2020 OU1 Annual Report.

Figure C-12: Sampling of Residential Properties – 2020



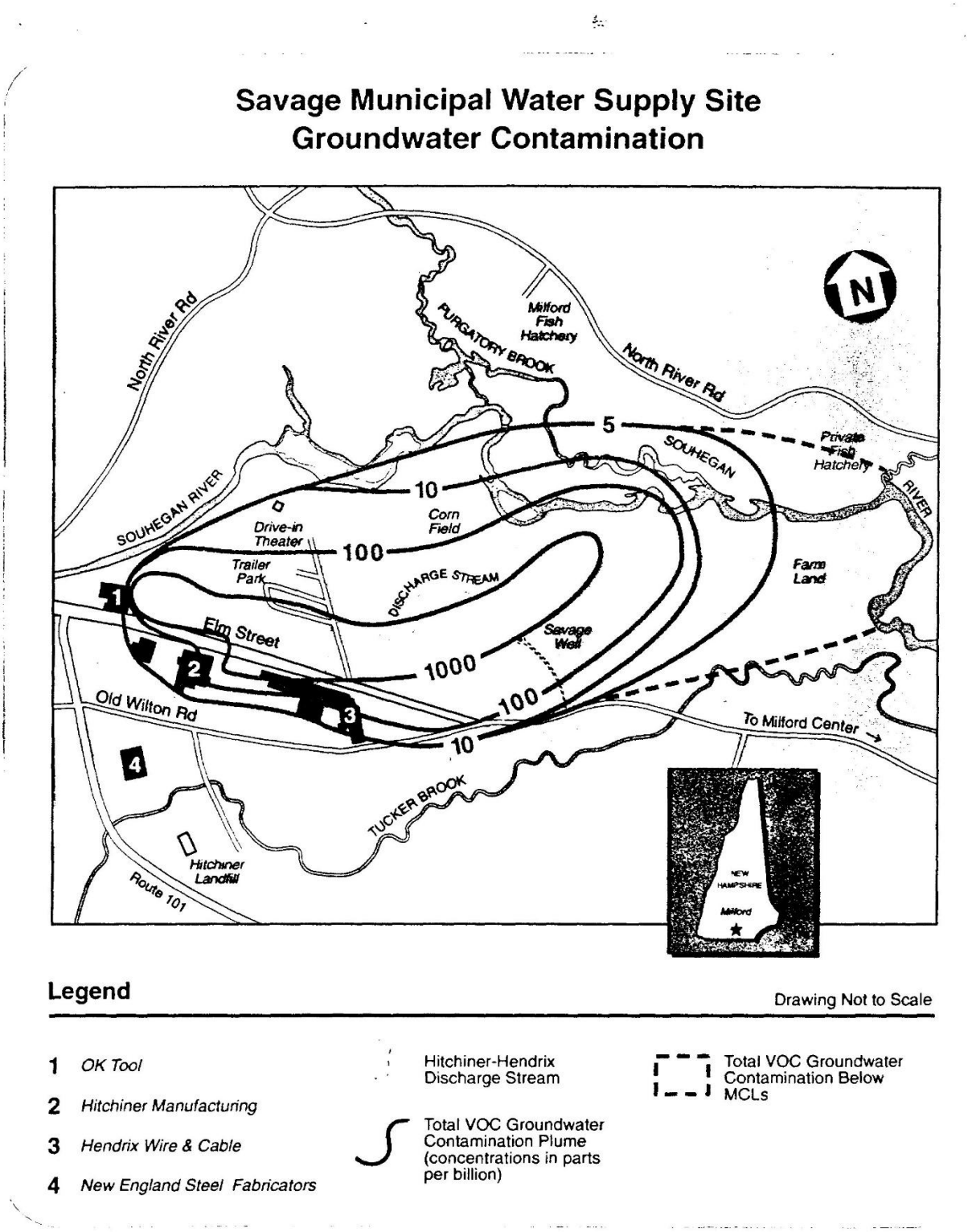
Source: Figure 4-30 of the 2020 OU1 Annual Report.

Figure C-13: 2003 and 2009 1,4-Dioxane Sampling Results at OU2



Source: Figure 1 of the 2010 1,4-Dioxane Analysis Results.

Figure C-14: 1991 ROD Groundwater Contamination



Source: 1991 ROD Figure on page 6

APPENDIX D – OU2 PCE concentrations Versus Time (Selected Wells)[3]

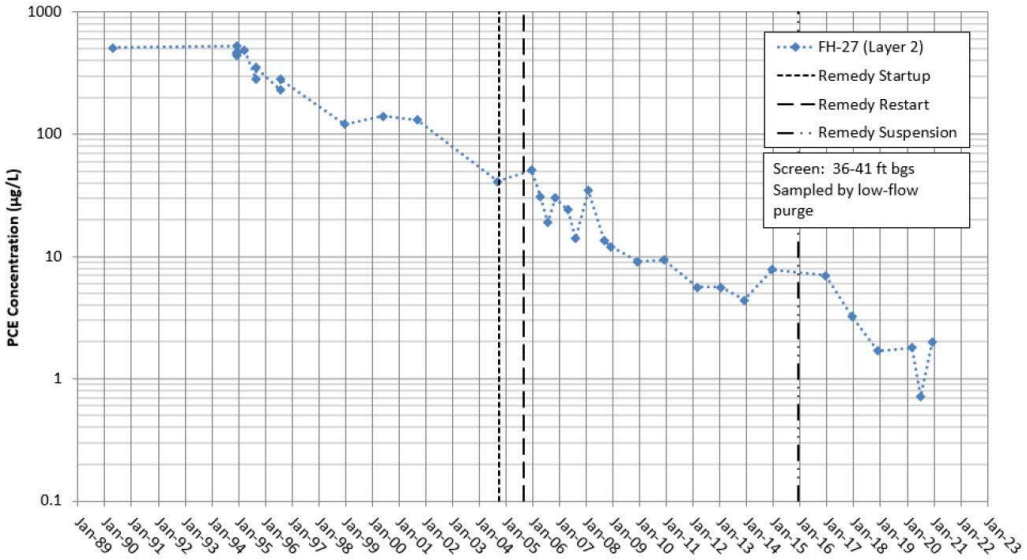


Figure A.1 PCE Concentrations *versus* Time for Monitoring Well FH-27. Savage Well Superfund Site, Milford, NH.

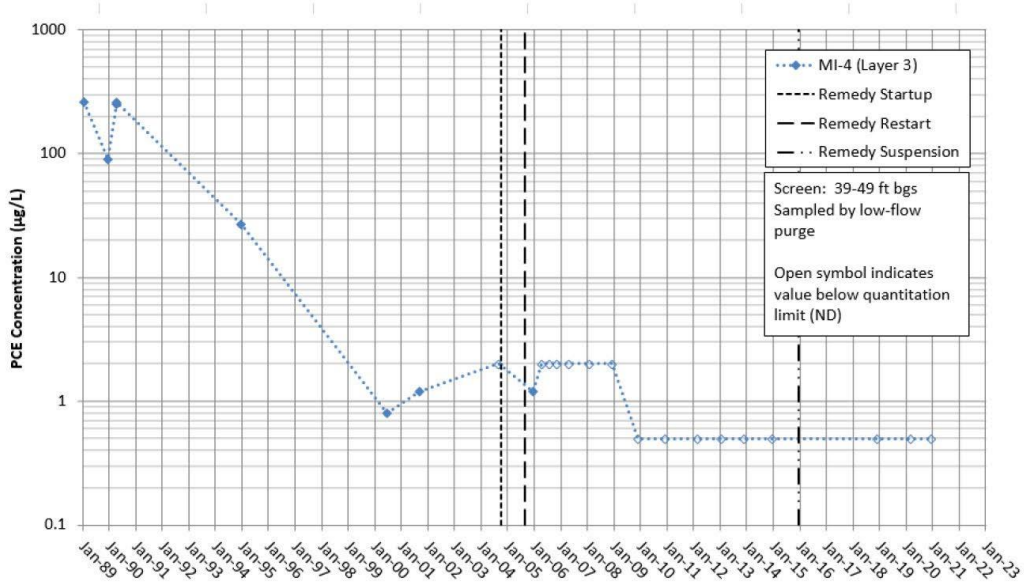


Figure A.2 PCE Concentrations *versus* Time for Monitoring Well MI-4. Savage Well Superfund Site, Milford, NH.

[3] *Source:* Appendix A of the OU2 2020 Groundwater Quality Monitoring Data: December 2020. Gradient.

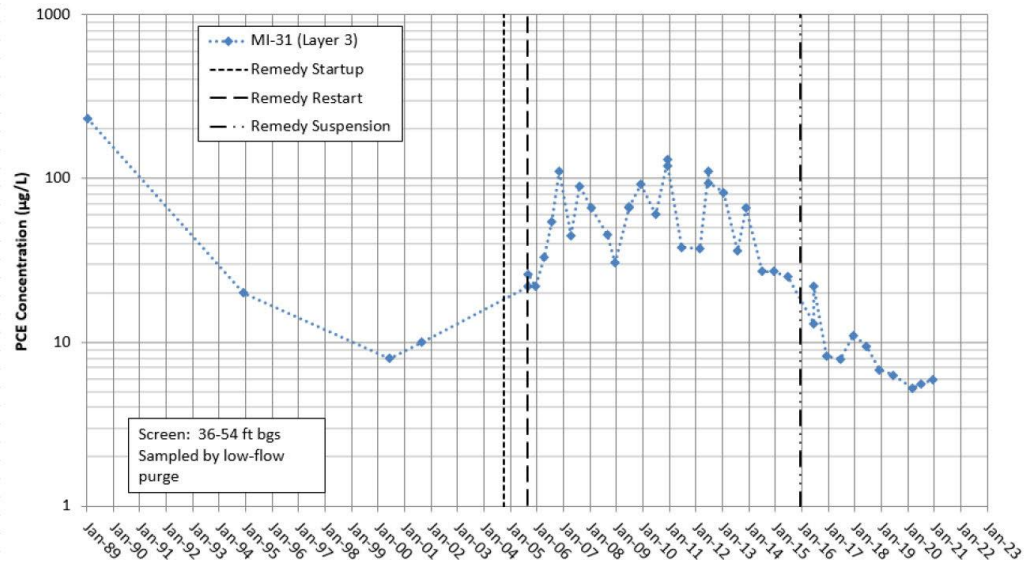


Figure A.3 PCE Concentrations *versus* Time for Monitoring Well MI-31. Savage Well Superfund Site, Milford, NH.

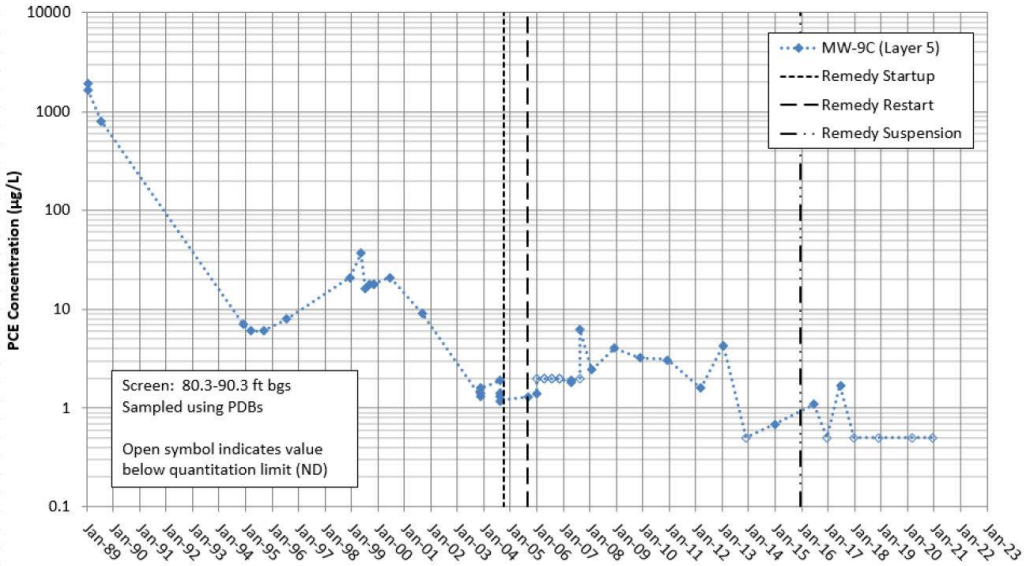


Figure A.4 PCE Concentrations *versus* Time for Monitoring Well MW-9C. Savage Well Superfund Site, Milford, NH.

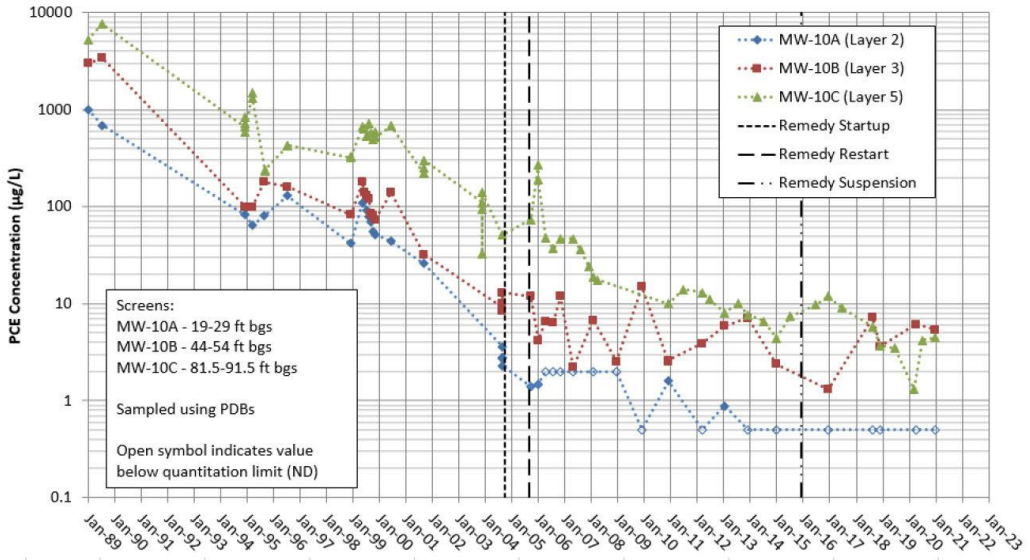


Figure A.5 PCE Concentrations *versus* Time for Monitoring Wells MW-10A/MW-10B/MW-10C. Savage Well Superfund Site, Milford, NH.

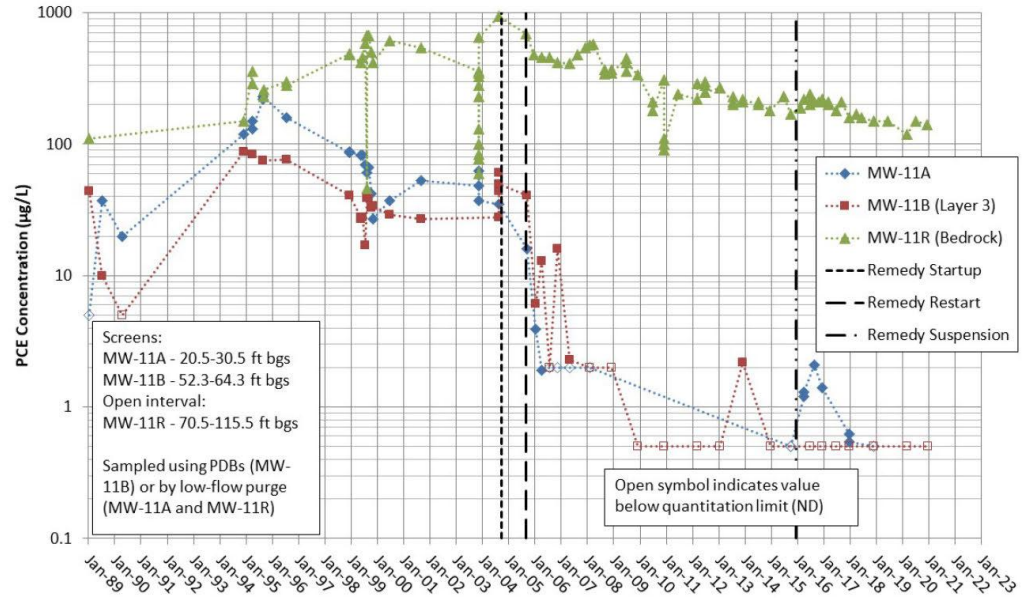


Figure A.6 PCE Concentrations *versus* Time for Monitoring Wells MW-11A/MW-11B/MW-11R. Savage Well Superfund Site, Milford, NH.

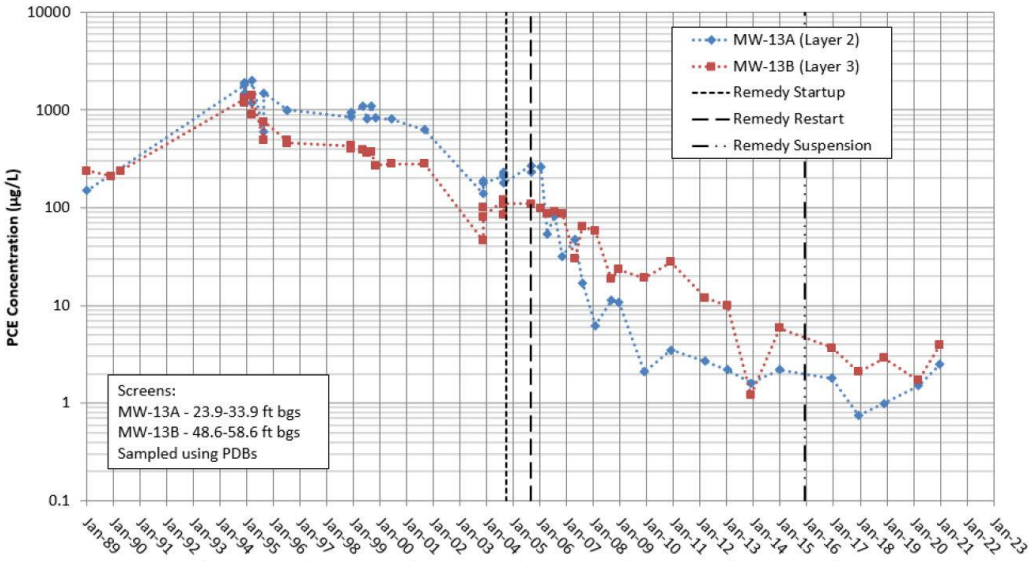


Figure A.7 PCE Concentrations *versus* Time for Monitoring Wells MW-13A/MW-13B. Savage Well Superfund Site, Milford, NH.

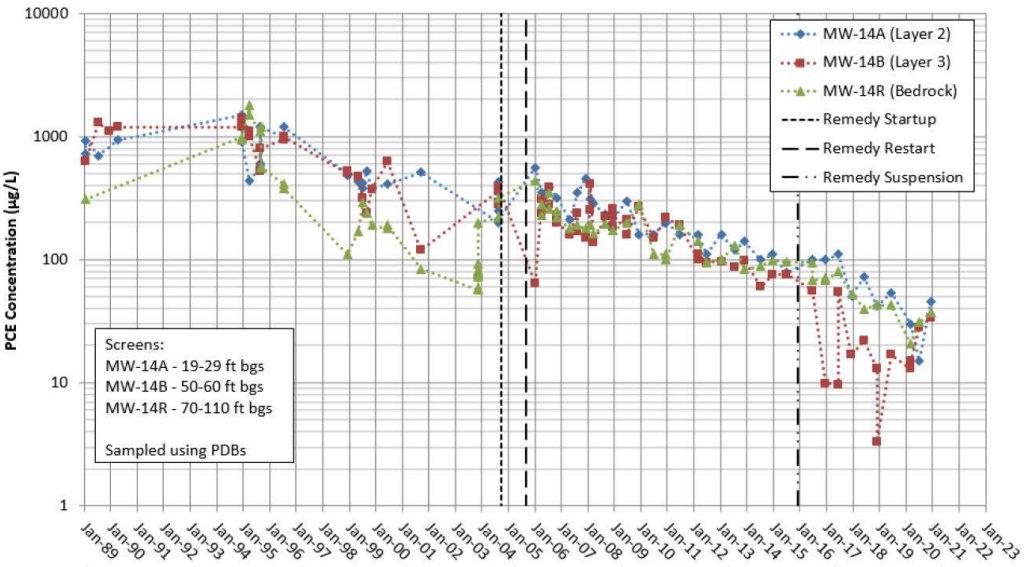


Figure A.8 PCE Concentrations *versus* Time for Monitoring Wells MW-14A/MW-14B/MW-14R. Savage Well Superfund Site, Milford, NH.

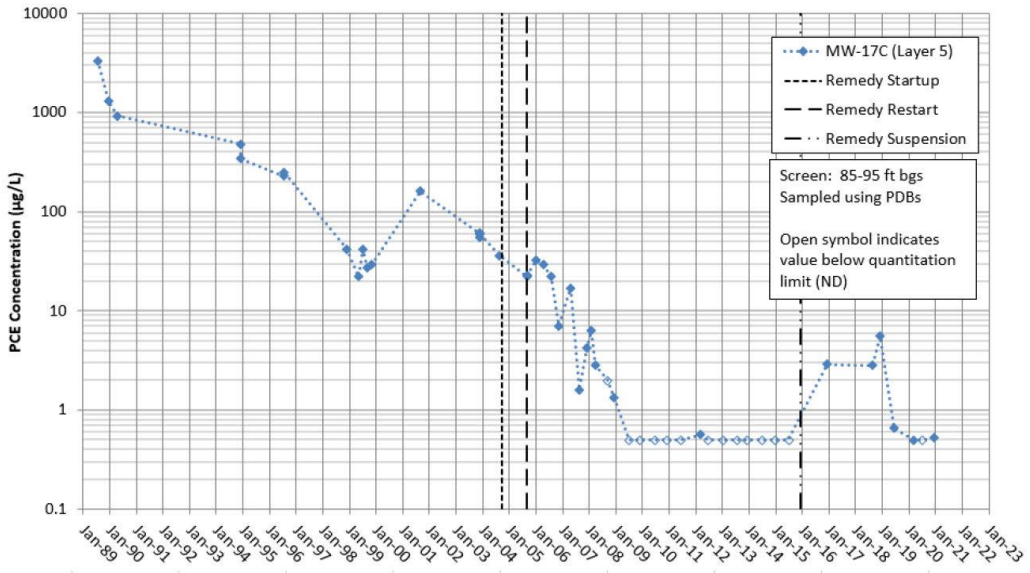


Figure A.9 PCE Concentrations *versus* Time for Monitoring Well MW-17C. Savage Well Superfund Site, Milford, NH.

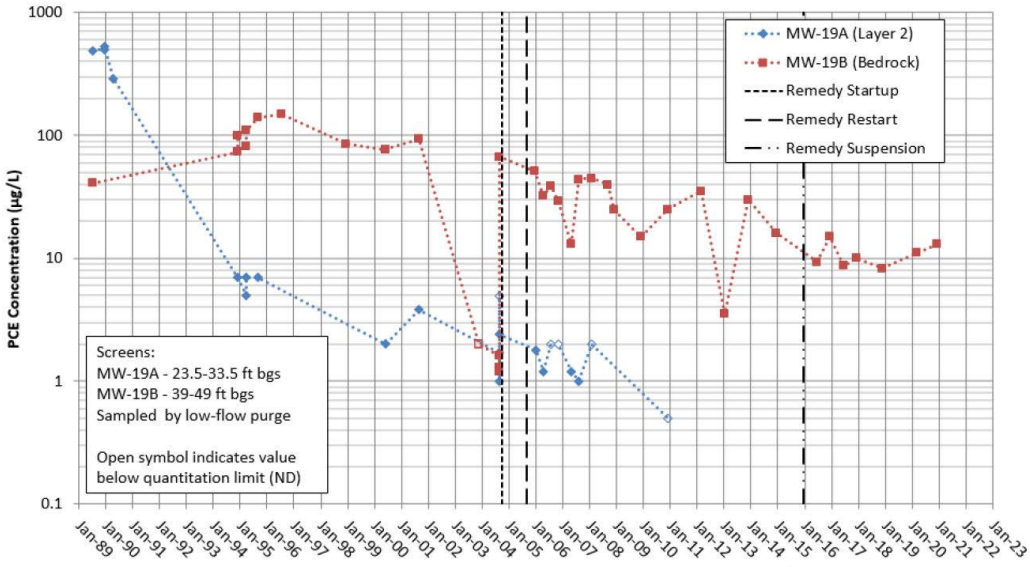


Figure A.10 PCE Concentrations *versus* Time for Monitoring Wells MW-19A/MW-19B. Savage Well Superfund Site, Milford, NH.

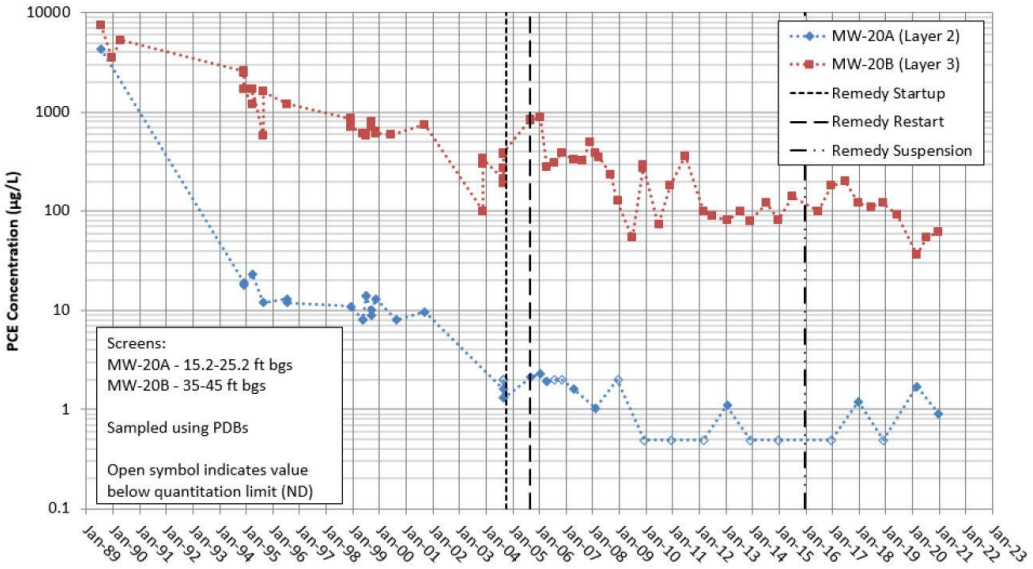


Figure A.11 PCE Concentrations *versus* Time for Monitoring Wells MW-20A/MW-20B. Savage Well Superfund Site, Milford, NH.

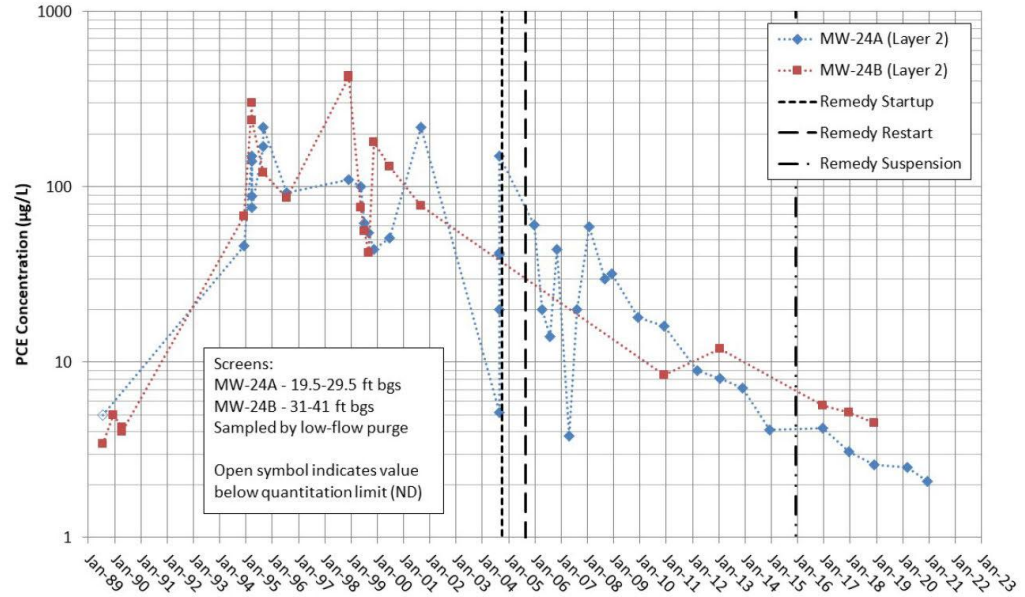


Figure A.12 PCE Concentrations *versus* Time for Monitoring Wells MW-24A/MW-24B. Savage Well Superfund Site, Milford, NH.

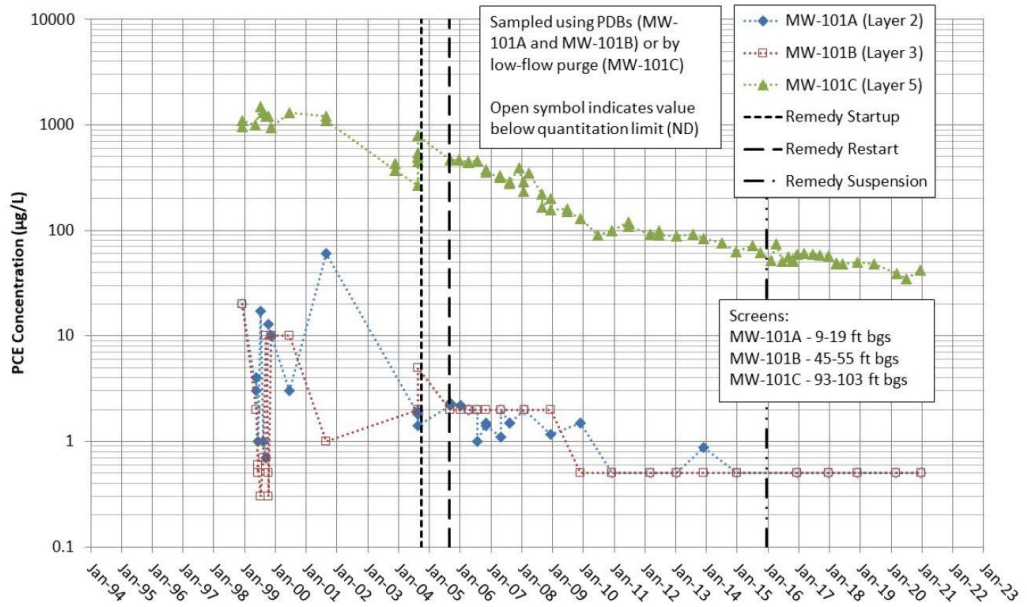


Figure A.13 PCE Concentrations *versus* Time for Monitoring Wells MW-101A/MW-101B/MW-101C. Savage Well Superfund Site, Milford, NH.

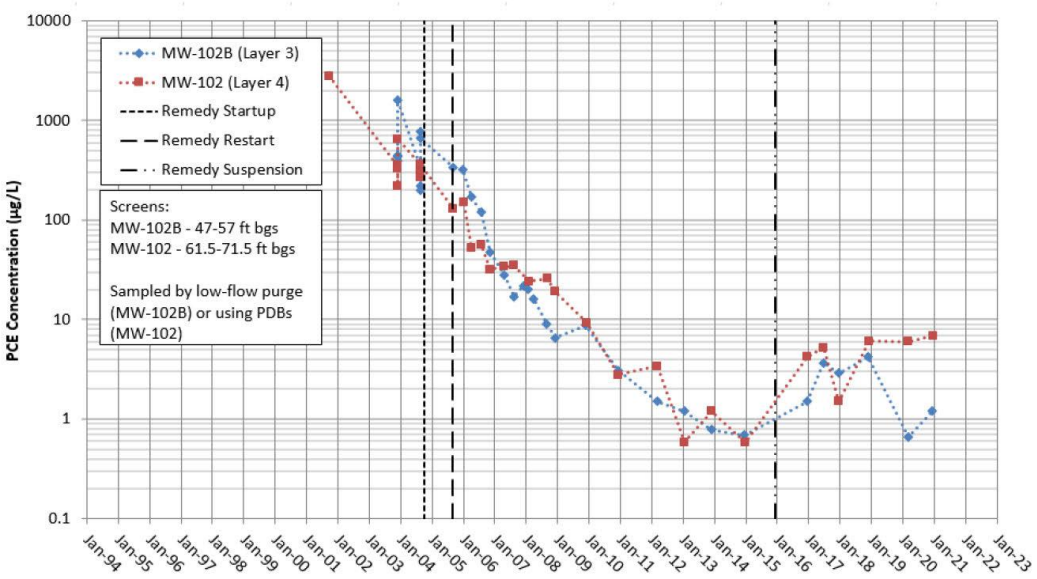


Figure A.14 PCE Concentrations *versus* Time for Monitoring Wells MW-102B/MW-102. Savage Well Superfund Site, Milford, NH.

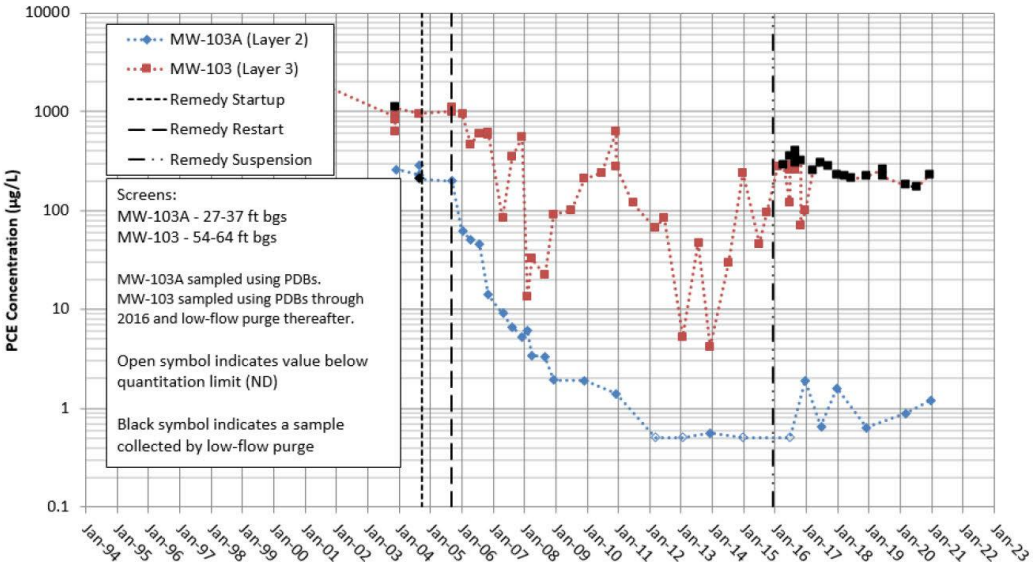


Figure A.15 PCE Concentrations *versus* Time for Monitoring Wells MW-103A/MW-103. Savage Well Superfund Site, Milford, NH.

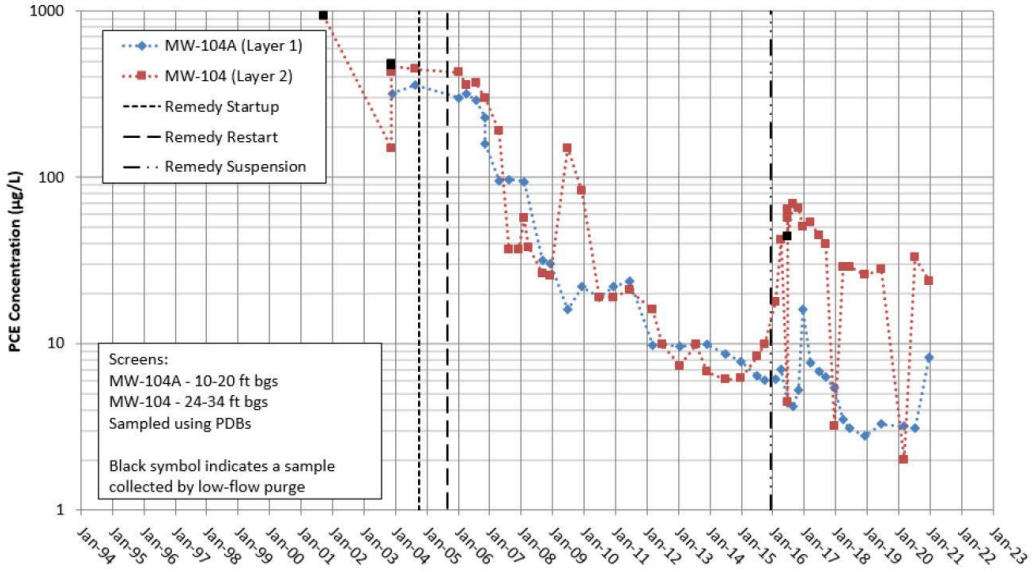


Figure A.16 PCE Concentrations *versus* Time for Monitoring Wells MW-104A/MW-104. Savage Well Superfund Site, Milford, NH.

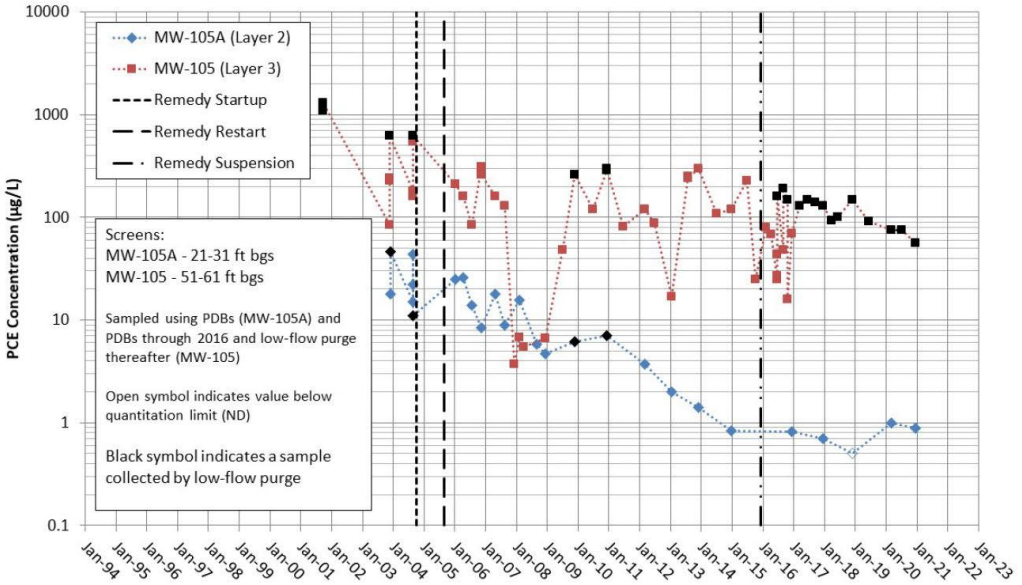


Figure A.17 PCE Concentrations *versus* Time for Monitoring Wells MW-105A/MW-105. Savage Well Superfund Site, Milford, NH.

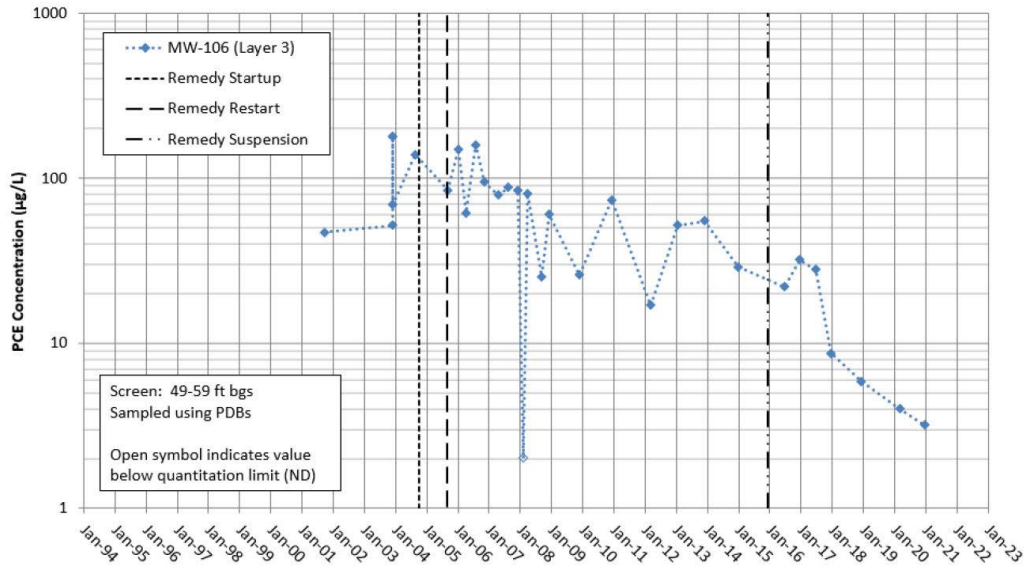


Figure A.18 PCE Concentrations *versus* Time for Monitoring Well MW-106. Savage Well Superfund Site, Milford, NH.

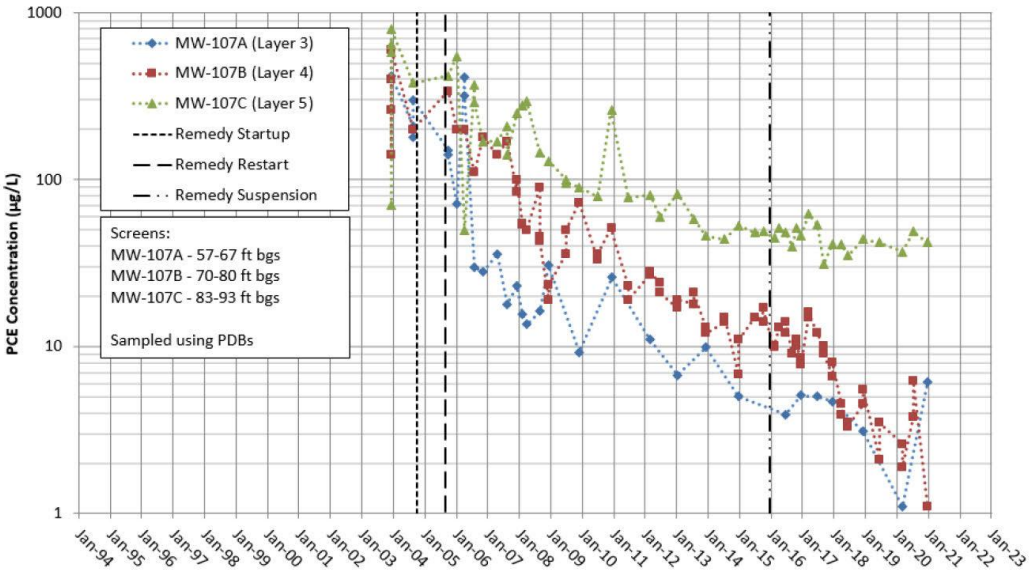


Figure A.19 PCE Concentrations *versus* Time for Monitoring Wells MW-107A/MW-107B/MW-107C. Savage Well Superfund Site, Milford, NH.

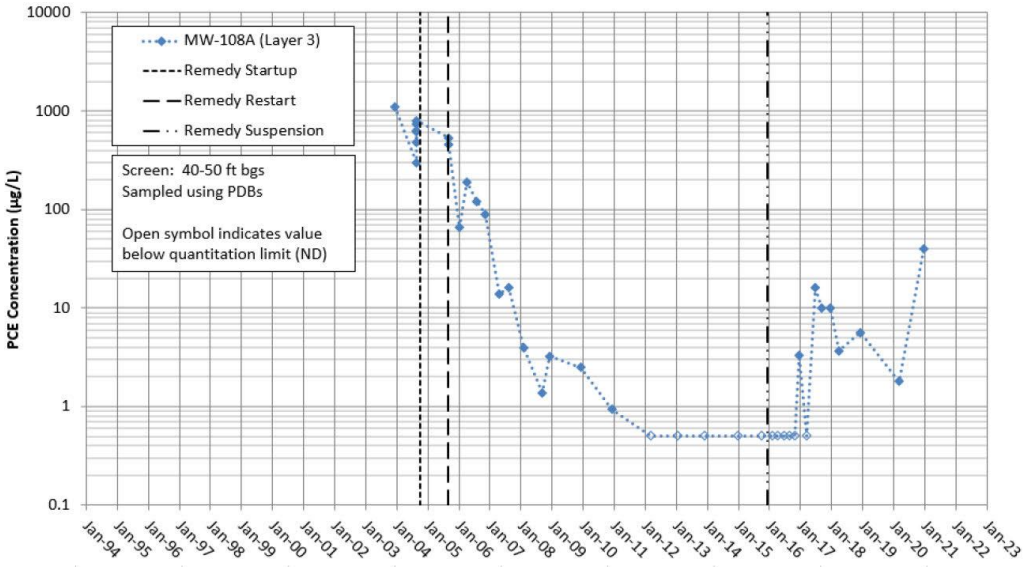


Figure A.20 PCE Concentrations *versus* Time for Monitoring Well MW-108A. Savage Well Superfund Site, Milford, NH.

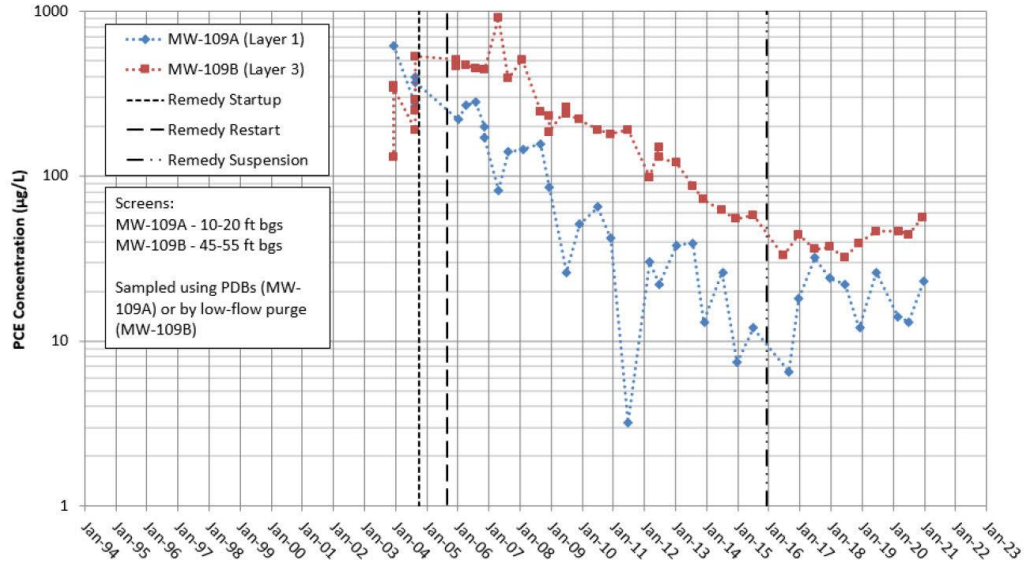


Figure A.21 PCE Concentrations *versus* Time for Monitoring Wells MW-109A/MW-109B. Savage Well Superfund Site, Milford, NH.

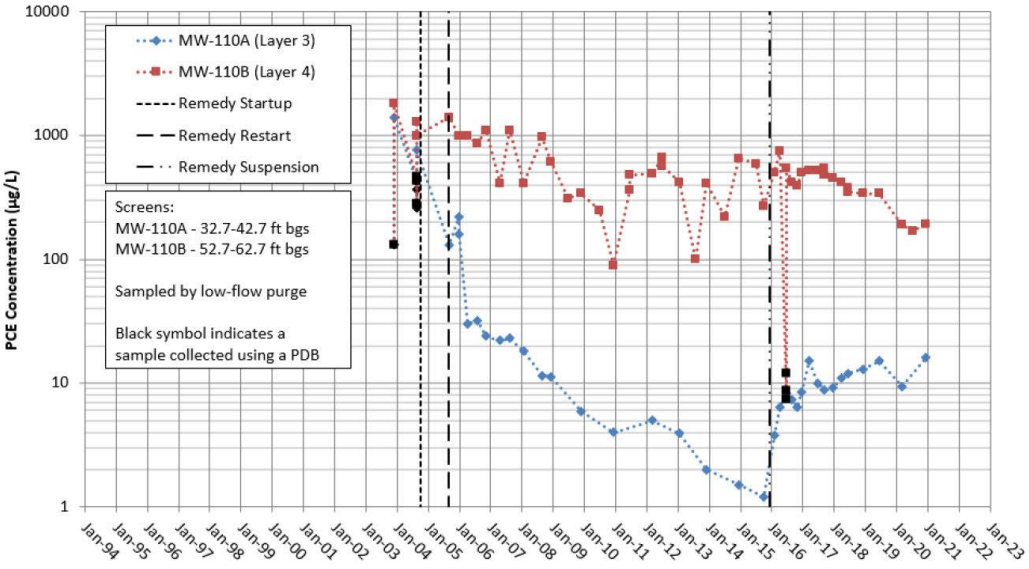


Figure A.22 PCE Concentrations *versus* Time for Monitoring Wells MW-110A/MW-110B. Savage Well Superfund Site, Milford, NH.

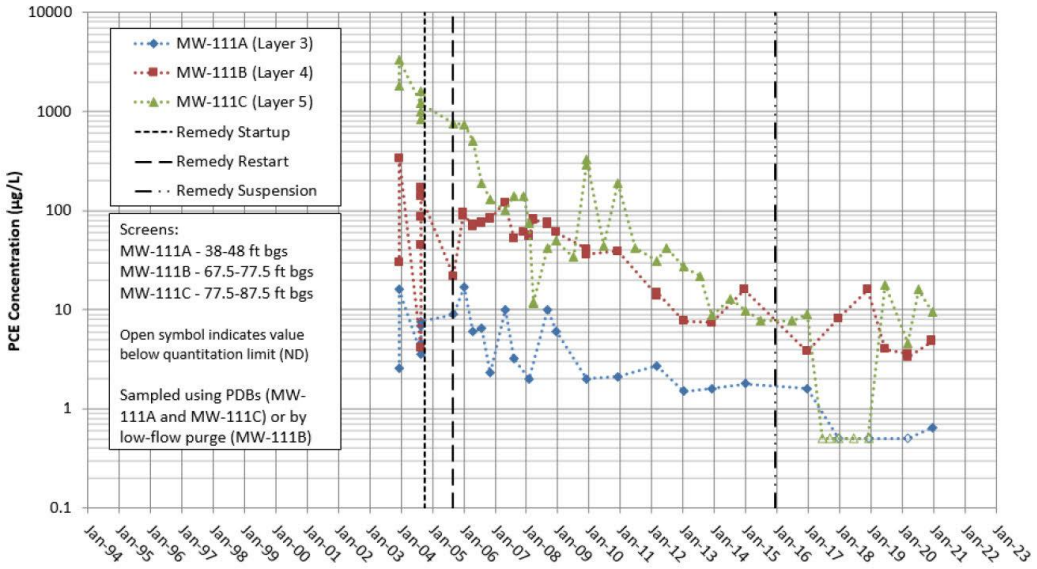


Figure A.23 PCE Concentrations *versus* Time for Monitoring Wells MW-111A/MW-111B/MW-111C. Savage Well Superfund Site, Milford, NH.

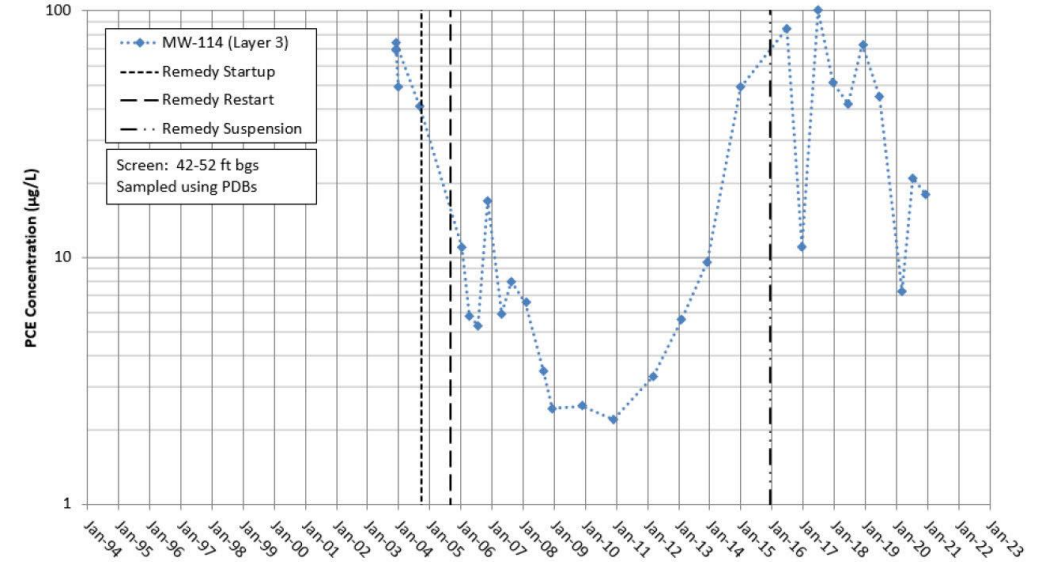


Figure A.24 PCE Concentrations *versus* Time for Monitoring Well MW-114. Savage Well Superfund Site, Milford, NH.

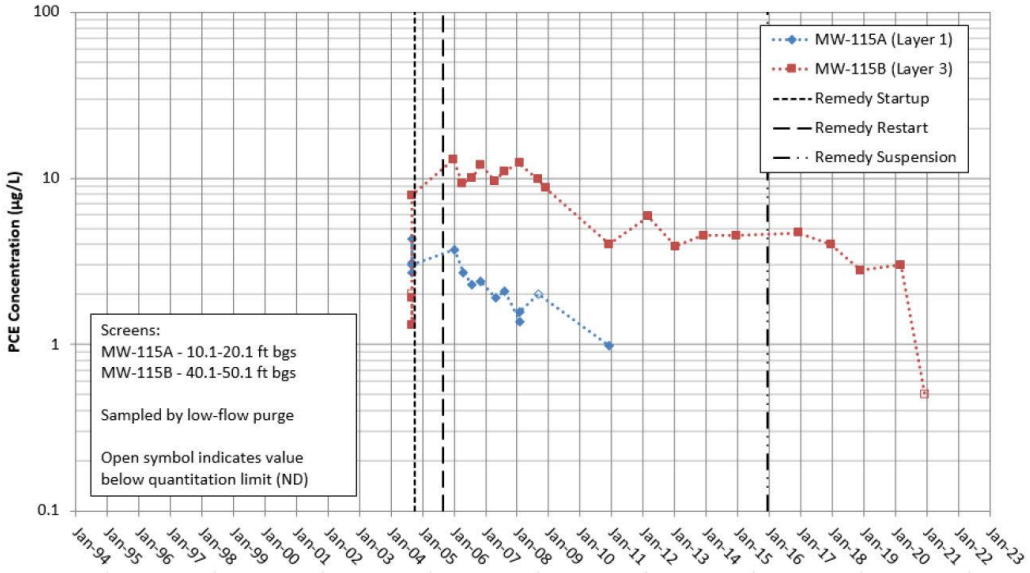


Figure A.25 PCE Concentrations *versus* Time for Monitoring Wells MW-115A/MW-115B. Savage Well Superfund Site, Milford, NH.

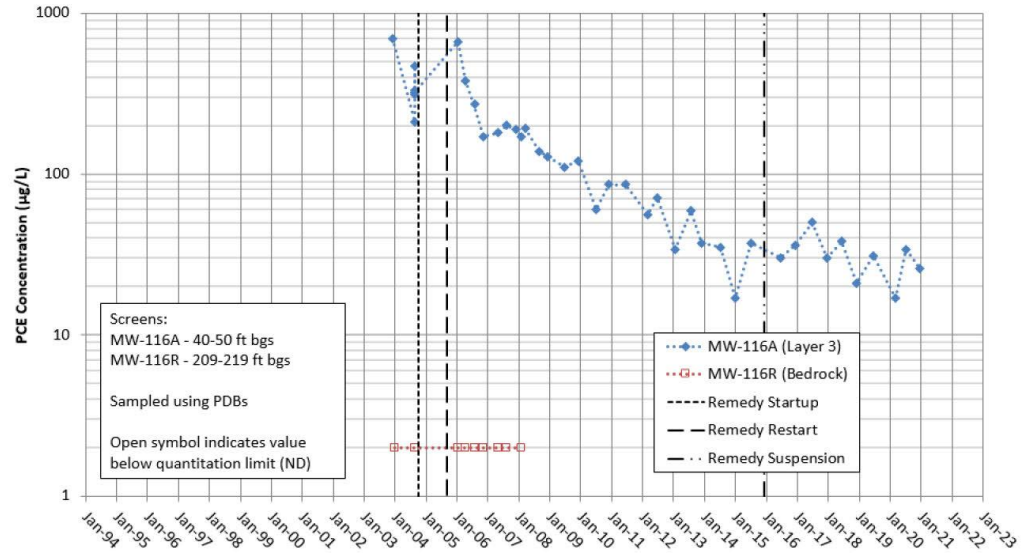


Figure A.26 PCE Concentrations *versus* Time for Monitoring Wells MW-116A/MW-116R. Savage Well Superfund Site, Milford, NH.

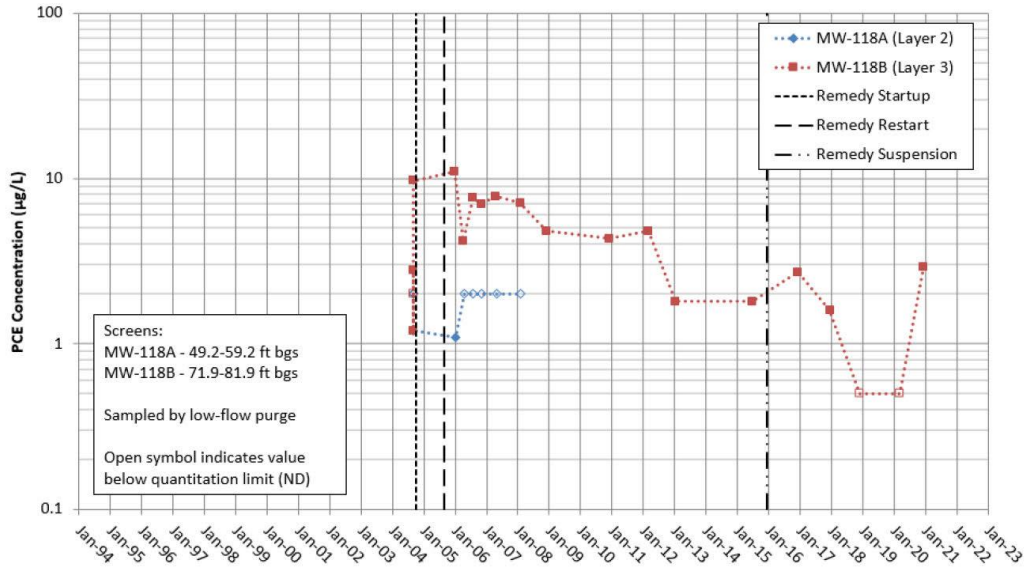


Figure A.27 PCE Concentrations *versus* Time for Monitoring Wells MW-118A/MW-118B. Savage Well Superfund Site, Milford, NH.

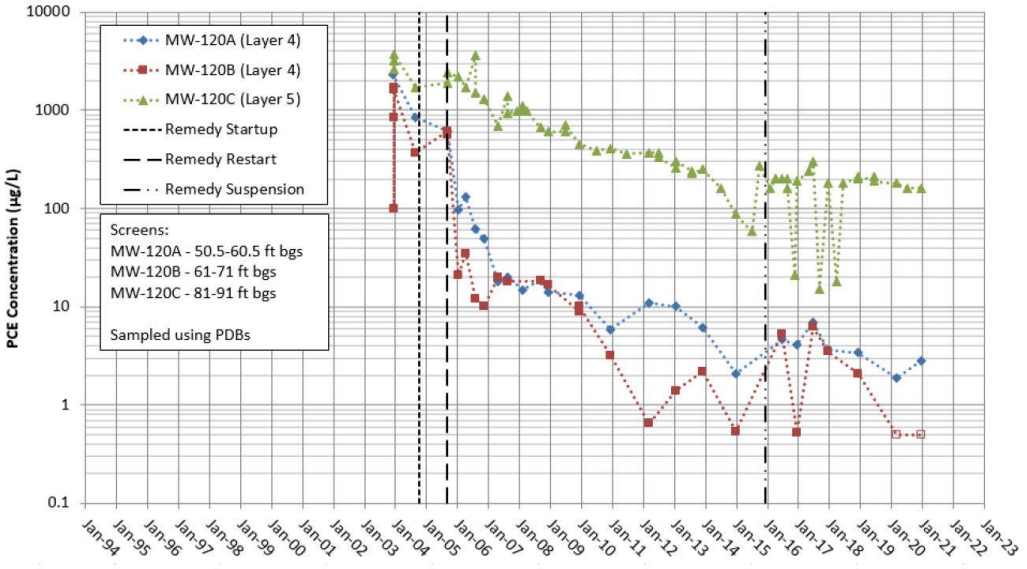


Figure A.28 PCE Concentrations *versus* Time for Monitoring Wells MW-120A/MW-120B/MW-120C. Savage Well Superfund Site, Milford, NH.

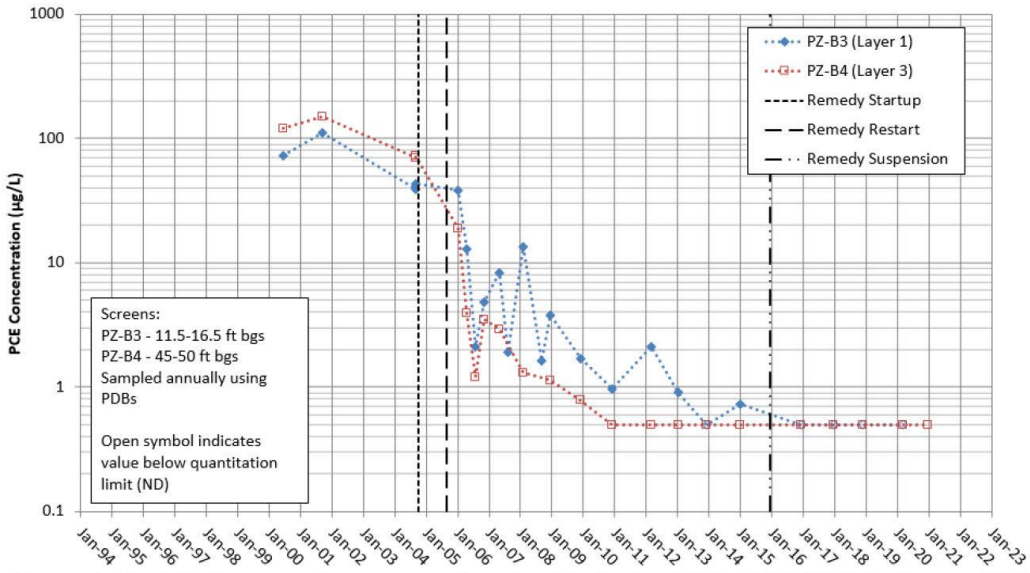


Figure A.29 PCE Concentrations *versus* Time for Monitoring Wells PZ-B3/PZ-B4. Savage Well Superfund Site, Milford, NH.

APPENDIX E – PRESS NOTICE

EPA United States Environmental Protection Agency

News Releases from Region 01

EPA to Review Cleanups at Seven New England Superfund Sites This Year

02/25/2021

Contact Information:
Dave Deegan (deegan.dave@epa.gov)
(617) 918-1017

BOSTON – The U.S. Environmental Protection Agency (EPA) will conduct comprehensive reviews of previously-completed cleanup work at seven National Priorities List (NPL) Superfund sites in New England this year. The sites, located in Connecticut, Maine, Massachusetts and New Hampshire, will undergo a legally-required Five-Year Review to ensure that previous remediation efforts at the sites continue to protect public health and the environment.

"Five-Year Reviews are designed to ensure that cleanup remedies continue to protect human health and the environment over time," **said EPA New England Acting Regional Administrator Deborah Szaro.** "These reviews also identify if changing circumstances or scientific understanding might require EPA to take additional actions at the site. By doing this work EPA provides assurance to community that health protection measures are adequate and working."

The Superfund program, a federal program established by Congress in 1980, investigates and cleans up the most complex, uncontrolled or abandoned hazardous waste sites in the country and works to facilitate activities to return them to productive use. EPA oversees Superfund studies and cleanups at 123 NPL sites across the six New England states. There are many phases of the Superfund cleanup process including considering future use and redevelopment and conducting post-cleanup monitoring of sites. EPA must ensure completed remedies continue to be protective of public health and the environment.

The Superfund sites where EPA will complete Five-Year Reviews in 2021 are listed below, and the web links provide detailed information on site status and past assessment and cleanup activity. Once the Five-Year Review is complete, its findings will be posted to the website in a final report.

Five-Year Reviews of Superfund sites in New England to be completed in 2021

Durham Meadows, Durham, Conn. www.epa.gov/superfund/durham
Callahan Mine, Brooksville, Maine www.epa.gov/superfund/callahan
Eastern Surplus, Meddybemps, Maine www.epa.gov/superfund/eastern
AMTL (Materials Technology Lab), Watertown, Mass.
www.epa.gov/superfund/amtl
Fort Devens - Sudbury Training Annex, Sudbury, Mass.
www.epa.gov/superfund/sudburyannex
Coakley Landfill, N. Hampton, N.H. www.epa.gov/superfund/coakley
Savage Municipal Water Supply, Milford, N.H. www.epa.gov/superfund/savage

More information on Superfund and other cleanup sites in New England:
https://www.epa.gov/cleanups/cleaning-new-england

LAST UPDATED ON FEBRUARY 25, 2021

APPENDIX F – INTERVIEW/QUESTIONNAIRE FORMS

INTERVIEW RECORD

Site Name: Savage Municipal Water Supply Superfund Site		**EPA ID No.:** NHD98067102
Subject: 2021 Five Year Review	**Date:** 5/20/2021	**Time:** 8am
Type: ☐ Telephone ☒ E-mail ☐ Other		☐ Incoming ☒ Outgoing
☒ Visit	**Location of Visit:** The Five-Year Review site visit was conducted May 18, 2021	

Contact Made By:

Name: ZaNetta Purnell	**Title:** Community Involvement Coordinator	**Organization:** USEPA

Individual Contacted:

Name: Robin Mongeon, P.E.	**Title:** Federal Sites Program Manager	**Organization:** New Hampshire Department of Environmental Services Hazardous Waste Remediation Bureau
Telephone No: (603) 271-7378 **Fax No:** (603) 271-2181	**Street Address:** PO Box 95, 29 Hazen Drive **City, State, Zip:** Concord, NH 03302-0095	
E-Mail Address: Robin.Mongeon@des.nh.gov		

1. What effects have site operations had on the surrounding community?

Since the installation of the slurry wall and pump and treat system in OU-1, and the groundwater pump and treat system that operated in OU-2, the overburden groundwater outside the slurry wall has continued to improve.

2. Are you aware of any community concerns or news articles regarding the site or its operation and administration? If so, please give details.

The neighbor immediately adjacent to the State-owned land in OU-1, where the slurry wall and ground water pump and treat system is located, has requested changes to the AUR on his property (Former Milford Police Station Property). While he is also concerned about certain remedial infrastructure located on his property, he needs to be reminded that he bought the property with these components in-place and the AUR is very specific that he cannot interfere with any part of the remedy.

In the past the Town of Milford has asked if trees can be planted along Elm Street/Route 101 to provide a more picturesque setting along the road. Currently there is a chain link fence all along Elm Street/Route 101 and surrounds the State-owned land in OU-1 controlling access to the OU-1 treatment plant and slurry wall area.

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

No

4. Are you concerned about the site's future reuse? If so, please give details.

Not at this time, as the State currently owns the portion of the site in OU-1 where the slurry wall and groundwater pump and treat system are located and there is a TI waiver on much of OU-1 that will limit the ability for future use in the foreseeable future for the State owned land.

5. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

Currently there is no bedrock remedy in-place at the site. The 2016 ROD Amendment included a bedrock component, but the revised remedy has not yet been implemented. It is important to note that the highest concentrations of the primary contaminant of concern, PCE, has been detected in deep bedrock and that properties north of the Souhegan River rely on bedrock groundwater for their drinking water as there is no municipal water north of the river.

6. General Comments:

The implementation of a bedrock remedy is a key component of the remedy that needs to be addressed in order for the site to remain protective of human health, due to the potential receptors across the river that use bedrock for drinking water.

INTERVIEW RECORD

Site Name: Savage Municipal Water Supply Superfund Site		**EPA ID No.:** NHD98067102
Subject: 2021 Five Year Review	**Date:**	**Time:**
Type: ☐ Telephone ☒ E-mail ☐ Other		☐ Incoming ☒ Outgoing
☐ Visit **Location of Visit:**		

Contact Made By:

Name: ZaNetta Purnell	**Title:** Community Involvement Coordinator	**Organization:** USEPA

Individual Contacted:

Name: John Shannon	**Title:** Town Administrator	**Organization:** Town of Milford, NH
Telephone No: 603-249-0602	**Street Address:** 1 Union Square	
Fax No: 603-673-2273	**City, State, Zip:** Milford, NH 03055	
E-Mail Address: jshannon@milford.nh.gov		

7. What effects have site operations had on the surrounding community?

The site operations have had little effect on the surrounding community.

8. Are you aware of any community concerns or news articles regarding the site or its operation and administration? If so, please give details.

No. The Town is not aware of any recent community concerns or news articles regarding the site or its operation and administration.

9. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

No. The Town is not aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities.

10. Are you concerned about the site's future reuse? If so, please give details.

No, based on our understanding the site.

11. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

The Elm Street corridor represents one of the primary gateways into Milford. In an effort to lessen the visual impact of the treatment facility and site, the Town requests that a vegetated buffer (trees) be installed along the frontage of the property on Elm Street.

12. General Comments:

No further comments.

INTERVIEW RECORD

Site Name: Savage Municipal Water Supply Superfund Site		**EPA ID No.:** NHD98067102	
Subject: 2021 Five Year Review	**Date:** 3/25/2021	**Time:** 1430	
Type: ☐ Telephone ☒ E-mail ☐ Other		☐ Incoming ☒ Outgoing	
☐ Visit **Location of Visit:**			

Contact Made By:

Name: ZaNetta Purnell	**Title:** Community Involvement Coordinator	**Organization:** USEPA

Individual Contacted:

Name: Jim Soukup, LSP, PG, RG	**Title:** OU1 Project Manager	**Organization:** Weston Solutions, Inc.
Telephone No: (603) 656-5480	**Street Address:** 43 N. Main Street	
Fax No: (603) 305-0337	**City, State, Zip:** Concord, NH 03301	
E-Mail Address: Jim.soukup@westonsolutions.com		

1. What effects have site operations had on the surrounding community?

Site operations have minimal impact on the local community at large. Traffic and noise associated with site operations is negligible. Site operations have impacted the property owner located directly to the east, as a number of monitoring wells are located on his property and he seems intent on trying to further develop that property. He has inquired about closing out unneeded monitoring wells.

2. Are you aware of any community concerns or news articles regarding the site or its operation and administration? If so, please give details.

I am not aware of any community concerns, other than those of the adjacent property owner to the east as stated above

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

I am not aware of any such events or activities.

4. Are you concerned about the site's future reuse? If so, please give details.

Site-related contamination is known to be present in deep bedrock at concentrations exceeding MCLs and AGQS on the undeveloped property just to the north, across the Souhegan River. Municipal water is not available in that area. Future residential development of that property would require onsite groundwater use and would like encounter and draw in contamination from OU1 via the deep bedrock pathway. Pumping tests performed on the deep bedrock have confirmed strong anisotropy in the deep bedrock that represents a direct pathway from the source area to this property.

5. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

The process equipment and building infrastructure are now approaching 30 years old, exceeding their designed lifetime. We are seeing increasing frequency of equipment and infrastructure failures each year. As the equipment continues to age, these failures will continue to increase, resulting in higher annual O&M costs and potentially increased downtime for the extraction and treatment system.

6. General Comments:

The existing pump & treat remedy has been highly effective at achieving the Remedial Action Objections for the overburden aquifer outside the source area (slurry wall). Treatment of the overburden aquifer inside the slurry wall with ISCO has significantly reduced contaminant mass in the overburden within the source area. Neither of these remedies were designed to address contamination in the deep bedrock either within the source area or in downgradient areas. The potential for offsite migration of contamination in deep bedrock to downgradient receptors (OU2 to the east and developable properties to the north) remains a serious concern for this Site.

April 28, 2021

ZaNetta Purnell
Public Affairs Specialist, Community Involvement Coordinator
US EPA Region 1 – Office of the Regional Administrator/Public Affairs
5 Post Office Square, Suite 100, Mailcode ORA01-1
Boston, MA 02109
via email to Purnell.ZaNetta@epa.gov

Re: Response to US EPA's 2021 Five-Year Review Questionnaire
Savage Well Superfund Site, Operable Unit 2
Milford, New Hampshire

Dear Ms. Purnell:

On behalf of Hitchiner Manufacturing Company, Inc. and ABB Installation Products, Inc. (the Settling Parties), Gradient is submitting this response to the United States Environmental Protection Agency (US EPA) 2021 Five-Year Review questionnaire, which we received *via* e-mail on March 22, 2021.

Please let us know if you have any questions or need additional information.

Yours truly,

GRADIENT

Manu Sharma, P.E.
Principal

Attachment: Savage Well Superfund Site 2021 Five-Year Review Questionnaire Response

cc: Gerardo Millán-Ramos, Project Manager, US EPA Region 1
Robin Mongeon, Federal Sites Section Supervisor, New Hampshire Department of Environmental Services (NHDES) Waste Management Division
Gregory H. Smith, McLane Middleton
Mark C. Rouvalis, McLane Middleton
Adam Dumville, McLane Middleton
Robert R. Lucic, Sheehan Phinney Bass & Green
Timothy C. Sullivan, Hitchiner Manufacturing Co., Inc.
Robin M. Staszak, ABB Installation Products, Inc.

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INTERVIEW RECORD

Site Name: Savage Well Superfund Site		**EPA ID No.:** NHD98067102	
Subject: 2021 Five-Year Review	**Date:** April 28, 2021	**Time:** N/A	
Type: ☐ Telephone ☒ E-mail ☐ Other		☐ Incoming ☒ Outgoing	
☐ Visit **Location of Visit:**			

Contact Made By:

Name: ZaNetta Purnell	**Title:** Community Involvement Coordinator	**Organization:** US EPA

Individual Contacted:

Name: Manu Sharma, M.S., P.E.	**Title:** OU-2 Project Coordinator	**Organization:** Gradient

Telephone No: (617) 395-5515	**Street Address:** One Beacon Street, 17th Floor
Fax No: (617) 395-5001	**City, State, Zip:** Boston, MA 02108
E-Mail Address: msharma@gradientcorp.com	

1. What effects have site operations had on the surrounding community?

We are not aware of any effects that the Operable Unit 2 (OU-2) site operations have had on the surrounding community.

2. Are you aware of any community concerns or news articles regarding the site or its operation and administration? If so, please give details.

We are not aware of any community concerns or news articles regarding the OU-2 portion of the Site or its operation and administration.

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

We are not aware of any events, incidents, or activities at the OU-2 portion of the Site, such as vandalism, trespassing, or emergency responses from local authorities.

4. Are you concerned about the site's future reuse? If so, please give details.

No. The existing institutional controls (ICs) at OU-2 have protected public health by ensuring that community members are not exposed to affected groundwater. However, in response to recommendations made in the prior 2016 Five-Year Review regarding the need for enhanced ICs, we have concluded that it would be best if the United States Environmental Protection Agency (US EPA), New Hampshire Department of Environmental Services (NHDES), and the Settling Parties (Hitchiner Manufacturing Co., Inc. and ABB Installation Products, Inc.) work together with the Town of Milford, New Hampshire, to establish a groundwater management zone (GMZ) over the plume to prohibit the use of groundwater without prior approval from the Town, US EPA, and NHDES. Note that the area of the proposed GMZ is already serviced by municipal water. The Town ordinance establishing the GMZ would address the groundwater plume associated with both Operable Unit 1 (OU-1) and OU-2. Based on the existing ICs, the presence of a public water supply, the proposed enhanced ICs, and the relatively low concentrations of volatile organic compounds (VOCs) in groundwater at OU-2, there is no concern about future reuse of the OU-2 portion of the Site.

5. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

Comments Regarding the Amended OU-1 Remedy

Gradient reviewed the following design documents associated with the proposed modifications to the OU-1 remedy:

- March 7, 2019, Final Pre-Remedial Design Investigation Report, and
- March 8, 2019, Final Permeable Reactive Barrier (PRB) Conceptual Design Report.

Based on our review of these documents, the Settling Parties continue to have significant concerns regarding the proposed amended OU-1 remedy, as outlined in our May 23, 2019, comments on the aforementioned documents. Importantly, our concerns are consistent with US EPA's own Remedy Optimization Review team's March 26, 2019, conclusion that, "there is uncertainty regarding the potential for the OU-1 remedy to mitigate the migration of VOCs from OU-1 to OU-2." In summary, the Settling Parties remain concerned that the modification to the OU-1 remedy will mobilize contaminant mass from OU-1 into OU-2, particularly *via* shallow bedrock.

Comments Regarding a Transition to Monitored Natural Attenuation (MNA) at OU-2

The key compound of concern at the Site is tetrachloroethylene (PCE), which originated at the OK Tool Source Area (OU-1). The Settling Parties are responsible for remediating the downgradient overburden aquifer in OU-2, which is also referred to as the Extended Plume. The OU-2 remedy is guided by a 1991 Record of Decision and has included:

- Groundwater extraction, treatment, and injection, and
- Natural attenuation beyond the groundwater extraction capture zone.

The OU-2 remedial system, which operated from October 2004 to December 2015, performed effectively and has met its design objectives. As is typically the case with groundwater pump-and-treat systems, the OU-2 system performance data showed that PCE concentrations in extracted groundwater were reaching an asymptote during the last 3-4 years of remedy operation (2012-2015), with the rate of decline of observed PCE concentrations in OU-2 monitoring wells largely driven by natural attenuation processes rather than groundwater extraction and treatment. In consideration of these observations, the Settling Parties recommended – and US EPA agreed – that groundwater extraction and treatment be suspended starting in December 2015 and that groundwater quality be monitored to evaluate whether PCE concentrations in groundwater rebound as part of a suspension test. This suspension test has been ongoing since that time and has demonstrated that the PCE plume remains stable, with no appreciable or sustained rebound in PCE concentrations at OU-2. Groundwater quality data collected during the suspension test (a period of approximately 5 years) indicate that the remedy can be transitioned to MNA with no adverse impact on human health or the environment. These findings are consistent with US EPA's own Remedy Optimization Review team's March 26, 2019 conclusions that enhancements to the OU-2 remedy would provide little tangible benefits and would not be cost-effective.

Based on the above findings, the Settling Parties requested that the OU-2 remedy be transitioned to MNA in a Suspension Test Summary Report (March 20, 2019). We are currently awaiting US EPA's response to this request.

6. General Comments:

None.

Jefferson Odhner
Odhner Holographics, Inc.
Unit 3
589 Elm Street
Milford, NH 03055

April 22, 2021

ZaNetta Purnell
Public Affairs Specialist, Community Involvement Coordinator
USEPA Region 1 – Office of the Regional Administrator/ Public Affairs
5 Post Office Square, Suite 100, Mailcode ORA01-1
Boston, MA. 02109

RE: Savage Municipal Wells, 5 year review

Dear ZaNetta Purnell:

Being the property owner adjacent on the east side of the Savage Wells site, I am writing to provide my input into your 5 year review. I have 3 areas of concern:

1. A significant portion of the fence on the Savage well site was put on my property. I would like to have this fence removed or relocated. Attached is the Certified Plot Plan of my property showing where the fence is on my property and where my property line is in relation to the current location of the fence.

2. My property (589 Elm Street; i.e.: the old Police Station) is adjacent to the Savage Well site. As such, a deed restriction was put on the property at its purchase 4 years ago. I would like to have this deed restriction removed. I had a sub-slab Summa canister test performed in central portion of the building which resulted finding no contamination. The results of this test were sent to Robin Mongeon. At our last meeting she said that she would remove the deed restriction on at least the entire building and the eastern half of the property adjacent to the building (the side opposite the Savage Well site). This has not happened. Attached is a picture of the minimum area I would like to see the deed restriction removed from. Robin had agreed to this in principal during out last meeting. If you approve the attached amended AUR, I will see to it that it gets recorded in the Hillsborough County Registry of deeds, Book 8988, Page 2984.

   However, there being no contamination found in the wells, even with drilling into bedrock, no contamination <u>under</u> the slab of the building and no contamination found

in the surface soil at 589 Elm Street, I would prefer to have the deed restriction lifted for the entire property all together.

3. A baseball field has been in continuous use on the property since the 1950s by both the Town of Milford and private baseball clubs. There are steel well heads that stick up out of the ground a couple feet or more at a number of places on the property. I believe that some of these are now inactive. I would like to see the well head which are inactive removed and the ones that are active made flush with the ground to prevent people from injuring themselves and improve the aesthetics of the property. It would also allow mowing and property maintenance to be improved. Currently the owner is mowing around all of these well sites with no monetary support from the EPA for this maintenance. Making the active well heads flush to the ground would improve safety and make the maintenance easier. If it is a question of locating the wells once they are flush, a small forsythia plant or another flowering shrub could be planted next to each well to make it easy to find.

4. I would also like to see the manholes that are part of the groundwater discharge gallery made flush to the ground. There is really no reason that there needs to be a large concrete structure holding up the man-hole covers in the outfield area of the baseball field. These structures could easily be made flush to the ground. Once again, the location can be marked with a flowering shrub.

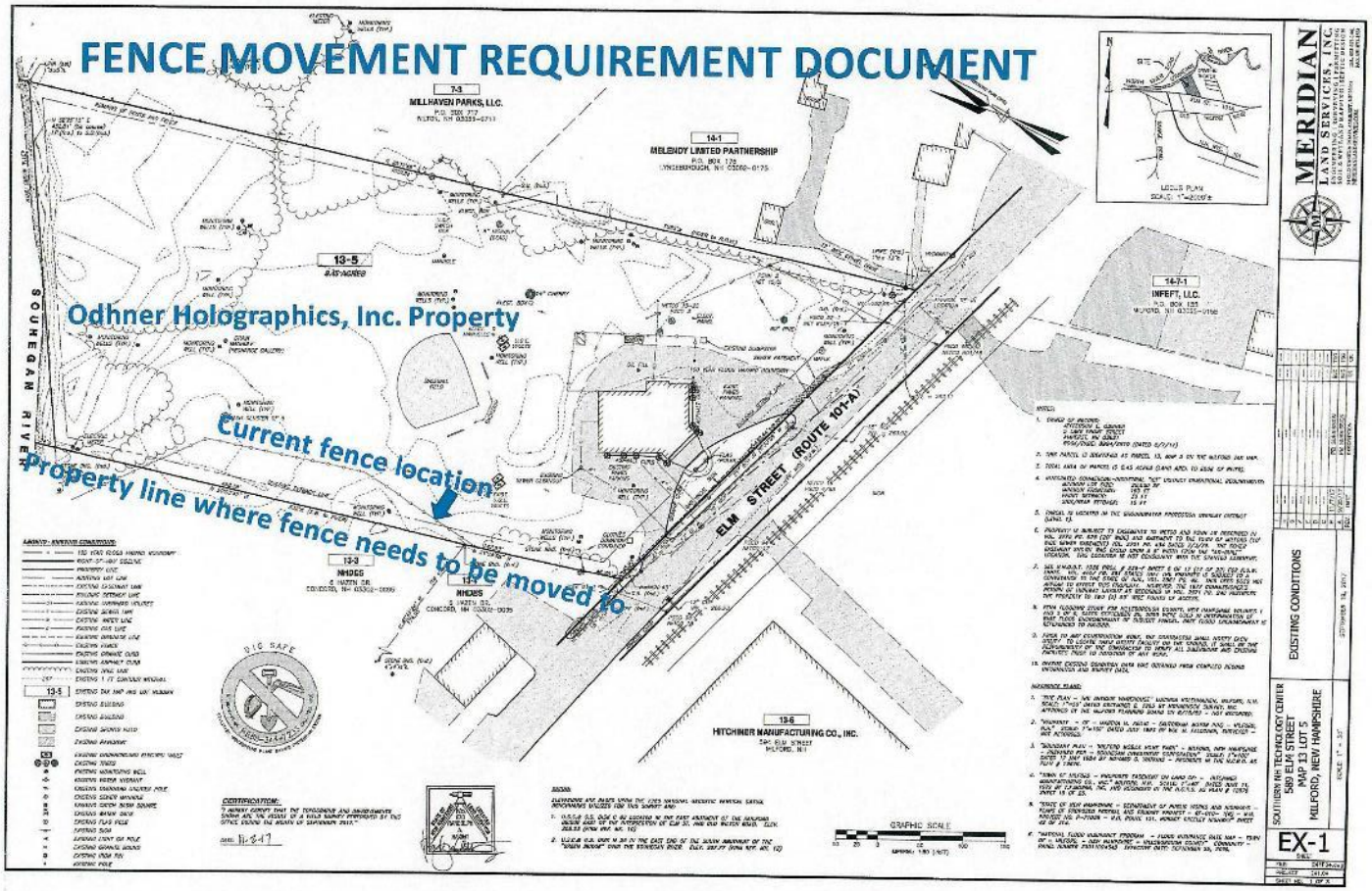
Sincerely,

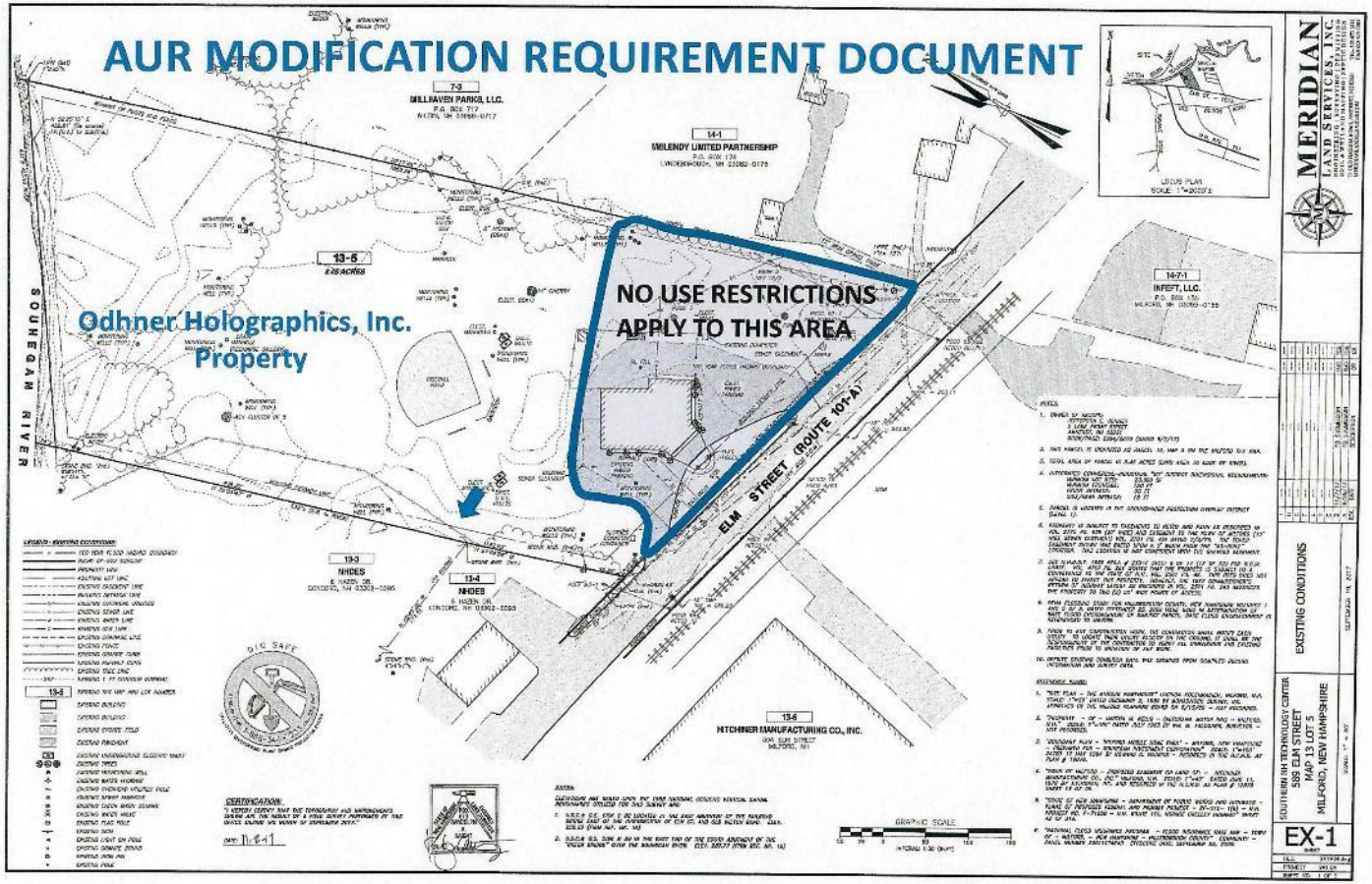
Jefferson Odhner

Jefferson E. Odhner
President
Odhner Holographics, Inc.
5 Lake Front Street
Amherst, NH. 03031

Odhner Holographics Inc. Lab:
589 Elm Street
Milford, NH. 03055

Email: jodhner@stabilock.com
Phone: (603) 673-8651


FENCE MOVEMENT REQUIREMENT DOCUMENT
Odhner Holographics, Inc. Property
Current fence location
Property line where fence needs to be moved to
SOUHEGAN RIVER
ELM STREET (ROUTE 101-A)
MILLHAVEN PARKS, LLC.
MELENDY LIMITED PARTNERSHIP
INFEFT, LLC.
HITCHINER MANUFACTURING CO., INC.
MERIDIAN LAND SERVICES, INC.
SOUTHERN NH TECHNOLOGY CENTER
589 ELM STREET
MAP 13 LOT 5
MILFORD, NEW HAMPSHIRE
EXISTING CONDITIONS
EX-1


AUR MODIFICATION REQUIREMENT DOCUMENT
Odhner Holographics, Inc.
Property
NO USE RESTRICTIONS
APPLY TO THIS AREA
ELM STREET (ROUTE 101-A)
SOUHEGAN RIVER
MILLHAVEN PARKS, LLC.
MELENDY LIMITED PARTNERSHIP
INFEFT, LLC.
HITCHINER MANUFACTURING CO., INC.
NHDES
13-5
13-6
14-1
14-7-1
MERIDIAN
LAND SERVICES, INC.
EXISTING CONDITIONS
SOUTHERN NH TECHNOLOGY CENTER
595 ELM STREET
MAP 13 LOT 5
MILFORD, NEW HAMPSHIRE
EX-1

APPENDIX G – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Savage Municipal Water Supply	**Date of Inspection:** 05/18/2021
Location and Region: Milford, New Hampshire, 1	**EPA ID:** NHD980671002
Agency, Office or Company Leading the Five-Year Review: EPA	**Weather/Temperature:** Sunny, mid-70 degrees Fahrenheit

Remedy Includes: (check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment (OU1)
- ☐ Surface water collection and treatment
- ☒ Other: PRB, has not been implemented in OU1
- ☒ Monitored natural attenuation (OU2)
- ☐ Groundwater containment
- ☒ Vertical barrier walls (OU1 slurry wall)

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M OU1 Site Manager**	Jim Soukup Name	OU1 Project Manager Title	03/25/2021 Date

Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
Problems, suggestions ☐ Report attached: _____

2. **O&M OU2 Site Manager**	Manu Sharma Name	OU2 Project Coordinator Title	04/28/2021 Date

Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state, and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems/suggestions ☐ Report attached: _____

Agency _____
Contact _____Name _____ _____ _____
Title Date Phone No.
Problems/suggestions ☐ Report attached:_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems/suggestions ☐ Report attached:_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems/suggestions ☐ Report attached: _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems/suggestions ☐ Report attached:_____

4. **Other Interviews** (optional) ☐ Report attached: _____

Town Administrator

Property Owner of 589 Elm Street

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☐ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☐ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

2.	**Site-Specific Health and Safety Plan**	☒ Readily available	☒ Up to date	☐ N/A
	☒ Contingency plan/emergency response plan	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

3.	**O&M and OSHA Training Records**	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

7.	**Groundwater Monitoring Records**	☒ Readily available	☐ Up to date	☐ N/A

Remarks: _____

8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☒ Water (effluent)	☒ Readily available	☐ Up to date	☐ N/A

Remarks: _____

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☐ N/A

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☒ Contractor for state (OU1)

☐ PRP in-house ☒ Contractor for PRP (OU2)

☐ Federal facility in-house ☐ Contractor for Federal facility

☐ _____

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A

Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: Remaining required institutional controls are being discussed.

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident
   Remarks: _____

2. **Land Use Changes On Site** ☒ N/A
   Remarks: _____

3. **Land Use Changes Off Site** ☒ N/A
   Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☒ N/A

1. **Roads Damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A
   Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface

1. **Settlement** (low spots) ☐ Location shown on site map ☐ Settlement not evident
   Area extent: _____ Depth: _____
   Remarks: _____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths: _____ Widths: _____ Depths: _____
   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Area extent: _____ Depth: _____
   Remarks: _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Area extent: _____ Depth: _____
   Remarks: _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established
   ☐ No signs of stress ☐ Trees/shrubs (indicate size and locations on a diagram)
   Remarks: _____

6. **Alternative Cover** (e.g., armored rock, concrete) ☐ N/A
   Remarks: _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Area extent: _____ Height: _____
   Remarks: _____

8.	**Wet Areas/Water Damage**	☐ Wet areas/water damage not evident	
	☐ Wet areas	☐ Location shown on site map	Area extent: _____
	☐ Ponding	☐ Location shown on site map	Area extent: _____
	☐ Seeps	☐ Location shown on site map	Area extent: _____
	☐ Soft subgrade	☐ Location shown on site map	Area extent: _____
	Remarks: _____		
9.	**Slope Instability**	☐ Slides	☐ Location shown on site map
	☐ No evidence of slope instability		
	Area extent: _____		
	Remarks: _____		

B. Benches ☐ Applicable ☐ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1.	**Flows Bypass Bench**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
2.	**Bench Breached**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		
3.	**Bench Overtopped**	☐ Location shown on site map	☐ N/A or okay
	Remarks: _____		

C. Letdown Channels ☐ Applicable ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1.	**Settlement** (Low spots)	☐ Location shown on site map	☐ No evidence of settlement
	Area extent: _____		Depth: _____
	Remarks: _____		
2.	**Material Degradation**	☐ Location shown on site map	☐ No evidence of degradation
	Material type:_____		Area extent: _____
	Remarks: _____		
3.	**Erosion**	☐ Location shown on site map	☐ No evidence of erosion
	Area extent: _____		Depth: _____
	Remarks: _____		
4.	**Undercutting**	☐ Location shown on site map	☐ No evidence of undercutting
	Area extent: _____		Depth: _____
	Remarks: _____		
5.	**Obstructions**	Type: _____	☐ No obstructions

☐ Location shown on site map Area extent: _____

Size: _____

Remarks: _____

6. **Excessive Vegetative Growth** Type: _____

☐ No evidence of excessive growth

☐ Vegetation in channels does not obstruct flow

☐ Location shown on site map Area extent: _____

Remarks: _____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Gas Monitoring Probes**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

3. **Monitoring Wells** (within surface area of landfill)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

4. **Extraction Wells Leachate**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs maintenance ☐ N/A

Remarks: _____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**

☐ Flaring ☐ Thermal destruction ☐ Collection for reuse

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Gas Collection Wells, Manifolds and Piping**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs maintenance ☐ N/A

Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A

   Remarks: _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A

   Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Area extent: _____ Depth: _____ ☐ N/A

   ☐ Siltation not evident

   Remarks: _____

2. **Erosion** Area extent: _____ Depth: _____

   ☐ Erosion not evident

   Remarks: _____

3. **Outlet Works** ☐ Functioning ☐ N/A

   Remarks: _____

4. **Dam** ☐ Functioning ☐ N/A

   Remarks: _____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident

   Horizontal displacement: _____ Vertical displacement: _____

   Rotational displacement: _____

   Remarks: _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident

   Remarks: _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident

   Area extent: _____ Depth: _____

   Remarks: _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A

   ☐ Vegetation does not impede flow

   Area extent: _____ Type: _____

   Remarks: _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident

   Area extent: _____ Depth: _____

   Remarks: _____

4. **Discharge Structure** ☐ Functioning ☐ N/A

Remarks: _____

VIII. VERTICAL BARRIER WALLS ☒ Applicable ☐ N/A

1. **Settlement** ☐ Location shown on site map ☒ Settlement not evident

Area extent: _____ Depth: _____

Remarks: _____

2. **Performance Monitoring** Type of monitoring: Water measurement

☐ Performance not monitored

Frequency: Weekly ☐ Evidence of breaching

Head differential: _____

Remarks: _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☒ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☒ Good condition ☒ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☒ Applicable ☐ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☒ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☐ Others: _____

☒ Good condition ☐ Needs maintenance

☒ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☒ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☒ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: The OU2 groundwater treatment building needs to be repaired or removed. It has not been used since 2015 and is deteriorating.

6. **Monitoring Wells** (pump and treatment remedy)

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☒ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☒ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The remedy was designed to prevent ingestion, migration and future inhalation of contaminated groundwater, and to remove and/or contain DNAPL and groundwater contamination. Due to ongoing performance issues with the implemented OU1 remedies and an investigation of the extent of contamination in bedrock and the finalization of a 2014 RI, EPA issued an OU1 ROD Amendment in 2016. The PRB remedial design efforts have been reviewed by EPA's Optimization Team. EPA Region 1 is in discussions with NHDES and USGS as to how to proceed with the OU1 remedy. The OU2 remedy was modified in 2017 with an ESD to MNA. Bedrock groundwater monitoring is necessary.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Current monitoring activities appear to be generally adequate. More monitoring may be necessary in the Groundwater Cleanup Area in OU1 and monitoring for 1,4-dioxane in OU2 need to be conducted to establish the current status of 1,4-dioxane contamination.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

No additional issues were identified, although adequate monitoring is necessary to ensure the containment of the groundwater plume.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

The PRB remedial design efforts have been reviewed by EPA's Optimization Team. EPA Region 1 is in discussions with NHDES and USGS as to how to proceed with the OU1 remedy. No opportunities for further optimization were identified for OU2.

APPENDIX H – SITE INSPECTION PHOTOS

Historical photo of installation of slurry wall

Signage on OU1 gate

Fencing surrounding the OU1 slurry wall and groundwater treatment plant

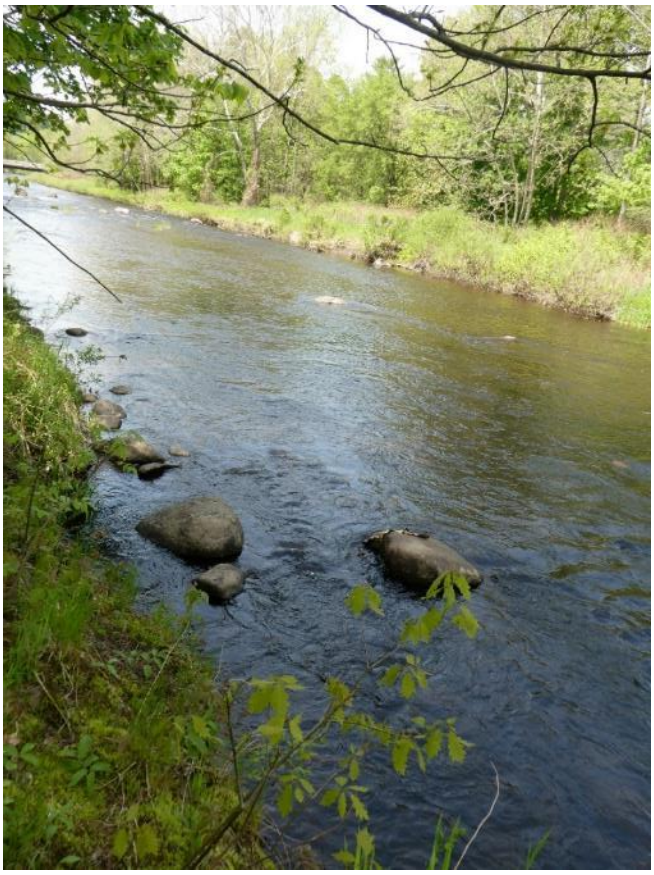
OU1 groundwater treatment plant

Tray aerators at the OU1 groundwater treatment


Vegetation within the slurry wall

OU1 infiltration gallery

Baseball field behind 589 Elm Street (view from the inside the slurry wall)



Souhegan River

Agricultural field surrounding OU2 monitoring well

OU2 groundwater treatment building

Interior of OU2 groundwater treatment building (not operating)

Milford Mobile Home Park

Milford Drive-In Movie Theater

Agricultural use on parcel 7-10

Stocked fishpond on parcel 7-10

APPENDIX I – DECISION DOCUMENT ARAR REVIEW TABLES

This FYR has determined there are no changes needed for the OU1 or OU2 ARARs. Table I-1 and I-2 shows OU1 chemical, action and location specific ARARs. Table I-3 shows OU2 chemical, action and location specific ARARs.

Table I-1: OU1 2016 AROD ARARs for In-Situ Chemical Oxidation

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
Chemical Specific				
There are no chemical-specific ARARs, due to invoking the Technical Impracticability Waiver.				
Action Specific				
Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901, et seq., 40 C.F.R. Parts 261, 262 and 264	Applicable for remedial action where hazardous waste will be moved and Relevant and Appropriate for remedial actions where hazardous waste left in place.	New Hampshire has been delegated the authority to administer these RCRA standards through its state hazardous waste management regulations (Env-Hw 100-1100). These provisions have been adopted by the State.	Any wastes generated by remedial activity will be analyzed by appropriate test methods. If found to be hazardous wastes, then they will be managed in accordance with the substantive requirements of the State hazardous waste regulations. Wastes that may be generated include: investigation derived waste from monitoring activities and contaminated media produced during the construction and future operation and maintenance of the PRB and other components of the remedy.	The ROD only cites 40 C.F.R Part 262 as an applicable federal standard.
Clean Water Act (CWA), Section 402, 33 U.S.C. § 1342; 40 C.F.R.122, 125, 131, 136, 450 – Discharge of Pollutants	Applicable	These standards address water discharges which may be directed to surface water. Also establishes stormwater standards for construction and development projects that are over one acre.	If a discharge from the remedial action, including construction and O&M of the PRB, is directed to surface water the discharge will be treated, if necessary, so that these standards will be achieved. Monitoring may be performed, if required to determine whether operation and maintenance of the remedy could potentially affect nearby surface water bodies, in accordance with Env-Or-607 (see below). Any remedial action that will disturb one acre or more, including construction and O&M of the PRB, as well as demobilization of the treatment system, will meet these stormwater standards.	As cited in the ROD except the ROD only cited section 122 and did not include stormwater standards at 40 C.F.R. Part 450.
Safe Drinking Water Act (42 U.S.C. §300f et seq.); National primary drinking water regulations (40	Relevant and Appropriate	Establishes maximum contaminant levels (MCLs) for common organic and inorganic contaminants applicable	Used to establish Performance Standards for monitoring groundwater at the Technical Impracticability Zone compliance boundary to ensure there is no migration of contaminated groundwater exceeding these standards beyond	Not identified as action- specific groundwater monitoring standards in the ROD or ESD.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
C.F.R. 141, Subpart B and G)		to public drinking water supplies. Used as relevant and appropriate monitoring standards for aquifers and surface water bodies that are potential drinking water sources.	the boundary. Inside of the compliance boundary, ICs will be required to prevent contact/ingestion of groundwater that exceeds these standards.	
Safe Drinking Water Act (42 U.S.C. §300f et seq.); National primary drinking water regulations (40 C.F.R. 141, Subpart F)	Relevant and Appropriate for non-zero MCLGs only; MCLGs set as zero are To Be Considered.	Establishes maximum contaminant level goals (MCLGs) for public water supplies. MCLGs are health goals for drinking water sources. These unenforceable health goals are available for a number of organic and inorganic compounds.	Used to establish Performance Standards for monitoring groundwater at the Technical Impracticability Zone compliance boundary to ensure there is no migration of contaminated groundwater exceeding these standards beyond the boundary. Inside of the compliance boundary, ICs will be required to prevent contact/ingestion of groundwater that exceeds these standards.	Not identified as action- specific groundwater monitoring standards in the ROD or ESD.
Health Advisories (EPA Office of Drinking Water)	To Be Considered	Health Advisories are estimates of risk due to consumption of contaminated drinking water; they consider non-carcinogenic effects only. To be considered for contaminants in groundwater that may be used for drinking water where the standard is more conservative than either federal or state statutory or regulatory standards. The Health Advisory standard for manganese is 0.3 mg/l [milligrams per liter].	Used to establish Performance Standards for monitoring groundwater at the Technical Impracticability Zone compliance boundary to ensure there is no migration of contaminated groundwater exceeding these standards beyond the boundary. Inside of the compliance boundary, ICs will be required to prevent contact/ingestion of groundwater that exceeds these standards.	Guidance not cited in the ROD or ESD.
Use of Monitored Natural Attenuation at Superfund, RCRA	To Be Considered	EPA guidance regarding the use of monitored natural attenuation for the	MNA will not achieve groundwater cleanup within the TI Zone. However, contaminants outside of the slurry wall/PRB will attenuate	Guidance not cited in the ROD or ESD.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
Corrective Action, and Underground Storage Tank Sites, OSWER Directive 9200.4-17P (April 21, 1999)		cleanup of contaminated soil and groundwater. In particular, a reasonable time frame for achieving cleanup standard though monitored attenuation would be comparable to that which could be achieved through active restoration.	after installation of the PRB and ISCO treatment. Monitoring of the natural attenuation process will help assess whether the Performance Standards for preventing migration of contaminants beyond the TI Zone compliance boundary is being achieved.	
Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration June 26, 2009 OSWER Directive 9283.1-33	To Be Considered	Guidance on developing groundwater remedies at CERCLA sites.	Due to the Technical Impracticability Waiver groundwater within the TI Zone does not have to achieve groundwater standards. Beyond the TI Zone compliance boundary groundwater must achieve federal drinking water and risk-based standards or more stringent State groundwater standards. Inside of the compliance boundary groundwater use restrictions will be in place for as long as the TI waiver remains in effect. Groundwater monitoring using these standards will be used to make sure groundwater exceeding these standards does not migrate beyond the compliance boundary. Exceedance of these standards within the compliance boundary is a basis for establishing prohibitions on the use of groundwater within the compliance boundary. An additional buffer zone beyond the compliance boundary to prevent groundwater wells from being installed that would draw contaminated groundwater beyond the compliance boundary may also be established, if required.	Guidance not cited in the ROD or ESD.
National Emission Standards for Hazardous Air Pollutants, 40 C.F.R. 61	Applicable	Establishes standards for emissions of designated hazardous air pollutants.	Emissions from any dust containing regulated air contaminants will be controlled during construction and O&M of the PRB and any other components of the alternative to comply with all pertinent standards	As cited in the ROD.
Underground Injection Control	Applicable	Regulations established to assure that	The ISCO injection component to this alternative will be implemented in compliance	Not cited in the ROD or ESD.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
Program, 40 C.F.R. 144, 146, 147 (Subpart EE)		underground injection will not endanger drinking water sources.	with these standards to protect drinking water sources outside of the TI Zone.	
RCRA, Interim Status Treatment, Storage, and Disposal Facility Standards, Chemical, Physical and Biological Treatment: 40 C.F.R. Part 265 Subpart Q	Relevant and Appropriate	Standards for operating chemical, physical and biological treatment systems, including the proper handling of reagents, system maintenance, and closure procedures.	The ISCO treatment and PRB components to this alternative will be implemented, including the handling/management of treatment reagents, in compliance with these standards.	Not cited in the ROD or ESD.
Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air OSWER Directive 9200.2-154	To Be Considered	Guidance for assessing protectiveness at sites where a vapor intrusion remedy has not been implemented and: 1) the vapor intrusion pathway was never adequately characterized; or 2) changes in site conditions have potentially led to a complete vapor intrusion pathway.	ICs will either require evaluation of vapor intrusion risks above the contaminant plume within the TI Zone, if any structures are to be constructed over the plume or allow protective vapor mitigation measures, approved by EPA and NHDES, to be installed in any new or reoccupied structures in lieu of conducting a risk evaluation.	Guidance not cited in the ROD or ESD.
State Requirements				
Contaminated Site Management, NH Admin. Code Env-Or 600: Part 607, Groundwater Management Permits; Part 608, Activity and Use Restrictions; Part 610, Monitoring	Applicable	Env-Or Part 607 requires monitoring of the groundwater quality, requires implementation of measures to restore the groundwater quality, and requires an evaluation of the effectiveness of the measures. Part 608 establishes standards for setting institutional controls to protect human health and components of the remedy. Part 610 establishes standards for	ICs will be established to protect against use of contaminated groundwater within the TI Zone. Groundwater use restrictions will be established to prevent human exposure to contaminated groundwater. Groundwater monitoring will be required permanently and therefore monitoring wells will be installed, operated, and decommissioned under these standards. Contaminated media generated from the installation and O&M of the PRB and monitoring/ treatment wells; ISCO system; and any other remedial activity will be managed in compliance with these standards. Activity and use restrictions will be established to prevent disturbance to the components of the remedy	ROD contains general citation to Env-Ws 410. Section Env-Ws 410.26 changed to Env-Or 607.05 by the State. The ROD does not cite the other regulatory requirements of Env-Or 600, including standards for activity and use restrictions.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		monitoring groundwater, including requirements and criteria for constructing, developing, and decommissioning monitoring wells.	(including monitoring/treatment wells, slurry wall/PRB, and ISCO system). There will be at least yearly compliance monitoring to ensure groundwater use and activity restrictions remain in place and are enforced.	
Hazardous Waste Management Act and Hazardous Waste Regulations, RSA Ch. 147-A, Env-Hw 100-1100	Applicable for remedial actions where hazardous waste will be moved and Relevant and Appropriate for remedial actions where hazardous waste left in place.	Establishes standards for the treatment, storage, transport and disposal of hazardous waste and the closure of hazardous waste facilities. New Hampshire has been delegated the authority to administer the federal RCRA standards through these state hazardous waste management regulations.	Management of hazardous wastes as part of the remedial action must comply with the substantive requirements of these regulations. Some of the specific sections of the regulations that pertain to the remedial action are cited below.	The ROD only includes a citation to part of the hazardous waste management regulations at Env-Wm 500. Env-Wm 100-1100 was changed to Env-Hw 100-1100 by the State.
Identification and Listing of Hazardous Wastes, N.H. Admin. Code Env-Hw 400	Applicable	These standards list particular hazardous wastes and identify the maximum concentration of contaminants for which the waste would be a RCRA characteristic waste. The analytical test set out in Appendix II of 40 C.F.R. Part 261 is referred to as the Toxicity Characteristic Leaching Procedure (TCLP). The federal requirements 40 C.F.R. Part 261 are incorporated by reference.	Any wastes generated by remedial activity will be analyzed under these standards to determine whether they are listed or characteristic hazardous waste. Wastes that may be generated include: investigation derived waste from monitoring activities and contaminated media produced during the construction or O&M of the PRB and other components of the remedy. Materials that are listed waste or exceed TCLP hazardous waste thresholds will be disposed off-site in a RCRA Subtitle C facility. Non-hazardous materials will be disposed appropriately.	The specific State identification and listing of hazardous waste regulations were not identified in the ROD or ESD.
Requirements for Hazardous Waste Generators, N.H. Admin. Code Env-	Applicable	Requires a determination as to whether waste materials are hazardous and, if so, requirements	If remedial activity generates hazardous wastes, then they will be managed in accordance with the substantive requirements of these regulations.	The ROD cited the general generator standards at Env-Wm 500, as well as specific provisions of these regulations

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
Hw 500, including Part 507 Storage Requirements; Part 513 Emergency/ Remedial Actions		for managing such materials on site prior to shipment off site. The federal requirements 40 C.F.R. Part 262 are incorporated by reference.		pertaining to manifesting, recordkeeping, packaging and labelling. Env-Wm 500 has since been changed to Env-Hw 500 by the State. Only the substantive, environmental provisions of these regulations are ARARs.
Requirements for Owners and Operators of Hazardous Waste Facilities/Hazardous Waste Transfer Facilities, N.H. Admin. Code Env-Hw 700: including § 702.09 General Design Requirements; § 702.10 Groundwater Monitoring; § 702.11 Other Monitoring; Part 706, Emergency/ Remedial Actions; § 708.02 Operation Requirements; and § 708.03 Technical Requirements	Relevant and Appropriate	This regulation establishes requirements for owners or operators of hazardous waste treatment, storage or disposal facilities. Part 708 incorporates by reference the federal requirements under 40 C.F.R. Part 264, including but not limited to Subpart G (closure/post closure) and Subpart X (miscellaneous units).	The PRB and ISCO treatment system will be constructed and maintained to meet relevant and appropriate hazardous waste treatment system standards.	The specific State hazardous waste facility owner/operator regulations were not identified in the ROD or ESD.
Drinking Water Quality Standards: NH Admin. Code Env-Dw 700	Relevant and Appropriate for MCLs and non-zero MCLGs only; MCLGs set as zero are To Be Considered.	State MCLs and MCLGs establish maximum contaminant levels permitted in public water supplies and are the basis of State Ambient Groundwater Quality Standards (AGQS) that are applicable to site groundwater. The regulations are generally	State standards that are more stringent than federal standards used to establish Performance Standards for monitoring groundwater at the Technical Impracticability Zone compliance boundary to ensure there is no migration of contaminated groundwater exceeding these standards beyond the boundary. Inside of the compliance boundary, ICs will be required to prevent contact/ingestion of groundwater that exceeds these standards.	Not identified as action-specific groundwater monitoring standards in the ROD or ESD.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		equivalent to the Federal Safe Drinking Water Act (SDWA).		
New Hampshire Ambient Groundwater Quality Standards (NH AGQS): Env-Or 603.03, Table 600-1.	Relevant and Appropriate	Establishes maximum concentration levels for regulated contaminants in groundwater which result from human operations or activities. NH AGQS are equivalent to MCLs for contaminants that have MCLs. NH AGQS have been established for site groundwater contaminants for which no MCLs are established, and are derived to be protective for drinking water uses. The NH AGQS will be used for site contaminants where MCLs are not currently established.	State standards that are more stringent than federal standards used to establish Performance Standards for monitoring groundwater at the Technical Impracticability Zone compliance boundary to ensure there is no migration of contaminated groundwater exceeding these standards beyond the boundary. Inside of the compliance boundary, ICs will be required to prevent contact/ingestion of groundwater that exceeds these standards.	Not identified as action-specific groundwater monitoring standards in the ROD or ESD.
Groundwater Quality Criteria: NH Admin. Code Env-Or 603.01(a), (b), and (c)	Applicable	Wm-Or 603.01(a), (b) and (c) provide that groundwater shall be suitable for use as drinking water without treatment; shall not contain any regulated contaminant in concentrations greater than ambient groundwater quality standards established in Env-Or 603.03; and shall not contain any regulated contaminant at a concentration such that the natural discharge of	State standards that are more stringent than federal standards used to establish Performance Standards for monitoring groundwater at the Technical Impracticability Zone compliance boundary to ensure there is no migration of contaminated groundwater exceeding these standards beyond the boundary. Inside of the compliance boundary, ICs will be required to prevent contact/ingestion of groundwater that exceeds these standards.	Not identified as action- specific groundwater monitoring standards in the ROD or ESD.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		that groundwater to surface water will cause a violation of a surface water quality standard established in Env-Wq 1700.		
Non degradation of Groundwater to Protect Surface Water: NH Admin. Code Env-Or 603.01 (c)	Applicable	Wm-Or 603.01(c) provides that, unless naturally occurring, groundwater shall not contain any contaminants at concentrations such that groundwater to surface water results in a violation of surface water standards in any surface water body within or adjacent to the site. Env-Or 603.01 (c) therefore incorporates surface water standards set forth at Env-Ws 1700.	State standards that are more stringent than federal standards used to establish Performance Standards for monitoring groundwater at the Technical Impracticability Zone compliance boundary to ensure there is no migration of contaminated groundwater exceeding these standards beyond the boundary. Inside of the compliance boundary, ICs will be required to prevent contact/ingestion of groundwater that exceeds these standards.	Not identified as action- specific groundwater monitoring standards in the ROD or ESD.
Protection of Groundwater: R.S.A. 485-A: 13, NH Admin. Code Env-Wq 402	Applicable	These regulations establish substantive requirements for discharges to groundwater, including prohibited discharges (Env-Wq 402.07), water quality sampling (Env-Wq 402.8), and compliance criteria (Env-Wq 402.22).	Discharges to groundwater from the construction and O&M of the PRB, ISCO system, or any other component of the alternative will meet discharge standards.	ROD included the statutory citation and the regulatory citation at Env-Ws 410. The statutory citation has not changed, but Env-Ws 410 has been changed to Env-Wq 402 by the State.
Underground Injection Controls: Env-Wq 404	Applicable	State standards established to supplement federal underground injection standards that assure that underground injection will not	The ISCO injection component to this alternative will be implemented in compliance with these standards to protect drinking water sources outside of the TI Zone.	Not cited in the ROD or ESD.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		endanger drinking water sources.		
Enforcement of Classification, R.S.A. 485-A:12	Applicable	Any discharge to groundwater or surface water that lowers the quality of the water below its classification is prohibited.	Remedial alternatives involving the discharge to groundwater or surface water from the construction or O&M of the PRB or other components of the remedy must comply with these standards.	As cited in the ROD.
Standards for Construction, Maintenance and Abandonment of Wells, NH Admin. Code We 600	Applicable for drinking water wells; Relevant and Appropriate for monitoring wells	This provision requires that wells be constructed, maintained, relocated, and/or abandoned according to these regulations. We 602.05 address restrictions on location wells in contaminated areas.	Wells used for the remedy will be created, operated, and closed in compliance with these standards. Well restriction standards shall be incorporated into institutional controls to prevent groundwater use within the TI Zone and the well-restriction area outside of the TI Zone.	The ROD only cited well abandonment section We 604.
Air Pollution Control: RSA Ch. 125-C; Specific regulations at Env-A cited below.	Applicable	Air pollution control statutory requirements.	If operation and maintenance of the PRB or other remedial actions cause a release of contaminants into the air, emissions controls will be included in the remedial design to control emissions.	As cited in the ROD.
Fugitive Dust, N.H. Admin. Code Env-A Part 1002	Applicable	Requires precautions to prevent, abate and control fugitive dust during specified activities, including excavation, maintenance, and construction.	Precautions to control fugitive dust emissions will be required during site remediation activities that could generate dust, such as installation and O&M of the PRB and treatment/monitoring wells.	As cited in the ROD.
Regulated Toxic Air Pollutants, NH Admin. Code Env-A Part 1400	Applicable	This regulation identifies toxic air pollutants to be regulated. These pollutants are also listed by EPA in 40 CFR 261. High, moderate and low Toxicity Classifications are established. Air toxics in these classifications are regulated when they occur in concentrations	If there are remedial processes that result in releases of contaminants into the air, in particular the construction and O&M of the PRB and other components of the alternative, air quality standards will be complied with during remedial activities.	Cited in the ROD's chemical-specific ARAR table as Env-A 1300. Current citation is Env-A 1400 as an action-specific ARAR.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		that cause adverse health effects including increased cancer risk.		
Location Specific				
Fish and Wildlife Coordination Act (16 U.S.C. §661 et seq.)	Applicable	Any modification of a body of water or wetland requires consultation with the U.S. Fish and Wildlife Service and the appropriate state wildlife agency to develop measures to prevent, mitigate, or compensate for losses of fish and wildlife.	Contact with appropriate federal agencies will be maintained during construction and O&M of the injection/monitoring wells and PRB, as well as any other components of the remedy that may alter protected resource areas	No change.
Floodplain Management and Protection of Wetlands (44 C.F.R. § 9)	Relevant and Appropriate	FEMA regulations that set forth the policy, procedure and responsibilities to implement and enforce Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands). Prohibits activities that adversely affect a federally-regulated wetland unless there is no practicable alternative and the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use. Requires the avoidance of impacts associated with the occupancy and modification of federally-designated 100-year and	If there is no practicable alternative method to work in federal jurisdictional wetlands then all practicable measures will be taken to minimize and mitigate any adverse impacts. Erosion and sedimentation control measures would be adopted during construction, O&M, and restoration activities within federal jurisdictional wetlands. Standards for construction and O&M of any components of the alternative, including injection/monitoring wells and the PRB, in federal jurisdictional wetlands or the 500-year floodplain will be attained based on a determination that (a) there is no practical alternative method that will achieve cleanup objectives with less adverse impact; (b) all practical measures would be taken to minimize and mitigate any adverse impacts from the work; (c) there would be no likely impact on federal threatened or endangered (T&E) species; (d) actions would be taken to minimize impact of hydrologic changes during the work; (e) after completion of the work, there would be no significant net loss of flood storage capacity, and no significant net increase in flood stage or	Former wetland and floodplain regulations cited in the ROD that incorporated Executive Orders 11988 and 11990 at 40 C.F.R. Part 6, Appendix A no longer exist so have been replaced by regulatory requirements to meet the Executive Order standards at 44 C.F.R. § 9.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		500-year floodplain and to avoid development within floodplain wherever there is a practicable alternative. An assessment of impacts to 500-year floodplain is required for critical actions – which includes siting hazardous waste facilities in a floodplain. Requires public notice when proposing any action in or affecting floodplain or wetlands.	velocities; and (f) river and riverbanks would be restored and habitat will be improved. Public comment was solicited as part of the Proposed Plan concerning any proposed alteration to wetlands and floodplain and no negative comments were received.	
Clean Water Act, Section 404 (33 U.S.C. § 1344); Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 C.F.R. Part 230, 231 and 33 C.F.R. Parts 320-323)	Applicable	For discharge of dredged or fill material into federal jurisdictional water bodies or wetlands, there must be no practical alternative with less adverse impact on aquatic ecosystem; discharge cannot cause or contribute to violation of state water quality standard or toxic effluent standard or jeopardize federal T&E species; discharge cannot significantly degrade waters of U.S.; must take practicable steps to minimize and mitigate adverse impacts; must evaluate impacts on flood level, flood velocity, and flood storage capacity. Sets standards for restoration and mitigation required as a result of	Under this alternative construction and O&M of the PRB, slurry wall, and injection/monitoring wells that will result in the dredging or filling of federal jurisdictional wetlands would be subject to these requirements. Activities must be conducted in accordance with these requirements including, but not limited to, mitigation and/or restoration. EPA determined the selected alternative is the LEDPA because (a) there is no practical alternative method that will achieve cleanup objectives with less adverse impact and (b) all practical measures would be taken to minimize and mitigate any adverse impacts from the work. Public comment was solicited on EPA's LEDPA finding in the Proposed Plan and no negative comments were received.	The ROD only cited part of the applicable regulations at 40 C.F.R. Part 230.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		unavoidable impacts to aquatic resources. EPA must determine which alternative is the "Least Environmentally Damaging Practicable Alternative" (LEDPA) to protect wetland and aquatic resources.		
State Requirements				
Criteria and Conditions for Fill and Dredge In Wetlands: RSA Ch. 482-A and NH Admin. Code Env-Wt Parts 100-900	Applicable	These standards regulate filling and other activities in or adjacent to wetlands, and establish criteria for the protection of wetlands from adverse impacts on fish, wildlife, commerce, and public recreation.	All activities within on-site State jurisdictional wetlands and floodplain areas will comply with these wetland protection requirements.	ROD citation (Env-Wm 300-400 and 600) changed to Env-Wt 100-900 by the State.
Siting requirements for hazardous waste facilities and variances, Env-Hw 304.08 (Existing facilities) and 304.09 (New facilities).	Relevant and Appropriate	Flood control measures must be identified for any facility within the 100-year floodplain. Similarly, new facilities located within 3,000 feet of faults displaced in Holocene times must show that no faults pass within 200 feet of the facility.	Siting and O&M of the monitoring/treatment wells and PRB will be done in accordance with these regulations.	ROD citation (He-P 1905.09) changed to Env-Ws 304.08 and 304.09 by the State.
Native Plant Protection Act, R.S.A. 217-A	Applicable	Prohibits damaging plant species listed as endangered in the State.	Any remedial action that may damage state-listed endangered plants will need to meet these standards.	Not cited in the ROD or ESD.
Endangered Species Conservation Act, R.S.A. 212-A	Applicable	Prohibits the taking of State-listed endangered species and regulates such activities with regard to State-listed threatened species.	Any remedial action that may take state-listed species will need to meet these standards.	Not cited in the ROD or ESD.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
Terrain Alteration, Env-Wq 1500 and RSA 485-A:17	Applicable	The purpose of these rules is to protect drinking water, surface water and groundwater from degradation resulting from any activity which significantly alters terrain or occurs in or on the border of the surface waters of the state. Env-Wq 1505.04 specifically addresses Stormwater Management and Erosion and Sediment Control.	Any significant excavation in or around the Souhegan River or other surface water bodies on-site as part of the remedial action will be conducted in compliance with the substantive requirements of these standards.	ROD citation (Env-Ws 415) changed to Env-Wq 1500 by the State.

Table I-2: OU1 2016 ROD Amendment ARARs for Monitored Natural Attenuation

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
Chemical Specific				
EPA Risk Reference Dose (RfDs)	To Be Considered	Dose levels developed by EPA to protect sensitive individuals over the course of a life-time. RfDs reflect a daily exposure level likely to be without appreciable risk of adverse health effects.	Risk-based standards developed using this guidance will be achieved through extraction/treatment and Monitored Natural Attenuation based on achieving risk-based groundwater standards within approximately 100 years.	No change.
EPA Carcinogenicity Slope Factor	To Be Considered	Slope factors are developed by EPA from Health Effects Assessments and present the most up-to-date information on cancer risk potency. Slope factors are developed by EPA from Health Effects Assessments by the	Risk-based standards developed using this guidance will be achieved through Monitored Natural Attenuation based on achieving risk-based groundwater standards within approximately 100 years.	No change.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		Carcinogenic Assessment Group.		
Guidelines for Carcinogen Risk Assessment EPA/630/P-03/001F (March 2005)	To Be Considered	Guidance for assessing cancer risk.	Risk-based standards developed using this guidance will be achieved through Monitored Natural Attenuation based on achieving risk-based groundwater standards within approximately 100 years.	This guidance not cited in the ROD or ESD.
Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens EPA/630/R-03/003F (March 2005)	To Be Considered	Guidance of assessing cancer risks to children.	Risk-based standards developed using this guidance will be achieved through Monitored Natural Attenuation based on achieving risk-based groundwater standards within approximately 100 years.	This guidance not cited in the ROD or ESD.
Safe Drinking Water Act (42 U.S.C. §300f *et seq.*); National primary drinking water regulations (40 C.F.R. 141, Subpart B and G)	Relevant and Appropriate	Establishes maximum contaminant levels (MCLs) for common organic and inorganic contaminants applicable to public drinking water supplies. Used as relevant and appropriate cleanup standards for aquifers and surface water bodies that are potential drinking water sources.	MCLs will be achieved through extraction/treatment and Monitored Natural Attenuation within approximately 100 years.	The ROD cites 40 C.F.R 141.11-16, however 40 C.F.R. Subpart B now only consists of 40 C.F.R. 141.11-13 and there is no 141.14-16. All of Subpart G is cited for this amended remedy alternative (40 C.F.R. 141.60-66).
Safe Drinking Water Act (42 U.S.C. §300f et seq.); National primary drinking water regulations (40 C.F.R. 141, Subpart F)	Relevant and Appropriate for non-zero MCLGs only; MCLGs set as zero are To Be Considered	Establishes maximum contaminant level goals (MCLGs) for public water supplies. MCLGs are health goals for drinking water sources. These unenforceable health goals are available for a number of organic and inorganic compounds.	MCLGs will be achieved through Monitored Natural Attenuation within approximately 100 years.	The ROD cites 40 C.F.R. 141.50-51 as the MCLG regulation citation but the MCLGs are now within Subpart F, which incorporates 40 C.F.R. 141.50-55.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
Health Advisories (EPA Office of Water)	To Be Considered	Health Advisories are estimates of risk due to consumption of contaminated drinking water; they consider non-carcinogenic effects only. To be considered for contaminants in groundwater that may be used for drinking water where the standard is more conservative than either federal or state statutory or regulatory standards. The Health Advisory standard for manganese is 0.3 mg/l.	Risk-based standards developed using this guidance will be achieved through Monitored Natural Attenuation based on achieving risk-based groundwater standards within approximately 100 years.	This guidance not cited in the ROD or ESD.
State Requirements				
Drinking Water Quality Standards: NH Admin. Code Env-Dw 700	Relevant and Appropriate for MCLs and non-zero MCLGs only; MCLGs set as zero are To Be Considered	State MCLs and MCLGs establish maximum contaminant levels permitted in public water supplies and are the basis of State Ambient Groundwater Quality Standards (AGQS) that are applicable to site groundwater. The regulations are generally equivalent to the Federal Safe Drinking Water Act (SDWA).	State MCLs and MCLGs will be achieved through Monitored Natural Attenuation within approximately 100 years.	ROD citation (Env-Ws 315 - 317) changed to Env-Dw 700 by the State.
New Hampshire Ambient Groundwater Quality Standards (NH AGQS) (Env-Or 603.03, Table 600-1)	Relevant and Appropriate	Establishes maximum concentration levels for regulated contaminants in groundwater which result from human operations or activities. NH AGQS are equivalent to MCLs for contaminants that have	These State groundwater standards, when more stringent than federal standards, will be achieved through Monitored Natural Attenuation within approximately 100 years.	ROD citation (Env-Ws 410.05) changed to Env-Or 603.03, Table 600-1 by the State.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		MCLs. NH AGQS have been established for site groundwater contaminants for which no MCLs are established, and are derived to be protective for drinking water uses. The NH AGQS will be used for site contaminants where MCLs are not currently established.		
Location Specific				
Fish and Wildlife Coordination Act (16 U.S.C. §661 et seq.)	Applicable	Any modification of a body of water or wetland requires consultation with the U.S. Fish and Wildlife Service and the appropriate state wildlife agency to develop measures to prevent, mitigate, or compensate for losses of fish and wildlife.	Contact with appropriate federal agencies will be maintained during construction and O&M of any monitoring wells or other remedial infrastructure that may alter protected resource areas	No change.
Floodplain Management and Protection of Wetlands (44 C.F.R. § 9)	Relevant and Appropriate	FEMA regulations that set forth the policy, procedure and responsibilities to implement and enforce Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands). Prohibits activities that adversely affect a federally-regulated wetland unless there is no practicable alternative and the proposed action	If there is no practicable alternative methods to work in federal jurisdictional wetlands then all practicable measures will be taken to minimize and mitigate any adverse impacts. Erosion and sedimentation control measures would be adopted during construction, O&M, and restoration activities within federal jurisdictional wetlands. Standards for construction or O&M of any monitoring wells or other remedial infrastructure in federal jurisdictional wetlands or the 500-year floodplain will be attained based on a determination that (a) there is no practical alternative method that will achieve cleanup objectives with less adverse impact; (b) all practical measures would be taken to minimize	Former wetland and floodplain regulations cited in the ROD that incorporated Executive Orders 11988 and 11990 at 40 C.F.R. Part 6, Appendix A no longer exist so have been replaced by regulatory requirements to meet the Executive Order standards at 44 C.F.R. § 9.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		includes all practicable measures to minimize harm to wetlands that may result from such use. Requires the avoidance of impacts associated with the occupancy and modification of federally designated 100-year and 500-year floodplain and to avoid development within floodplain wherever there is a practicable alternative. An assessment of impacts to 500-year floodplain is required for critical actions – which includes siting hazardous waste facilities in a floodplain. Requires public notice when proposing any action in or affecting floodplain or wetlands.	and mitigate any adverse impacts from the work; (c) there would be no likely impact on federal threatened or endangered (T&E) species; (d) actions would be taken to minimize impact of hydrologic changes during the work; (e) after completion of the work, there would be no significant net loss of flood storage capacity, and no significant net increase in flood stage or velocities; and (f) river and riverbanks would be restored and habitat will be improved. Public comment was solicited as part of the Proposed Plan concerning any proposed alteration to wetlands and floodplain and no negative comments were received.	
Clean Water Act, Section 404 (33 U.S.C. § 1344); Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 C.F.R. Part 230, 231 and 33 C.F.R. Parts 320-323)	Applicable	For discharge of dredged or fill material into federal jurisdictional water bodies or wetlands, there must be no practical alternative with less adverse impact on aquatic ecosystem; discharge cannot cause or contribute to violation of state water quality standard or toxic effluent standard or jeopardize federal T&E species; discharge cannot significantly degrade waters of U.S.; must take	Under this alternative construction and O&M of the monitoring wells and any other remedial infrastructure that will result in the dredging or filling of federal jurisdictional wetlands would be subject to these requirements. Activities must be conducted in accordance with these requirements including, but not limited to, mitigation and/or restoration. EPA will determine the selective alternative is the LEDPA because (a) there is no practical alternative method that will achieve cleanup objectives with less adverse impact and (b) all practical measures would be taken to minimize and mitigate any adverse impact from the work Public comment was solicited on EPA's LEDPA finding in the Proposed Plan and no negative comments were received.	The ROD only cited part of the applicable regulations at 40 C.F.R. Part 230.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		practicable steps to minimize and mitigate adverse impacts; must evaluate impacts on flood level, flood velocity, and flood storage capacity. Sets standards for restoration and mitigation required as a result of unavoidable impacts to aquatic resources. EPA must determine which alternative is the "Least Environmentally Damaging Practicable Alternative" (LEDPA) to protect wetland and aquatic resources.		
State Requirements				
Criteria and Conditions for Fill and Dredge In Wetlands: RSA Ch. 482-A and NH Admin. Code Env-Wt Parts 100-900	Applicable	These standards regulate filling and other activities in or adjacent to wetlands, and establish criteria for the protection of wetlands from adverse impacts on fish, wildlife, commerce, and public recreation.	All activities within on-site State jurisdictional wetlands and floodplain areas will comply with these wetland protection requirements.	ROD citation (Env-Wm 300-400 and 600) changed to Env-Wt 100-900 by the State.
Native Plant Protection Act, R.S.A. 217-A	Applicable	Prohibits damaging plant species listed as endangered in the State.	Any remedial action that may damage state-listed endangered plants will need to meet these standards.	Not cited in the ROD or ESD.
Endangered Species Conservation Act, R.S.A. 212-A	Applicable	Prohibits the taking of State-listed endangered species and regulates such activities with regard to State-listed threatened species.	Any remedial action that may take state- listed species will need to meet these standards.	Not cited in the ROD or ESD.
Terrain Alteration, Env-Wq 1500 and RSA 485-A:17	Applicable	The purpose of these rules is to protect drinking water, surface	Any significant excavation in or around the Souhegan River or other surface water bodies on-site as part of the remedial action will be	ROD citation (Env-Ws 415) changed to Env-Wq 1500 by the State.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		water and groundwater from degradation resulting from any activity which significantly alters terrain or occurs in or on the border of the surface waters of the state. Env-Wq 1505.04 specifically addresses Stormwater Management and Erosion and Sediment Control.	conducted in compliance with the substantive requirements of these standards.	
Action Specific				
Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901, et seq., 40 C.F.R. Parts 261, 262 and 264	Applicable for remedial actions where hazardous waste will be removed.	New Hampshire has been delegated the authority to administer these RCRA standards through its state hazardous waste management regulations (Env-Hw 100-1100). These provisions have been adopted by the State.	Any wastes generated by remedial activity will be analyzed by appropriate test methods. If found to be hazardous wastes, then they will be managed in accordance with the substantive requirements of the State hazardous waste regulations. Wastes that may be generated include: investigation derived waste from monitoring activities and contaminated media produced during the O&M of the groundwater treatment system, monitoring wells and other components of the remedy.	The ROD only cites 40 C.F.R. Part 262 as an applicable federal standard.
Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites, OSWER Directive 9200.4-17P (April 21, 1999)	To Be Considered	EPA guidance regarding the use of monitored natural attenuation for the cleanup of contaminated soil and groundwater. In particular, a reasonable time frame for achieving cleanup standard though monitored attenuation would be comparable to that which could be achieved through active restoration.	Based on the source control measures to be taken within the TI Zone and monitoring data to date EPA has calculated, based on this MNA guidance, that groundwater cleanup standards can be achieved within 100 years	This guidance not cited in the ROD or ESD.
Summary of Key Existing EPA CERCLA Policies	To Be Considered	Guidance on developing groundwater remedies at CERCLA sites.	Beyond the TI Zone compliance boundary groundwater within the Groundwater Cleanup Area must achieve federal drinking water and	The guidance not cited in the ROD or ESD.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
for Groundwater Restoration June 26, 2009 OSWER Directive 9283.1-33			risk-based standards or more stringent State groundwater standards. Groundwater use restrictions will be in place for as long as the groundwater exceeds cleanup standards. Groundwater monitoring using these standards will be used to determine where ICs are required and to document if cleanup standards are achieved.	
State Requirements				
Contaminated Site Management, NH Admin. Code Env-Or 600: Part 607, Groundwater Management Permits; Part 608, Activity and Use Restrictions; Part 610, Monitoring	Applicable	Env-Or Part 607 requires monitoring of the groundwater quality, requires implementation of measures to restore the groundwater quality, and requires an evaluation of the effectiveness of the measures. Part 608 establishes standards for setting institutional controls to protect human health and components of the remedy. Part 610 establishes standards for monitoring groundwater, including requirements and criteria for constructing, developing, and decommissioning monitoring wells.	ICs will be established to protect against use of contaminated groundwater until groundwater cleanup standards are achieved. Groundwater monitoring will be required until cleanup standards are achieved and therefore monitoring wells will be installed, operated, and decommissioned under these standards. Contaminated media generated from installation of wells, and any other remedial activity will be managed in compliance with these standards. Activity and use restrictions will be established to prevent disturbance to the components of the remedy (including monitoring wells). There will be at least yearly compliance monitoring to ensure groundwater use and activity restrictions remain in place and are enforced.	ROD contains general citation to Env-Ws 410. Section Env-Ws 410.26 changed to Env-Or 607.05 by the State. The ROD does not cite the other regulatory requirements of Env-Or 600, including standards for activity and use restrictions.
Hazardous Waste Management Act and Hazardous Waste Regulations, RSA Ch. 147-A, Env- Hw 100-1100	Applicable for remedial actions where hazardous waste will be moved.	Establishes standards for the treatment, storage, transport and disposal of hazardous waste and the closure of hazardous waste facilities. New Hampshire has been delegated the authority to administer the federal RCRA standards through	Management of hazardous wastes as part of the remedial action must comply with the substantive requirements of these regulations. Some of the specific sections of the regulations that pertain to the remedial action are cited below.	The ROD only includes a citation to part of the hazardous waste management regulations at Env-Wm 500. Env-Wm 100-1100 was changed to Env-Hw 100-1100 by the State.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		these state hazardous waste management regulations.		
Identification and Listing of Hazardous Wastes, N.H. Admin. Code Env-Hw 400	Applicable	These standards list particular hazardous wastes and identify the maximum concentration of contaminants for which the waste would be a RCRA characteristic waste. The analytical test set out in Appendix II of 40 C.F.R. Part 261 is referred to as the Toxicity Characteristic Leaching Procedure (TCLP). The federal requirements 40 C.F.R. Part 261 are incorporated by reference.	Any wastes generated by remedial activity will be analyzed under these standards to determine whether they are listed or characteristic hazardous waste. Wastes that may be generated include: investigation derived waste from monitoring activities and contaminated media produced during the operation and maintenance of the monitoring well system and other components of the remedy. Materials that are listed waste or exceed TCLP hazardous waste thresholds will be disposed off-site in a RCRA Subtitle C facility. Non-hazardous materials will be disposed appropriately.	The specific State identification and listing of hazardous waste regulations were not identified in the ROD.
Requirements for Hazardous Waste Generators, N.H. Admin. Code Env-Hw 500, including Part 507 Storage Requirements; Part 513 Emergency/ Remedial Actions	Applicable	Requires a determination as to whether waste materials are hazardous and, if so, requirements for managing such materials on site prior to shipment off site. The federal requirements 40 C.F.R. Part 262 are incorporated by reference.	If any remedial activity generates hazardous wastes, then it will be managed in accordance with the substantive requirements of these regulations.	The ROD cited the general generator standards at Env-Wm 500, as well as specific provisions of these regulations pertaining to manifesting, recordkeeping, packaging and labelling. Env-Wm 500 has since been changed to Env-Hw 500 by the State. Only the substantive, environmental provisions of these regulations are ARARs.
Protection of Groundwater: R.S.A. 485-A: 13, NH Admin. Code Env-Wq 402	Applicable	These regulations establish substantive requirements for discharges to groundwater, including prohibited discharges (Env-q 402.07), water quality sampling (Env-Wq 402.8) and	Discharges to groundwater from any component of the alternative will meet discharge standards.	ROD included the statutory citation and the regulatory citation at Env-Ws 410. The statutory citation has not changed, but Env-Ws 410 has been changed to Env-Wq 402 by the State.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		compliance criteria (Env-Wq 402.22).		
Enforcement of Classification, R.S.A. 485-A:12	Applicable	Any discharge to groundwater or surface water that lowers the quality of the water below its classification is prohibited.	Remedial alternatives involving the discharge to groundwater or surface water must comply with these standards.	As cited in the ROD.
Standards for Construction, Maintenance and Abandonment of Wells, NH Admin. Code We 600	Applicable for drinking water wells; Relevant and Appropriate for monitoring wells	This provision requires that wells be constructed, maintained, relocated, and/or abandoned according to these regulations. We 602.05 address restrictions on location wells in contaminated areas.	Wells used for the remedy will be created, operated, and closed in compliance with these standards. Well restriction standards shall be incorporated into institutional controls to prevent groundwater use within the Groundwater Cleanup Area until groundwater cleanup standards are achieved.	The ROD only cited well abandonment section We 604.
Air Pollution Control: RSA Ch. 125-C; Specific regulations at Env-A cited below.	Applicable	Air pollution control statutory requirements.	If operation and maintenance of groundwater treatment system, monitoring wells or other remedial actions cause a release of contaminants into the air, emissions controls will be included in the remedial design to control emissions.	As identified in the ROD.
Ambient Air Quality Standards, NH Admin. Code Env-A 300	Applicable	These regulations set primary and secondary ambient air quality standards (equivalent to federal standards). The standards do not allow significant deterioration of existing air quality in any portion of the state for: particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone hydrocarbons and lead.	If there are remedial processes, including the monitoring well system, that result in releases of contaminants into the air, air quality standards will be complied with during remedial activities	Cited in the ROD (specifically Parts 303 and 304) as a chemical-specific standard, however, these are action-specific standards addressing the control of air emissions.
Fugitive Dust, N.H. Admin. Code Env-A Part 1002	Applicable	Requires precautions to prevent, abate and control fugitive dust during	Precautions to control fugitive dust emissions will be required during site remediation activities that could generate dust, such as	As cited in the ROD.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		specified activities, including excavation, maintenance, and construction.	installation and maintenance of the monitoring well system.	
Regulated Toxic Air Pollutants, NH Admin. Code Env-A Part 1400	Applicable	This regulation identifies toxic air pollutants to be regulated. These pollutants are also listed by EPA in 40 CFR 261. High, moderate and low Toxicity Classifications are established. Air toxics in these classifications are regulated when they occur in concentrations that cause adverse health effects including increased cancer risk.	If there are remedial processes that result in releases of contaminants into the air, air quality standards will be complied with during remedial activities.	Cited in the ROD's chemical-specific ARAR table as Env-A 1300. Current citation is Env-A 1400 as an action-specific ARAR.

Table I-3: OU2 2017 ESD ARARs

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
Chemical Specific				
EPA Risk Reference Dose (RfDs)	To Be Considered	Dose levels developed by EPA to protect sensitive individuals over the course of a life-time. RfDs reflect a daily exposure level likely to be without appreciable risk of adverse health effects.	Risk-based standards developed using this guidance will be achieved through extraction/treatment and Monitored Natural Attenuation based on achieving risk-based groundwater standards within approximately 60 years.	No change.
EPA Carcinogenicity Slope Factor	To Be Considered	Slope factors are developed by EPA from Health Effects Assessments and present the most up-to-date information on cancer risk potency. Slope	Risk-based standards developed using this guidance will be achieved through extraction/treatment and Monitored Natural Attenuation based on achieving risk-based groundwater standards within approximately 60 years.	No change.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		factors are developed by EPA from Health Effects Assessments by the Carcinogenic Assessment Group.		
Guidelines for Carcinogen Risk Assessment EPA/630/P-03/001F (March 2005)	To Be Considered	Guidance for assessing cancer risk.	Risk-based standards developed using this guidance will be achieved through extraction/treatment and Monitored Natural Attenuation based on achieving risk-based groundwater standards within approximately 60 years.	The ROD does not cite this risk guidance.
Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens EPA/630/R-03/003F (March 2005)	To Be Considered	Guidance of assessing cancer risks to children.	Risk-based standards developed using this guidance will be achieved through extraction/treatment and Monitored Natural Attenuation based on achieving risk-based groundwater standards within approximately 60 years.	The ROD does not cite this risk guidance.
Safe Drinking Water Act (42 U.S.C. §300f *et seq.*); National primary drinking water regulations (40 C.F.R. 141, Subpart B and G)	Relevant and Appropriate	Establishes maximum contaminant levels (MCLs) for common organic and inorganic contaminants applicable to public drinking water supplies. Used as relevant and appropriate cleanup standards for aquifers and surface water bodies that are potential drinking water sources.	MCLs will be achieved through extraction/treatment and Monitored Natural Attenuation within approximately 60 years.	The ROD cites 40 C.F.R 141.11-16, however 40 C.F.R. Subpart B now only consists of 40 C.F.R. 141.11-13 and there is no 141.14-16. All of Subpart G is cited for this amended remedy alternative (40 C.F.R. 141.60-66).
Safe Drinking Water Act (42 U.S.C. §300f et seq.); National primary drinking water regulations (40 C.F.R. 141, Subpart F)	Relevant and Appropriate for non-zero MCLGs only; MCLGs set as zero are To Be Considered	Establishes maximum contaminant level goals (MCLGs) for public water supplies. MCLGs are health goals for drinking water sources. These unenforceable health goals are available for a number of organic	MCLGs will be achieved through extraction/treatment and Monitored Natural Attenuation within approximately 60 years.	The ROD cites 40 C.F.R. 141.50-51 as the MCLG regulation citation but the MCLGs are now within Subpart F, which incorporates 40 C.F.R. 141.50-55.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		and inorganic compounds.		
Drinking Water Health Advisory for Manganese, EPA-822-R-04-003 January, 2004	To Be Considered	Health Advisories are estimates of risk due to consumption of contaminated drinking water; they consider non-carcinogenic effects only. To be considered for contaminants in groundwater that may be used for drinking water where the standard is more conservative than either federal or state statutory or regulatory standards. The Health Advisory standard for manganese is 0.3 mg/l.	Risk-based standards developed using this guidance will be achieved through extraction/treatment and Monitored Natural Attenuation based on achieving risk-based groundwater standards within approximately 60 years.	The ROD does not cite this risk guidance.
State Requirements				
Drinking Water Quality Standards: NH Admin. Code Env-Dw 700	Relevant and Appropriate for MCLs and non-zero MCLGs only; MCLGs set as zero are To Be Considered	State MCLs and MCLGs establish maximum contaminant levels permitted in public water supplies and are the basis of State Ambient Groundwater Quality Standards (AGQS) that are applicable to site groundwater. The regulations are generally equivalent to the Federal Safe Drinking Water Act (SDWA).	State MCLs and MCLGs will be achieved through extraction/treatment and Monitored Natural Attenuation within approximately 60 years.	ROD citation (Env-Ws 315 - 317) changed to Env-Dw 700 by the State.
New Hampshire Ambient Groundwater Quality Standards (NH AGQS) (Env-Or	Relevant and Appropriate	Establishes maximum concentration levels for regulated contaminants in groundwater which result from human operations or activities. NH AGQS are	These State groundwater standards will be achieved through extraction/ treatment and Monitored Natural Attenuation within approximately 60 years.	ROD citation (Env-Ws 410.05) changed to Env-Or 603.03, Table 600-1 by the State.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
603.03, Table 600-1)		equivalent to MCLs for contaminants that have MCLs. NH AGQS have been established for site groundwater contaminants for which no MCLs are established, and are derived to be protective for drinking water uses. The NH AGQS will be used for site contaminants where MCLs are not currently established.		
Action Specific				
Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901, et seq., 40 C.F.R. Parts 261, 262 and 264	Applicable for remedial actions where hazardous waste will be moved and Relevant and Appropriate for remedial actions where hazardous waste left in place.	New Hampshire has been delegated the authority to administer these RCRA standards through its state hazardous waste management regulations (Env-Hw 100-1100). These provisions have been adopted by the State.	Any wastes generated by remedial activity will be analyzed by appropriate test methods. If found to be hazardous wastes, then they will be managed in accordance with the substantive requirements of the State hazardous waste regulations. Wastes that may be generated include: investigation derived waste from monitoring activities and contaminated media produced during the O&M of the groundwater treatment system, monitoring wells and other components of the remedy.	The ROD only cites 40 C.F.R. Part 262 as an applicable federal standard.
Clean Water Act; National Pollutant Discharge Elimination System (NPDES); Section 402, 33 U.S.C. § 1342, 40 C.F.R.122,125, 131, 136, 450	Applicable	Establishes the specifications for discharging pollutants from any point source into the waters of the U.S. Also, includes stormwater standards for activities disturbing more than one acre.	Effluent from the treatment system will meet the substantive requirements of the NPDES program if discharged to surface waters. If O&M or any other remedial activities alter more than one acre of land, then stormwater standards will apply.	As cited in the ROD except the ROD only cited section 122 and did not include stormwater standards at 40 C.F.R. Part 450.
Clean Water Act, National Recommend Water Quality Criteria (NRWQC)(33 U.S.C.	Relevant and Appropriate	NRWQC are health-based criteria developed for chemical constituents in surface water. They have been developed to	The more stringent NRWQC for aquatic life will be relevant and appropriate for monitoring surface water quality from discharges of the treatment system under certain circumstances.	Cited in the ROD as a chemical-specific standard, however, these are action-specific standards addressing surface water monitoring. Cited in the ROD as

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
§ 1314, 40 CFR Part 131)		protect aquatic life and human health from harmful effects due to exposure to chemically impacted surface water. NRWQC can be more stringent than MCLs if it is necessary to protect aquatic organisms. The more stringent NRWQC for aquatic life will be relevant and appropriate under certain circumstances.		Ambient Water Quality Criteria at 33 U.S.C. 304(a)(1).
Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites, OSWER Directive 9200.4-17P (April 21, 1999)	To Be Considered	EPA guidance regarding the use of monitored natural attenuation for the cleanup of contaminated soil and groundwater. In particular, a reasonable time frame for achieving cleanup standard though monitored attenuation would be comparable to that which could be achieved through active restoration.	Based on the operation of the groundwater treatment system and monitoring data to date EPA has estimated, based on this MNA guidance, that groundwater cleanup standards will be achieved within the ROD's estimate of 60 years.	The ROD does not cite this guidance.
Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration June 26, 2009 OSWER Directive 9283.1-33	To Be Considered	Guidance on developing groundwater remedies at CERCLA sites.	Within OU2, groundwater is estimated to achieve federal drinking water and risk-based standards or more stringent State groundwater standards within the ROD's estimate of 60 years. Groundwater use restrictions will be in place for as long as the groundwater exceeds cleanup standards. Groundwater monitoring using these standards will be used to determine where ICs are required and to document if cleanup standards are achieved.	The ROD does not cite this guidance.
Clean Air Act – National Ambient Air Quality	Relevant and Appropriate	Define levels of air quality necessary to protect public health with	The on-site air stripper will have its off- gas treated to ensure that any discharge to the ambient air meets pertinent regulations.	Cited in the ROD as a chemical-specific standard, however, these are action-specific standards

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
Standards (40 C.F.R. Part 50		an adequate margin of safety. Secondary standards define levels of air quality necessary to protect public welfare from any known or anticipated adverse effects of a pollutant.		addressing air discharge standards for the air stripper.
State Requirements				
Contaminated Site Management, NH Admin. Code Env-Or 600: Part 607, Groundwater Management Permits; Part 608, Activity and Use Restrictions; Part 610, Monitoring	Applicable	Env-Or Part 607 requires monitoring of the groundwater quality, requires implementation of measures to restore the groundwater quality, and requires an evaluation of the effectiveness of the measures. Part 608 establishes standards for setting institutional controls to protect human health and components of the remedy. Part 610 establishes standards for monitoring groundwater, including requirements and criteria for constructing, developing, and decommissioning monitoring wells.	ICs will be established to protect against use of contaminated groundwater until groundwater cleanup standards are achieved. Groundwater monitoring will be required until cleanup standards are achieved and therefore monitoring wells will be installed, operated, and decommissioned under these standards. Contaminated media generated from installation of wells, and any other remedial activity will be managed in compliance with these standards. Activity and use restrictions will be established to prevent disturbance to the components of the remedy (including the treatment system and monitoring wells). There will be at least yearly compliance monitoring to ensure groundwater use and activity restrictions remain in place and are enforced.	ROD contains general citation to Env-Ws 410. Section Env-Ws 410.26 changed to Env-Or 607.05 by the State. The ROD does not cite the other regulatory requirements of Env-Or 600, including standards for activity and use restrictions.
Hazardous Waste Management Act and Hazardous Waste Regulations, RSA Ch. 147-A, Env- Hw 100-1100	Applicable for remedial actions where hazardous waste will be moved and Relevant and Appropriate for remedial actions where hazardous waste left in place.	Establishes standards for the treatment, storage, transport and disposal of hazardous waste and the closure of hazardous waste facilities. New Hampshire has been delegated the authority to administer the federal RCRA standards through	Management of hazardous wastes as part of the remedial action must comply with the substantive requirements of these regulations. Some of the specific sections of the regulations that pertain to the remedial action are cited below.	The ROD only includes a citation to part of the hazardous waste management regulations at Env-Wm 500. Env-Wm 100-1100 was changed to Env-Hw 100-1100 by the State.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		these state hazardous waste management regulations.		
Identification and Listing of Hazardous Wastes, N.H. Admin. Code Env-Hw 400	Applicable	These standards list particular hazardous wastes and identify the maximum concentration of contaminants for which the waste would be a RCRA characteristic waste. The analytical test set out in Appendix II of 40 C.F.R. Part 261 is referred to as the Toxicity Characteristic Leaching Procedure (TCLP). The federal requirements 40 C.F.R. Part 261 are incorporated by reference.	Any wastes generated by remedial activity will be analyzed under these standards to determine whether they are listed or characteristic hazardous waste. Wastes that may be generated include: investigation derived waste from monitoring activities and contaminated media produced during the operation and maintenance of the monitoring well system and other components of the remedy. Materials that are listed waste or exceed TCLP hazardous waste thresholds will be disposed off-site in a RCRA Subtitle C facility. Non-hazardous materials will be disposed appropriately.	The specific State identification and listing of hazardous waste regulations were not identified in the ROD.
Requirements for Hazardous Waste Generators, N.H. Admin. Code Env-Hw 500, including Part 507 Storage Requirements; Part 513 Emergency/ Remedial Actions	Applicable	Requires a determination as to whether waste materials are hazardous and, if so, requirements for managing such materials on site prior to shipment off site. The federal requirements 40 C.F.R. Part 262 are incorporated by reference.	If any remedial activity generates hazardous wastes, then it will be managed in accordance with the substantive requirements of these regulations.	The ROD cited the general generator standards at Env-Wm 500, as well as specific provisions of these regulations pertaining to manifesting, recordkeeping, packaging and labelling. Env-Wm 500 has since been changed to Env-Hw 500 by the State. Only the substantive, environmental provisions of these regulations are ARARs.
Protection of Groundwater: R.S.A. 485-A: 13, NH Admin. Code Env-Wq 402	Applicable	These regulations establish substantive requirements for discharges to groundwater, including prohibited discharges (Env-q 402.07), water quality sampling (Env-Wq 402.8) and	Discharges to groundwater from any component of the alternative will meet discharge standards.	ROD included the statutory citation and the regulatory citation at Env-Ws 410. The statutory citation has not changed, but Env-Ws 410 has been changed to Env-Wq 402 by the State.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		compliance criteria (Env-Wq 402.22).		
Best Available Technology and Treatment Techniques, NH Admin. Code Env-Dw-722	Applicable	Requires use of best available technology when treating organic and inorganic contaminants in wastewaters.	Remedial activities aimed at achieving MCLs for organic and inorganic contaminants will use the best available technology.	ROD contains citations to Env-Ws 346 and 347 changed to Env-Dw-722 by the State.
Standards of Design and Construction of Sewerage and Wastewater Treatment Facilities, Env-Wq 700	Applicable	Requires use of best available technology when treating organic and inorganic contaminants in wastewaters.	Remedial activities aimed at achieving MCLs for organic and inorganic contaminants will use the best available technology.	ROD contains citation to Env-Ws 700 changed to Env-Wq 700 by the State.
Criteria for Groundwater Discharges (Env-Wq 402.04)	Applicable	Establishes groundwater discharge criteria which include MCLs and MCLGs adopted by the Water Supply and Pollution Control Division.	Require remedial action to eliminate discharge of contaminants including VOCs and inorganic contaminants resulting in groundwater contamination above State MCL and MCLG levels.	Cited in the ROD as a chemical-specific standard, however, these are action-specific standards addressing discharges to groundwater. ROD citation (Env-Ws 410.09) changed to Env-Wq 402.04 by the State.
Surface Water Quality Standards (Env-Wq 1700)	Applicable	Establish water quality criteria for toxic substances. The criteria are essentially the same as the federal NRWQC. Criteria are established for fresh and marine waters.	Surface water monitoring standards for assessing treatment system discharges to surface waters.	Cited in the ROD as a chemical-specific standard, however, these are action-specific standards addressing surface water monitoring. ROD citation (Env-Ws 432) changed to Env-Wq 1700 by the State.
Enforcement of Classification, R.S.A. 485-A:12	Applicable	Any discharge to groundwater or surface water that lowers the quality of the water below its classification is prohibited.	Remedial alternatives involving the discharge to groundwater or surface water must comply with these standards.	As cited in the ROD.
Standards for Construction, Maintenance and Abandonment of	Applicable for drinking water wells; Relevant and Appropriate for monitoring wells	This provision requires that wells be constructed, maintained, relocated, and/or abandoned according to these	Wells used for the remedy will be created, operated, and closed in compliance with these standards. Well restriction standards shall be incorporated into institutional controls to	The ROD only cited well abandonment section We 604.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
Wells, NH Admin. Code We 600		regulations. We 602.05 address restrictions on location wells in contaminated areas.	prevent groundwater use within OU2 until groundwater cleanup standards are achieved.	
Air Pollution Control: RSA Ch. 125-C; Specific regulations at Env-A cited below.	Applicable	Air pollution control statutory requirements.	If operation and maintenance of groundwater treatment system, monitoring wells or other remedial actions cause a release of contaminants into the air, emissions controls will be included in the remedial design to control emissions.	As identified in the ROD.
Ambient Air Quality Standards, NH Admin. Code Env-A 300	Applicable	These regulations set primary and secondary ambient air quality standards (equivalent to federal standards). The standards do not allow significant deterioration of existing air quality in any portion of the state for: particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone hydrocarbons and lead.	If there are remedial processes, including the groundwater treatment system and monitoring well system, that result in releases of contaminants into the air, air quality standards will be complied with during remedial activities	Cited in the ROD (specifically Parts 303 and 304) as a chemical-specific standard, however, these are action-specific standards addressing the control of air emissions.
Air Pollution Control, Env-A 604-606	Relevant and Appropriate	Establishes standards for the release of air emissions including VOC's and hazardous air pollutants. Applicable standards include the most stringent of the following requirements: 1) New source performance standards (40 CFR Part 60); 2) National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61); 3) New Hampshire State	Discharges of contaminants to the air from treatment operations shall be restricted and treated to ensure that no regulatory air discharge limits are exceeded.	As cited in the ROD.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		Implementation Plan limits.		
Testing and Monitoring Procedures, NH Admin. Code Env-A 800	Applicable	Require emission testing and ambient air quality monitoring. Establish procedures for VOC testing and Continuous Emission Monitoring.	Remedial measures generating air emissions will be tested to ensure the attainment of pertinent standards.	As cited in the ROD.
Fugitive Dust, N.H. Admin. Code Env-A Part 1002	Applicable	Requires precautions to prevent, abate and control fugitive dust during specified activities, including excavation, maintenance, and construction.	Precautions to control fugitive dust emissions will be required during site remediation activities that could generate dust, such as O&M of the treatment system or installation and maintenance of the monitoring well system.	As cited in the ROD.
Regulated Toxic Air Pollutants, NH Admin. Code Env-A Part 1400	Applicable	This regulation identifies toxic air pollutants to be regulated. These pollutants are also listed by EPA in 40 CFR 261. High, moderate and low Toxicity Classifications are established. Air toxics in these classifications are regulated when they occur in concentrations that cause adverse health effects including increased cancer risk.	If there are remedial processes that result in releases of contaminants into the air, air quality standards will be complied with during remedial activities.	Cited in the ROD's chemical-specific ARAR table as Env-A 1300. Current citation is Env-A 1400 as an action-specific ARAR.
Location Specific				
Fish and Wildlife Coordination Act (16 U.S.C. §661 et seq.)	Applicable	Any modification of a body of water or wetland requires consultation with the U.S. Fish and Wildlife Service and the appropriate state wildlife agency to develop measures to prevent, mitigate, or compensate	Contact with appropriate federal agencies will be maintained during construction and O&M of any monitoring wells or other remedial infrastructure that may alter protected resource areas	No change.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		for losses of fish and wildlife.		
Floodplain Management and Protection of Wetlands (44 C.F.R. § 9)	Relevant and Appropriate	FEMA regulations that set forth the policy, procedure and responsibilities to implement and enforce Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands). Prohibits activities that adversely affect a federally-regulated wetland unless there is no practicable alternative and the proposed action includes all practicable measures to minimize harm to wetlands that may result from such use. Requires the avoidance of impacts associated with the occupancy and modification of federally designated 100-year and 500-year floodplain and to avoid development within floodplain wherever there is a practicable alternative. An assessment of impacts to 500-year floodplain is required for critical actions – which includes siting hazardous waste facilities in a floodplain. Requires public notice when proposing any	To the extent any remedial activities need to occur within federal jurisdictional wetland then all practicable measures will be taken to minimize and mitigate any adverse impacts. Erosion and sedimentation control measures would be adopted during construction, O&M, and restoration activities within federal jurisdictional wetlands. Standards for construction or O&M of any monitoring wells or other remedial infrastructure in federal jurisdictional wetlands or the 500-year floodplain will be attained based on a determination that (a) there is no practical alternative method that will achieve cleanup objectives with less adverse impact; (b) all practical measures would be taken to minimize and mitigate any adverse impacts from the work; (c) there would be no likely impact on federal threatened or endangered (T&E) species; (d) actions would be taken to minimize impact of hydrologic changes during the work; (e) after completion of the work, there would be no significant net loss of flood storage capacity, and no significant net increase in flood stage or velocities; and (f) river and riverbanks would be restored and habitat will be improved. Public comment received on this draft ESD concerning any proposed alteration to wetlands and floodplain will be addressed in the final version of the ESD.	Former wetland and floodplain regulations cited in the ROD that incorporated Executive Orders 11988 and 11990 at 40 C.F.R. Part 6, Appendix A no longer exist so have been replaced by regulatory requirements to meet the Executive Order standards at 44 C.F.R. § 9.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		action in or affecting floodplain or wetlands.		
Clean Water Act, Section 404 (33 U.S.C. § 1344); Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 C.F.R. Part 230, 231 and 33 C.F.R. Parts 320-323)	Applicable	For discharge of dredged or fill material into federal jurisdictional water bodies or wetlands, there must be no practical alternative with less adverse impact on aquatic ecosystem; discharge cannot cause or contribute to violation of state water quality standard or toxic effluent standard or jeopardize federal T&E species; discharge cannot significantly degrade waters of U.S.; must take practicable steps to minimize and mitigate adverse impacts; must evaluate impacts on flood level, flood velocity, and flood storage capacity. Sets standards for restoration and mitigation required as a result of unavoidable impacts to aquatic resources. EPA must determine which alternative is the "Least Environmentally Damaging Practicable Alternative" (LEDPA) to protect wetland and aquatic resources.	Under this alternative construction and O&M of the monitoring wells and any other remedial infrastructure that will result in the dredging or filling of federal jurisdictional wetlands would be subject to these requirements. Activities must be conducted in accordance with these requirements including, but not limited to, mitigation and/or restoration. EPA has determined in the ROD that the remedy satisfies the standards under these regulations, including the LEDPA requirements.	The ROD only cited part of the applicable regulations at 40 C.F.R. Part 230.
State Requirements				

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
Criteria and Conditions for Fill and Dredge In Wetlands: RSA Ch. 482-A and NH Admin. Code Env-Wt Parts 100-900	Applicable	These standards regulate filling and other activities in or adjacent to wetlands, and establish criteria for the protection of wetlands from adverse impacts on fish, wildlife, commerce, and public recreation.	All activities within on-site State jurisdictional wetlands and floodplain areas will comply with these wetland protection requirements.	ROD citation (Env-Wm 300-400 and 600) changed to Env-Wt 100-900 by the State.
Siting requirements for hazardous waste facilities and variances, Env-Hw 304.08 (Existing facilities) and 304.09 (New facilities).	Relevant and Appropriate	Flood control measures must be identified for any facility within the 100-year floodplain. Similarly, new facilities located within 3,000 feet of faults displaced in Holocene times must show that no faults pass within 200 feet of the facility	Siting and O&M of the treatment facility will be done in accordance with these regulations.	ROD citation (He-P 1905.09) changed to Env-Ws 304.08 and 304.09 by the State.
Native Plant Protection Act, R.S.A. 217-A	Applicable	Prohibits damaging plant species listed as endangered in the State.	Any remedial action that may damage state-listed endangered plants will need to meet these standards.	Not cited in the ROD.
Endangered Species Conservation Act, R.S.A. 212-A	Applicable	Prohibits the taking of State-listed endangered species and regulates such activities with regard to State-listed threatened species.	Any remedial action that may take state- listed species will need to meet these standards.	Not cited in the ROD.
Terrain Alteration, Env-Wq 1500 and RSA 485-A:17	Applicable	The purpose of these rules is to protect drinking water, surface water and groundwater from degradation resulting from any activity which significantly alters terrain or occurs in or on the border of the surface waters of the state. Env-	Any significant excavation in or around the Souhegan River or other surface water bodies on-site as part of the remedial action will be conducted in compliance with the substantive requirements of these standards.	ROD citation (Env-Ws 415) changed to Env-Wq 1500 by the State.

Requirements	Status	Requirement Synopsis	Action to be Taken to Attain ARAR	Changes from 1991 ROD and 1996 ESD
		Wq 1505.04 specifically addresses Stormwater Management and Erosion and Sediment Control.		

APPENDIX J – DETAILED ARARS REVIEW TABLES

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain "a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and control of further release at a minimum which assures protection of human health and the environment." The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate. In performing the FYR for compliance with ARARs, only those ARARs that address the protectiveness of the remedy are reviewed.

The 1991 ROD established interim cleanup levels in groundwater for contaminants of concern identified in the baseline risk assessment and found to pose an unacceptable risk to either public health or the environment. Interim cleanup levels were set based on the pertinent ARARs (*e.g.*, drinking water maximum contaminant level goals [MCLGs] and MCLs) or other suitable criteria.

Under the Safe Drinking Water Act, the federal MCLG and MCL for nickel were both 100 µg/L (rounded from 140 µg/L). However, EPA has vacated and remanded those standards based on procedural errors during rule-making. Table J-1 compares the 2016 ROD Amendment and 2017 ESD groundwater cleanup levels to current standards. The only changes noted are that the state currently has a more stringent standard for 1,1-DCA in OU1 and for 1,4-dioxane for OU2.

Table J-1: Groundwater ARAR Cleanup Level Comparison

COC	2016 OU1 ROD Amendment Groundwater Cleanup Levels (µg/L)	2017 OU2 ESD Groundwater Cleanup Levels[a] (µg/L)	Current Standards[c] (µg/L)	Change
1,1-DCA	200	81[b]	81[d]	More stringent/No change
trans-1,2-DCE	100	100	100	No change
cis-1,2-DCE	70	70	70	No change
1,1-DCE	7	7	7	No change
Benzene	--	5	5	No change
1,1,1-TCA	200	200	200	No change
Methylene chloride	--	5	5	No change
PCE	5	5	5	No change
TCE	5	5	5	No change
Antimony	--	6	6	No change
Arsenic	--	10	10	No change
Beryllium	--	4	4	No change
Chromium	--	100	100	No change
Lead	--	15	15	No change
Nickel	--	100	100[d]	No change
1,4-dioxane	--	3[b]	0.32[d]	More stringent

Notes:

a. Based on federal MCLs, unless otherwise noted.
b. Based on the state AGQS.
c. Based on National Primary Drinking Water Standards, unless otherwise noted. Available at https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations#Inorganic, accessed 4/7/2021.
d. Based on state AGQS, available at https://casetext.com/regulation/new-hampshire-administrative-code/title-env-department-of-environmental-services/subtitle-env-or-oil-and-remediation-programs/chapter-env-or-600-contaminated-site-management/part-env-or-603-groundwater-quality-criteria/section-env-or-60303-ambient-groundwater-quality-standards-agqs, accessed 4/7/2021.

-- = indicates contaminant does not have a cleanup level

APPENDIX K – INSTITUTIONAL CONTROLS

Figure K-1: Notice of Activity and Use Restriction

NOTICE OF ACTIVITY AND USE RESTRICTION

Site: Town of Milford Property
589 Elm Street
Milford, NH 03055

Town Parcel: Map 13, Lot 5
Deed Refs: Book 4767 Pages 261-262
Owners of Record: Town of Milford

This Notice of Activity and Use Restrictions ("Notice") is made on this 17th day of July 2017, the Town of Milford, New Hampshire.

WHEREAS, The Town of Milford, 1 Union Square, Milford, Hillsborough County, New Hampshire ("Owner/Grantor") owns a certain parcel of land situated at 589 Elm Street in Milford, New Hampshire 03055 (the "Property") and described more fully in Exhibit A which is attached hereto and made a part hereof; and,

WHEREAS, the Property, is located within the OK Tool Source Area Operable Unit 1 ("OU-1") portion of the Savage Municipal Water Supply Well Superfund Site (the "Site") in Milford, Hillsborough County, New Hampshire; and,

WHEREAS, the U.S. Environmental Protection Agency ("EPA") placed the Site on the National Priorities List in 1983; and,

WHEREAS, EPA issued a Record of Decision ("ROD") on September 27, 1991, and an Explanation of Significant Differences ("ESD") on December 19, 1996, identifying the remedy to be employed for the cleanup of groundwater at OU-1; and

WHEREAS, hazardous substances including tetrachloroethylene and trichloroethylene have been detected in the groundwater at the Property at levels above the cleanup standards delineated in the ROD and ESD; and

WHEREAS, the selected remedial action for OU-1 includes a groundwater extraction and treatment plant ("Treatment Plant") composed of a slurry wall, extraction wells, injection wells, a recharge gallery, and long term monitoring of groundwater and drinking water through sampling, and maintenance of monitoring wells; and

WHEREAS, EPA has evaluated the vapor intrusion pathway at the Property and has determined that there could be an unacceptable risk from vapor intrusion should the Property be used for non-industrial purposes; and

WHEREAS, the remedy delineated in the ROD and ESD also requires institutional controls assuring that activities and uses of the Property will be restricted so as to minimize risks to human health and the environment; and

WHEREAS, the State of New Hampshire Department of Environmental Services ("State") is conducting certain operation and maintenance ("O&M") activities at OU-1 pursuant to the ROD and ESD; and

WHEREAS, those O&M activities include operation and maintenance of a groundwater extraction and treatment plant ("Treatment Plant") composed of a slurry wall, extraction wells, injection wells, a recharge gallery, piping, electrical and appurtenances; and

WHEREAS, portions of the Treatment Plant infrastructure, and numerous monitoring wells are located on the Property; and

WHEREAS, EPA has reviewed and concurred on this Notice and the State has reviewed and approved this Notice, and has approved the continued use of the Property subject to the restrictions set forth in this Notice.

NOW, THEREFORE, notice is hereby given that the activity and use restrictions set forth below apply to the Property:

1. **Prohibited Activities and Uses Set Forth in this Activity and Use Restriction ("AUR").**
   The following activities and uses are prohibited and, if implemented on the Property, may result in a significant risk of harm to human health, safety, welfare or the environment or may present a substantial hazard.

   (a) Extraction of groundwater for purposes other than carrying out the remedy specified in the ROD and ESD by EPA and/or the State.

   (b) Any activity, including soil excavation and groundwater extraction, interfering with the remedy established in the ROD and ESD, or subsequent remedy decision documents.

   (c) Any use of the Property for residential or day care purposes.

2. **Obligations/Conditions.**
   Obligations and/or Conditions to be undertaken and/or maintained at the Property as set forth in the AUR shall include the following:

   (a) Following appropriate prior notice to the owner, the State and EPA and their representatives may have access to and privilege to go upon and into all of the land and buildings at the Property, at their sole discretion, to carry out the remedy specified in the ROD and ESD.

   (b) The State and EPA are permitted, privileged and authorized to take action as necessary to implement the remedy (and/or modifications to the remedy), including, but not limited to, maintenance of the fencing, slurry wall, infiltration gallery, extraction wells and treatment system piping, collection of indoor air samples, installation of, and access

to, monitoring wells to take groundwater samples for analyses, and shall not be liable to make any compensation therefore.

(c) The State and EPA may install any pipes, pumps, electrical lines, buildings and structures on the Property as may be necessary and appropriate in their discretion to respond to hazardous wastes on the Property and protect human health or the environment.

(d) The State and EPA may take such other and further actions with respect to the Property as may be reasonable and necessary to protect human health and the environment.

(e) Prior to any site work, including but not limited to loaming and seeding, paving, or building construction, that could potentially damage any component of the remedy established in the ROD and ESD, or subsequent remedy decision documents, the owner shall submit plans to the State for approval, after a reasonable opportunity for review and comment by EPA, that describe how the components of the remedy will be protected, or replaced in-kind at the owner's expense.

(f) All occupied structures on the Property shall be equipped with a sub-slab depressurization system to prevent indoor air contamination from subsurface vapors originating from contaminated groundwater at the Property. Prior to construction, the owner shall submit design documents to the State for review and approval, after a reasonable opportunity for review and comment by EPA, for the sub-slab depressurization system for each structure to be occupied . The owner shall submit to the State for review and approval, after a reasonable opportunity for review and comment by EPA, an operations and maintenance plan for the sub-slab depressurization system(s) that include specific performance standards. The owner shall submit to the State annually routine monitoring results documenting that the performance standards for the systems are being met.

3. Emergency Procedures.

In the event that the performance standards for the sub-slab depressurization system(s) are not being met, indicating conditions that may result in significant risk to human health from exposure to Site contaminants, the owner shall submit to the State for approval a written contingency plan. The contingency plan shall document steps to be implemented so that the sub-slab depressurization system(s) will meet the performance standards and shall include a schedule for implementation. Upon approval by the State, the contingency plan shall be implemented.

4. Proposed Changes in Activities and Uses.

This AUR may be amended or modified by the owner upon written application to and approval by the State, after a reasonable opportunity for review and comment by EPA. Any proposed changes in activities and uses at the Property that may result in a greater risk of exposure than currently exists at the Property shall be evaluated by a qualified Environmental Consulting Firm, which shall render a written opinion satisfactory to the State and EPA that the proposed changes will not present an unacceptable level of risk to human health and the environment. This written opinion shall include an evaluation of the

vapor intrusion pathway. Said opinion shall accompany the application. Any and all requirements set forth in any determination by the State and EPA as part of the approval process to ensure a condition of no unacceptable risk in the implementation of the proposed activity or use shall be fully satisfied by the owner before such activity or use is commenced. Any fees or cost recovery obligations shall be paid in full prior to the approval of any such modification or amendment. The approval or denial of any such request for amendment or modification shall be in the sole discretion of the State and EPA.

5. **Duration of Activity and Use Restrictions.**

This AUR shall run with the land and become binding upon successive owners of the Property or portions of the Property and shall remain in full force and effect until terminated by the State and EPA.

6. **Termination of Activity and Use Restrictions.**

Termination must be approved in writing by the State and EPA. As part of the termination process, the following information may be required:

a. written request to the State and EPA by the owners of the Property to terminate this AUR with an explanation as to why all restrictions are no longer necessary to ensure the protection of human health and the environment;

b. supporting documentation as outlined in Env-Or 600 (or similar rules that may be in effect at such time);

c. any other information the State or EPA may deem necessary to justify the termination of the AUR.

7. **Recordation.**

This Notice, any modifications or amendments, and any terminations are effective upon issuance and shall be recorded in the chain of title for the Property at the Hillsborough County, New Hampshire Registry of Deeds. All future recordation costs shall be the responsibility of the owner. The owner shall provide certified copies of all AUR recorded instruments to the State and EPA within 60 days of recordation.

8. **Incorporation into Deeds, Mortgages, Leases, and Instruments of Transfer.**

This Notice shall be incorporated either in full or by reference into the chain of title of all deeds, easements, mortgages, leases, licenses, occupancy agreements or any other instrument of transfer, whereby an interest in and/or a right to use the Property or a portion thereof is conveyed. The notice of this instrument shall be substantially in the following form:

NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN ACTIVITY AND USE RESTRICTION, DATED _____, 2017, RECORDED IN THE PUBLIC LAND RECORDS DATED _____, 2017, AND RECORDED IN BOOK _____, PAGES _____ OF THE HILLSBOROUGH COUNTY LAND RECORDS.

9. Violation of Activity and Use Restriction.
The owner shall notify the State and EPA in writing within 14 days of discovery of a violation of any condition of this recorded AUR. Within 60 days of discovery of a violation, the owner shall submit recommendations to correct the violation to the State and EPA for approval, including a corrective action plan and schedule for implementing the plan. Upon approval, the plan shall be implemented by the owner.

10. No Abrogation or Waivers
Nothing herein is intended, nor shall it be deemed to abrogate from or constitute a waiver of any of the rights, powers, interests, and privileges that the State or the EPA may have under law.

11. Self Certification
The owner shall self-certify compliance with the AUR every year in the month of December beginning in the year 2018, on a form provided by the State. Within 30 days of receipt of a self-certification form provide by the State, the owner at the time shall: 1) sign the form to certify that all the conditions of the AUR are being met and 2) return the signed form to the State.

12. Authorization
The undersigned, Town Administrator certifies and warrants that he has been duly authorized by vote of the selectboard of the Town of Milford at a properly convened meeting of the selectboard to execute this Notice and cause it to be recorded.

NOW, THEREFORE, this Notice shall run with the land, shall be deemed to constitute a conservation restriction pursuant to New Hampshire Revised Statutes Annotated 477:45 through 477:47, shall become binding upon successive owners of the Property, and shall be enforceable by the State.

WITNESSETH the execution hereof under seal this 17th day of July, 2017.

By: Mark Bender Town Administrator
Town of Milford, Owner/Grantor

State of New Hampshire
County of New Hampshire

This instrument was acknowledged before me on the day of July 2017, by Mark Bender, Town Adminstrator, Town of Milford, Owner/Grantor.

Anna M. Philbrick
(Signature of notarial officer)

(Seal, if any)

Notary Public, State of New Hampshire
My commission expires:_____

TINA M. PHILBRICK, Notary Public
State of New Hampshire
My Commission Expires September 18, 2018

EXHIBIT A

Property Description of Parcel Subject to Notice

Town of Milford Parcel
Tax Map 13 Lot 5
Book 4767 Pages 261-262

A certain tract or parcel of land with the buildings thereon situated in Milford, Hillsborough County, State of New Hampshire, bounded and described as follows, to wit:

Beginning at a stone bound at the southeast corner of the premises on the northerly side of the state highway running between Richardson's Crossing and Jones' Crossing, so-called, at land now or formerly of Celia Melendy, formerly of the E. D. Searles Estate;

Thence westerly by the northerly line of said highway to a stone bound at land now or formerly of Ectus J. Trombly, formerly of Nila K. Lincoln;

Thence northerly by land now or formerly of said Trombly, formerly of said Lincoln, said line passing through another stone bound a short distance northerly from said highway and running to a stone bound on the southerly bank of the Souhegan River;

Thence easterly by the southerly bank of the Souhegan River to land now or formerly of said Celia Melendy, formerly of E. D. Searles Estate;

Thence southerly by said Melendy land, formerly of said Searles Estate, said line being designated by a wire fence, to the point of beginning. Containing ten acres more or less.

APPENDIX L – TECHNICAL MEMORANDUM

Memorandum

Subject: Savage Municipal Water Supply Superfund Site – Evaluation of Ecological Risk Documentation and Resolution to Information Gap between the 2014 SLERA Memorandum and the 2016 Five Year Review

To: Gerardo Millán-Ramos, EPA Remedial Project Manager

From: TaChalla Gibeau and Bart Hoskins, Ecological Risk Assessors, EPA Region 1

Date: August 31, 2021

Introduction

During the 2021 Five Year Review for Savage Municipal Water Supply Superfund Site (the Site), Region 1 (R1) ecological risk assessors found a gap in information in the ecological risk conclusions noted in the 2016 Five Year Review (FYR). The 2016 FYR referenced a 2014 Screening Level Ecological Risk Assessment (SLERA) prepared by EPA to reflect updated surface water and sediment benchmarks. The current EPA ecological risk team for the Site was unable to locate the referenced 2014 SLERA, however we did find a draft 2014 ecological risk Draft Memorandum which may have been a precursor document to the SLERA. We were initially unable to resolve an inconsistency in risk conclusions between the 2016 FYR and the 2014 Draft Memorandum. After further research and evaluation of documentation that was available, the current R1 ecological risk assessors determined that the 2016 FYR conclusions on ecological risk still stand. The 2016 5YR conclusions were that despite exceedances of surface water and sediment benchmarks, there is no significant ecological risk to benthic invertebrates or other aquatic life in the drainage between the trailer park complex (where the confluence of the former discharge stream and an unnamed brook was located) and the former discharge stream confluence with the Souhegan River, because permitted discharges from the Hendrix facility were ceased and the discharge stream no longer exists as aquatic habitat.

One area of uncertainty was left unresolved in the 2014 ecological risk evaluations. The former discharge stream now appears to be a terrestrial vegetated swale. This means that any former sediment contaminants would now be evaluated as soil contaminants with different exposure pathways and benchmarks. Ecological risks resulting from soil contamination were not evaluated on site. Hence, there is an information gap. Should the question arise again in the future, a memorandum summarizing characterization and assessment of ecological risk from soil exposure on site is necessary. The purpose of this memorandum is to fill that information gap.

Description of the Information Gap

After reconstructing the original pathways, it is determined that what was referred to as "Trailer Park Brook" in the 2014 Draft Memorandum was actually an unnamed intermittent stream (designated by blue line in Figure 1) that flowed northwest to southeast passing by the south side of the trailer park, merging with the outfall stream of the Hitchiner/Hendrix Property discharge pipe (designated by red line in Figure 1), which was considered the "Upper Discharge Stream". Everything after the confluence of the two streams has been variously referred to as "Trailer Park Brook" and/or the "Discharge Stream" or "Lower Discharge Stream" (designated by purple line in Figure 1).

The 2014 Draft Memorandum concluded that the concentrations of nickel, chromium and PCBs were sufficiently high to suggest impacts to aquatic organisms and that further investigation was necessary to determine current concentrations in surface water and sediment. It went on to recommend an investigation into the potential for biological impacts by conducting surface water and/or sediment toxicity testing and/or benthic invertebrate community studies. However, permitted discharges from the Hendrix facility ceased when Hendrix installed a process water recycling system in March 1990. The cessation of discharges from the Hendrix facility resulted in the discontinuation of the upper discharge stream. The drying up of the Lower Discharge stream ensued as the unnamed stream apparently did not have a sufficient flow to maintain it. The 2016 Five Year Review states,

> The [2014] Ecological Risk Assessment concluded that there were potential impacts to the Souhegan River sediments in OU2 as a result of industrial discharges to the river. However, with discontinuation of the discharges, ecological impacts were expected to diminish. Ecological risks resulting from soil contamination were not evaluated… As with the original [1991] Ecological Risk Assessment, the [2014] SLERA found that both surface water and sediment benchmarks were exceeded in OU2, but that the exceedances were not ecologically significant because of the discontinuation of the discharge of contaminants from industrial operations. No ecological risks were identified in OU1.

The decision to eliminate the ecological benchmark exceedances from further consideration was based on the elimination of aquatic habitat that occurred when discharge from industrial operations ceased. The potential risk from the same contaminants in a newly created soil matrix was not evaluated.

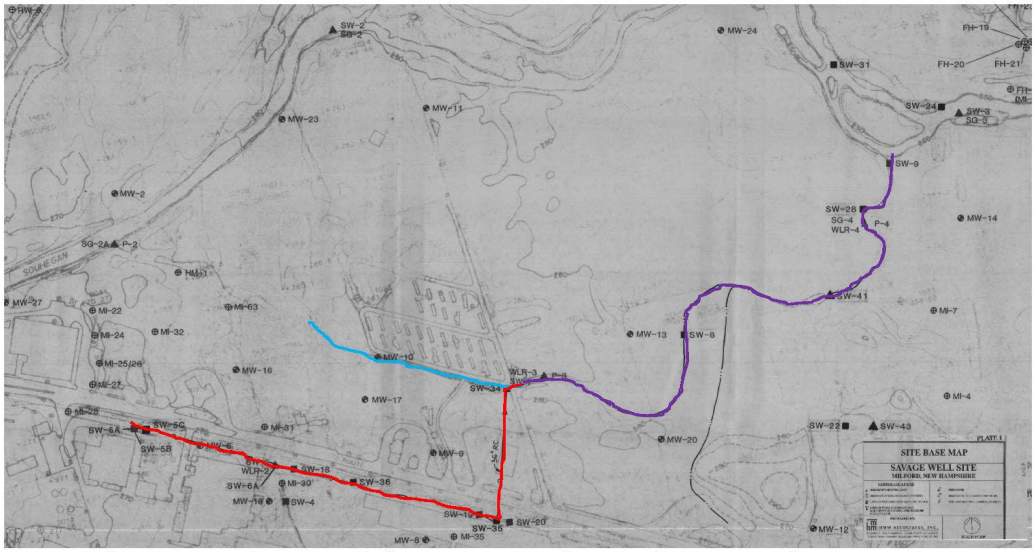


Figure 1: Plate 1 Excerpt from *Remedial Investigation, Volume 5, Plates 1-6, Final*

COPEC Detections and Current Soil Benchmarks

In order to do due diligence in performing a screening level ecological risk assessment for the soil pathway, the sediment and surface water COPEC detections from the 1989 sampling event, that were used in the 1991 and the 2014 SLERAs, were again used to screen against current soil benchmarks. The EPA EcoSSL Soil benchmarks were used for this screening (https://www.epa.gov/risk/ecological-soil-screening-level-eco-ssl-guidance-and-documents)

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COPEC	Soil Benchmark Exceeded (mg/kg)	Benchmark Type	Receptor Affected	Sediment Exceedance Range (mg/kg)	Exceedance Locations
Metals					
Beryllium	2.5	NOEL	Plant	2.65 - 3.95	SW-28, SW-28D, SW-31, SW-24
Total Chromium	23	NOEL	Avian	29.1-36	SW-7, SW-8, SW-28D, SW-9
Copper	70	NOEL	Plant	101-187	SW-7, SW-8, SW-28D
VOCs					
Acetone	1.2	NOEL	Mammal	43	SW-34
Methylene Chloride (Dichloromethane)	0.21	NOEL	Soil Invertebrate Mammal	24-26	SW-7, SW-7D

Out of the contaminants listed in the EPA EcoSSLs, the following metals were not included in the original sampling event: Boron, Chromium III, Chromium VI, Cobalt, Lithium, Molybdenum, Selenium, Silver, Strontium, Thallium, Tin, Uranium. SW-41 had only surface water, and no sediment sampling; SW-34 was only included in the sediment sampling for VOCs. Several of the metals listed above are now part of EPA Contract Laboratory Program (CLP) Target Analyte List. The TAL metals would normally be part of a soil risk screening to the extent that suitable benchmarks are available.

As discussed in Section 5.1 of the 1991 RI Part I, "[M]etals have limited mobility and tend to remain bound to soils rather than migrating downstream in surface waters or into groundwater. By contrast, the physical and chemical properties of VOCs result in a tendency to volatilize from surface waters into the atmosphere and to migrate as highly soluble compounds into groundwater, rather than remaining at high levels in surface water or sediments." Therefore, because decades have passed since the sediment samples were taken in 1989, it is highly unlikely that any VOCs remain in this particular reach in OU2, in what is currently soil. It is therefore unlikely that there is any significant risk to ecological receptors through VOC contamination.

Some uncertainty exists regarding current concentrations, within the lower drainage stream, of the three metals (beryllium, total chromium, and copper) that exceeded soil screening benchmarks, as well as CLP TAL metals that were not included in the 1989 sampling. It is recommended that a few surface soil samples should be taken for metals analysis in the former discharge stream channel, and the resulting data should be screened using current ecological risk soil benchmarks. This would enable EPA R1 to confirm with greater confidence that no residual soil risks exist.

Conclusions

Currently the available evidence supports the 2016 Five Year Review conclusion that ecological risks are unlikely for aquatic receptors. Since the former aquatic habitat in the lower drainage swale is now terrestrial habitat, a screening using soil benchmarks was performed using Eco SSLs. A few exceedences of no-effect benchmarks were noted. It is our view that the potential for risk to terrestrial ecological receptors is low, however a very limited assessment of current conditions would allow for a more definite conclusion on this point. Such an assessment could include collection of a small number of surface soil samples in the former lower drainage stream and re-screening this pathway using more current data.

The available evidence supports the overall conclusion that the remedy is protective of ecological receptors. A very limited program to confirm this determination is suggested for the next Five Year Review.