Remedial Investigation Phase VI Work Plan for Off-Site Groundwater

Superlon Plastics Site
Tacoma, Washington

Prepared for:

The Chemours Company FC, LLC
Corporate Remediation Group

Prepared by:

PIONEER TECHNOLOGIES CORPORATION

5205 Corporate Center Ct. SE, Suite A
Olympia, Washington 98503
Phone: 360.570.1700
Fax: 360.570.1777
www.usPIONEER.com

May 2026

Professional Certification

This document is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that I was in responsible charge of the work performed for this document that was associated with my certifications (with the exception of the appendices containing information prepared by other professionals).



May 21, 2026
Date

Nathan Starr
Senior Hydrogeologist
PIONEER Technologies Corporation
Washington Licensed Geologist Cert No. 2760

Table of Contents

Section 1: Introduction 1-1
1.1 Site Location and Description ... 1-1
Section 2: Background 2-1
2.1 Site Setting ... 2-1
2.2 Overview of Remedial Actions ... 2-3
Section 3: Initial Conceptual Site Model 3-1
3.1 Primary Contaminant Sources ... 3-1
3.2 Release Mechanisms and Environmental Fate ... 3-1
3.3 Hydrogeologic Framework and Contaminant Transport ... 3-2
3.4 Exposure Pathways and Potential Receptors ... 3-3
3.5 Monitored Natural Attenuation Considerations ... 3-5
3.6 CSM Uncertainties ... 3-6
Section 4: Data Gap Analysis 4-1
4.1 Plume Delineation Data Gaps ... 4-1
Section 5: Initial Remedial Investigation Plan 5-1
5.1 Task 1: Phase VI Groundwater Characterization ... 5-1
5.2 Task 2: Additional Characterization ... 5-4
5.3 Task 3: Monitoring Well Network Design and Installation ... 5-4
5.4 Preliminary Implementation Timeline ... 5-5
Section 6: References 6-1

Figures

Figure 1 Site Location
Figure 2 Site Features
Figure 3 Monitoring Well Locations
Figure 4 OSP IA Operable Units
Figure 5 Areas Remediated by the OSP and Ditch IAs
Figure 6 Arsenic Concentrations in the Perched Aquifer
Figure 7 Arsenic Concentrations in the Shallow Aquifer
Figure 8 Arsenic Concentrations in the Intermediate Aquifer
Figure 9 Exposure Conceptual Site Model
Figure 10a Proposed Sample Locations
Figure 10b Proposed Sample Locations with Arsenic Concentrations in the Perched Aquifer
Figure 10c Proposed Sample Locations with Arsenic Concentrations in the Shallow Aquifer

Figure 10d Proposed Sample Locations with Arsenic Concentrations in the Intermediate Aquifer

Tables

Table 1 Sampling Design
Table 2 Preliminary Implementation Timeline

List of Acronyms

Acronym	Definition / Description
bgs	Below ground surface
btoc	Below Top of Casing
CAP	Cleanup Action Plan
CL	Cleanup Level
Chemours	The Chemours Company FC, LLC
COCs	Constituents of Concern
CSM	Conceptual Site Model
CY	Cubic yard
FS	Feasibility Study
GW	Groundwater
GWM	Groundwater Monitoring
HPT	Hydraulic profiling tool
IA	Interim Action
Kd	Soil-water distribution coefficient
mg/kg	Milligrams/kilogram
mg/l	Milligrams per liter
MNA	Monitored natural attenuation
msl	Mean sea level as defined by National Geodetic Vertical Datum of 1929
MW	Monitoring Well
MTCA	Model Toxics Control Act
OSP	On-Property Soils and Surface Water
OU	Operable Unit
PCL	Preliminary Cleanup Level
PERC	Pacific Environmental and Redevelopment Corporation
PIONEER	PIONEER Technologies Corporation
Property	Superlon Plastics Property
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAU	Remedial action unit
REL	Remediation Level

RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
SCL	Freshwater Sediment Cleanup Level
SCO	Sediment Cleanup Objective
SCSL	Upper Tier Freshwater Sediment Cleanup Screening Level
SEP	Sequential Extraction Procedure
Site	Superlon Plastics Site
SW	Surface water
TPH	Total petroleum hydrocarbon
TCE	Trichloroethylene
USEPA	United States Environmental Protection Agency
µg/kg	Micrograms per kilogram
VOCs	Volatile organic compounds
WAC	Washington Administrative Code
White Birch	White Birch Group, LLC

SECTION 1: INTRODUCTION

This Work Plan presents the technical approach for further characterization of groundwater located at properties adjacent to the Superlon Plastics Property (Property). The Property is located at 2116 Taylor Way, Tacoma, Washington (see Figure 1). Work to be completed will occur on adjacent Lincoln Avenue, Taylor Way, and properties owned by the Port of Tacoma and Gardner-Fields. This work is necessary to obtain a better understanding of constituent concentrations in groundwater surrounding the Property's perimeter which will be used to guide future phases of the groundwater portion of the Remedial Investigation (RI).

This Work Plan has been prepared on behalf of the White Birch Group, LLC (White Birch) and the Chemours Company FC, LLC (Chemours). These companies are hereafter referred to as the "Companies". The Companies or their authorized agent will complete the work described in this Work Plan in accordance with Model Toxics Control Act (MTCA), Chapter 173-340 of the Washington Administrative Code (WAC) under Agreed Order No. DE 5940.

The Agreed Order requires that the Companies submit a Work Plan to Ecology for review and approval whenever work is to be completed at the Superlon Plastics Site (Site).

This Work Plan presents the detailed scope of work for Task 1: Phase VI Groundwater Characterization (Section 5.1). Tasks 2 through 4 and the subsequent RI/FS are described at a planning level to provide Ecology with the overall investigative framework and anticipated sequencing. Separate Work Plans will be submitted to Ecology for review and approval prior to implementation of Task 2 (Additional Characterization, if warranted), Task 3 (Monitoring Well Network Design and Installation), and Task 4 (Quarterly Groundwater Monitoring). Each subsequent Work Plan will incorporate findings from preceding tasks and will refine the scope, methods, and schedule based on data collected during earlier phases of the investigation.

1.1 Site Location and Description

The Site and its neighboring properties are located in a highly industrial area of the Tacoma Tidal Flats between the Blair and Hylebos Waterways (see Figure 1). Definition of the Site boundaries (per MTCA) and an evaluation of data from off-Property media will be presented in a future RI/Feasibility Study (FS) and Cleanup Action Plan (CAP) for the Site. This approach, which has been approved by Ecology, was adopted in order to continue progress toward a final remedy for on-Property media, while continuing to investigate off-Property issues and to define the Site boundary (Ecology 2013a).

The Property is bordered to the northeast by Taylor Way; to the north by a curved rail road right-of-way owned by the City of Tacoma Public Works; to the northwest by Lincoln Avenue and a warehouse operation; and to the southeast by property leased and operated by Gardner-Fields Products, a roofing and waterproofing products manufacturing business (see Figure 2). To the southwest of the Property is a ditch located on the northeast side of a paved trucking yard owned by the Port of Tacoma (see Figure 2).

SECTION 2: BACKGROUND

A summary of key Site background information is presented in this section.

2.1 Site Setting

2.1.1 Climate

The marine-influenced climate at the Site is typical of Western Washington and is relatively mild. The average annual precipitation for Tacoma is approximately 40 inches, with most of the precipitation falling between October and April (Western Regional Climate Center 2019).

2.1.2 Topography and Drainage

The Site is relatively flat, with the exception of a stormwater infiltration basin located on the eastern central portion of the Property and a drainage ditch located on Port of Tacoma property southwest of the Property (see Figure 2).[1] With the exception of the basin and ditch, topographic elevations generally range between 8 feet and 11 feet above mean sea level (msl).[2] The surface water elevation of the stormwater infiltration basin fluctuates around 7 feet above msl and the elevation of the ditch varies between 2.5 and 4 feet above msl (ESM 2021). Stormwater on the Property flows via sheet flow to the basin, where it infiltrates.

2.1.3 Geology

The underlying regional geology is dominated by Quaternary ice age glacial deposits. In general, regional glacial deposits include sand and gravel aquifers associated with glacial outwash and low permeability glacial till deposits containing clay and silt (Washington Division of Geology and Earth Resources 2015).

The Site is located within the tideflats of the Puyallup River delta. In general, the pre-development tideflats consisted of alternating layers of fluvial lower permeability silt/clay and sandy deposits. In the early 1900s, hydraulic fill from Commencement Bay and its tributaries (e.g., Hylebos and Blair Waterways) was used to raise the Property and surrounding areas above the tideflats. Review of aerial photographs indicates that additional fill was brought onto the Property between 1966 and 1975. This material extends from the land surface to 8 to 10 feet below ground surface (bgs) across the Property and includes fine sands and silts, large wood pilings, construction debris, industrial wastewater treatment sludge (from chlor-alkali manufacturing), manufacturing by-products imported from off-Property sources, and hydrated lime. The known extent of industrial wastewater treatment sludge was removed from the Property during the remedial actions discussed in Section 2.2.

[1] The ditch drains to the northwest along the northeast side of the Port of Tacoma property and then drains to the southwest within the City of Tacoma's right-of-way along the northwest side of the Port of Tacoma property.

[2] All elevations in this report are presented relative to msl as defined by National Geodetic Vertical Datum of 1929.

Based on interpretations from the Site's soil boring logs and monitoring well (MW) logs the relevant lithologic units at the Site, from shallowest to deepest, include the following:

- Fill: The fill unit consisting of primarily hydraulic fill (fine sands and silts) with large wood pilings, construction debris, industrial wastewater treatment sludge, manufacturing by-products imported from off-Property sources, and hydrated lime.
- Upper Silt: The upper silt unit is interpreted to be the historic tideflat surface and consists primarily of clayey silt to fine sandy silt.
- Shallow Sand: The shallow sand unit consists primarily of a native fine to medium sand with shell fragments and silt interbeds.
- Lower Silt: The lower silt unit consists primarily of clayey silt to fine sandy silt.
- Lower Sand: The lower sand unit primarily consists of a fine to medium sand with silt interbeds.

2.1.4 Hydrogeology

Based on interpretations from the Site's soil boring logs and MW logs the relevant hydrostratigraphic units at the Site, correspond to specific lithologic units and include the following from shallowest to deepest:

- Perched Aquifer: The Perched Aquifer is the saturated portion of the fill unit. The thickness of the Perched Aquifer is approximately eight to ten feet. Groundwater within the Perched Aquifer is typically encountered at depths of less than six feet bgs in most portions of the Site, and currently daylights in the stormwater infiltration basin.
- Upper Aquitard: The Upper Aquitard is the upper silt unit (i.e., the historic tideflat surface). The thickness of the Upper Aquitard is approximately five to ten feet. Thin and/or leaky portions of the Upper Aquitard have been identified in the central portion of the Property.
- Shallow Aquifer: The Shallow Aquifer is the shallow sand unit. The thickness of the Shallow Aquifer is approximately ten to 22 feet.
- Intermediate Aquitard: The Intermediate Aquitard is the lower silt unit. The thickness of the Intermediate Aquitard is approximately ten to 20 feet.
- Intermediate Aquifer: The Intermediate Aquifer is the lower sand unit. The Intermediate Aquifer appears to be at least 20 feet thick.

The groundwater gradient in the aquifers is tidally influenced and will be evaluated during future phases of the RI process.

2.1.5 Property Land Use

The Property is currently owned by the White Birch Group, LLC and operated by Superlon Plastics Company, Incorporated, an extruded plastic pipe manufacturer. The Property is developed with two industrial buildings (Buildings C and D), asphalt paved lots and a stormwater infiltration basin (see Figure 2).

2.1.6 Overview of Ownership History

Historically the Property has had numerous owners and uses since its initial development. A history of Property ownership is listed below (Pacific Environmental and Redevelopment Corporation [PERC]/ PIONEER Technologies Corporation [PIONEER] 2011).

- In 1925, Latimer-Goodwin purchased an approximately 5-acre parcel from Buffelen Lumber & Manufacturing Company. Latimer-Goodwin developed it for the manufacture of lead arsenate pesticides.
- In 1944, Grasselli, a subsidiary of DuPont, purchased Latimer-Goodwin's land parcel and the pesticide manufacturing facilities located there. Grasselli manufactured lead arsenate and calcium arsenate insecticides until 1946, and performed product mixing and agricultural chemical warehousing operations until 1949.
- In 1951, DuPont sold the Property to V.C. Monahan, who operated the Cabin Creek Lumber Company.
- In 1968, V.C. Monahan in turn sold the Property to Justus Company, Inc., who operated a wood treatment facility there.
- In 1972, Frank B. Lynott, of Justus Cedar Homes and Lindal Cedar Homes sold the Property to Mr. Ragnar M. Nars, to be used for Superlon Plastics Company, Incorporated.
- In 1992, the Property was subdivided evenly into thirds, all of which were re-consolidated and granted through a series of quit claim deeds to White Birch Group, LLC. White Birch continues to own the Property and Superlon Plastics Company continues to occupy the Property.

2.2 Overview of Remedial Actions

Numerous investigation, evaluation, and cleanup activities have been performed at the Site since 2010. The remedial actions are summarized in the following subsections.

2.2.1 Remedial Investigation Phase I

The following actions were completed as described in the Phase I RI Work Plan (PERC 2010):

- Collected soil samples
- Collected sediment samples and a surface water sample from the ditch (see Figure 2).
- Reviewed and compiled existing data about the Property and surrounding properties;
- Evaluated the nature and extent of fill material on-property;
- Evaluated the potential impacts from on-property surface water and storm water to the ditch;
- Preliminarily assessed the potential impacts from vapor intrusion;
- Used data collected during soil and groundwater sampling to evaluate the potential of utility corridors as preference pathways to contaminant migration; and,
- Determined additional information that would be needed to conduct an FS.

2.2.2 Remedial Investigation Phase II

The following actions were completed as described in the Phase II RI Work Plan (PERC/ PIONEER 2011):

- Performed a UST investigation and collected additional sediment samples from the ditch as well as additional soil samples as identified in the Phase II RI work plan. No soil samples were

collected on the Gardner-Fields property. Gardner-Fields was not responsive to access requests and access to the Gardner-Fields property was not obtained. This represented the only exception to the scope of work listed in the Phase II RI work plan;

- Compiled all known data about the Property and surrounding properties;
- Assessed the potential impacts from vapor intrusion as new data was developed; and
- Expanded the evaluation of the potential impacts from off-property surface water and storm water to the ditch.

2.2.3 Remedial Investigation Phase III

The objective of the Phase III RI was to expand upon the knowledge learned during the Phases I and II of the RI and to thoroughly characterize existing conditions in groundwater throughout the Superlon Property and to complete characterization of soil at the Property. The following actions were completed as described in the Phase III RI Work Plan (PERC 2012a):

- Installed additional MWs in the Shallow and Intermediate Aquifers (the current and former MWs are presented on Figure 3).
- Collected surface water samples from under former Building A and in the former Building B footprint.
- Re-evaluated Constituents of Potential Concern and develop a focused list of Constituents of Concern (COCs) for the Site; and
- Developed a conceptual site exposure model that depicted the understanding of actual and potential exposure pathways to the Site COCs that existed at that time.

2.2.4 Interim Action Phase I

The Phase I IA included (PERC 2012b):

- Removing surficial vegetation;
- Installing a coffer dam between former Buildings A and B to facilitate surface water management;
- Removing and disposing of a four-inch layer of surface soil across all exposed areas of the Property;
- Contouring the ground surface to direct surface water toward the stormwater infiltration basin under former Building B (Building B has since been removed and the basin is shown on Figure 2 southeast of Building C);
- Placing a compacted gravel layer over the area to prevent contact with contaminated soils;
- Characterizing Building B materials to determine the proper disposal option after demolition;
- Demolishing Building B and disposing the resulting debris; and,
- Securing the Building B footprint by placing a layer of quarry spalls over this area.

2.2.5 Interim Action Phase II

Phase II IA included the following steps and actions:

- Sludge excavation and disposal which included (PERC 2012c):
    - Excavating wastewater treatment sludge (see Figure 5);

  - Characterizing excavated materials to determine the proper disposal option; and,
  - Disposing the excavated waste water treatment sludge.
- Building D soil removal and disposal which included (PERC 2014a):
  - Excavating soil exceeding excavation goals underneath the footprint of Building D, prior to construction of the building (see Figure 5);
  - Characterizing excavated materials to determine the proper disposal option; and,
  - Disposing the excavated soils.
- Former Building B soil removal and disposal in 2016 and 2017, which included:
  - Excavated soils with concentrations exceeding 900 milligrams/kilogram (mg/kg) within the footprint of former Building B (excavation depths ranged from 1 to 9 feet bgs);
  - Characterized excavated materials to determine the proper disposal option; and
  - 750 tons of excavated soils were dewatered, treated with Metals Treatment Technologies, LLC (MT2) ECOBOND®, and disposed of as non-hazardous soil at Waste Management's Columbia Ridge Landfill in Arlington, Oregon in 2017.
  - This area was re-excavated as part of the On-Property Soils and Surface Water Interim Action (OSP IA) to 10 to 15 feet bgs (see Section 2.2.10; PERC 2025).

2.2.6 Remedial Investigation Report for On-Property Soils and Surface Water

The RI for OSP characterized the nature and extent of contamination in the context of past activities on the Property including presentation and evaluation of the analytical data, fill characteristics, and other pieces of information that had been collected on the Property through the completion of Phases I, II and III of the RI (PERC 2013). Specifically, the RI-OSP found that:

- Arsenic and lead are present in soil throughout the Property at concentrations exceeding industrial land use direct contact screening levels.
- Arsenic, cadmium, lead, pentachlorophenol and vinyl chloride in soil may be contributing to the presence of these constituents in the surficial aquifer.
- Total petroleum hydrocarbon (TPH) gasoline fraction, diesel fraction, and heavy oil fraction soil concentrations are greater than the industrial land use direct contact screening levels in a few isolated locations. In all cases these occurrences are co-mingled with arsenic and/or lead exceedances.
- Volatile organic compounds (VOCs; in particular trichloroethylene (TCE) and vinyl chloride) were associated with the wastewater treatment sludge formerly located in the western corner of the Property. An IA removed the VOC-containing wastewater treatment sludge, with the exception of a thin lens of the material at the excavation limits along the southern property boundaries in two directions - toward the Gardner-Fields property and toward the off-Property drainage ditch (PERC 2012c).
- Arsenic, cadmium, lead, mercury, TPH heavy oil fraction, pentachlorophenol, 1,2-cis-dichloroethylene, and TCE have been detected in perched water above drinking water screening levels.
- In addition, the RI-OSP identified six soil Operable Units (OU 1 through OU6) based upon the distinct characteristics their fill types (see Figure 4).

2.2.7 Feasibility Study for On-Property Soils and Perched Water

The FS-OSP presents the technical approach to remediate soils and perched water on the Property only (PERC 2014c). The FS-OSP determined the remedial action objectives (RAOs), Cleanup Levels (CLs), and Remediation Levels (RELs) which set the qualitative and quantitative remediation goals for the remediation of soils and perched water on the Property.

The FS-OSP identified one exposure pathway by which industrial workers could indirectly contact constituents in on-Property perched water. This involves the migration of constituents from perched water to groundwater, with the underlying groundwater used as part of a future process cooling water system. Under this scenario, exposure of industrial workers could occur as a part of maintenance activities on the cooling water system. Based on this pathway, the non-potable groundwater CLs for arsenic, cadmium and lead were calculated to be 0.67, 1.05 and 1.65 milligrams per liter (mg/l), respectively. However, this pathway is not complete as use of a groundwater-fed process cooling water system does not occur at the Property.

The FS-OSP identified the following two potentially complete exposure pathways for soil: (1) the soil-to-perched water pathway where constituents in soil leach or migrate into perched water; and, (2) direct contact with soils by a future utility worker.

CLs for the soil-to-perched water pathway were developed for arsenic and lead for each of the six OUs depending on the leachability of the material in each OU. The CLs for arsenic and lead in OU 3 were calculated at 114 and 2,121 mg/kg (see the FS-OSP for CLs for the other OUs).

CLs for the direct soil pathway were developed for arsenic and lead for the Property as a whole. The CLs for arsenic and lead were calculated at 588 and 1,000 mg/kg.

The FS-OSP determined that the CLs are the RELs for arsenic and did not specifically calculate RELs for lead, since arsenic and lead are typically co-located, and remediation of arsenic soils will also remediate lead to below the industrial CL for lead of 1,000 mg/kg.

The FS-OSP selected preferred remedial alternative for on-Property soils and perched water consists of:

- Installing a Slurry or Grout Wall Around the Property Perimeter;
- Treating Perched Water to the Perched Water REL;
- Excavating and Disposing of Soil Greater Than Direct Contact RELs in OUs 4 and 6;
- Excavating and Stabilizing Soils Greater Than Soil-to Perched Water RELs in OUs 1, 2, and 3;
- Covering the Property; and,
- Applying a Deed Restriction to Ensure On-Going Industrial Land Use.

The FS-OSP indicated that after completion of the six cleanup actions, on- and off-Property groundwater will be monitored to determine the progress of natural attenuation.

2.2.8 Feasibility Study for On-Property Soils and Perched Water Addendum 1

The FS-OSP Addendum 1 presents a revised remedial alternative that was determined during the remedial design process to implement the FS-OSP selected alternative (PERC 2014c; PERC/PIONEER 2017b). The revised alternative removed installing a slurry or grout wall around the Property perimeter. Ecology agreed to the revised remedial alternative on August 24, 2017, which consists of:

- Treating Perched Water to the Perched Water REL;
- Excavating and Disposing of Soil Greater Than Direct Contact RELs in OUs 4 and 6;
- Excavating and Stabilizing Soils Greater Than Soil-to Perched Water RELs in OUs 1, 2, and 3;
- Covering the Property; and,
- Applying a Deed Restriction to Ensure On-Going Industrial Land Use.

The FS-OSP Addendum 1 also indicted that after completion of the five cleanup actions, on- and off-Property groundwater will be monitored to determine the progress of natural attenuation.

2.2.9 Cleanup Action Plan for Interim Action Phase IV On-Property Soils and Perched Water

The CAP-OSP summarizes the technical approach of the preferred remedial alternative that was selected in the FS-OSP (see Section 2.2.7; PERC/PIONEER 2015b). The CAP-OSP includes installing a slurry or grout wall around the Property perimeter as selected in the FS-OSP. However subsequent to Ecology's approval of the CAP-OSP the FS-OSP Addendum 1 was approved by Ecology which removed installing a slurry or grout wall around the Property perimeter from the selected remedy. As such a slurry or grout wall was not be installed around the Property perimeter as part of the CAP-OSP. Remediation of soils and perched groundwater on the Property as described in the CAP-OSP were completed between 2017 and 2024, under an interim action approach following a Remedial Design Report approved by Ecology in 2018 (PERC/PIONEER 2018a). The CAP indicated that following remediation of soils and perched groundwater the Property will be covered with a cap and a deed restriction will be placed on the Property to ensure industrial land use.

2.2.10 Interim Action Phase IV for On-Property Soils and Perched Water

The Interim Action Phase IV for On-Property Soils and Perched Water Report (OSP IA) provides documentation of CAP-OSP remediation activities conducted at the Property (PERC 2025). On-Property Soils and Perched Water IA remedial actions at the Site included (Figure 5 shows the excavated area):

- The demolition of the former administrative Building (Building A; PERC/PIONEER 2018b);
- The excavation and treatment of soils likely to be (from the evaluation of RI data) characteristically hazardous to a maximum depth of 15 feet;
- The excavation of soils likely to be (from the evaluation of RI data) characteristically non-hazardous to a maximum depth of 15 feet;
- The treatment, analytical evaluation and the disposal of soils likely to be (from the evaluation of RI data) characteristically hazardous to a maximum depth of 15 feet;
- The management of stockpiled soils requiring off property disposal;

- The restoration and paving of the disturbed areas of the Property following the completion of work to the grading plan as required in the Project's Construction Stormwater Permit; and
- The restoration of the Property to pre-construction conditions following remediation.

At the completion of the OSP IA over 37,500 cubic yard (CY) of soil and debris were excavated. Over 24,000 CY (30,133 tons) was treated and disposed of at the LRI landfill and over 13,400 CY of soil was reused. In addition, 161 tons of (Resource Conservation and Recovery Act) RCRA hazardous soil, 22 tons RCRA hazardous soil with liquid, 320 tons of RCRA hazardous wastewater sludge, 4,800 tons of WA Dangerous Waste hydrated lime and 397 tons of RCRA hazardous debris was disposed of at hazardous waste landfills. In total over 200,000 pounds of arsenic and lead were treated or removed from the property.

Specific areas of the property with arsenic and lead concentrations greater than their RELs were left in-place following remediation. The majority of these areas are under obstructions that made additional excavation impossible or unpractical. These areas include:

- Soil and perched groundwater under the current production building (Building C);
- Soil and perched groundwater under the current storage building (Building D);
- Soil and perched groundwater along the property boundary with the City of Tacoma rail line tracks;
- Soil and perched groundwater under the railroad spur that formerly supplied rail access to the existing storage silos;
- Soil along property boundary with Gardner Fields;
- Soil greater than 15 feet bgs; and
- Small sections on property locations that were inaccessible due to plant operations.

2.2.11 *Remedial Investigation Phase IV Characterization of Drainage Ditch Sediment*

Phase IV RI consisted of characterization of the sediment and surface water in the drainage ditch (see Figures 2 and 5; PERC/PIONEER 2017a). The RI Phase IV included a sampling event on September 7th and 8th, 2016 to characterize the nature and extent of arsenic and lead as well as TPH in ditch sediment and surface water that remain after remediation of an asphalt tar oil spill (Ecology 2015a). Gardner-Fields Products spilled asphaltic tar oil on their property and approximately 70,000 gallons was released into the ditch on February 8, 2015 (Ecology 2015a). ERM, on behalf of Gardner-Fields Products, conducted remediation in the ditch (including sediment removal) to address the spill. Post-remediation sediment samples were collected and the results indicated that elevated arsenic (up to 330 mg/kg) and lead (up to 350 mg/kg) concentrations remained in the ditch (ERM 2015).

The Phase IV RI used the following sediment screening levels for this evaluation:

- Washington State sediment background concentrations; and
- MTCA Lower Tier Freshwater Sediment Cleanup Objectives (SCOs), Freshwater Sediment Cleanup Levels (SCLs), and Upper Tier Freshwater Sediment Cleanup Screening Levels (SCSLs), as promulgated by Ecology in the Sediment Management Standards (Ecology 2013b).

Based on data collected during the September 2016 sampling event the Phase IV RI determined that the SCSL exceedances for all constituents were primarily located in surface sediment (i.e., 0-0.5 feet bgs). The majority of concentrations collected from 0.5 to 8 feet bgs were non-detect or were detected below background concentrations. Residual contamination above SCLSs/SCOs from the asphalt tar oil spill remained in surface sediment in the ditch.

2.2.12 Interim Action Phase III Ditch Remediation

Based on the findings from Phase IV RI, Phase III IA was initiated to remediate the drainage ditch. Phase III IA addressed the arsenic and lead concentrations that were present in the ditch adjacent to the Superlon property that were potentially associated with the Superlon Site (PERC/PIONEER 2025c and 2025d).

The objectives of Phase III IA were:

- Excavate sediment from surface grade in areas of the ditch where arsenic and lead concentration exceed the Freshwater SCOs promulgated by Ecology in the Sediment Management Standards (Ecology 2013b);
- Confirm the effectiveness of the remediation using confirmation sampling on the base and sidewall of the remediation excavations; and
- Restore the sediment in the ditch.

Phase III met the objectives by removing all soils above the remediation levels in all of the excavated RAUs (see Figure 5).[3] Excavation sidewall sample results indicate that soil and sediment with elevated concentrations of lead and/or arsenic remain along the borders of the ditch, including areas developed with (e.g., Superlon Property buildings, the Haub Log Yard retaining wall, Lincoln Avenue).

2.2.13 Remedial Investigation Phase V Characterization of Operable Unit 3

Phase V RI consisted of characterization of the soil and groundwater in OU 3 to better determine 1) the connection between the Perched and Shallow Aquifers; 2) the distribution of arsenic in the vadose zone soil, Perched Aquifer soil, and groundwater at OU 3; 3) the prevalence of arsenic within highly stable minerals and iron oxide concentrations within the Upper Aquitard; and 4) the distribution of dissolved arsenic and lead in groundwater along the Property boundary.

Key conclusions from evaluations presented in the Phase V report include (PERC/PIONEER 2023a):

- OU 3 arsenic groundwater concentrations in the Perched Aquifer are significantly less than Shallow Aquifer arsenic groundwater concentrations. This indicates the Perched Aquifer at OU 3 was not a significant source contributing to the Shallow Aquifer arsenic plume.
- OU 3 arsenic soil concentrations in the Perched Aquifer were lower than those in the Upper Aquitard, which indicates that the majority of the arsenic mass at OU 3 is located in the Upper

[3] IA Phase III divided the ditch into segments referred to as remedial action units (RAUs). Each RAU was excavated until bottom confirmation samples from the RAU confirmed that all soils and sediments in the RAU with arsenic and lead concentrations above the RELs had been removed.

Aquitard. This is congruent with historical information indicating that the tidal flats within OU 3 were filled with hydrated lime between 1966 and 1972, long after lead arsenate and calcium arsenate insecticide activities ended in 1951 (i.e., the fill that created the Perched Aquifer within OU 3 was brought on to the Property after the releases of lead arsenate and calcium arsenate had occurred).

- Precipitation or co-precipitation of arsenic with highly stable minerals in the Upper Aquitard of OU 3 and low arsenic groundwater concentrations in the Perched Aquifer were observed. This combination of factors indicates that arsenic in soil at OU 3 is not leaching into groundwater to the extent predicted by leachability analysis and is not causing arsenic groundwater concentrations to exceed the groundwater REL.
- Arsenic groundwater concentrations in the Perched Aquifer exceeded the Preliminary Cleanup Level (PCL) of 0.0080 mg/L along all sides of the Property boundary where water was present (see Figure 6).
- Arsenic groundwater concentrations in the Shallow Aquifer ranged from 0.11 to 65 mg/L. The distribution appears to indicate (1) dominant plume migration to the southwest, south, and southeast, (2) minor plume migration to the west and northwest, and (3) a possible off-Property source to the southeast (see Figure 7).
- Arsenic groundwater concentrations in the Intermediate Aquifer plume are delineated to the PCL of 0.0080 mg/L along the southwest, northwest, and northeast sides of the Property boundary. The Intermediate Aquifer plume is not delineated to the southeast (see Figure 8).

Recommendations in this report include:

- Conduct off-Property investigation(s) to delineate the groundwater plume in the Perched, Shallow, and Intermediate Aquifers.
- The arsenic soil REL of 114 mg/kg for OU 3 was selected based on leachability analysis (PERC 2014c). However, data from this investigation indicates that arsenic in soil at OU 3 is not leaching into groundwater to the extent predicted by leachability analysis and is not causing arsenic groundwater concentrations to exceed the groundwater REL. Therefore, it is recommended that the CAP-OSP arsenic soil REL for OU 3 be based on the soil direct contact pathway cleanup level of 588 mg/kg.

2.2.14 Groundwater Monitoring

Groundwater monitoring (GWM) has been conducted at the Site since 2011. GWM was conducted quarterly from the third quarter of 2011 until the fourth quarter of 2015, when the sampling frequency was reduced to one event per year (Ecology 2015b). The results of the 2015 through 2024 GWM events were documented in the 2015 through 2025 GWM Reports (PERC/PIONEER 2015a, 2016, 2017c, 2018c, 2019, 2021a, 2021b, 2023b, 2025a, and 2025b, and PIONEER 2025a).

The results from the most recent GWM event indicate the on-Property soil and perched groundwater interim action removal action has resulted in significant decreases in arsenic concentrations within the Shallow Aquifer, particularly in MW-9S and MW-10S. While some MWs show slight increases in arsenic, the maximum concentrations in these MWs are significantly lower than those in MWs with decreasing trends. This indicates a much greater decrease in dissolved mass in the MWs with decreasing trends compared to the increase in dissolved mass in the MWs with increasing trends. Arsenic concentrations in the downgradient Intermediate Aquifer MWs remain stable and are generally less than the Puget Sound groundwater arsenic background threshold value of 0.008 mg/L (Ecology 2022). Fluctuations in arsenic concentration were noted in the source area MW MW-13I, which will continue to be monitored as part of the annual sampling program. Lead concentrations in the Shallow Aquifer are generally one to three-orders of magnitude less than arsenic concentrations and were only detected in three shallow MWs (MW-4S, MW-10S, and MW-13S) in 2025, with no detections in intermediate MWs. It is anticipated that arsenic concentrations in the Shallow Aquifer will continue to decrease in response to the on-Property soil and perched groundwater interim action removal action (PIONEER 2025a). Lead concentrations in the Shallow Aquifer are variable, with a decreasing trend in MW-10S and an increasing trend in MW-4S, and will continue to be evaluated as part of the annual GWM program.[4]

The GWM well network historically consisted of 26 Shallow and Intermediate Aquifer co-located MWs installed at 12 locations on and off the Property. As of 2025, 10 MWs remained in place, while the other 16 have been decommissioned (see Figure 3). A brief history of MW locations is presented below:

- Seven Shallow Aquifer MWs (MW-1S – MW-7S) were installed during Phase I RI activities in 2011, in accordance with the Phase I RI Work Plan (PERC 2010).
- One Shallow Aquifer MW (MW-8S) and eight Intermediate Aquifer MWs (MW-1I – MW-8I) were installed during Phase III RI activities in 2012, in accordance with the Phase III RI Work Plan (PERC 2012a).
- Four Shallow Aquifer MWs (MW-9S – MW-12S) and four Intermediate Aquifer MWs (MW9I – MW12I) were installed during Phase IV RI activities in 2014, in accordance with the Phase IV RI Work Plan (PERC 2014b).
- Sixteen MWs were decommissioned in 2017 (MW-1I, MW-1S, MW-3I, MW-3S, MW-5I, MW-5S, MW-6I, MW-6S, MW-7I, MW-7S, MW-8I, MW-8S, MW-11I, MW-11S, MW-12I, and MW-12S; PERC/PIONEER 2018c).

[4] The disparity between dissolved arsenic and lead concentrations reflects their contrasting geochemical behavior in groundwater systems. Lead has very low solubility under the near-neutral pH conditions typical of the Site's aquifers and is strongly sorbed to iron oxides, clay minerals, and organic matter in the aquifer matrix. As a result, lead released from source soils is predominantly retained in the solid phase and migrates very slowly relative to groundwater flow. Arsenic, by contrast, is more mobile than lead (Smedley and Kinniburgh 2002). This geochemical distinction explains why arsenic, rather than lead, defines the extent of the dissolved-phase groundwater plume and is the primary indicator constituent for plume delineation in this Work Plan.

- One Shallow Aquifer MW (MW-13S) and one Intermediate Aquifer MW (MW-13I) were installed in November 2019 (PERC/PIONEER 2021a).[5]

[5] MW-13S and MW-13I were installed in the proximate location of MW-3S and MW-3I, which were abandoned in 2017 to allow for soil remediation.

SECTION 3: INITIAL CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) provides a framework for understanding the nature and extent of contamination at the Site, including contaminant sources, release mechanisms, migration pathways, and potential receptors. This section synthesizes historical Site information (PERC 2013; PERC/PIONEER 2011, 2023a, 2025), hydrogeologic conditions (PERC 2014b; PERC/PIONEER 2017a), and analytical data to develop an understanding of the groundwater contamination at the Site that will guide the Phase VI RI in accordance with Ecology guidance (Ecology 1995).

3.1 Primary Contaminant Sources

Historical Site operations and filling activities have resulted in multiple sources of groundwater contamination (PERC 2013). The primary sources of arsenic and lead contamination include:

Lead Arsenate and Calcium Arsenate Pesticide Manufacturing (1925-1946): Latimer-Goodwin and subsequently Grasselli manufactured lead arsenate and calcium arsenate insecticides on the Property (PERC/PIONEER 2011; PERC 2013). These operations were the primary source of arsenic and lead contamination, particularly in Operable Units 1 and 2, which correspond to the footprints of former Buildings A and B (see Figure 4). Elevated arsenic and lead concentrations in soil throughout the Property are directly attributable to these historical pesticide manufacturing activities.

Industrial Wastewater Treatment Sludge: VOCs, particularly TCE and vinyl chloride, were associated with industrial wastewater treatment sludge (from chlor-alkali manufacturing) formerly located in the southwestern corner of the Property (PERC 2013). The majority of this sludge was removed during Phase II Interim Action (PERC 2012c), though thin lenses remain along the southeastern property boundaries toward the Gardner-Fields property and the off-Property drainage ditch.

Off-Property "Shot" Material: Black spherical crystalline particles ("shot"), likely originating from the former adjacent US Gypsum rock wool production facility at 2301 Taylor Way, were identified in Operable Units 5 and 6 (PERC 2025). These materials contain elevated arsenic and lead concentrations and represent a distinct contaminant source.

3.2 Release Mechanisms and Environmental Fate

Contaminants have been released to environmental media through multiple mechanisms (PERC 2013; PERC 2014c):

Direct Deposition and Soil Impacts: Manufacturing operations resulted in direct deposition of arsenic and lead compounds into surface soils. The Phase IV Interim Action (2017-2024) excavated and treated over 37,500 CYs of impacted soil, removing over 200,000 pounds of arsenic and lead from the Property (PERC 2025). However, contaminated soil remains in place under Buildings C and D, beneath the railroad spur, along the Gardner-Fields property boundary, below 15 feet bgs, and along the City of Tacoma rail line (see Figure 5).

Leaching to Groundwater: Arsenic and lead in soil have leached into underlying groundwater systems. The extent and rate of leaching varies by operable unit based on soil characteristics and geochemical conditions. Phase V RI data from OU 3 indicate that arsenic is not leaching into groundwater to the extent originally predicted by laboratory leaching analysis (PERC/PIONEER 2023a; Wenzel et al. 2001), suggesting that Site-specific geochemical conditions (particularly precipitation or co-precipitation with stable minerals in the Upper Aquitard) limit arsenic mobility in certain areas.

VOC Migration: VOCs associated with the industrial wastewater treatment sludge have migrated through soil and into groundwater. TCE and vinyl chloride have been detected in groundwater samples from the Perched and Shallow Aquifers. Additionally, if residual VOCs are present in the perched aquifer they have the potential to partition into the soil vapor phase.

3.3 Hydrogeologic Framework and Contaminant Transport

The Site's hydrogeologic framework controls groundwater flow directions and contaminant transport rates (PERC 2014b; PERC/PIONEER 2017a). The five hydrostratigraphic units identified at the Site create a complex multi-aquifer system with varying degrees of hydraulic connectivity:

Perched Aquifer Characteristics: The Perched Aquifer is approximately 8 to 10 feet thick and exists within the anthropogenic fill unit. Groundwater is typically encountered at depths of less than 6 feet bgs and daylights in the on-Property stormwater infiltration basin. Phase V RI documented arsenic concentrations exceeding the PCL of 0.0080 mg/L along all Property boundaries where water was present (see Figure 6). The Perched Aquifer is discontinuous with thickness and lateral extent varying based on historical fill practices (PERC/PIONEER 2023a).

Upper Aquitard: This 5 to 10 foot thick unit of clayey silt represents the historic tideflat surface and provides partial separation between the Perched Aquifer and Shallow Aquifer. However, thin or leaky portions have been identified in the central Property area, allowing potential vertical migration of contaminants. Geochemical analysis suggests this unit plays a critical role in arsenic attenuation through precipitation and co-precipitation mechanisms (PERC/PIONEER 2023a and Wenzel et al. 2001).

Shallow Aquifer System: The Shallow Aquifer is the primary contaminant transport pathway at the Site. Thickness ranges from 10 to 22 feet, consisting of fine to medium sand with shell fragments and silt interbeds. Phase V RI documented arsenic concentrations ranging from 0.11 to 65 mg/L on-Property, with dominant migration to the southwest, south, and southeast (see Figure 7). The plume has not been delineated to below the PCL in any direction. Tidal influences affect groundwater elevations in this unit (PERC/PIONEER 2023a).

Intermediate Aquitard and Aquifer: The Intermediate Aquitard (10 to 20 feet thick clayey silt) provides partial separation from the deeper Intermediate Aquifer (>20 feet thick sand). The Intermediate Aquifer plume has been delineated to below the PCL in three directions (southwest, northwest, northeast) but remains undelineated to the southeast (see Figure 8). Hydraulic connectivity between the Shallow and Intermediate Aquifers appears to be very limited (PERC/PIONEER 2023a).

Groundwater Flow and Tidal Influences: The distribution of dissolved arsenic concentrations in the Shallow Aquifer indicates dominant plume migration to the southwest toward the drainage ditch, as well as to the south and southeast (PERC/PIONEER 2023a). Plume delineation relies on indicator constituent concentrations rather than groundwater gradient mapping, as historical gradient patterns may have shifted. Furthermore, groundwater gradients in the aquifers are known to be tidally influenced; quantitative evaluation of these tidal influences and gradients will be evaluated during Task 4 – Quarterly Groundwater Monitoring (see Section 5.4). These gradient data will supplement and refine the concentration-based plume delineation, providing an independent line of evidence for assessing plume migration directions and rates.

3.4 Exposure Pathways and Potential Receptors

The CSM identifies several potential exposure pathways and receptors (see Figure 9) that require evaluation as part of the RI/FS process:

Groundwater-to-Vapor Intrusion: Preliminary vapor intrusion assessments conducted during prior investigations indicated this pathway is incomplete for current Site conditions (PERC 2014c). The majority of VOC-containing sludge was removed during Phase II IA, and the Phase IV source removal further reduced residual contamination. If VOCs are detected in perched groundwater during future monitoring events at concentrations warranting further evaluation, soil vapor intrusion sampling may be considered at that time. Future development of the Site or adjacent properties may also warrant re-evaluation of this pathway.

Direct Contact by Future Workers: Under current industrial/commercial land use, potential future Site workers could encounter contaminated groundwater during utility work, foundation excavation, or other subsurface activities. However, this exposure pathway is considered incomplete because groundwater is not currently accessed on-Property, no current plans exist for groundwater extraction, and an environmental covenant is anticipated to be put in place on the Property that prohibits extraction or removal of groundwater for any purpose (PIONEER 2025b).

On-Property Surface Water: Following the Interim Actions completed in 2025, Buildings A and B were removed, and the stormwater infiltration basin underlying these structures was reconfigured and surrounded by an asphalt-paved parking area. This configuration creates a potential exposure pathway for workers accessing the basin, as it receives both stormwater sheet flow and daylighting groundwater from the Perched Aquifer.[6] While this pathway will be evaluated as part of the RI/FS process, long-term exposure risks are unlikely due to the in-situ groundwater treatment additive (Free Flow FF-200 FS or FF-100 FS) that was mixed into the backfill during the Phase IV Interim Action. This additive is designed to continually bind dissolved arsenic and lead to soil particulates (primarily iron) as the backfilled areas re-saturate, providing ongoing source control. Recent updates to EPA toxicity values in January 2025

[6] The basin is an industrial-property best management practice that does not discharge to a water of the state; it is therefore not subject to WAC 173-201A surface water criteria.

increased the toxicity profile for arsenic, resulting in a calculated non-potable perched groundwater REL of 63 µg/L for the basin worker exposure scenario (dermal contact below the knees and incidental ingestion during walking, wading, and splashing); the REL was derived under WAC 173-340-708(3) and -745 using the arsenic oral and dermal toxicity values from the February 2025 CLARC update, with the cancer endpoint controlling. Full derivation is documented in the Stormwater Infiltration Basin REL Memo (PIONEER 2025c). A water sample collected in August 2025 detected dissolved arsenic at 530 µg/L, significantly exceeding the REL. Consequently, institutional controls, including fencing and access restrictions, are required to manage risks to workers performing maintenance activities (PIONEER 2025b).

Surface Water Migration: Groundwater may discharge to the off-Property drainage ditch southwest of the Property. Sediment in the ditch was remediated to the Lincoln Avenue culvert during Phase III IA (PERC/PIONEER 2025c and 2025d; Figure 5), which included backfilling the ditch with clean imported sediment under the Sediment Management Standards (SMS) Freshwater Sediment Cleanup Objective (SCO; 14 mg/kg arsenic) for the 0–2 ft biologically active zone, eliminating the ecological direct-contact pathway for that portion of the ditch (WAC 173-204; Ecology 2013b). Downgradient of the Phase III IA terminus at the Lincoln Avenue culvert, the ditch was not remediated due to access constraints from existing infrastructure; ecological receptors (benthic invertebrates and aquatic life under WAC 173-204) in the unremediated downgradient reach remain a potentially complete pathway and will be evaluated as part of the Task 3/4 ditch characterization, with receptor classification (freshwater SCO, low-salinity criteria, or marine SQS) conditional on pore water salinity. The remaining questions are (1) whether Site-related groundwater discharges to the ditch at concentrations that could affect surface water quality, and (2) whether sediment downstream of the culvert contains COCs at levels that exceed the applicable SMS criteria. Following installation of permanent MWs in the perched aquifer proximal to the ditch (Task 3), water level data will be used to evaluate the hydraulic gradient between the perched groundwater system and the ditch invert. If sustained water level data indicate that the groundwater table intersects the ditch bottom and a discharge pathway exists, surface water sampling in the ditch will be evaluated as a component of long-term monitoring. If discharge is not indicated, the ditch pathway will be documented as incomplete and Ecology concurrence will be sought. Ecological receptor classification for any surface water sampling will be conditional on pore water salinity per WAC 173-204-200 (freshwater SCO, WAC 173-204-562; low-salinity criteria, WAC 173-204-563; or marine SQS, WAC 173-204-320); pore water salinity will be incorporated into the Task 3/4 ditch sampling plan. Quantitative groundwater (GW)-to-surface water (SW) pathway evaluation will be documented in a post-Task 3/4 evaluation memorandum (see “Post-Task 3/4 Evaluation Memoranda” below).

Ditch Sediment/Soil Direct Contact: Future intrusive activities in the Lincoln Avenue right-of-way (utility, drainage, and road-maintenance work) could result in workers having direct contact with ditch sediment and underlying soil below the biologically active zone (see Figure 9). [7] Quantitative evaluation

[7] Most of the Phase III IA excavation extended deeper than 2 ft, frequently between 5 and 10 ft, before clean backfill placement (see PERC/PIONEER 2025c and 2025d for excavation specifics).

will be conducted under WAC 173-340-740(6) and -745 using the depth-stratified framework described in Section 4.1.5. Sampling depths and assignment of the framework require wet-season groundwater elevation data from the Task 3 permanent monitoring wells to bound the vadose/saturated boundary beneath the ditch (see Section 4.1.5).

Off-Property Migration: The primary exposure concern is ongoing off-Property migration of arsenic-contaminated groundwater. Adjacent properties include industrial/commercial facilities (Port of Tacoma, Gardner-Fields), transportation corridors (Taylor Way, Lincoln Avenue), and municipal infrastructure (City of Tacoma). Characterization of off-Property plume extent is necessary to evaluate potential impacts to these receptors and to define Site boundaries under MTCA.

Post-Task 3/4 Evaluation Memoranda: The pathway-specific evaluations identified above will be documented in technical memoranda following completion of Task 3 well installation and Task 4 quarterly sampling (See Section 5.4). The post-Task 3/4 memoranda will document (i) derivation of the site-specific vadose-zone leaching cleanup level under WAC 173-340-747 using three-phase partitioning with soil-water distribution coefficient (Kd) values constrained by Sequential Extraction Procedure (SEP) data; (ii) initial SEP-based monitored natural attenuation evaluation for the saturated zone; (iii) quantitative groundwater-to-surface-water pathway evaluation using hydraulic gradient data from Task 3 wells, with receptor classification under WAC 173-204 conditional on pore water salinity; and (iv) the direct-contact pathway analysis for off-site excavation and maintenance workers under WAC 173-340-740(6) and -745. These memoranda will inform the RI/FS and any subsequent cleanup action plan.

3.5 Monitored Natural Attenuation Considerations

Given the removal of over 200,000 pounds of arsenic and lead during the Phase IV Interim Action, the Companies intend to evaluate Monitored Natural Attenuation (MNA) as a potential remedy component for groundwater (PERC 2025). This approach is consistent with United States Environmental Protection Agency (USEPA) guidance for inorganic contaminants (USEPA 2007a, 2007b, 2015).

Source Control Effectiveness: The Phase IV source removal substantially reduced the ongoing mass flux of arsenic to groundwater. In addition to the physical removal of over 37,500 CYs of contaminated soil, an in-situ groundwater treatment additive (Free Flow FF-200 FS, a 1:1 buffer-to-iron reagent) was mixed directly into the clean imported soil used to backfill the excavations (PERC 2025). This additive is designed to treat perched groundwater by binding dissolved arsenic and lead to iron particulates within the soil matrix, effectively removing them from the aqueous phase. The binding mechanism is ongoing; as the backfilled areas continue to re-saturate, the additive provides sustained source control by sequestering dissolved arsenic and lead that may leach from residual source areas beneath buildings, along property boundaries, and below 15 feet bgs. Recent 2025 monitoring data show decreasing trends in Shallow Aquifer arsenic concentrations following completion of soil remediation (PIONEER 2025a), providing preliminary evidence of both source control effectiveness and successful performance of the binding additives.

Geochemical Attenuation Mechanisms: Multiple lines of evidence suggest natural attenuation processes are occurring at the Site. Phase V RI data from OU 3 demonstrate that arsenic concentrations in the Perched Aquifer are significantly lower than predicted based on laboratory leaching studies, indicating in-situ immobilization through precipitation or co-precipitation with iron oxides and other stable mineral phases (PERC/PIONEER 2023a; Wenzel et al. 2001). The Upper Aquitard appears to function as a reactive zone limiting downward arsenic migration.

MNA Evaluation Framework: A comprehensive MNA evaluation will be conducted as part of the RI/FS following completion of plume delineation and long-term monitoring. The evaluation will follow USEPA guidance (USEPA 2007a, 2007b, 2015; Argonne 2003; Savannah River 2011) and will include: (1) documentation of contaminant trends, (2) characterization of attenuation mechanisms, (3) assessment of attenuation capacity and sustainability, (4) comparison of attenuation rates to migration rates, and (5) evaluation of protectiveness. A minimum of eight quarterly monitoring events is anticipated to establish the temporal dataset necessary for statistical trend analysis.

3.6 CSM Uncertainties

Several uncertainties remain in the current CSM that will be addressed through the phased investigation approach outlined in this Work Plan:

Off-Property Plume Extent: The lateral extent of the groundwater plume off-Property is unknown. The Perched Aquifer plume extent is uncertain due to the discontinuous nature of this unit. The Shallow Aquifer plume is not delineated in any direction. The Intermediate Aquifer plume remains open to the southeast. Complete three-dimensional plume characterization is a critical data gap (see Section 4.1).

Off-Property Contamination Sources: Phase V RI data suggest possible off-Property sources of arsenic contamination southeast of the Property, potentially related to former US Gypsum operations. The nature, extent, and contribution of these potential sources to groundwater contamination require investigation.

Regional Background and Source Attribution: The Site is located within the Tacoma Smelter Plume and the heavily industrialized Tacoma Tidal Flats, where arsenic and lead concentrations in groundwater and soil may be elevated due to regional contamination unrelated to the Superlon Site. The Puget Sound groundwater arsenic background threshold value of 0.008 mg/L (Ecology 2022) is equivalent to the PCL used as the plume delineation target throughout this Work Plan. At locations where off-Property arsenic concentrations approach but do not substantially exceed the PCL, distinguishing Site-related contamination from regional background will be an important interpretive consideration. This uncertainty is particularly relevant in the Perched Aquifer, where stormwater infiltration through arsenic affected surface soils on adjacent industrial properties may contribute to arsenic concentrations independent of Superlon Site sources. Evaluation of background contributions will be incorporated into the RI/FS using multiple lines of evidence, including concentration gradients relative to on-Property source areas, comparison with regional background datasets, and geochemical indicators where available.

Long-Term Source Term: While substantial source removal was achieved during Phase IV, contaminated soil remains in areas that were not accessible (beneath buildings, along property boundaries, below 15 feet). The long-term leaching potential of these remaining source areas and their impact on groundwater quality requires evaluation through post-remediation monitoring. In addition, the in-situ groundwater treatment additive (Free Flow FF-200 FS) incorporated into the excavation backfill during Phase IV is designed to continue binding dissolved arsenic and lead as the backfilled areas re-saturate, providing ongoing source control. The long-term effectiveness of this additive in reducing contaminant flux requires evaluation through post-remediation monitoring.

Attenuation Mechanisms and Sustainability: While preliminary evidence suggests natural attenuation is occurring, comprehensive characterization of attenuation mechanisms, rates, and long-term sustainability requires additional investigation, including geochemical sampling (pH, Eh, dissolved oxygen, arsenic speciation) and extended monitoring to document temporal trends.

SECTION 4: DATA GAP ANALYSIS

This section identifies critical data gaps that must be addressed to support the Site-wide Remedial Investigation and Feasibility Study per Ecology guidance (Ecology 1995, 2013b). The data gaps analysis builds upon the uncertainties identified in the CSM and focuses on information needs required to delineate groundwater plumes, evaluate remedial alternatives, and support regulatory decision-making under MTCA.

4.1 Plume Delineation Data Gaps

4.1.1 Perched Aquifer Delineation

Current Status: Phase V RI documented that arsenic concentrations in the Perched Aquifer exceeded the PCL of 0.0080 mg/L along all sides of the Property boundary where water was present (see Figure 6) (PERC/PIONEER 2023a). However, the Perched Aquifer is discontinuous, and its lateral extent and connectivity off-Property are poorly understood.

Data Gap: The lateral extent of the Perched Aquifer arsenic plume off-Property has not been delineated to below the PCL (see Figures 10a and 10b for proposed sampling locations). The presence, thickness, and water quality of the Perched Aquifer in areas adjacent to the Property (Lincoln Avenue, Taylor Way, Port of Tacoma property, Gardner-Fields property) are unknown.

Justification for Additional Data: Delineation of the Perched Aquifer plume is necessary to define the Site boundary under MTCA and to evaluate whether institutional controls, monitoring, or active remediation will be required for off-Property perched.

4.1.2 Shallow Aquifer Plume Extent

Current Status: Phase V sampling documented arsenic concentrations in the Shallow Aquifer ranging from 0.11 to 65 mg/L on-Property (see Figure 7) (PERC/PIONEER 2023a). The distribution indicates dominant plume migration to the southwest, south, and southeast, with possible off-Property sources to the southeast.

Data Gap: The lateral extent of the Shallow Aquifer arsenic plume off-Property has not been delineated to below the PCL in any direction (see Figures 10a and 10c for proposed sampling locations). The vertical distribution of contamination within the Shallow Aquifer (which ranges from 10 to 22 feet in thickness) is not well characterized off-Property. Additionally, the nature and extent of the suspected off-Property source to the southeast requires investigation.

Justification for Additional Data: Complete three-dimensional delineation of the Shallow Aquifer plume is essential for MTCA compliance and for evaluating remedial alternatives. The Shallow Aquifer represents the primary contaminant transport pathway at the Site and shows the highest arsenic concentrations.

4.1.3 Intermediate Aquifer Southeastern Extent

Current Status: Phase V RI delineated the Intermediate Aquifer arsenic plume to below the PCL of 0.0080 mg/L along the southwest, northwest, and northeast sides of the Property boundary (see Figure 8) (PERC/PIONEER 2023a). However, the plume remains open to the southeast.

Data Gap: The lateral extent of the Intermediate Aquifer arsenic plume to the southeast has not been delineated (see Figures 10a and 10d for proposed sampling locations). The connection (if any) between elevated concentrations in the Intermediate Aquifer and the suspected off-Property source in the Shallow Aquifer is unknown.

Justification for Additional Data: Complete delineation of the Intermediate Aquifer plume is required to define the Site boundary and to evaluate whether the suspected off-Property source impacts multiple aquifer systems.

4.1.4 Regional Background Characterization

Current Status: The PCL of 0.0080 mg/L used as the delineation target for arsenic is equivalent to the Puget Sound groundwater arsenic background threshold value (Ecology 2022). Off-Property groundwater data from this investigation will represent the first systematic characterization of arsenic concentrations in the aquifer systems surrounding the Property.

Data Gap: At the margins of the plume, arsenic concentrations attributable to Site releases may be indistinguishable from regional background levels influenced by Tacoma Smelter Plume deposition and industrial stormwater infiltration on adjacent properties. No Site-specific background dataset currently exists for the off-Property aquifer systems.

Justification for Additional Data: Distinguishing Site-related arsenic from regional background is necessary for defensible Site boundary definition under MTCA and for evaluating whether off-Property concentrations near the PCL require remedial action or represent ambient conditions. Task 1 data from the most distal boring locations (e.g., HPT-GW-101, HPT-GW-102, HPT-GW-107 through HPT-GW-110) will be evaluated against regional background datasets to assess whether a formal background study is warranted as a component of the RI/FS.

4.1.5 Sediment at the Western Terminus of the Ditch IAs

Current Status: Sediment in the off-Property Lincoln Avenue drainage ditch was addressed during the Phase III IA under the Sediment Management Standards (SMS; WAC 173-204), with backfill in the 0–2 ft biologically active zone (BAZ) meeting the Freshwater Sediment Cleanup Objective (SCO) of 14 mg/kg arsenic (Ecology 2013b; PERC/PIONEER 2025c, 2025d).[8] At the western terminus of the ditch, sampling and excavation concluded during the Phase III IA; sediment and soil beneath and laterally beyond the excavation footprint have not been characterized for the soil-to-groundwater pathway below the BAZ.

[8] Most of the Phase III IA excavation extended deeper than 2 ft, frequently between 5 and 10 ft, before clean backfill placement (see PERC/PIONEER 2025c and 2025d for excavation specifics).

Data Gap: Three aspects of the western terminus require additional characterization.

1) The vadose/saturated zone boundary beneath the ditch is not known; wet-season groundwater elevation data from the Task 3 permanent monitoring wells are needed to bound the saturated zone.
2) The direct-contact pathway for future excavation- and maintenance-worker exposure in the Lincoln Avenue right-of-way (utility, drainage, and road-maintenance activities) has not been evaluated under WAC 173-340-740(6) and -745.
3) The groundwater-to-surface-water (GW-to-SW) pathway between groundwater and the ditch has not been quantitatively characterized, and receptor classification under WAC 173-204 (freshwater SCO, low-salinity criteria, or marine SQS; WAC 173-204-200, -562, -563, -320) is conditional on pore water salinity, which has not been measured. The upgradient culvert centerline (2.43 ft NGVD29; ESM 2021; PERC/PIONEER 2025d) lies approximately 2.15 ft below the local Mean High Water elevation (4.58 ft NGVD29; NOAA Sta. 9446484, 1983–2001 tidal epoch), indicating a plausible mechanism for marine-water intrusion into ditch sediment pore water.

Justification for Additional Data: Characterization of the western terminus is required to evaluate ditch sediment and soil below the BAZ under a depth-stratified framework comprising a site-specific vadose-zone leaching cleanup level under WAC 173-340-747, a saturated-zone monitored natural attenuation evaluation under WAC 173-340-360(2)(c) (see Section 3.5), quantitative evaluation of the GW-to-SW pathway, and a direct-contact pathway evaluation under WAC 173-340-740(6) and -745. Pore water salinity is also required to identify applicable WAC 173-201A surface water criteria and WAC 173-204 sediment classification (freshwater, low-salinity, or marine). Western terminus sampling and pore water salinity measurements are conducted under Task 3/4 following installation of the Task 3 monitoring wells; sampling design (locations, depths, analytical suite, and pore water salinity protocol) will be presented in the Task 3/4 Work Plan.

SECTION 5: INITIAL REMEDIAL INVESTIGATION PLAN

This section presents the Initial RI Plan, which outlines a phased approach directly founded upon the uncertainties established in the Initial CSM (Section 3). Specifically, this Plan is designed to resolve the critical data gaps identified in the Data Gap Analysis (Section 4) to achieve full Site characterization. The investigation is structured into sequential tasks that are designed to be completed systematically. All field activities will be conducted in accordance with the Ecology-approved Site-Specific Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP; PERC/PIONEER 2022b) and Health and Safety Plan (PERC/PIONEER 2012).

5.1 Task 1: Phase VI Groundwater Characterization

Task 1 involves hydraulic profiling tool (HPT) borings with hydropunch groundwater sampling at eleven off-Property locations to delineate the arsenic and lead plumes in the Perched, Shallow, and Intermediate Aquifers. This work will provide three-dimensional characterization of groundwater contamination across the Property boundaries to guide future MW placement. The complete scope of work for Task 1, including detailed sampling design, field procedures, decontamination protocols, boring completion requirements, reporting format, and schedule, is presented below in Sections 5.1.1 through 5.1.7.

5.1.1 Purpose

The purpose of this section is to present the methodology for collecting and analyzing groundwater samples pursuant to this Work Plan in accordance with applicable components of Ecology guidance (Ecology 1995). Specific methods to be used to complete the field investigation are described in the SAP/QAPP (PERC/PIONEER 2022b).

The Site wide RI/FS will include defining the Site's boundaries and monitoring the Site's groundwater plume to determine the progress of natural attenuation following the OSP cleanup actions completed in 2024. The GWM network will be expanded in phases to delineate and monitor the groundwater plume in order to determine the progress of natural attenuation. Prior to installing MWs, a better understanding of the Site's hydrostratigraphy and the migration of dissolved arsenic and lead across the Property boundary is needed to guide the location of future MWs. The findings from this scope of work will support delineation of the Site's arsenic and lead groundwater plume in the Perched, Shallow, and Intermediate Aquifers which will be used to determine the location of new MWs.

5.1.2 Sampling Design

This section presents the sampling design of Phase VI to support delineation of the Site's arsenic and lead groundwater plume in the Perched, Shallow, and Intermediate Aquifers.

As part of Phase VI, groundwater samples will be collected and analyzed as summarized in Table 1 (see Figure 10a for sample locations and Figures 10b, 10c, and 10d for the sampling locations by aquifer with

the aquifer's groundwater arsenic concentrations). The SAP/QAPP summarizes the analytical methods, target reporting limits, and holding times for all media and analytes.

Eleven HPT borings (HPT-GW-101 through HPT-GW-110, and HPT-GW-08) are proposed to support delineation of the arsenic plume in the Perched, Shallow, and Intermediate Aquifers (see Figure 10a). HPT-GW-08 was proposed as part of the sample design for RI Phase V field work, but was unable to be completed at the time. HPT-GW-08 is re-proposed for completion during the RI Phase VI field work. HPT-GW-101 and HPT-GW-102 will be advanced to 50 feet bgs, while HPT-GW-103 through HPT-GW-110 and HPT-GW-08 will be advanced to 20 feet bgs.

The following analyses will be completed to determine the vertical extent of the Perched, Shallow, and Intermediate Aquifers and the dissolved arsenic and lead concentrations in the aquifers (see Table 1).

5.1.2.1 Delineating the Perched Aquifer

Arsenic groundwater concentrations in the Perched Aquifer exceeded the PCL of 0.008 mg/L along all sides of the Property boundary where sampled (see Figure 10b). To support delineation of the arsenic plume in the Perched Aquifer:

- HPT-GW-101 through HPT-GW-110 and HPT-GW-08 will be used to determine the vertical interval of the Perched Aquifer.
- Following the determination of the Perched Aquifer interval using the HPT, groundwater samples will be collected from the Perched Aquifer at each of the eleven locations. The groundwater samples will be collected from hydropunches installed in the Perched Aquifer to collect groundwater samples for dissolved arsenic and lead (following the procedures and methods presented in Section 3.2.2.2 of the SAP/QAPP).

5.1.2.2 Delineating the Shallow Aquifer

Arsenic groundwater concentrations in the Shallow Aquifer exceeded the PCL along all sides of the Property boundary where water was present (see Figure 10c). To support delineation of the arsenic plume in the Shallow Aquifer:

- HPT-GW-101 through HPT-GW-110 and HPT-GW-08 will be used to determine the vertical interval of the Shallow Aquifer.
- Following the determination of the Shallow Aquifer interval using the HPT, groundwater samples will be collected from the Shallow Aquifer at each of the eleven locations. The groundwater samples will be collected from hydropunches installed in the Shallow Aquifer to collect groundwater samples for dissolved arsenic and lead (following the procedures and methods presented in Section 3.2.2.2 of the SAP/QAPP).

5.1.2.3 Delineating the Intermediate Aquifer

Evaluation of the arsenic plume present in the Intermediate Aquifer during Phase V RI resulted in delineation to the southwest, northwest, and northeast sides of the property to below the PCL of 0.008 mg/L (see Figure 10d). To support delineation of the arsenic plume in the Intermediate Aquifer to the southeast:

- HPT-GW-101 and HPT-GW-102 will be used to determine the upper vertical interval of the Intermediate Aquifer. This evaluation is not designed to determine the lower extent of the Intermediate Aquifer, which is deeper than 50 feet bgs.
- Following the determination of the Intermediate Aquifer interval using the HPT, groundwater samples will be collected from the Intermediate Aquifer at each of the two locations. The groundwater samples will be collected from hydropunches installed in the Intermediate Aquifer to collect groundwater samples for dissolved arsenic and lead (following the procedures and methods presented in Section 3.2.2.2 of the SAP/QAPP).

5.1.3 Pre-Mobilization

Prior to the implementation of this Work Plan, a number of key pre-mobilization coordination tasks will need to be completed. Key pre-mobilization coordination tasks include:

- Coordinate the anticipated field schedule with Ecology.
- Coordinate access with Ecology, Gardner-Fields (HPT-GW-101 and HPT-GW-102), the Port of Tacoma (HPT-GW-103 through HPT-GW-106), and the City of Tacoma (HPT-GW-08, and HPT-GW-107 through HPT-GW-110).
- Coordinate with Chemours, PIONEER, and on- and off-Site contractors regarding health and safety details specific to this project (e.g., field team organization and communication, potential hazards and associated controls, work zones, decontamination, personal protective equipment, air monitoring).
- Obtain necessary health and safety paperwork from team members (e.g., training records).
- Call the Washington Call Before You Dig phone number for all proposed excavation and drilling locations.
- Conduct private utility locates at drilling locations.
- If necessary, core through asphalt/concrete to facilitate drilling activities.
- Ensure the licensed driller submits the necessary notices of intent and associated fees to the Ecology Water Resources Program for proposed drilling locations.
- Coordinate with the licensed driller, and field staff to ensure that sample volume, sample preparation, and sample preservation requirements can be met for the laboratory analyses.
- Coordinate with the project laboratories on key elements of the SAP/QAPP (e.g., sample volume, sample preservation, analytical methods and analytes, field quality control samples, target reporting limits).
- Obtain sample containers from the project laboratories.
- Obtain the necessary equipment and supplies (e.g., water level meter, water quality multimeter, 0.45-micron filters).

5.1.4 Decontamination

Between boring locations, decontamination will include the following process:

- Each length of pipe will be pressure washed.
- The exterior and interior surfaces of each rod will be scrubbed using Alconox® soap.
- The exterior and interior surfaces of each rod will be re-washed using a pressure washer.
- Decontamination of personnel and equipment will follow the procedures identified in the Project Health and Safety Plan (PERC/PIONEER 2012).

5.1.5 Boring Completion and Surveying

Following sampling, each boring will be backfilled with bentonite chips or grout in accordance with Chapter 173-160 WAC. Boring locations will be surveyed, establishing horizontal coordinates using a handheld GPS unit.

5.1.6 Reporting

Upon receipt of the qualified laboratory data, a Technical Memorandum will be developed that will include:

- A description of the work completed, noting any exceptions to the methodology described in this work plan;
- Figures showing the sampling locations;
- HPT logs for boring locations;
- The findings of the laboratory analyses; and
- Interpretation of the investigation's findings.

The findings presented in the Technical Memorandum will be used to guide the location of future MWs and will be incorporated into the RI/FS following delineation of the groundwater plume.

5.1.7 Task 1 Schedule

The preparatory and field work described in this work plan is anticipated to be completed within approximately three months following the execution of access agreements with all adjacent property owners (i.e., City of Tacoma, Port of Tacoma, and Gardner-Fields) and access is provided to all of the adjacent properties where borings are shown on Figure 10a. The Technical Memorandum is anticipated to be completed within approximately two months of completing the field work.

5.2 Task 2: Additional Characterization

Purpose: If Phase VI results indicate that additional characterization is needed to completely delineate groundwater plumes (particularly the Shallow Aquifer or to characterize suspected off-Property sources), Task 2 will consist of conducting supplemental investigation.[9]

Approach: Task 2 will be implemented only if Phase VI results indicate incomplete delineation. The approach includes: (1) evaluate Phase VI results to identify additional sampling needs, (2) identify specific additional boring locations, (3) work with Ecology to facilitate property access, (4) conduct supplemental HPT/hydropunch sampling, (5) prepare updated technical memorandum.

5.3 Task 3: Monitoring Well Network Design and Installation

Following complete plume delineation (Tasks 1-2), Task 3 will install a permanent off-Property MW network for long-term monitoring, MNA evaluation, and compliance demonstration.

[9] Task 2 may be unnecessary if Phase VI achieves complete delineation of all three aquifer plumes to below cleanup levels.

5.3.1 Network Design Principles

The MW network will be designed to serve multiple objectives, including monitoring downgradient plume extents, demonstrating CL achievement, tracking source area mass reduction, establishing background/upgradient reference conditions, and characterizing flow directions and vertical gradients. Individual MWs may serve more than one of these functions depending on their location and screened interval.

5.3.2 Well Specifications

MWs will be constructed to Ecology standards: 8-inch diameter boreholes; 2-inch Schedule 40 PVC casing; 0.020-inch slot screens; 10-foot screen intervals; #10-20 silica sand pack; bentonite seal above sand pack; grout to surface; flush-mount vaults (paved areas) or protective casings; surveyed to ±0.01 feet.

5.3.3 Installation Procedures

Installation will use hollow-stem auger with soil sampling at least every five feet. Screen placement will be field-adjusted based on lithology. MWs will be developed, surveyed, and sampled initially for arsenic, lead, and field parameters. Construction logs, as-builts, development records, survey data, and initial results will be documented. During monitoring MW installation, soil samples will be analyzed for arsenic and lead to characterize off-Property soil concentrations concurrent with MW construction. This phased approach, delineating the groundwater plume prior to collecting soil data, is consistent with the dynamic partitioning of arsenic and lead between groundwater and soil phases at this Site, which necessitates characterization of dissolved-phase plume geometry before interpreting solid-phase distributions. Soil analytical results will be incorporated into the updated CSM and used to evaluate whether additional soil characterization is warranted.

5.3.4 Anticipated New Well Locations

Based on current understanding, new MWs are anticipated on: Port of Tacoma property (downgradient), Gardner-Fields property (southeastern extent), Taylor Way and Lincoln Avenue rights-of-way. Specific locations and screened intervals will be determined based on Tasks 1-2 findings.

5.4 Preliminary Implementation Timeline

Table 2 presents the preliminary implementation schedule for completing the Remedial Investigation, Feasibility Study, and Cleanup Action Plan for the Superlon Plastics Site. The schedule accounts for MTCA regulatory requirements, property access constraints, and the sequential nature of investigation tasks.

Table 2. Preliminary Implementation Timeline

Phase	Activity	Timeframe	Key Milestones / Notes
Task 1	Work Plan Submittal & Ecology Review	Q4 2025 – Q2 2026	Work Plan Rev. 1 submitted Mar 2026; 60-day Ecology review
Task 1	Property Access Negotiations	Q2 2026	CRITICAL PATH: Gardner-Fields, Port of Tacoma, City of Tacoma
Task 1	HPT/Hydropunch Field Work & Lab Analysis	Q3 – Q4 2026	3 months field work + 1 month lab analysis
Task 1	Technical Memorandum & Ecology Review	Q4 2026- Q2 2027	Milestone: Phase VI Complete (Q2 2027)
Task 2	Results Evaluation & Access Facilitation	Q2 - Q4 2027	May be skipped if Task 1 achieves full delineation (6-8 month savings)
Task 2	Supplemental Investigation & Reporting	Q4 2027 - Q1 2028	Additional HPT/hydropunch if needed
Task 3	Task 3/4 Work Plan & Ecology Review	Q1 - Q3 2028	Design based on Tasks 1-2 findings
Task 3	MW Field Installation & Reporting	Q3 - Q4 2028	Milestone: MWs Installed (Q4 2028)
Task 4	Quarterly GW Sampling (8 events minimum)	Q4 2028 - Q3 2030	Milestone: 8 Quarters Complete (Q3 2030); MNA trend analysis; ditch discharge evaluation
Task 4	Post-Task 3/4 Evaluation Memoranda	Q3 – Q4 2030	Vadose-zone leaching CUL, SEP-MNA, GW-to-SW, and direct-contact pathway memos; informs RI/FS
RI/FS	Draft & Final RI/FS Reports	Q1 - Q4 2031	Milestone: Draft RI/FS Submitted (Q3 2031)
CAP	Draft CAP, Public Comment, Final CAP	Q1 - Q4 2032	Milestone: CAP Approved (Q4 2032)
Long-Term	IC Implementation & Monitoring	2032+	5-year periodic reviews per MTCA

The timeframes presented in Table 2 are planning-level estimates intended to illustrate the anticipated sequencing of investigation activities. Actual implementation timelines are dependent upon property access negotiations, regulatory review periods, contractor availability, and other factors outside the Companies' control. This schedule does not constitute a commitment to specific completion dates

Critical Path Items: (1) Property access negotiations with Gardner-Fields; (2) Complete plume delineation before MW installation; (3) 8 quarters of GWM; (4) Regulatory review timelines at multiple milestones.

Acceleration Opportunities: If Phase VI achieves complete delineation, Task 2 can be eliminated (6-8 months saved).

SECTION 6: REFERENCES

Argonne National Laboratory. 2003. Review of Arsenic Removal Technologies for Contaminated Groundwaters. April.

Ecology. 1995. Guidance on Sampling and Data Analysis Methods. January. https://fortress.wa.gov/ecy/publications/SummaryPages/9449.html

Ecology. 2013a. Electronic mail from Marv Coleman to Tim Bingman regarding Ecology approval to separate on-property soils investigations into a separate Remedial Investigation and Feasibility Study track. January 13.

Ecology. 2013b. Washington State Department of Ecology. Sediment Management Standards, Chapter 173-240 WAC. March.

Ecology. 2015a. Spills Program Investigation Summary Form. Gardner-Fields, Inc., asphalt spill. July 23.

Ecology. 2015b. Electronic mail from Marv Coleman to Jeff King with the subject "Reduction in groundwater monitoring." November 12.

Ecology. 2021 Sediment Cleanup User's Manual (SCUM) Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204 WAC. Third Revision December.

Ecology. 2022. Natural Background Groundwater Arsenic Concentrations in WA. Publication No. 14-09-044. January.

ERM. 2015. Asphalt Removal Completion Report. August 14.

ESM. 2021. Consulting Engineers LLC. 2021. Superlon Plastics Ditch As-Built. July 7.

PERC. 2010. Phase I Remedial Investigation Work Plan, for the Superlon Plastics Site, Tacoma, Washington. February.

PERC. 2012a. Phase III Remedial Investigation Work Plan, for the Superlon Plastics Site, Tacoma, Washington. July.

PERC. 2012b. Phase I Interim Action Report for the Superlon Plastics Site, Tacoma, Washington. January.

PERC. 2012c. Sludge Excavation and Disposal Report for the Superlon Plastics Site, Tacoma, Washington. March.

PERC. 2013. Remedial Investigation Report for On-Property Soils and Surface Water at the Superlon Plastics Property, Tacoma, Washington. August.

PERC. 2014a. Soil Excavation and Disposal Report – Building D Subsoils for the Superlon Plastics Site, Tacoma, Washington. January.

PERC. 2014b. Work Plan: Remedial Investigation for Groundwater – Phase IV. February 20.

PERC. 2014c. Feasibility Study Report for On-Property Soils and Perched Water at the Superlon Plastic Property, Tacoma, Washington. December.

PERC. 2025. Phase IV Interim Action Report for On-Property Soils and Perched Water at the Superlon Plastic Property, Tacoma, Washington. May.

PERC/PIONEER. 2011. Phase II Remedial Investigation Work Plan, for the Superlon Plastics Site, Tacoma, Washington. May.

PERC/PIONEER. 2012. Health and Safety Plan for the Superlon Plastics Site, Tacoma, Washington. April.

PERC/PIONEER. 2015a. 2015 Groundwater Monitoring Report Superlon Plastics Property. March 9.

PERC/PIONEER. 2015b. Cleanup Action Plan for On-Property Soils and Perched Water for the Superlon Plastics Site. Tacoma, Washington. July 30.

PERC/PIONEER. 2016. 2016 Groundwater Monitoring Report Superlon Plastics Property. October 26.

PERC/PIONEER. 2017a. Superlon Plastics Site: Remedial Investigation Phase IV Characterization of the Drainage Ditch Sediment – Results. February.

PERC/PIONEER. 2017b. Superlon Plastics Site: Addendum 1 to the Feasibility Study for On-Property Soils and Perched Water. June.

PERC/PIONEER. 2017c. 2017 Groundwater Monitoring Report Superlon Plastics Property. October 6.

PERC/PIONEER. 2018a. Remedial Design Report for the Superlon Plastics Site. March (updated).

PERC/PIONEER. 2018b. Building A Demolition Report for the Superlon Plastics Site, Tacoma, Washington. March.

PERC/PIONEER. 2018c. 2018 Groundwater Monitoring Report Superlon Plastics Property. October 16.

PERC/PIONEER. 2019. 2019 Groundwater Monitoring Report Superlon Plastics Property. October 21.

PERC/PIONEER. 2021a. 2020 Groundwater Monitoring Report Superlon Plastics Property. March 3.

PERC/PIONEER. 2021b. 2021 Groundwater Monitoring Report Superlon Plastics Property. November 30.

PERC/PIONEER. 2022a. Superlon Plastics Site: Remedial Investigation Phase V Work Plan for Characterization of Operational Unit 3 and Property Groundwater. March 17.

PERC/PIONEER. 2022b. Sampling and Analytical Plan & Quality Assurance Project Plan. February.

PERC/PIONEER. 2023a. Remedial Investigation Phase V Characterization of Operable Unit 3 Report – Superlon Plastics Site. July 18.

PERC/PIONEER. 2023b. 2022 Groundwater Monitoring Report Superlon Plastics Property. March 28.

PERC/PIONEER. 2025a. 2023 Groundwater Monitoring Report Superlon Plastics Property. February 6.

PERC/PIONEER. 2025b. 2024 Groundwater Monitoring Report Superlon Plastics Property. February 13.

PERC/PIONEER. 2025c. Phase III Interim Summary Report–Ditch Remediation Phase I. March 23.

PERC/PIONEER. 2025d. Phase III Interim Summary Report–Ditch Remediation Phase II. April 15.

PIONEER. 2025a. 2025 Groundwater Monitoring Report Superlon Plastics Property. October 16.

PIONEER. 2025b. Recommended Institutional Controls and Environmental Covenant Requirements for the Superlon Property - Pierce County Parcel No. 0321351042, Superlon Plastics Site, Tacoma Washington. December 18.

PIONEER. 2025c. Stormwater Infiltration Basin Remediation Level Memorandum, Superlon Plastics Site, Tacoma, Washington. November 25.

Savannah River National Laboratory. 2011. The Scenarios Approach to Attenuation-Based Remedies for Inorganic and Radionuclide Contaminants. August 4.

Smedley, P.L. and D.G. Kinniburgh. 2002. A Review of the Source, Behaviour and Distribution of Arsenic in Natural Waters. Applied Geochemistry 17(5): 517–568.

USEPA. 2007a. Monitored Natural Attenuation of Inorganic Contaminants in Groundwater: Volume 1, Technical Basis for Assessment. EPA/600/R-07/139. October.

USEPA. 2007b. Monitored Natural Attenuation of Inorganic Contaminants in Groundwater: Volume 2, Assessment for Non-Radionuclides Including Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Nitrate, Perchlorate, and Selenium. EPA/600/R-07/140. October.

USEPA. 2015. Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites. OSWER Directive 9283.1-36. August.

Washington Division of Geology and Earth Resources. 2015. Map Series 2015-03. Geologic Map of the Tacoma 1:100,000-scale Quadrangle, Washington

Wenzel, Walter et al. 2001. Arsenic Fractionation in Soils Using an Improved Sequential Extraction Procedure. Analytica Chimica Acta 436 (2001) 309-323.

Western Regional Climate Center. 2019. Climate Summary for Tacoma 1 Station (458278) between 1982 and 2016. http://www.wrcc.dri.edu, accessed February.

Tables

Table 1: Sampling Design for Superlon RI Phase VI - Off-Site Groundwater Investigation

Boring ID	Boring Location Note[1]	Estimated Boring Depth (feet bgs)	Media	Potential Sample Interval (feet bgs)	Sample Purpose	Arsenic and Lead GW[2]
HPT-GW-101	HPT locations are designed to determine the intervals of the Perched, Shallow and Intermidiate Aquifers. At each location a hydropunch groundwater sample will be collected from the Perched, Shallow, and Intermidiate Aquifers.	50	GW	9, 20, 50	Determine dissolved arsenic and lead concentrations in the Perched, Shallow, and Intermediate Aquifers off-Property towards the southeast (adjacent property owner: Gardner-Fields).	3
HPT-GW-102		50	GW	9, 20, 50		3
HPT-GW-103	HPT locations are designed to determine the intervals of the Perched and Shallow Aquifers. At each location a hydropunch groundwater sample will be collected from the Perched and Shallow Aquifers.	20	GW	9, 20	Determine dissolved arsenic and lead concentrations in the Perched and Shallow Aquifers off-Property towards the southwest (adjacent property owner: Port of Tacoma).	2
HPT-GW-104		20	GW	9, 20		2
HPT-GW-105		20	GW	9, 20		2
HPT-GW-106		20	GW	9, 20		2
HPT-GW-107		20	GW	9, 20	Determine dissolved arsenic and lead concentrations in the Perched and Shallow Aquifers off-Property towards the northwest (adjacent property owner: City of Tacoma).	2
HPT-GW-108		20	GW	9, 20		2
HPT-GW-109		20	GW	9, 20	Determine dissolved arsenic and lead concentrations in the Perched and Shallow Aquifers off-Property towards the northeast (adjacent property owner: City of Tacoma).	2
HPT-GW-110		20	GW	9, 20		2
HPT-GW-08		20	GW	9, 20		2
Field QC Samples			GW	N/A	Field Duplicates	2
			GW	N/A	Equipment Blanks	1
					Total Samples	27

Notes:

bgs: below ground surface, GW: groundwater, QC: quality control.

[1] Boring locations will be adjusted as necessary in the field based on overhead power lines, underground utilities, etc.

[2] All groundwater samples for metals analyses will be field filtered with a 0.45-micron filter.

Figures





Legend

Superlon Property Boundary

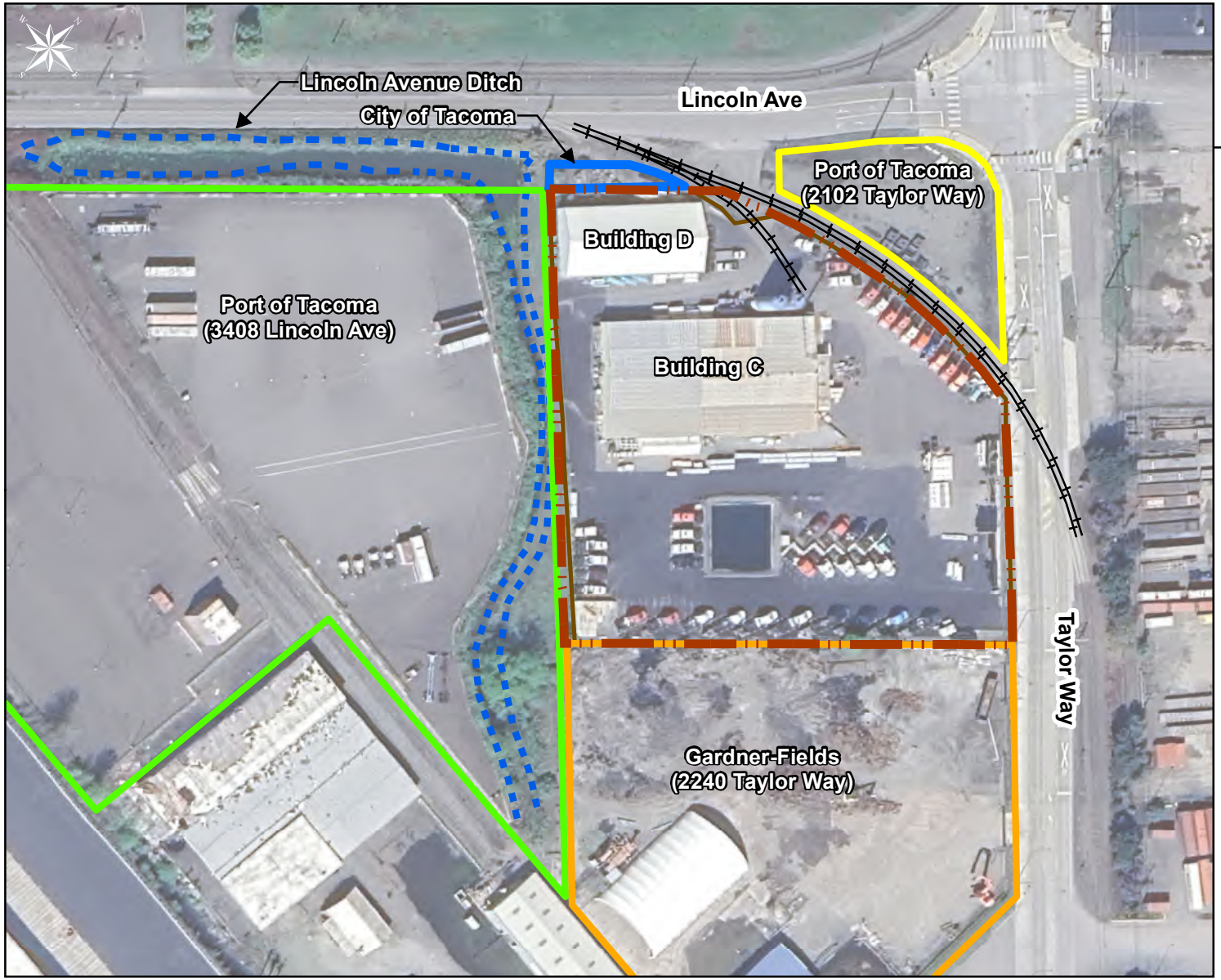
0 600 1,200 Feet

PIONEER TECHNOLOGIES CORPORATION

Property Location
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 1

Document Path: G:\Projects\SuperlonMaps\2025\RI Phase VI GW WP\Figure 1_Superlon Site Location.mxd; Author: MDK; Date Saved: 11/18/2025





Legend

- Superlon Property Boundary
- City of Tacoma
- Gardner-Fields
- Port of Tacoma
- 2102 Taylor Way (Port Owned)
- Railroad
- Fence
- Ditch

0 100 200 Feet

PIONEER TECHNOLOGIES CORPORATION

Property Features
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 2

Document Path: G:\Projects\SuperlonMaps\2025\RI Phase VI GW WP\Figure 2_Site Features.mxd; Author: MDK; Date Saved: 11/18/2025





Legend

Monitoring Wells
- Shallow Aquifer
- Intermediate Aquifer
- Decommissioned Well

Property Features
- Railroad
- Fence
- Ditch
- Property Boundary

0 60 120 Feet

PIONEER TECHNOLOGIES CORPORATION

Monitoring Well Locations
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 3

Document Path: G:\Projects\SuperlonMaps\2025\RI Phase VI GW WP\Figure 3_Locations of MWs.mxd; Author: MDK; Date Saved: 11/19/2025





Legend

Operable Units
- Operable Unit 1
- Operable Unit 2
- Operable Unit 3
- Operable Unit 4
- Operable Unit 5
- Operable Unit 6

Other Site Features
- Property Boundary
- Railroad
- Ditch

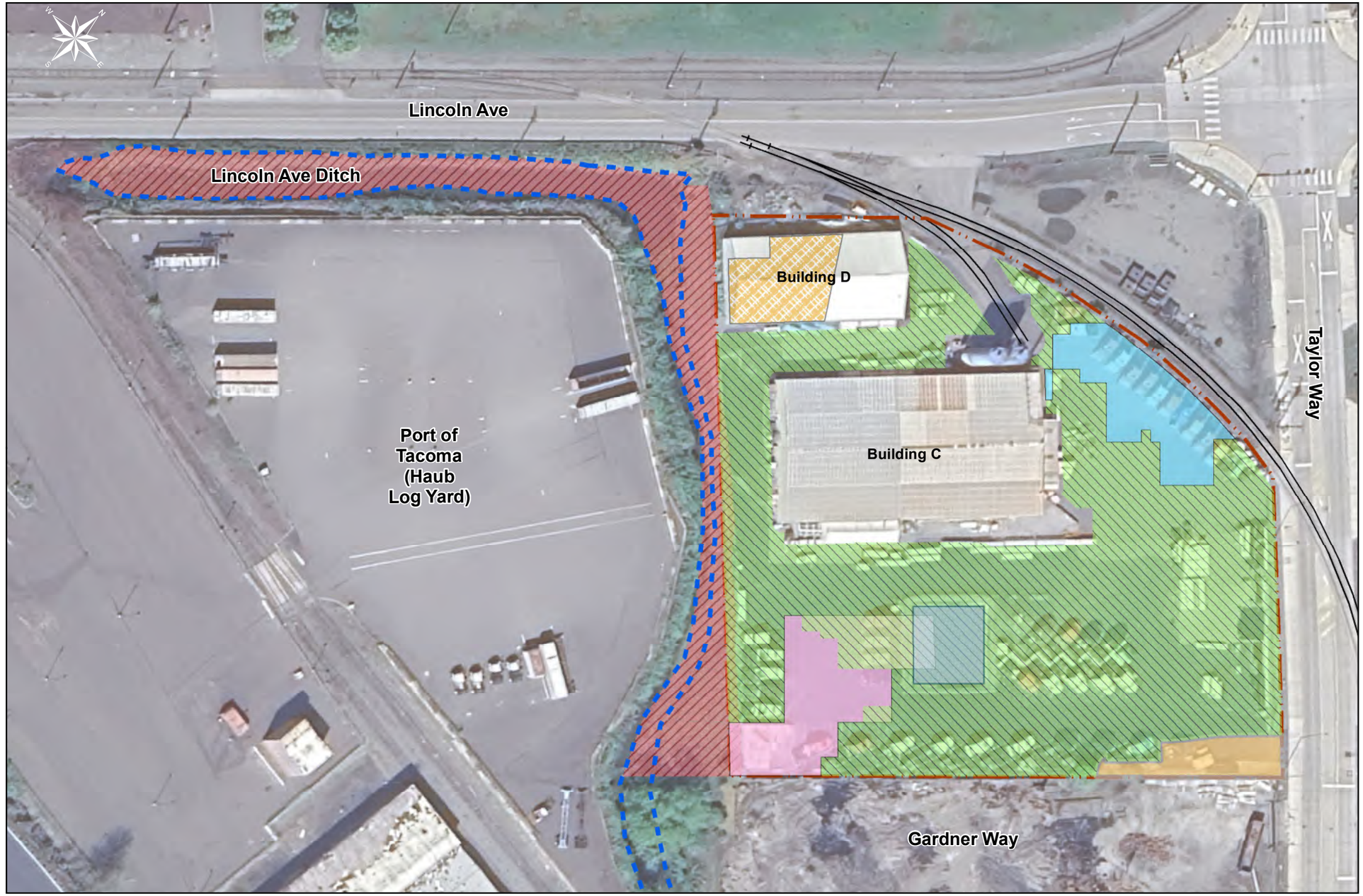
0 60 120 Feet

PIONEER TECHNOLOGIES CORPORATION

OSP IA Operable Units
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 4

Document Path: G:\Projects\SuperlonMaps\2025\RI Phase VI GW WP\Figure 4_Operable Unit Locations.mxd; Author: MDK; Date Saved: 11/19/2025





Legend

- Remediated (IA Ph. II PERC 2012c)
- Remediated (IA Ph. II, PERC 2014a)
- Remediated (IA Ph. III, PERC/PIONEER 2025c and 2025d)
- Remediated (IA Ph. IV, PERC 2025)
- OU5 (Black Shot associated with Gardner Fields Site; PERC/PIONEER 2018a)
- Soil Not Exceeding RELs, not Requiring Remediation
- Pond
- Railroad
- Superlon Property Boundary
- Drainage Ditch

0 100 200 Feet

PIONEER TECHNOLOGIES CORPORATION

Areas Remediated by the OSP and Ditch IAs
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 5

Document Path: G:\Projects\Superlon\Maps\2025\RI Phase VI GW WP\Figure 5_Remedial Action Units.mxd; Author: MDK; Date Saved: 11/19/2025





Legend

- RI Phase V Sample Location (Sampled April 2022)
- Shallow/Intermediate Well Sample Location (Sampled August 2023)

Arsenic Concentrations (mg/L)

- Not Sampled
- Max Arsenic ≤ 0.0080
- 0.0080 < Arsenic < 0.10
- 0.10 < Arsenic < 1.0
- Max Arsenic > 1.0

Other Site Features

- Property Boundary
- Railroad
- Ditch
- Decommissioned Wells

Notes:
-Concentrations shown are in mg/L.
-Screen interval listed in feet below ground surface following site ID.

0 60 120 Feet

PIONEER TECHNOLOGIES CORPORATION

Arsenic Concentrations in the Perched Aquifer
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 6

Document Path: G:\Projects\SuperlonMaps\2025\RI Phase VI GW WP\Figure 6_Perched Aq GW.mxd; Author: MK; Date Saved: 11/19/2025





Legend

- RI Phase V Sample Location (Sampled April 2022)
- Shallow Well Sample Location (Sampled August 2022)

Arsenic Concentrations (mg/L)

- Max Arsenic ≤ 0.0080
- 0.0080 < Arsenic < 0.10
- 0.10 < Arsenic < 1.0
- Max Arsenic > 1.0

Other Site Features

- Property Boundary
- Railroad
- Ditch
- Decommissioned Wells

Notes:
-Concentrations shown are in mg/L.
-Shallow well samples were collected as part of the 2023 Groundwater Monitoring event (PERC/PIONEER, 2023).
-Screen interval listed in feet below ground surface following site ID.

0 60 120 Feet

PIONEER TECHNOLOGIES CORPORATION

Arsenic Concentrations in the Shallow Aquifer
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 7

Document Path: G:\Projects\SuperlonMaps\2025\RI Phase VI GW WP\Figure 7_Shallow Aq GW.mxd; Author: MDK; Date Saved: 11/19/2025





Legend

- RI Phase V Sample Location (Sampled April 2022)
- Intermediate Well Sample Location (Sampled August 2023)

Arsenic Concentrations (mg/L)

- Max Arsenic ≤ 0.0080
- 0.0080 < Arsenic < 0.10
- 0.10 < Arsenic < 1.0
- Max Arsenic > 1.0

Other Site Features

- Property Boundary
- Railroad
- Ditch
- Decommissioned Wells

Notes:
-Concentrations shown are in mg/L.
-Intermediate well samples were collected as part of the 2023 Groundwater Monitoring event (PERC/PIONEER, 2023).
-Screen interval listed in feet below ground surface following site ID.

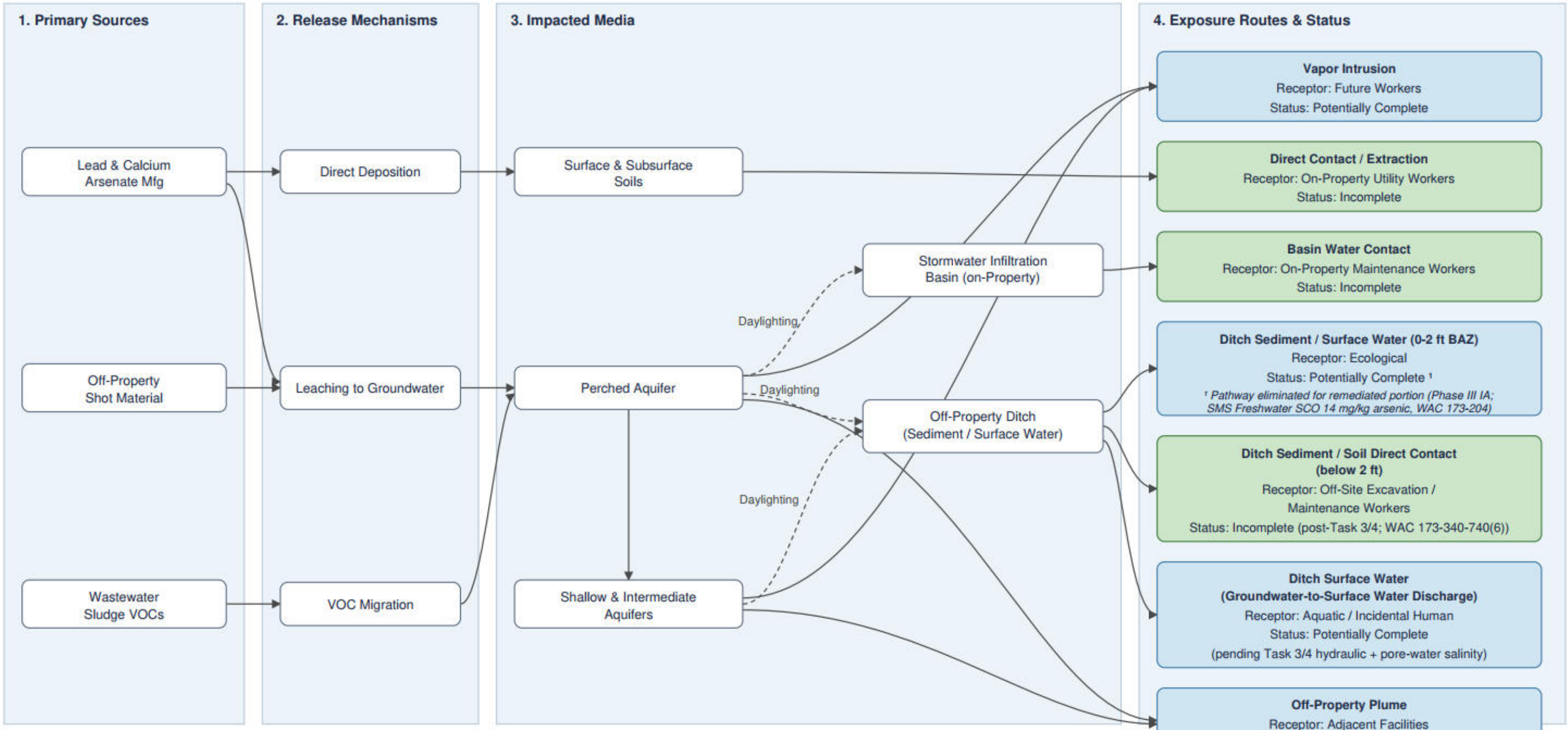
0 60 120 Feet

PIONEER TECHNOLOGIES CORPORATION

Arsenic Concentrations in the Intermediate Aquifer
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 8

Document Path: G:\Projects\SuperlonMaps\2025\RI Phase VI GW WP\Figure 8_Intermediate Aq GW.mxd; Author: MDK; Date Saved: 11/19/2025



Notes: Dashed arrows - daylighting from perched and shallow/intermediate groundwater to on-Property stormwater infiltration basin and off-Property ditch.

PIONEER TECHNOLOGIES CORPORATION

Exposure Conceptual Site Model
Remedial Investigation Phase VI Work Plan for Off-Site Groundwater
Superlon Plastics Site

Figure 9





Legend

RI Phase VI Proposed Sample Locations

- Perched and Shallow Aquifers
- Perched, Shallow, and Intermediate Aquifers

Current Monitoring Wells

- Shallow Aquifer Wells
- Intermediate Aquifer Wells

Site Features

- Superlon Property Boundary
- Parcel Boundaries (Property Between Parcels is Owned by the City of Tacoma)
- Railroad
- Ditch

Notes:
*HPT-GW-08 was proposed as part of the sample design for RI Phase V field work, but was unable to be completed at the time. HPT-GW-08 is re-proposed for completion during the RI Phase VI field work.

0 100 200 Feet

PIONEER TECHNOLOGIES CORPORATION

Proposed Sample Locations
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 10a

Document Path: G:\Projects\SuperlonMaps\2025\RI Phase VI GW WP\Figure 9a_Proposed Sample Locations.mxd; Author: MDK; Date Saved: 11/19/2025





Legend

RI Phase VI Proposed Sample Locations

- Perched Aquifer

Arsenic Concentrations (mg/L)

- Max Arsenic ≤ 0.0080
- 0.0080 < Arsenic ≤ 0.10
- 0.10 < Arsenic ≤ 1.0
- Max Arsenic > 1.0

Site Features

- Superlon Property Boundary
- Parcel Boundaries (Property Between Parcels is Owned by the City of Tacoma)
- Railroad
- Ditch
- Monitoring Well

Notes:
*HPT-GW-08 was proposed as part of the sample design for RI Phase V field work, but was unable to be completed at the time. HPT-GW-08 is re-proposed for completion during the RI Phase VI field work.

0 100 200 Feet

PIONEER TECHNOLOGIES CORPORATION

Proposed Sample Locations with Arsenic Concentrations in the Perched Aquifer
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 10b

Document Path: G:\Projects\SuperlonMaps\2025\RI Phase VI GW WP\Figure 9b_Proposed Sample Locations.mxd; Author: MDK; Date Saved: 11/19/2025





Legend

RI Phase VI Proposed Sample Locations
- Shallow Aquifer

Sample Type
- RI Phase V Sample Location

Arsenic Concentrations (mg/L)
- Max Arsenic ≤ 0.0080
- 0.0080 < Arsenic ≤ 0.10
- 0.10 < Arsenic ≤ 1.0
- Max Arsenic > 1.0

Site Features
- Superlon Property Boundary
- Parcel Boundaries (Property Between Parcels is Owned by the City of Tacoma)
- Railroad
- Ditch
- Monitoring Well

Notes:
*HPT-GW-08 was proposed as part of the sample design for RI Phase V field work, but was unable to be completed at the time. HPT-GW-08 is re-proposed for completion during the RI Phase VI field work.

0 100 200 Feet

PIONEER TECHNOLOGIES CORPORATION

Proposed Sample Locations with Arsenic Concentrations in the Shallow Aquifer
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 10c

Document Path: G:\Projects\SuperlonMaps\2025\RI Phase VI GW WP\Figure 9c_Proposed Sample Locations - S.mxd; Author: MDK; Date Saved: 11/19/2025





Legend

RI Phase VI Proposed Sample Locations
- Intermediate Aquifer

Sample Type
- RI Phase V Sample Location

Arsenic Concentrations (mg/L)
- Max Arsenic ≤ 0.0080
- 0.0080 < Arsenic ≤ 0.10
- 0.10 < Arsenic ≤ 1.0
- Max Arsenic > 1.0

Site Features
- Superlon Property Boundary
- Parcel Boundaries (Property Between Parcels is Owned by the City of Tacoma)
- Railroad
- Ditch
- Monitoring Well

0 100 200 Feet

PIONEER TECHNOLOGIES CORPORATION

Proposed Sample Locations with Arsenic Concentrations in the Intermediate Aquifer
RI Phase VI Work Plan
Superlon Plastics Property, Tacoma, Washington

Figure 10d

Document Path: G:\Projects\SuperlonMaps\2025\RI Phase VI GW WP\Figure 9d_Proposed Sample Locations - I.mxd; Author: MDK; Date Saved: 11/19/2025