Superfund Proposed Plan

U.S. Environmental Protection Agency, Region II

Sherwin-Williams/Hilliards Creek Superfund Site
Operable Unit 2
Gibbsboro, New Jersey

November 2019

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the U.S. Environmental Protection Agency's (EPA's) Preferred Alternative to address contaminated soil, sediment, and light non-aqueous phase liquid (LNAPL) present at the Sherwin-Williams/Hilliards Creek Superfund site (Site), located in Gibbsboro, New Jersey. This Site is comprised of the former manufacturing plant (FMP) area, Hilliards Creek, Kirkwood Lake, and portions of Silver Lake (Figure 1). This plan addresses EPA's second operable unit (OU) for the Site, referred to as OU2. Operable unit 1 (OU1) addresses shallow soil contamination on residential properties. EPA's preferred alternative for OU2 will address soil contamination present within the FMP area, LNAPL[1] within and adjoining the FMP area, and contaminated soil and sediments within Upper Hilliards Creek. Upper Hilliards Creek is the portion of Hilliards Creek that runs from Foster Avenue to West Clementon Avenue and is approximately 800 feet in length.

The preferred alternative calls for the excavation and capping of soil within portions of the FMP area. Excavated soil would be disposed of off-site. Some areas of contaminated soils would be capped, and institutional controls (ICs) in the form of deed notices would be implemented. Floodplain soils and sediments within Upper Hilliards Creek would be excavated and disposed of off-site. Surface water would be monitored. LNAPL contamination present within portions of the FMP area would be excavated, while in other areas of the FMP and at properties along U.S. Avenue, LNAPL would undergo in-situ biological treatment.

[1] LNAPL is a liquid that does not dissolve in groundwater and is lighter than water and therefore, is commonly found floating at or near the groundwater table.

MARK YOUR CALENDARS

PUBLIC COMMENT PERIOD
November 25 – December 30, 2019
EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING
December 5, 2019
EPA will hold a public meeting to explain the Proposed Plan and alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at the Gibbsboro Senior Center, 250 Haddonfield-Berlin Road, Gibbsboro, New Jersey 08026

For more information, see the Administrative Record file at the following locations:

EPA Records Center, Region 2
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308
Hours: Monday-Friday – 9 AM to 5 PM by apt

Gibbsboro Borough Hall/Library
49 Kirkwood Road
Gibbsboro, New Jersey 08026
For Library Hours:
http://www.gibbsborotownhall.com/index.php/library

M. Allan Vogelson Regional Branch Library – Voorhees
203 Laurel Road
Voorhees, New Jersey 08043
For Library Hours:
http://www.camdencountylibrary.org/voorhees-branch

Send comments on the Proposed Plan to:

Ray Klimcsak Remedial Project Manger
U.S. EPA, Region 2
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EPA's website for the Sherwin-Williams/Hilliards Creek Site:
http://epa.gov/superfund/sherwin-williams

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Future operable units will address site-related groundwater contamination (OU3), and the remaining portions of Hilliards Creek, Kirkwood Lake, and Silver Lake (OU4).

A comprehensive Remedial Investigation (RI) was conducted by the Sherwin-Williams Company (Sherwin-Williams), with EPA oversight, under a 1999 Administrative Order on Consent (AOC). The RI included sampling of soil, sediment, surface water, soil gas, indoor air, and groundwater throughout the Site. The results of these investigations have identified areas where Remedial Action (RA) is required.

This Proposed Plan contains descriptions and evaluations of the cleanup alternatives considered for the FMP area, off-property areas that adjoin the FMP area, and Upper Hilliards Creek. EPA developed this Proposed Plan, as the lead agency, in consultation with the New Jersey Department of Environmental Protection (NJDEP), the support agency. In consultation with NJDEP, EPA will select a final remedy for contaminated soil, sediment, surface water, and the LNAPL contamination, after reviewing and considering all information submitted during the 30-day public comment period.

EPA, in consultation with NJDEP, may modify the Preferred Alternative or select another response action presented in this Proposed Plan, based on new information or public comments. Therefore, the public is encouraged to review and comment on the alternatives presented in this Proposed Plan.

EPA is issuing this Proposed Plan as part of its community relations program under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund) 42 U.S.C. 9617(a), and Section 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This Proposed Plan summarizes information that can be found in greater detail in the FMP area 2018 RI and 2019 Feasibility Study (FS) reports, as well as other documents contained in the EPA Administrative Record file. The location of the Administrative Record file is provided on the previous page. EPA and NJDEP encourage the public to review these documents to gain a more comprehensive understanding of the site-related Superfund activities performed by Sherwin-Williams, under EPA and NJDEP oversight.

SITE DESCRIPTION

Three sites collectively make up what is commonly referred to as the “Sherwin-Williams Sites,” which are located in areas of Gibbsboro and Voorhees, New Jersey. These sites are: the *Sherwin-Williams/Hilliard’s Creek Superfund site,* located in both Gibbsboro and Voorhees; the *Route 561 Dump site* (*Dump Site*) in Gibbsboro; and the *United States Avenue Burn Superfund site* (*Burn Site*) in Gibbsboro (Figure 1). The Sites represent source areas of contamination from which contaminated soil and sediment have migrated to downgradient areas within Gibbsboro and Voorhees.

The Site includes the FMP area, Hilliards Creek, Kirkwood Lake, and portions of Silver Lake. The FMP area is approximately 25 acres in size and is comprised of commercial buildings and a former waste lagoon area that is currently undeveloped wooded land. Hilliards Creek is formed by the outflow from Silver Lake. The outflow enters a culvert beneath a parking lot at the former paint manufacturing facility and resurfaces on the south side of Foster Avenue. From this point, Hilliards Creek flows in a southerly direction through the FMP area and continues downstream through residential and undeveloped areas. At approximately one mile from its origin, Hilliards Creek empties into Kirkwood Lake. Kirkwood Lake, located in Voorhees, is approximately 25 acres, with residential properties lining its northern shore.

SITE HISTORY

The former Sherwin-Williams facility was developed in the early 1800s as a saw mill and was later used as a grain mill. In 1851, John Lucas & Co., Inc. (Lucas), purchased the property and converted the grain mill into a paint and varnish manufacturing facility that produced oil-based paints, varnishes and lacquers. Sherwin-Williams purchased Lucas in the early 1930s and expanded operations at the facility. Historic features at the former facility included wastewater lagoons, above-ground storage tanks, railroad lines, drum storage areas, and numerous production and warehouse buildings (Figure 2). The facility was closed in 1977 and was sold to developer Robert K. Scarborough (Scarborough) in 1981. Scarborough renamed the former Sherwin-Williams property the “Paint Works Corporate Center” (PWCC). The developer altered some features of the property, however, several of the larger buildings were retained and later converted into office, storage, and other commercial spaces (Figure 3).

In 1978, after Sherwin-Williams closed all paint and varnish manufacturing operations, NJDEP issued a Directive to Sherwin-Williams to excavate and properly dispose of the waste material remaining in the former waste lagoons (Figure 2). These actions were completed by Sherwin-Williams in 1979, with NJDEP oversight, and resulted in the removal of approximately 8,100 cubic yards of sludge that was disposed of off-site. In 1990, Sherwin-Williams entered into an Administrative Consent Order (ACO) with NJDEP to investigate the extent of groundwater contamination, and to characterize a petroleum-like seep in the vicinity of the 1 and 5 Foster Avenue buildings. A “Seep Area” was identified and investigated, and the location of the Seep Area can be seen in Figure 3. From 1991 until 2000, five phases of RI activities were performed by Sherwin-Williams, under NJDEP oversight. In 1997, Scarborough sold the PWCC to Brandywine Realty Trust (Brandywine). Brandywine retains operation of the PWCC as commercial and office space.

In 2001, the NJDEP terminated its ACO with Sherwin-Williams. In 2002, a new release of petroleum-like product was observed in the Seep Area and reported to state and federal agencies. In response to the observed seep, EPA issued Sherwin-Williams an “Expedia Notice”. The 2002 Expedia Notice required Sherwin-Williams to perform interim actions to prevent seep-related discharges from reaching Hilliards Creek, as well as additional geophysical and soil investigations throughout the PWCC. Sherwin-Williams’ activities under the EPA 2002 Expedia Notice were completed, and the Notice was closed out by EPA in 2007. In 2008, the Sherwin-Williams/Hilliards Creek Superfund site was placed on the National Priorities List (NPL) and, under EPA oversight, RI/FS activities began pursuant to the 1999 AOC and continue at present.

SITE CHARACTERISTICS

The EPA OU2 Proposed Plan evaluates alternatives that address soil contamination present throughout the FMP area, LNAPL contamination located at the FMP and on adjoining off-property areas, and contaminated soil and sediments within Upper Hilliards Creek. Due to the large size and scope of work, EPA has designated “subareas” of the FMP area to aid in review of this plan. The six subareas of OU2 are described below. Figure 4 shows the approximate extent of each subarea provided in the description. Historic features are also provided in the subarea descriptions below. These historical Site features are shown on Figure 2.

Subarea 1: This subarea is the historic location of the former paint production buildings, the lacquer manufacturing building, and Former Tank Farm B, where above-ground storage tanks contained raw materials. This area was historically referred to as the former main plant area. It encompasses the area to the north of Foster Avenue, in the vicinity of the 10 Foster Avenue building and the 6 East Clementon slab (the building was demolished by Brandywine in 2014), and south of Foster Avenue, in the vicinity of the 7 Foster Avenue building.

Subarea 2: This area consists of Former Tank Farm A (above-ground and underground storage tanks that contained raw materials) and the Former Resin Manufacturing Area. This area includes the 2 and 4 Foster Avenue buildings, portions of Foster Avenue, and the parking areas (including the grassy lot) east of the buildings where LNAPL contamination is present.

Subarea 3: Subarea 3 is the off-property area that adjoins the FMP area. This area includes the parking area east of the 2 and 4 Foster Avenue buildings, United States Avenue, and mostly residential properties east of United States Avenue where LNAPL is found at the groundwater table.

Subarea 4: This area, known as the Seep Area, is downgradient of Former Tank Farm A. This area includes the parking/paved area adjoining the 1 and 5 Foster Avenue buildings. LNAPL historically seeped from the ground surface in this area and discharged into Hilliards Creek.

Subarea 5: Former Lagoon Area. This is the location of the former lagoons and holding basins that contained manufacturing wastes. It is currently vacant and undeveloped and contains terrestrial habitat. It is located south of Subarea 4.

Subarea 6: Upper Hilliards Creek. This area includes the floodplain soils and sediments of the portion of Hilliards Creek, approximately 800 feet long, that runs from Foster Avenue to West Clementon Road. Historically, wastes were either directly discharged to the creek, or inadvertent discharges from the lagoons were released into the creek.

Summary of Pre-Remedial Investigation Activities

The 2018 RI Report contains a comprehensive description of all "pre-RI" investigation activities performed by Sherwin-Williams under the ACO with NJDEP, and under the authority and oversight of the EPA Removal program. The 2018 RI Report also contains information from previous investigations performed by Scarborough's environmental consultants. This historic data aided EPA in directing Sherwin-Williams to perform more focused RI sampling activities (2009 – 2016), pursuant to the 1999 AOC. The RI report, containing pre-RI data, is available in the EPA Administrative Record file.

Summary of Remedial Investigation Activities

The following is a summary of the investigations and findings for the FMP area (Subareas 1, 2, 4, and 5); Upper Hilliards Creek (Subarea 6); and, off-site properties (Subarea 3) that are the focus of this Proposed Plan.

FMP Area Soil RI Sampling Approach

Sherwin-Williams collected over 3,000 soil samples from over 400 sample locations. Soil samples were collected from surface (0.0 – 2.0 feet below the surface) and subsurface (greater than 2.0 feet below the surface) intervals and were sent to laboratories for analyses. Many soil samples were collected in shallow groundwater to determine the approximate extent of LNAPL impacts. Soil samples were collected beneath the slab of the 6 East Clementon building after Brandywine demolished the building. No soil samples were collected beneath the remaining buildings in Subareas 1, 2, and 4.

FMP Soil Sample Findings

Soil data in the 2018 RI Report was compared to the NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS), often referred to as "residential soil standards". Review of the soil data collected from Subarea 1 indicates that there are broad areas of soil contamination, above residential soil standards, predominately beneath paved surfaces that consist primarily of lead and arsenic. The residential soil standards for lead and arsenic are 400 milligrams per kilogram (mg/kg) and 19 mg/kg, respectively. The highest concentration of lead is detected at 15,300 mg/kg, and the highest concentration of arsenic is detected at 863 mg/kg. These concentrations are in separate sample locations beneath the 6 East Clementon slab. The remaining detections of lead and arsenic in soil samples are found immediately east of the 6 East Clementon slab and are well below these concentrations. In a localized area, beneath the 6 East Clementon slab, arsenic contamination is present in soil both above and below the water table. Based on shallow groundwater sampling, it is likely that the arsenic in the soil below the water table is the source of arsenic groundwater contamination.

Soil sample locations containing polycyclic aromatic hydrocarbons (PAHs) above the residential soil standards are co-located with approximately seventy-five percent of the sample locations containing lead and arsenic above residential soil standards. The highest concentration of PAHs is benzo(a)pyrene at 69 mg/kg, with the majority of the remaining exceedances being well below this value. The residential soil standard for benzo(a)pyrene is 0.5 mg/kg.

A localized area of polychlorinated biphenyls (PCBs) was detected near the northern portion of the 10 Foster Avenue building. Lead, arsenic, and PAHs are also present above residential soil standards at this location. The highest concentration of the PCB Aroclor 1260 was detected at a concentration of 1,200 mg/kg. The residential soil remediation standard is 0.2 mg/kg. The remaining PCB concentrations are generally below 3.0 mg/kg. The source of PCB contamination appears to be the location of a historic electrical transformer substation.

In the southern portion of Subarea 1, south of Foster Avenue beneath the paved surfaces that surround the 7 Foster Avenue building, are areas of lead and arsenic contamination present in shallow soils, predominantly less than 4 feet deep. The highest concentration of lead detected throughout this area is present at a concentration of 3,050 mg/kg, while the highest concentration of arsenic is 138 mg/kg. PAHs exceed residential soil standards; however, they are not co-located with lead and arsenic exceedances with the same frequency as PAH exceedances in the northern portion of Subarea 1 (north of Foster Avenue). The PAH exceedances of soil standards are generally present at depths of less than two feet, but one location extended to ten feet below the paved surface. The highest concentration of benzo(a)pyrene is present at a concentration of 22 mg/kg.

Within the southern portion of Subarea 1, pentachlorophenol (PCP) is also found above the residential soil standard (0.9 mg/kg) but at a lower frequency of detection. The highest concentration of PCP is 2.7 mg/kg. PCP was detected in very few soil sample locations, generally less than two feet deep, however, the deepest detection of PCP was found at eight feet deep.

Within Subarea 5 (the former lagoon area), located to the east of Hilliards Creek and south of Subarea 4, the RI sampling results indicated the presence of PCP and PAHs. The highest concentration of PCP is 650 mg/kg, whereas the highest concentration of benzo(a)pyrene is 1.1 mg/kg. The PCP concentrations are largely detected in the subsurface soils and below the water table. The PCP-contaminated soils are residual lagoon wastes that were not addressed during the removal actions performed by Sherwin-Williams under the 1978 NJDEP Directive.

The remaining Subareas of the Site include: Subareas 2, 3, and 4, and Upper Hilliards Creek (Subarea 6), and are discussed below. Subareas 2 through 4 are impacted with LNAPL. Arsenic, lead, and PAHs, frequently detected at Subarea 1, were found on a very limited basis in Subareas 2 and 4. The contamination within Subareas 2 through 4 is almost exclusively limited to LNAPL.

LNAPL and Residual LNAPL-Impacted Soils

The LNAPL at the Site is comprised of degraded mineral spirits, residual petroleum hydrocarbons, with some aromatic and aliphatic compounds, including volatile organic compounds (VOCs), semi-volatile organic compound (SVOCs), such as benzene and naphthalene (respectively), and associated tentatively identified compounds (TICs). A TIC is a compound that can be detected by the analytical testing method, but its identity and concentration cannot be confirmed without further analytical investigation. The source of the LNAPL release is primarily located in Former Tank Farm A. The presence of LNAPL can be attributed to the chemicals historically stored in Former Tank Farm A. Spills and releases of chemicals from Former Tank Farm A migrated downward through the soil column and entered the shallow groundwater.

RI sampling activities conducted to determine the extent of LNAPL included the collection of soil samples, groundwater samples from fixed monitoring wells, aqueous grab samples, and vapor intrusion studies. Environmental screening techniques included: a photo-ionizing detector (PID), membrane interface probe (MIP), laser-induced fluorescence (LIF), and visual observations. The use of these different methodologies provided multiple lines of evidence which were used to approximate the vertical and horizontal extent of LNAPL-impacted soils. Figure 5 presents the approximate horizontal extent of LNAPL-impacted soils.

The LNAPL at the Site is lighter than water and is generally found near the groundwater table. LNAPL is the source of dissolved-phase VOCs and SVOCs in shallow groundwater.

Within Subarea 2, the water table was often encountered eight to ten feet below ground surface. Soil samples indicated VOC and SVOC TICs (components of LNAPL) often extended 10 – 15 feet below the water table. Within the Seep Area (Subarea 4), where the water table was often encountered one to three feet below ground surface, LNAPL-impacted soils were recorded up to seven feet in thickness. The water table beneath Subarea 3 (off-property area) was often not encountered until nearly 15 feet below ground surface. The LNAPL-impacted soils were less than four feet thick at the water table in this area.

Vapor Intrusion Studies

EPA initiated vapor intrusion studies in May 2008. Vapor intrusion activities included the collection of sub-slab soil gas samples beneath the basements of a number of residential properties along U.S. Avenue and Berlin Road in Gibbsboro. Analysis of sub-slab soil gas indicated no detections of VOC compounds beneath the slabs of the residential properties.

In December 2008, EPA collected sub-slab soil gas samples from beneath all commercial buildings (Subareas 1, 2, and 4) within the FMP area. The sub-slab soil gas samples detected high concentrations of several VOC compounds, such as: benzene, toluene, ethylbenzene, and xylene (BTEX) beneath the slabs of the 2 and 4 Foster Avenue buildings (Subarea 2). Former Tank Farm A, located adjacent to these buildings, contained chemical compounds used for paint, lacquer, and varnish manufacturing, including mineral spirits, benzene, toluene, and xylene. Based on the 2008 sub-slab soil gas results from beneath the 2 and 4 Foster Avenue slabs, EPA has periodically performed resampling activities.

Methane Monitoring

In 2015, as part of the periodic vapor intrusion monitoring activities, methane vapors were detected beneath the 2 and 4 Foster Avenue slabs. Methane concentrations are due to the natural breakdown processes (biodegradation) of the LNAPL. Methane concentrations have been periodically monitored to ensure that they are at acceptable levels, and the methane concentrations are used as a means to approximate the extent of LNAPL-impacted soils.

Upper Hilliards Creek RI Sampling Activities

A majority of the sampling activities within Upper Hilliards Creek were completed in 2008. However, Sherwin-Williams returned to Upper Hilliards Creek in 2016 to collect soil and sediment samples for hexavalent chromium and extractable petroleum hydrocarbons (EPHs). Sherwin-Williams again returned in 2017 to collect additional soil, sediment, and a variety of biota, to complete an analysis of a site-specific Baseline Ecological Risk Assessment (BERA) which is discussed below.

Upper Hilliards Creek Soil Sample Findings

Lead, arsenic, and PAHs were found above residential soil standards within Upper Hilliards Creek floodplain soils. PCB Aroclor 1260 was also detected above residential soil standards within Upper Hilliards Creek soils. PCBs and PAHs are frequently co-located with lead and arsenic. Concentrations of lead and arsenic remain relatively the same throughout Upper Hilliards Creek floodplain soils. Lead and arsenic concentrations are generally similar in either the 0.0 – 0.5-foot to 1.5 – 2.0-foot intervals. The highest concentrations of lead and arsenic detected were 7,580 mg/kg and 191 mg/kg, respectively. Exceedances of residential soil standards for lead and arsenic are present in shallow soil but not consistently present in soils deeper than two feet. The metal constituents antimony and cyanide were infrequently detected above the residential soil standards, 31 mg/kg and 47 mg/kg, respectively. When detected above the residential soil standards, they are co-located with the presence of lead and arsenic.

Concentrations of PAHs were generally highest in the most upstream portions of Upper Hilliards Creek near Foster Avenue, adjacent to the 1 Foster Avenue building. Concentrations of PAHs in soils are also much higher in the surface soils (0.0 – 0.5 feet in depth) than in subsurface (1.5 – 2.0 feet in depth). The highest reported concentration of benzo(a)pyrene detected in a surface soil sample was 37 mg/kg, whereas, at the same sample location, the subsurface soil concentration was 2.6 mg/kg. Concentrations of PAHs in floodplain soils decline downstream, to where the highest reported concentration of benzo(a)pyrene was detected at 8.4 mg/kg.

PCB Aroclor 1260 was also detected in floodplain soils above residential soil standards. Similar to PAHs, the highest concentrations of PCB Aroclor 1260 were found at upstream points, declining downstream, and also present at higher concentrations in surface soils than in subsurface soils.

The soil sampling activities outside of the Hilliards Creek floodplain, upland and behind residential properties, also found lead, arsenic, and PAHs, but at relatively low concentrations, and in soils less than two feet in depth. The highest reported concentrations of lead, arsenic, and benzo(a)pyrene were: 626 mg/kg, 25 mg/kg, and 0.87 mg/kg, respectively.

Upper Hilliards Creek Sediment Findings

Sediment samples were collected from approximately fifteen locations in Upper Hilliards Creek. In addition, sediment samples were collected from within the Silver Lake conveyance system, the underground culvert which connects the Silver Lake outflow to the confluence of Hilliards Creek. Sediment sample results were compared to the NJDEP lowest effect levels (LEL) for ecological receptors, which are often lower than residential soil standards.

Lead and arsenic were found most frequently and at the greatest concentrations above the NJDEP LEL of 31 mg/kg for lead and 6 mg/kg for arsenic for ecological receptors. Contaminants in sediment that exceed the LEL criteria generally require further evaluation. Other constituents found above this criterion were cadmium, chromium, copper, cyanide, mercury, zinc, PAHs, pesticides, and PCBs. These other constituents were found less frequently and are co-located with lead and arsenic.

Lead and arsenic LEL exceedances were found in sediment throughout Upper Hilliards Creek. The concentration of lead varies from below the LEL for ecological receptors to 10,900 mg/kg. The arsenic levels varied from below the LEL for ecological receptors to over 1,720 mg/kg. For both metals, the highest values were found within creek sediments in the vicinity of the former lagoon area, where several historic releases were reported to have occurred from the lagoons.

Upper Hilliards Creek Surface Water Findings

Surface water samples were collected from five locations within Upper Hilliards Creek on two occasions. One sampling event was performed after a significant rain event, and another sampling event was performed during a dry period. Surface water results were compared to the NJDEP New Jersey Surface Water Quality Standards (NJSWQS).

Analyses of the surface water showed exceedances of the NJSWQS for aluminum, iron, zinc, cyanide, and lead. As with the other media, lead is detected most frequently. Arsenic was not detected at concentrations above the NJSWQS.

The concentration of lead in surface water was compared to the NJSWQS of 5.4 micrograms/Liter (µg/L). The total lead value varied from below the NJSWQS to over 16 µg/L for total lead.

SCOPE AND ROLE OF OPERABLE UNIT

Due to the complexity of multiple properties comprising the Site and varying land uses, EPA is addressing the cleanup of the Site in several phases or OUs. OU1 consists of the residential properties that are being remediated in accordance with the EPA 2015 Record of Decision.

This Proposed Plan addresses OU2, which consists of soil, sediment, and LNAPL-impacted soils. Future operable units will address on-site groundwater contamination (OU3), and the remaining portions of Hilliards Creek, Kirkwood Lake, Silver Lake, and Bridgewood Lake (OU4).

WHAT IS A "PRINCIPAL THREAT"?

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Light Non-Aqueous Phase Liquid (LNAPL) in ground water may be viewed as source material. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

PRINCIPAL THREAT WASTE

Principal threat waste is defined in the box above. Although lead and arsenic in soil and sediment act as sources to surface water contamination and contribute to groundwater contamination, these sources are not highly mobile and are not considered principal threat wastes at this Site. LNAPL, a source material present in saturated soils (largely below the water table), is considered a principal threat waste.

SUMMARY OF SITE RISKS

As part of the RI/FS, a baseline risk assessment consisting of a human health risk assessment (HHRA) and BERA were conducted to estimate current and future effects of contaminants on human health and the environment. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects caused by hazardous substance exposure in the absence of any actions to control or mitigate these exposures under current and future site uses.

In the HHRA, cancer risk and noncancer health hazard estimates are based on current and future reasonable maximum exposure (RME) scenarios. These estimates were developed by taking into account various health protective estimates about the concentrations, frequency and duration of an individual's exposure to chemicals selected as contaminants of potential concern (COPCs), as well as the toxicity of these contaminants.

For the ecological risk assessment, representative ecological receptors were identified, and measurement and assessment endpoints were developed during the BERA to identify those receptors and areas where unacceptable risks are present. The final, EPA-approved, HHRA (2017) and BERA (2018) can be found in the EPA Administrative Record file, however, the following information is a summary of the findings of human health and ecological risks.

Human Health Risk Assessment Summary

EPA follows a four-step human health risk assessment process for assessing site-related cancer risks and noncancer health hazards. The four-step process is comprised of: Hazard Identification, Exposure Assessment, Toxicity Assessment, and Risk Characterization (see adjoining box "What is Risk and How is it Calculated" for more details on the risk assessment process).

The HHRA began with selecting COPCs in the various media (*i.e.*, soil, surface water, sediment, and soil gas) that could potentially cause adverse effects in exposed populations. COPCs are selected by comparing the maximum detected concentrations of each chemical identified with state and federal risk-based screening values. The screening of each COPC was then conducted separately for each exposure area.

Exposure areas are geographical designations created for the risk assessment in order to define areas of a site with similar anticipated use (based on zoning and other considerations) or similar levels of contamination. The 2017 HHRA presents 4 unique exposure areas, however, for the purposes of this Proposed Plan, the 6 Subareas described above will be used to summarize the 2017 HHRA findings.

<u>*Potential Exposure Pathways by Subareas*</u>

Subareas 1, 2, and 4 are currently utilized as an office and light industrial park (Figure 4). These areas are largely comprised of office buildings, paved surfaces, and several grassy areas (see Figure 6). South of Subarea 4 (Seep Area) is a large, vacant/undeveloped area, which was once the former lagoon area (Subarea 5). Upper Hilliards Creek (Subarea 6) originates south of Foster Avenue and flows for nearly a quarter mile adjacent to Subarea 5, before it traverses under West Clementon Road and continues into Kirkwood Lake. Subarea 3 consists of the existing mostly residential properties on the east side of U.S. Avenue.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the contaminants of potential concern (COPCs) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other noncancer health hazards, such as changes in the normal functions of organs within the body (*e.g.,* changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and noncancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one in ten thousand excess cancer risk;" or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one in ten thousand to a one in a million excess cancer risk. For noncancer health effects, a "hazard index" (HI) is calculated. The key concept for a noncancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which noncancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a noncancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site.

Based on current zoning and future land use assumptions, the following current and future receptor populations and routes of exposure were considered for Subareas 1 through 5:

- Construction/Utility Worker (adult): incidental ingestion, dermal contact, and inhalation of particulates and volatiles released from surface (0-2 feet) and subsurface (2-10 feet) soils.

- Outdoor Worker (adult): incidental ingestion, dermal contact, and inhalation of particulates and volatiles released from surface soils.

- Resident (child [0-6 years] and adult): incidental ingestion, dermal contact, and inhalation of particulates and volatiles released from surface soils.

- Exposure pathways specific to the Subareas 5 and 6 (due to their nature as being either a creek habitat or vacant/wooded land) included the following:

- Recreator (adult, adolescent [6-16 years], and child): incidental ingestion, dermal contact, and inhalation of particulates and volatiles released from surface soils; incidental ingestion and dermal contact of sediments, along with dermal contact with surface water while wading in Upper Hilliards Creek.

Buildings within Subareas 1, 2, and 4 have also been evaluated for potential vapor intrusion through the collection of sub-slab soil gas and indoor air data. The 2017 HHRA evaluated the potential risks associated with this pathway to the current and future commercial worker resulting from the inhalation of contaminants in indoor air.

Contaminant Exposure Evaluation Process (other than lead)

For contaminants other than lead, exposure point concentrations were estimated using either the maximum detected concentration of a contaminant or the 95% upper-confidence limit (UCL) of the average concentration. Chronic daily intakes were calculated based on the reasonable maximum exposure (RME), which is the highest exposure reasonably anticipated to occur at the Site. The RME is intended to estimate a conservative exposure scenario that is still within the range of possible exposures.

Lead Exposure Evaluation Process

It is not possible to evaluate risks from lead exposure using the same methodology as the other COPCs because there are no published quantitative toxicity values for lead. However, since the toxicokinetics (the absorption, distribution, metabolism, and excretion of toxins in the body) of lead are well understood, lead risks are assessed based on blood lead level (PbB), which can be correlated with both exposure and adverse health effects. Consequently, lead risks were evaluated using blood lead models, which predict PbB based on the total lead intake from various environmental media. Lead risks for non-resident adults (workers/construction workers) were assessed using the EPA Adult Lead Model (ALM). The target receptor for this model includes an adult female (of child bearing age) in order to protect a developing fetus. Lead risks for children were evaluated using the Integrated Exposure and Uptake Biokinetic (IEUBK) model. Both models estimate a central tendency (geometric mean) PbB on the basis of average or typical exposure parameter values. Therefore, the exposure point concentrations (EPCs) for lead were the arithmetic mean of all the samples within the exposure area from the appropriate depth interval.

Human Health Risk Assessment Findings by Media

In the risk assessment, two types of toxic health effects were evaluated for COPCs other than lead: cancer risk and noncancer hazard. Calculated cancer risk estimates for each receptor were compared to EPA's target risk range of $1x10^{-6}$ (one-in-one million) to $1x10^{-4}$ (one-in-ten thousand). The calculated noncancer hazard index (HI) estimates were compared to EPA's target threshold value of 1. This section provides an overview of the human health risks resulting from exposures to contaminants exceeding the target cancer risk and noncancer hazard thresholds. Risks associated with lead and vapor intrusion are discussed separately.

Surface Soil Findings

Risks and hazards were evaluated for current and potential future exposure to surface soil in each exposure area. Table 1-1 below summarizes the receptor populations in each exposure area, assessed in the HHRA, that were found to exceed EPA's cancer risk range and/or noncancer threshold criteria. In the HHRA soils from Subareas 1 and 2 were combined into one exposure area. The results for this exposure area, however, indicate that arsenic and PCB Aroclor 1260 comprised the majority of risk and hazard within only Subarea 1, particularly the area north of Foster Avenue. PCB Aroclor 1260 is localized to an area beneath the paved parking lot near the 10 Foster Avenue building. Benzo(a)pyrene and antimony were the compounds which contributed to elevated risk and hazard in the southern portion of Subarea 1 (south of Foster Avenue). Subareas 5 and 6 were combined as one exposure area in the 2017 HHRA, however, a majority of the risk and hazard was attributable to Subarea 6, due to the presence of arsenic and cyanide. No contaminants were associated with risks or hazards above EPA thresholds from Subarea 3 and 4.

Table 1-1: Summary of hazard and/or risk exceedances for surface soil by exposure area

Receptor	Hazard Index	Cancer Risk
Subareas 1 and 2 (North of Foster Avenue)		
Future Resident (child/adult)	**7**	**2×10^{-4}**
Subarea 1 (South of Foster Avenue)		
Future Resident (child/adult)	**7**	**3×10^{-4}**
Subareas 5 and 6		
Future Resident (child/adult)	**10**	**3×10^{-4}**
Current/Future Child Recreator	**4**	8×10^{-5}

*Bold indicates value above the acceptable risk range or value.

Surface and Subsurface Soil Findings

Exposure to surface and subsurface soil by future construction and utility workers were also considered in Subareas 1 through 5. No risks or hazards above EPA thresholds were identified for the utility worker. As shown in Table 1-2, Subareas 1, 5, and 6 were the only portions of the Site associated with noncancer estimates that exceeded EPA's threshold criteria for the construction worker. The cancer risks for this receptor were within the target risk range. PCB Aroclor 1260 and arsenic were the primary chemicals contributing to elevated hazard for surface and subsurface soils within Subareas 1 and 2, and Subareas 5 and 6, respectively. The hazard associated with PCB Aroclor 1260, however, was driven by elevated concentrations in Subarea 1. The hazards associated with arsenic in Subareas 5 and 6 were driven by elevated concentrations within the floodplain soils adjacent to Hilliards Creek (specific to Subarea 6).

Table 1-2: Summary of hazard and/or risk exceedances for surface/subsurface soil by exposure area

Receptor	Hazard Index	Cancer Risk
Subareas 1 and 2 (north of Foster Avenue)		
Future Construction Worker	**6**	5×10^{-6}
Subareas 5 and 6		
Future Construction Worker	**2**	8×10^{-6}

Surface Water and Sediment Findings

Exposure to surface water and sediments within Subarea 6 (Upper Hilliards Creek) by future child, adolescent, and adult recreators who may wade in this shallow stream were evaluated. Slightly elevated cancer risk was identified for the child recreator resulting from exposure to surface water. Benzo(a)pyrene comprised the majority of the risk; however, the individual cancer risk attributable to this chemical was equal to the upper bound limit of the target risk range (1×10^{-4}). Furthermore, it is likely that the risk associated with benzo(a)pyrene is overestimated, since elevated surface water concentrations were primarily attributable to suspended sediments in the samples analyzed. Therefore, benzo(a)pyrene is not considered to be a COC in surface water.

The chemicals accounting for the majority of risks and hazards in sediment included arsenic, cyanide, and chromium. However, it is likely that the risk due to chromium is overestimated because it was assumed that the chromium present is in the more toxic hexavalent form. This is conservative since chromium in the environment is generally dominated by the less toxic, trivalent form.

Table 1-3: Summary of hazard and/or risk exceedances for surface water and sediment within the Subarea 6

Receptor	Hazard Index	Cancer Risk
Surface Water		
Current/Future Child Recreator	0.3	**2×10^{-4}**
Sediment		
Current/Future Child Recreator	**12**	**1×10^{-3}**
Current/Future Adolescent Recreator	**3**	1×10^{-4}
Current/Future Adult Recreator	**2**	**2×10^{-4}**

Lead Results

Since there are no published quantitative toxicity values for lead, it is not possible to evaluate cancer and non-cancer risk estimates from lead using the same methodology as the other COCs. Consistent with EPA guidance, exposure to lead was evaluated separately from the other contaminants using blood lead modeling. The risk reduction goal for lead in soils for OU2 is to limit the probability of a child or developing fetus' PbB from exceeding 5 micrograms per deciliter (µg/dL) to 5% or less.

Lead was identified at levels contributing to PbB above the risk reduction goal for Subareas 1 and 6, and the western portion of Subarea 2, for the child resident, outdoor worker, construction worker, and/or child recreator. No risks with lead were found at levels above the risk reduction goal for the receptors evaluated in Subareas 3, 4, and 5. Exposure areas with elevated lead risks are summarized in Table 2.

Table 2: Summary of lead risks by exposure area

Receptor	Media	Probability of PbB > 5 µg/dL
Subareas 1 and 2 (north of Foster Avenue)		
Future Child Resident	Surface Soil	**14%**
Subarea 1 (south of Foster Avenue)		
Future Child Resident	Surface Soil	**99%**
Future Outdoor Worker		**19%**
Future Construction Worker	Surface/Subsurface Soil	**18%**
Subarea 6		
Future Child Resident	Surface Soil	**31%**
Future Construction Worker	Surface/Subsurface Soil	**9%**
Current/Future Child Recreator	Surface Soil/Sediment	**93%**

Vapor Intrusion Findings

During the RI, a vapor intrusion investigation was conducted to evaluate the potential migration of VOC-contaminated vapors into indoor air at seven commercial buildings on the FMP area. The buildings investigated included 1, 2, 4, 5, 7, and 10 Foster Avenue, and 6 East Clementon Road (all present in Subareas 1, 2, and 4). The indoor air and sub-slab vapor results were compared to EPA's risk-based, commercial vapor intrusion screening levels (VISLs) based on a cancer risk of 1×10^{-6} and hazard quotient of 1.

Results of the data collected indicated that elevated sub-slab vapor and indoor air concentrations were associated with the 2 Foster and 4 Foster Avenue buildings only (Subarea 2). These two buildings are currently unoccupied. Beneath the building slabs, a total of 12 VOCs: 1,2,3-trimethylbenzene, 1,2,4-trimethylbenzene, benzene, cyclohexane, ethylbenzene, m,p-xylenes, n-hexane, n-nonane, o-xylene, tetrachloroethene, trichloroethene, and vinyl chloride, were detected at concentrations exceeding sub-slab VISLs. Within indoor air, 10 VOCs were identified in exceedance of VISLs, which included acrolein, benzene, benzyl chloride, bromodichloromethane, chloroform, 1,2-dichloroethane, ethylbenzene, naphthalene, 1,1,2,2-tetrachloroethane, and trichloroethene.

Since the 2 and 4 Foster Avenue buildings are currently unoccupied, the vapor intrusion pathway remains incomplete, however, the exceedances of both sub-slab and indoor air VISLs indicate the potential for the vapor intrusion pathway to be complete if these buildings were to be used in the future.

A vapor intrusion investigation was also performed at residential properties in Subarea 3. Sub-slab samples collected at residential properties indicated no exceedances of sub-slab residential VISLs.

Conclusions

Apart from Subarea 3, exposure to contaminants in surface soils, subsurface soils, and sediments found at the FMP area were found to exceed EPA's threshold criteria. Based on these results, arsenic and lead were identified as the primary COCs; however, exposure to other metals (antimony, chromium, and cyanide), PCBs (Aroclor 1260), and SVOCs (benzo(a)pyrene) were also identified in soils and/or sediment exceeding cancer risk and noncancer hazard thresholds at some of the evaluated Subareas. Antimony and chromium are not considered primary COCs, because they are not found frequently and are co-located with arsenic and lead.

Overall, the exceedances of sub-slab and indoor air VISLs indicate a potential risk to commercial workers at the 2 Foster Avenue and 4 Foster Avenue buildings. Since these buildings are currently unoccupied, the vapor intrusion pathway remains incomplete, however, the exceedances of both sub-slab and indoor air VISLs indicate potential risks if these buildings were to be used in the future.

Based on the results of the HHRA, a remedial action is necessary to protect public health, welfare, and the environment from actual or threatened releases of hazardous substances.

Ecological Risk Assessment

A baseline ecological risk assessment was conducted to evaluate the potential for ecological risks from the presence of contaminants in the following media: sediment, surface water, pore water, and soil. The aquatic habitat is the stream, while the terrestrial habitat includes the Upper Hilliards Creek floodplain and adjacent forested areas (Subarea 6), and the Former Lagoon Area (Subarea 5, which is vacant and undeveloped. See Figure 6). Media concentrations were compared to ecological screening values as an indicator of the potential for adverse effects to ecological receptors by habitat type.

Exposure of terrestrial wildlife through ingestion of contaminated soil and biota, and exposure of aquatic wildlife to contaminants in Upper Hilliards Creek (Subarea 6) through ingestion of contaminated sediment, surface water, and biota were evaluated. Biological data were collected (benthic invertebrates, fish, and soil invertebrates) to assist in understanding site-specific bioaccumulation rates and subsequent exposure to upper trophic level receptors. In addition, COC concentrations and biological responses (sediment toxicity) were evaluated to understand potential community level impacts associated with sediment COCs.

A complete summary of all exposure scenarios and ecological receptor groups may be found in the 2018 BERA) which is part of the Administrative Record file.

Summary of the Baseline Ecological Risk Assessment

Ecological risks identified in the BERA for key inorganic COCs are primarily associated with localized elevated concentrations in soil and sediment within and near Upper Hilliards Creek (Subarea 6), whereas concentrations are much lower in Subarea 5 and are expected to pose minimal risks to wildlife.

The BERA provided evidence that COCs, primarily arsenic, lead, and cyanide are present in both aquatic and terrestrial environments and pose unacceptable risk to wildlife receptors. The greatest potential for exposure and unacceptable risk in Subarea 6 (Upper Hilliards Creek) is to aquatic invertivorous receptors (spotted sandpiper) from the ingestion of contaminated sediments and food items. There is low potential for toxicity to benthic organisms; no sediment toxicity was observed in any of the sample locations. Inorganic contaminants (arsenic, lead, and manganese) may pose unacceptable risk to the aquatic community (fish) based upon the exceedance of risk-based benchmarks in pore water, surface water, and fish tissue. Overall, terrestrial wildlife risks are driven primarily by arsenic and lead. Insectivorous wildlife (the American Robin and Short-Tailed Shrew) were identified as the wildlife receptors with the highest predicted exposures and hazard quotients in the terrestrial area of the Site. Similarly, the Spotted Sandpiper was identified as the receptor with the highest exposure and hazard quotient associated with the aquatic community in Upper Hilliards Creek.

Based on the results of the ecological risk assessment, a remedial action is necessary to protect the environment from actual or threatened releases of hazardous substances.

REMEDIAL ACTION OBJECTIVES

The following remedial action objectives (RAOs) for contaminated media address the human health and ecological risks at OU2 of the Site:

Soil

- Prevent potential current and future unacceptable risks to human and ecological receptors resulting from exposure to soil.
- Minimize migration of site-related contaminants in the soil to sediment, surface water, and groundwater.

Sediment

- Prevent potential current and future unacceptable risks to human and ecological receptors resulting from exposure to sediment.
- Minimize migration of site-related contaminants in the sediment to surface water.

LNAPL

- Prevent potential current and future unacceptable risks to human and ecological receptors resulting from direct contact with LNAPL.
- Prevent potential current and future risks to human health resulting from the presence of methane in soil gas.
- Minimize migration of LNAPL-related compounds.

Vapor Intrusion

- Prevent potential current and future unacceptable risks to human receptors resulting from inhalation of VOCs and SVOCs.

Achieving RAOs relies on the remedial alternative's ability to meet final cleanup levels derived from Preliminary Remediation Goals (PRGs), which are based on such factors as Applicable or Relevant and Appropriate Requirements (ARARs), calculated human health and ecological risks, background concentrations, and reasonably anticipated future land use. The FMP area is currently zoned commercial/light industrial, however, for soil contamination, the NJDEP RDCSRS are applicable as the Borough has indicated an anticipated residential future use for the FMP. Additionally, many adjacent parcels are zoned residential. The NJDEP Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) are applicable to soil contaminants which may exist under Foster and United States Avenue.

Within areas of the Site where soil contamination exists above the water table (i.e., unsaturated soils), EPA selected the application of the more stringent of the RDCSRS or the default NJDEP Impact to Groundwater Soil Screening Levels (IGWSSL). PCP, benzene, and napthalene have been detected in groundwater above the New Jersey Groundwater Quality Standards (NJGWQS) and have been detected in soils above their IGWSSL, therefore these compounds have been identified as COCs and their cleanup values are listed in Table 3. For areas of soil contamination that exist primarily below the water table (i.e., saturated soils), which act as a source to groundwater contamination, site-specific soil PRGs were developed to address sources of known shallow groundwater contamination in Subareas 1 and 5. Site-specific PRG values for groundwater source control were developed for arsenic and PCP in saturated soils in Subarea 1 and Subarea 5, respectively.

Finally, in Subarea 6, site-specific ecological PRGs were developed for sediment contamination and the top 1 foot of floodplain soil. These site-specific PRGs were developed from site-wide data that was collected as part of the 2018 BERA. Ecological PRGs are not applied to other subareas within the FMP area, as the other subareas do not contain significant ecological habitat. The lists of PRGs for soil and sediment can be found in Table 3. PRGs may be further modified through the evaluation of alternatives and are used to select the cleanup goals in the EPA Record of Decision.

Due to the site-specific nature of the LNAPL at the Site (i.e., high concentration of VOC and SVOC TICs, and for its presence in saturated soil), the LNAPL PRGs are based on NJDEP's Interim GWQS for TICs in groundwater. While groundwater is not the focus of this Proposed Plan, the effectiveness of the selected remedy to address LNAPL contamination will be further assessed as part of the future groundwater OU.

The presence of LNAPL contamination in shallow groundwater is also the source of indoor-air VOCs, SVOCs, and sub-slab methane concerns. Table 4 presents the LNAPL PRGs for TICs in shallow groundwater. Indoor-air and sub-slab VOC and SVOC concentrations will be compared to the chemical-specific VISLs. Methane concentrations will be compared to the lower explosive limit.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected remedy be protective of human health and the environment, be cost effective, comply with ARARs, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practical. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

Potential technologies applicable to soil, LNAPL, or sediment remediation were identified and screened for effectiveness, implementability, and cost criteria, with emphasis on effectiveness. Those technologies that passed the initial screening were then assembled into remedial alternatives.

For the soil and sediment alternatives, the proposed depths of excavation are based on the soil boring data taken during the RI. These depths were used to estimate the quantity of soil to be removed and the associated costs. The actual depths and quantity of soil to be removed will be finalized during design and implementation of the selected remedy. Full descriptions of each proposed remedy can be found in the 2019 FS which is part of the Administrative Record file.

Surface water monitoring is included as part of each soil and sediment remedial alternative except for No Action. Monitoring would be conducted on a quarterly basis to assess any changes in contaminant conditions over time. It is expected that removal of sediment, combined with soil removal, and/or capping will result in a decrease of surface water contaminants to levels below NJSWQS. If monitoring indicates that contamination levels have not decreased to below the NJSWQS, EPA may require an action in the future.

The time frames below are for construction and do not include the time to negotiate with the responsible parties, design a remedy, or procure necessary contracts. Timeframes for operation and maintenance (O&M) are also provided for alternatives that employ treatment of contaminants. The timeframe for O&M is the estimated timeframe to reach cleanup goals. Five-year reviews will be conducted as a component of the alternatives that would leave contamination in place above levels that allow for unlimited use and unrestricted exposure.

<u>SOIL ALTERNATIVES</u>:

Alternative 1 - No Action

Capital Cost:	*$0*
Annual O&M Cost:	*$0*
Present Worth Cost:	*$0*
Construction Timeframe:	*0 years*

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate the contaminated soil at the Site.

Soil Alternative 2 - Capping and Institutional Controls

Capital Cost:	*$4,953,000*
Annual O&M Cost:	*$55,000*
Present Worth Cost:	*$5,919,885*
Construction Timeframe:	*10 months*

This alternative would use engineering controls consisting of impermeable caps and soil covers as the primary method to prevent exposure to the contaminants in Site soils in Subareas 1, 2, 4, 5, and 6. Subarea 3 consists of a series of residential properties and one vacant, commercially owned property. No capping in Subarea 3 would be required, as there are no unacceptable risks associated with Subarea 3.

A total of approximately 8,000 cubic yards (CY) of soil would be removed and disposed of off-site under Soil Alternative 2 to accommodate the caps. The estimated limits of Soil Alternative 2 are shown in Figure 7.

Within Subareas 1, 2, and 4, existing impermeable caps, consisting of existing buildings, concrete building slabs, asphalted parking areas, and roadways would serve as the engineering controls under this alternative. Vegetated areas without existing permeable caps would be evaluated to determine if installation of a cap is needed. ICs in the form of a deed notice would be required to ensure that future use of the Site recognizes and maintains these controls.

Up to two feet of soil would be removed from Subareas 5 and 6 for the purpose of installing a cap. Following the shallow soil removal, if the RDCSRS are achieved, the area would be backfilled and revegetated. Subsurface locations, where constituents remain at concentrations greater than the RDCSRS, would receive a cap. The cap would consist of a demarcation layer, one and a half feet of common fill, and six inches of topsoil. The area would be revegetated according to regulatory requirements. A deed notice would be established for those areas where constituents remain at concentrations greater than the RDCSRS below the cap.

Soil Alternative 3 – Deep Soil Removal, LNAPL Removal/Bioremediation and Soil Gas Removal, Capping and Institutional Controls

Capital Cost:	*$23,512,000*
Annual O&M Cost:	*$629,500*
Present Worth Cost:	*$27,620,000*
Construction Time Frame:	*1 year*

Alternative 3 would remove soils from separate areas of the FMP that contain arsenic and PCP, which are a source to groundwater contamination. It would also remove PCBs from a small area, which are above Toxic Substances Control Act (TSCA) values. Alternative 3 would also rely on engineering and ICs to control exposure to the contamination at the FMP area.

A total of approximately 40,000 CY of soil would be removed and disposed of off-site under Alternative 3. The estimated limits of excavation activities are shown in Figure 8, and the estimated limits of LNAPL remediation activities are shown in Figure 9.
Soil Alternative 3 would consist of the following actions:

Subarea 1:

- Remove the soil that is the source of arsenic found in groundwater north of Foster Avenue to a depth of 15 feet.
- Remove soil, to a depth of approximately six feet, containing PCBs concentrations greater than 50 mg/kg (the concentration at which the PCBs become defined as a PCB remediation waste under TSCA) at locations adjacent to the Silver Lake conveyance north of Foster Avenue.
- Maintain the existing impermeable caps consisting of asphalted parking lots, roadways, concrete building slabs, and buildings. Locations not covered by the impermeable caps would be evaluated to determine if unsaturated soil containing contaminants at concentrations greater than the IGWSSLs would be removed or if impermeable capping would be expanded onto those areas.
- Address any underground structures that may be a potential source of contamination.

Subarea 2:

- Maintain the existing impermeable asphalt cap and soil cover.
- Cap or remove contaminants exceeding IGWSSL that are not currently paved.
- Install a LNAPL recovery system at the 2 and 4 Foster Avenue buildings.
- Install a system to deliver nutrients to the LNAPL across the Former Resin Plant/Tank Farm A area to stimulate existing LNAPL biodegradation.
- Install a system to remove methane and other soil gas from the subsurface.
- Address any underground structures that may be a potential source of contamination.

Subarea 3:

- Install injection wells and soil gas extraction wells on the former tavern/service station property, and on the west side of U.S. Avenue.

- Install pressurized nutrient injection wells along the U.S. Avenue right-of-way east of U.S. Avenue and south of the former tavern/service station.

- Install soil gas extraction and treatment, and nutrient mixing and injection systems in the eastern parking area of the 2 and 4 Foster Avenue buildings.

- Install piping beneath U.S. Avenue from the former tavern/service station to the 2 and 4 Foster Avenue parking area.

- Conduct direct push nutrient injections in those areas beneath impacted properties along U.S. Avenue where LNAPL is present.

- Operate the nutrient injection and soil gas recovery systems.

Subarea 4:

- Remove soil containing LNAPL from the Seep Area to an approximate depth of five to seven feet.

- Restore the excavation area and reinstall the parking area.

- Install a collection trench south of Foster Avenue to prevent LNAPL transport under Foster Avenue from the parking area east of 2 and 4 Foster Avenue (source of LNAPL) to the Seep Area and Upper Hilliards Creek.

Subarea 5:

- Remove soil from the western portion of the Former Lagoon Area to a depth of approximately eight feet below ground surface to address the source of pentachlorophenol in groundwater.

- Remove any additional unsaturated soil where pentachlorophenol is present at concentrations greater than the default IGWSSL.

- Restore the excavation areas and maintain the existing soil cap that is present across the remainder of the former Lagoon Area.

Subarea 6:

- Remove all soil containing constituents greater than the ecological PRGs in the top one foot of the Upper Hilliards Creek flood plain.

- Remove all soil at depths greater than one foot where constituents are present at concentrations greater than the lower of the RDCSRS or IGWSSL throughout the Upper Hilliards Creek floodplain.

Soil Alternative 4 – Deep and Intermediate Soil Removal, LNAPL Removal/Bioremediation, Soil Gas Removal, Capping and Institutional Controls

Capital Cost:	*$30,151,000*
Annual O&M Cost:	*$692,500*
Present Worth Cost:	*$34,259,000*
Construction Time Frame:	*2.5 years*

Under Alternative 4, the scope of the remediation in Subarea 1 differs from Alternative 3. All of the other elements in Alternative 4 are the same as those presented in Alternative 3. A total of approximately 67,000 CY of soil would be removed and disposed of off-site under Alternative 4. Figures 9 and 10 show the limits of LNAPL and soil cleanup actions, respectively, for this alternative.

Subarea 1:

- Excavate all soil contamination exceeding the RDCSRS or IGWSSL (whichever is lower) at the FMP north of Foster Avenue to a depth of four feet below the soil surface. The excavation to remove exceedances of RDCSRS or IGWSSL to four feet would apply to all areas except existing building footprints, as the majority of the contamination is located in the top four feet of soil. Areas within the four-foot excavation footprint that exceed RDCSRS or IGWSSL would receive either a soil or impermeable cap. An impermeable cap would be required for areas where contaminant levels exceeding the IGWSSL remain between the water table and the excavation bottom. A soil cap may be used for soil remaining below the excavated areas that do not exceed IGWSSL values or where IGWSSL do not apply (below the water table) but RDCSRS exceedances remain.

- Excavate soil contamination exceeding the RDCSRS or IGWSSL (whichever is lower) on the 7 Foster Avenue commercial lot to a depth of four feet below the soil surface in all areas except for the 7 Foster Avenue building footprint. Areas within the excavated footprint that exceed RDCSRS or IGWSSL would receive either a soil or impermeable cap. An impermeable cap would be required for areas where contaminant levels exceeding the IGWSSL remain between the water table and the excavation bottom. A soil cap may be used for soil remaining below the excavated areas that do not exceed IGWSSL values or where IGWSSL do not apply (below the water table) but RDCSRS exceedances remain.

- Address any underground structures that may be a potential source of contamination.

Soil Alternative 5 –Excavation to Depth and Institutional Controls

Capital Cost: *$104,893,000*
Annual O&M Cost: *$1,000*
Present Worth Cost: *$105,574,000*
Construction Time Frame: *8 years*

This alternative would remove and dispose of off-site all accessible soil exceeding PRGs (RDCSRS or IGWSSL, whichever is lower) and all soil containing LNAPL, regardless of depth. A total volume of approximately 300,000 CY of soil would be removed and disposed of off-site under Alternative 5; the estimated limits of the excavation are shown in Figure 11.

The scope of Alternative 5 would be:

Subarea 1:

- Removal of the parking areas on the property adjacent to the 7 Foster Avenue building, and the parking areas and a portion of the 6 East Clementon Road building slab on the property adjacent to the 10 Foster Avenue building.

- Removal of soil to a depth of one to ten feet adjacent to the 7 Foster Avenue building.

- Removal of soil to depths of five to fifteen feet on the property currently occupied by the 6 East Clementon Road building slab and adjacent to the 10 Foster Avenue building.

- Removal of any underground structures that may represent a source of contamination.

- Backfilling all areas to existing grade.

- Existing roadways, where contamination would remain, would serve as caps. ICs would be applied.

Subarea 2:

- Removal of the 2 and 4 Foster Avenue buildings and building slabs.

- Removal of the parking area and former red barn building slab.

- Removal of soil containing LNAPL to a depth of 25 feet below ground surface.

- Removal of any below ground structures that may represent potential sources of contamination.

- Removal of soil to seven to ten feet on the slopes towards Foster Avenue and U.S. Avenue, and backfilling all areas to existing grade.

Subarea 3:

- Demolition and replacement of several smaller buildings such as garages and storage sheds.

- Temporary relocation of residents from five residential properties and workers from one commercial property, for as long as one year each.

- Management of several million gallons of groundwater containing LNAPL.

- Installation of approximately 3,200 linear feet (100,000 ft^2) of shoring.

- Excavation of approximately 80,000 CY of soil.

- Disposal of approximately 20,000 CY of the excavated soil containing LNAPL, importing 20,000 CY of replacement soil, and reuse of 60,000 CY of soil.

- Restoration of properties to current conditions.

Subarea 4: (same as Alternative 3)

- Remove soil containing LNAPL from the Seep Area to an approximate depth of five to seven feet.

- Restore the excavation area and reinstall the parking area.

- Install a collection trench south of Foster Avenue to prevent LNAPL transport under Foster Avenue from the parking area east of 2 and 4 Foster Avenue (source of LNAPL) to the Seep Area and Upper Hilliards Creek.

Subarea 5:

- Remove soil to a depth of approximately 20 feet throughout the northwest portion of the Former Lagoon Area.

- Backfill to grade and restore.

Subarea 6:

- Remove all soil containing constituents greater than the ecological PRGs in the top one foot of the Upper Hilliards Creek flood plain.

- Remove all soil at depths greater than one foot where constituents are present at concentrations greater than the RDCSRS or IGWSSL (whichever is lower) throughout the Upper Hilliards Creek floodplain.

SEDIMENT ALTERNATIVES:

Sediment Alternative 1 – No Action

Capital Cost:	*$0*
Annual O&M Cost:	*$0*
Present Worth Cost:	*$0*
Timeframe:	*0 years*

The NCP requires that a "No Action" alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no action would be taken to remediate the contaminated sediment within Upper Hilliards Creek (Subarea 6).

Sediment Alternative 2 - Targeted Removal of Surface Sediment with Contaminants Greater than PRGs, Capping and Natural Recovery

Capital Cost:	*$1,377,000*
Annual O&M Cost:	*$16,500*
Present Worth Cost:	*$1,610,000*
Construction Time Frame:	*2 months*

One foot of sediment containing constituents at concentrations greater than the PRGs would be removed from Upper Hilliards Creek. Approximately 310 CY of sediment would be removed under this alternative. The extent of excavation is shown in Figure 12. A cap would then be installed, consisting of 6 inches of sand, covered by 3 inches of stone, that would act as an armoring layer. Natural sedimentation would then be allowed to fill in above the armoring layer and reestablish the current elevation of the stream. As part of this alternative, the sediment that has accumulated in the Silver Lake conveyance system, located beneath the parking area between the 2 and 4 Foster Avenue buildings and the 10 Foster Avenue building, and the sediment that is in the concrete culvert south of Foster Avenue, would be removed and disposed of off-site.

Sediment Alternative 3 – Removal of All Sediment with Contaminants Greater than PRGs

Capital Cost:	*$1,730,000*
Annual O&M Cost:	*$0*
Present Worth Cost:	*$1,759,000*
Construction Time Frame:	*3 months*

This alternative would consist of excavation of all sediment in Upper Hilliards Creek, the Silver Lake conveyance system, and concrete culvert containing contaminants at concentrations greater than the PRGs. Approximately 1,400 CY of sediment would be removed under this Alternative. The extent of excavation is shown in Figure 12. The areas where sediment would be removed would be backfilled with clean material that would both remain stable and provide habitat for the benthic community. Because all contaminants present at concentrations greater than the PRGs would be removed and disposed of off-site, there would be no need for a cap.

The estimated limits of Sediment Alternatives 2 and 3 are shown in Figure 12.

EVALUATION OF ALTERNATIVES

The NCP lists nine criteria that EPA uses to evaluate the remedial alternatives individually and against each other to select a remedy. This section of the Proposed Plan considers the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. Seven of the nine evaluation criteria are discussed below. The final two criteria, "State Acceptance" and "Community Acceptance" are discussed at the end of the document. A detailed analysis of each of the alternatives is in the 2019 FS report.

THE NINE SUPERFUND EVALUATION CRITERIA

1. Overall Protectiveness of Human Health and the Environment evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

3. Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

4. Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

5. Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.

6. Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

7. Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

8. State/Support Agency Acceptance considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

***9.* Community Acceptance** considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

<u>EVALUATION OF SOIL ALTERNATIVES</u>

1. Overall Protection of Human Health and the Environment

Alternative 1, No Action, would not be protective of human health or the environment since it does not include measures to prevent exposure to contaminated soil.

Alternative 2 would provide limited protection of human health and to ecological receptors. All exposure pathways would be eliminated by soil removal (in the ecological habitat areas), existing and new capping (in other areas of the Site), and ICs (Deed Notices). The soil removal and capping in the ecological habitat areas would prevent transport of soil containing contaminants into surface water bodies. However, under this alternative, sources of groundwater contamination would remain, no actions to remove or contain the LNAPL would be performed, and no actions would be conducted to mitigate the soil gas vapors beneath the 2 and 4 Foster Avenue buildings. Therefore, there would remain the possibility that, without ongoing manual recovery activities, discharges of LNAPL to Upper Hilliards Creek and potential indoor exposure to vapors originating in the subsurface would continue.

Alternatives 3 and 4 would protect human health and the environment by eliminating all exposure pathways through a combination of soil excavation, LNAPL treatment, and use of existing structures for capping. The soil removal and capping in the ecological habitat areas would prevent transport of soil containing contaminants into surface water bodies. In contrast to Alternative 2, under Alternatives 3 and 4, sources of groundwater contamination would be removed, LNAPL would be addressed by a combination of removal and bioremediation, and a subsurface soil ventilation system would remove vapors beneath the 2 and 4 Foster Avenue buildings. Alternative 5 would achieve protectiveness by excavating all impacted soils as well as LNAPL contamination. Alternatives 2, 3, 4, and 5 would require Deed Notices where constituents remain in soil at concentrations greater than the RDCSRS.

2. Compliance with Applicable or Relevant and Appropriate Requirements

Actions taken at any Superfund site must meet all applicable or relevant and appropriate requirements (ARARs) under federal and state laws or provide grounds for invoking a waiver of those requirements.

Alternative 1 would not meet ARARs.

Alternatives 2 through 5 would address chemical-specific ARARs, such as NJDEP RDCSRS, by removing contaminated soil, both in the shallow and deep zones, and capping and placing deed notices to eliminate direct contact. Action-specific ARARs would be met by Alternatives 2 through 5 during the construction phase by proper design and implementation of the action, including disposal of excavated soil at the appropriate disposal facility. The capping elements of these alternatives would meet action-specific ARARs. These alternatives would also be required to meet location-specific ARARs, such as NJDEP Wetlands Protection Act Rules.

3. Long-Term Effectiveness and Permanence

Alternative 1 would not provide long-term effectiveness or permanent protection to ecological receptors, groundwater, or surface water because the soil contaminants would remain uncontrolled.

Alternative 2, capping, would provide long-term effectiveness and permanence for control of direct contact exposure to soil contaminants as long as the cap is maintained, and the provisions of the deed notices are followed.

Alternative 3 would provide a greater degree of long-term effectiveness and permanence by a combination of capping, removal of metals, PCBs, and PCP from soil, as well as a combination of LNAPL removal and bioremediation.

Alternative 4 has the same components of Alternative 3. In addition, Alternative 4 would also include excavation of soil contaminants to a depth of four feet beneath Subarea 1 commercial properties (except under existing building footprints). The four-foot excavation of Alternative 4 provides for greater long-term protectiveness than Alternative 3 because it does not solely rely on ICs and existing shallow surficial caps to protect against potential releases and exposures from incidental shallow utility installations, maintenance, repair, or improvements common to active commercial and light industrial facilities.

Alternative 5 provides the greatest degree of long-term effectiveness and permanence. Under Alternative 5, all subsurface soil containing constituents at concentrations greater than the PRGs would be removed from the Site except for areas beneath roadways and remaining buildings.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 1 would not reduce the toxicity, mobility, or volume of soil contaminants since no material would be treated, removed, or capped.

Alternative 2, capping, would reduce mobility of contaminants but it involves no treatment of the contaminants, and therefore, no reduction in toxicity or volume. The principal threat waste LNAPL would not be treated under this alternative.

Alternatives 3 and 4 would provide the highest degree of reduction of toxicity, mobility, or volume through treatment. The principal threat waste LNAPL, would be treated through the construction of a recovery system in Subarea 2, which would reduce the LNAPL mobility, while LNAPL bioremediation would reduce its toxicity, mobility, and volume.

Alternative 5 does not provide for reduction of toxicity, mobility, or volume through treatment because soil removal, not treatment, would be used for this alternative.

5. Short-Term Effectiveness

Short-term effectiveness considers the effects the implementation of an alternative will have on the community, workers, and the environment, and the amount of time until an alternative effectively protects human health and the environment.

Alternative 1 does not present any short-term risks to site workers or the environment because it does not include active remediation work.

Under Alternatives 2 through 5, potential adverse short-term effects to the community increase with each successive alternative.

Risks to site workers, the community, and the environment include potential short-term exposure to contaminants during soil excavation. Potential exposures and environmental impacts associated with dust and runoff would be minimized with proper installation and implementation of dust and erosion control measures and monitoring. Subareas 5 and 6 of the Site consist of wooded areas and wetlands. Under Alternatives 2 through 5, it would be necessary to remove trees and vegetation, as well as disrupt the small streams and associated wildlife in Subareas 5 and 6. Alternatives in which the largest quantity of soil is removed would have the greatest area of impact, would require the longest period of time to complete, and would have the highest potential for short–term adverse effects. Among Alternatives 2 through 5, Alternative 2 would take the shortest time to achieve protection of human health and the environment and would, therefore, have the lowest potential for short-term adverse effects. Alternative 5 would involve the most invasive method of soil remediation and would take the longest time to implement and, therefore, would have the highest potential for short-term adverse effects.

6. Implementability

Because Alternative 1 would not entail any construction, it would be most easily implemented.

Alternative 2, capping, is readily implementable since much of the area in need of capping would rely on the existing buildings, concrete building slabs, and asphalted parking areas and roadways, with the exception of Subareas 3, 5, and 6.

Alternatives 3 through 5 have common implementability issues related to the removal of contaminated soil and installation of the caps. These include short-term traffic disruption on West Clementon Road, Foster Avenue and United States Avenue. The amount of disruption depends on the location of the contaminated soil, the amount of soil removed and the amount of time it takes for removal.

The increased volume of soil removal associated with Alternatives 3, 4, and 5 increases the implementation difficulties compared to Alternative 2.

In Alternatives 3 through 5, deep excavations to remove groundwater source areas in Subareas 1 and 5 present implementability challenges. Alternative 4 presents greater implementability challenges than Alternative 3, and Alternative 5 presents greater implementability challenges than Alternative 4, due to the additional volume of soil to be removed. The implementation issues related to road disruptions, capping, and off-site disposal can be managed through common engineering controls.

7. Cost

The total estimated present worth costs of the Soil Alternatives, calculated using the 7% discount rate, are:

- Alternative 1 - $0
- Alternative 2 - $5,919,885
- Alternative 3 - $27,620,000
- Alternative 4 - $34,259,000
- Alternative 5 - $105,574,000

EVALUATION OF SEDIMENT ALTERNATIVES

1. Overall Protection of Human Health and the Environment

Alternative 1 is not protective of human health or the environment because no action would be taken to address sediment contamination.

Alternative 2 would provide protection of human health and the environment by removing the sediment containing the highest concentrations of constituents and providing a cap to prevent human and ecological exposure to the remaining sediment that contains contaminants at concentration greater than the cleanup goals.

Alternative 3 would provide human health and ecological receptor protection by removing the sediment containing contaminants at concentrations greater than the PRGs and placing clean material in the stream bed as part of the restoration.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

There are no promulgated sediment cleanup values, therefore site-specific protective cleanup values were developed and can be met. Alternatives 2 and 3 would comply with action and location-specific ARARs that apply to remediation and filling in floodplains, work in wetland areas (NJDEP Wetlands Protection Act Rules), waste management (Resource Conservation Recovery Act Land Disposal Restrictions), and storm water management.

3. Long-Term Effectiveness and Permanence

Alternative 1 would allow existing contamination, and ecological exposures and risks to remain. No routine monitoring of contaminants or site conditions would be conducted to determine if natural processes are reducing the surface concentrations of contaminants in sediment.

The cap associated with Alternative 2 would be installed in Upper Hilliards Creek sediment. This alternative would be effective in maintaining protection of human health and the environment in the capped section of the water body. Such protectiveness would remain only as long as the cap remains in place. This alternative would require continued maintenance to ensure long-term effectiveness.

Alternative 3 would remove all sediment contamination from Upper Hilliards Creek. Alternative 3 would be more effective and have a higher degree of permanence than Alternative 2 since all contaminated sediment exceeding PRGs would be removed under Alternative 3.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

The major contamination in sediment at the Site is metals. The sediment alternatives, except No Action, involve removal and/or capping of the sediment. Although removal of the contaminated sediment would decrease the volume, and capping would decrease the mobility of contamination at the Site, no sediment alternative reduces the toxicity, mobility, or volume through treatment. Volume of contaminants at the Site would be reduced to a greater extent in Alternative 3 versus Alternative 2, as more contamination is removed from the Site; however, volume would not be reduced through treatment. Contaminants in excavated sediment would be transferred to a landfill without treatment.

5. Short-Term Effectiveness

Alternative 1 does not present any short-term risks to the community, site workers, or the environment because this alternative does not include remediation work.

Alternatives 2 and 3 involve excavation and thus have potential for short-term adverse effects. Potential risks posed to site workers, the community, and the environment during implementation of each of the sediment alternatives could be due to wind-blown or surface water transport of contaminants. Any potential impacts associated with dust and runoff would be minimized through proper installation and implementation of dust and erosion control measures. The areas would be monitored throughout the construction.

The potential risk of sediment release could increase with Alternatives 2 and 3, due to removal of existing vegetation. However, this could be managed with proper engineering controls. There is little difference in the implementation time from the shortest (two months) to the longest (three months). Therefore, Alternatives 2 and 3 are equal in terms of short-term effectiveness.

6. Implementability

Sediment Alternative 1 would not include any construction, and therefore would be easily implemented.

Alternatives 2 and 3 require sediment removal and face similar implementability challenges. Such challenges include access to low lying saturated areas, control of surface water flow, controlling groundwater intrusion into excavation areas, streambed stabilization, and wetland restoration.

The implementability challenges increase with the volume of sediment to be removed. Alternative 2 calls for the least amount of sediment removal and therefore presents the least amount of implementability challenges among the alternatives. In contrast, Alternative 3 poses slightly higher implementability challenges since it requires the largest remediation area and involves deeper removal of sediment.

7. Cost

The total estimated present worth costs of the Sediment Alternatives, calculated using the 7% discount rate, are:

- Alternative 1 - $0
- Alternative 2 - $1,610,000
- Alternative 3 - $1,759,000

PREFERRED ALTERNATIVES

The preferred soil alternative for the OU2 cleanup of the Sherwin-Williams/Hilliards Creek Superfund site is Alternative 4, Intermediate and Deep Soil Removal, LNAPL Removal/Bioremediation, Soil Gas Removal, Capping and Institutional Controls. The preferred alternative for sediment is Alternative 3, Excavation. As discussed above, the surface water will be monitored to determine the effectiveness of the implemented soil and sediment remedies. Together, these three elements comprise EPA's Preferred Alternatives.

Soil:

The Preferred Soil Alternative 4 (Figures 9 and 10) involves excavation, capping, off-site disposal of soil, and bioremediation of LNAPL. The major components of the Preferred Soil Alternative include:

- Excavation, transportation, and disposal of 67,000 CY of contaminated soil from Subareas 1, 4, 5, and 6.

- Excavation of soil up to depths of 15 feet in Subarea 1, to remove saturated soils containing arsenic that are the source to shallow groundwater contamination.

- Removal of soil in Subarea 1 containing PCBs at concentrations greater than 50 mg/kg.

- Removal of any underground structures that may be a source of contamination from all six subareas.

- Installation of a cap in Subareas 1, 2, 4, and 5.

- Restoration and revegetation of Subareas 1 and 5.

- Installation of a LNAPL recovery system Subarea 2.

- Injection of nutrients to stimulate existing LNAPL biodegradation in Subareas 2 and 3.

- Installation of a system to remove soil gas for the subsurface in Subarea 2.

- Excavation of soil containing LNAPL from Subarea 4 to an approximate depth of five to seven feet.

- Installation of a collection trench south of Foster Avenue to prevent LNAPL transport to Subareas 4 and 6.

- Removal of soil from Subarea 5 to a depth of 8 feet below ground surface to address the source of PCP in groundwater.

- Development of a site-specific impact to groundwater cleanup goal for PCP in Subarea 5, and removal of unsaturated soil exceeding such goal.

- Restoration of excavated areas and maintenance of the existing soil cap present across the remainder of Subarea 5.

- Excavation of all soil and sediment contaminants greater than their cleanup goals in Subarea 6.

- ICs, such as a deed notice, to inform the user of potential exposure to residual soils which exceed levels that allow for unrestricted use in Subareas 1, 2, 4, and 5. ICs would be established for areas of roadways that exceed NRDCSRS.

This alternative will remove soil within the saturated zones that contribute contaminants to groundwater in Subareas 1 and 5. By removing these saturated soils, the concentrations of contaminants in groundwater that exceed ground water quality standards (NJGWQS) is expected to be reduced. This alternative would generally remove the highest concentrations of soil contamination in Subarea 1, while capping remaining areas soils with lower concentrations.

The Preferred Soil Alternative was selected over other alternatives because it is expected to achieve substantial and long-term risk reduction through a combination of bioremediation of deep LNAPL, off-site disposal of soil contaminants, and the use of engineering and institutional controls, and is expected to allow the Site to be used for its reasonably anticipated future land use, which is commercial/residential. The Preferred Soil Alternative reduces the risk within a reasonable time frame, at a cost comparable to other alternatives, and provides for long-term reliability of the remedy.

The Preferred Soil Alternative will achieve cleanup goals that are protective for residential use. Though the remedy will be protective for this use, it will not achieve levels that would allow for unrestricted use since contamination would be left at depth in some areas, and therefore, ICs, such as deed notices will be required. Five-year reviews will be conducted since contamination will remain above levels that allow for unlimited use and unrestricted exposure.

Sediment:

The Preferred Sediment Alternative 3 (Figure 12) includes excavation of sediment with contaminant levels greater than the PRGs from Subarea 6. The major components of the Preferred Sediment Alternative include:

- Construction of a stream diversion system to allow access to sediments.
- Excavation of contaminants to depths ranging from 2 to 7 feet below sediment surface.
- Excavation, transportation, and disposal of an estimated 1,400 CY of contaminated sediment.
- Dewatering and processing of excavated sediment.
- Stream bank revegetation and restoration.

Deeper excavations of contaminated sediment will occur from the portion of Upper Hilliards Creek adjacent to the 1 Foster Avenue building. After remediation of sediment, the restored stream banks, riparian zone, and wetlands will be monitored for a period of five years to assure successful restoration of these areas.

The Preferred Sediment Alternative was selected over other alternatives because it is expected to achieve substantial and long-term risk reduction through off-site disposal of sediment by reducing contaminant levels in Upper Hilliards Creek. The Preferred Sediment Alternative 3 reduces risk within a reasonable timeframe, at a cost comparable to the other alternatives, and provides for long-term reliability of the remedy.

Surface Water:

Surface water monitoring will be conducted on a quarterly basis to assess any changes in contaminant conditions over time. It is expected that removal of contaminated sediment, combined with soil removal, and/or capping will result in a decrease of surface water contaminants to levels below NJSWQS. If monitoring indicates that contamination levels have not decreased to below the NJSWQS, EPA may require an action in the future.

The Preferred Alternatives are believed to provide the best balance of tradeoffs among the alternatives based on the information available to EPA at this time. EPA believes the Preferred Alternatives will be protective of human health and the environment, will comply with ARARs, will be cost-effective, and will utilize permanent solutions. The selected alternatives may change in response to public comment or new information. The total present worth cost for both the soil and sediment preferred alternatives is $36,018,000.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of a selected remedy.

State Acceptance

The state of New Jersey concurs with EPA's Preferred Alternatives for soil and sediment, however, the state cannot concur with the capping and institutional control component of the preferred soil alternative unless the property owners provide their consent to the placement of a cap and a deed notice.

Community Acceptance

Community acceptance of the Preferred Alternatives will be evaluated after the public comment period ends and will be described in the Record of Decision. Based on public comment, the Preferred Alternatives could be modified from the version presented in this Proposed Plan. The Record of Decision is the document that formalizes the selection of the remedy for a site.

COMMUNITY PARTICIPATION

EPA provided information regarding the cleanup of OU2 for the Site through meetings, the Administrative Record file for the Site, and announcements published in the local newspaper. EPA encourages the public to gain a more comprehensive understanding of the Site.

The dates for the public comment period, the date, the location and time of the public meeting, and the locations of the Administrative Record file are provided on the front page of this Proposed Plan.

For further information on EPA's Preferred Alternative for OU2 of the Site, please contact:

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On the Web at:
http://epa.gov/superfund/sherwin-williams

Table 3 - Preliminary Remediation Goals for Soil and Sediments* Contaminants of Concern

Contaminants	NJ Residential Direct Contact Soil Remediation Standard (mg/kg)	NJ Non-Residential Direct Contact Soil Remediation Standard** (mg/kg)	Default NJ Impact to GW Screening Levels - IGWSSL (Above the Water Table) (mg/kg)	Ecological PRGs for Upper Hilliards Creek Floodplain Soils (top 1 foot) and Sediments (both mg/kg)	Site Specific Soil Value for Saturated Soils (mg/kg)
Metal Contaminants					
Arsenic	19	19	19	19	50
Cyanide	47	680	20	58	---
Lead	400***	800	90	213	---
Semi-Volatile Organic Compound Contaminants					
Naphthalene	6****	17	25	---	---
Pentachlorophenol	0.9	3	0.3	---	15
Volatile Organic Compound Contaminants					
Benzene	2	5	0.005	---	---
Polycyclic Aromatic Hydrocarbons (PAHs) Contaminants					
Benzo(a)anthracene	5	17	0.8	---	---
Benzo(b)fluoranthene	5	17	2	---	---
Benzo(a)pyrene	0.5	2	0.2	---	---
Dibenzo(a, h)anthracene	0.5	2	0.8	---	---
Indeno (1,2,3 – CD) pyrene	5****	17	7	---	---
Polychlorinated Biphenyls (PCBs) Contaminants					
Aroclor 1254	0.2	1	0.2	---	---
Aroclor 1260	0.2	1	0.2	---	---

*The ecologically derived sediment cleanup values are also being utilized for the top 1 foot of floodplain soils.
**The NJDEP Non-Residential Direct Contact Soil Remediation Standard (NRDCSRS) are applicable to soil contaminants which may exist under Foster and United States Avenue.
*** Additionally, to achieve the risk reduction goal established for the Site, which is to limit the probability of a child's blood lead level exceeding 5 µg/dL to 5% or less, the average lead concentration across the surface of the remediated area must be at or below 200 mg/kg.
**** The RDCSRS will be used as a cleanup goal when the RDCSRS is more stringent than the IGWSSL.

Table 4 – Preliminary Remediation Goals for LNAPL Contamination

Contaminant	NJ Groundwater Quality Standards	NJ Interim Groundwater Quality Standards for Tentatively Identified Compounds (TICs) µg/L	Methane Concentrations
Petroleum Hydrocarbons*	None Noticeable	--	--
Total VOC and/or SVOC TIC Compounds in groundwater**	--	500 µg/L	--
Individual VOC and/or SVOC TIC Compound in groundwater**	--	100 µg/L	--
Total Carcinogenic VOC and/or SVOC TIC Compounds in groundwater**	--	25 µg/L	--
Individual Carcinogenic VOC and/or SVOC TIC Compound in groundwater**	--	5 µg/L	--
Indoor air methane concentrations must be addressed:	--	--	Not to exceed the Lower Explosive Limit (LEL)

* LNAPL at Site is comprised of residual petroleum hydrocarbons (likely the source of the methane), degraded mineral spirits, and a combination of SVOC and VOC TICs.

**The EPA preferred OU2 actions will address soil contamination in shallow groundwater. EPA will select a future remedial alternative to address groundwater contamination at the Site as part of Operable Unit 3 (OU3).

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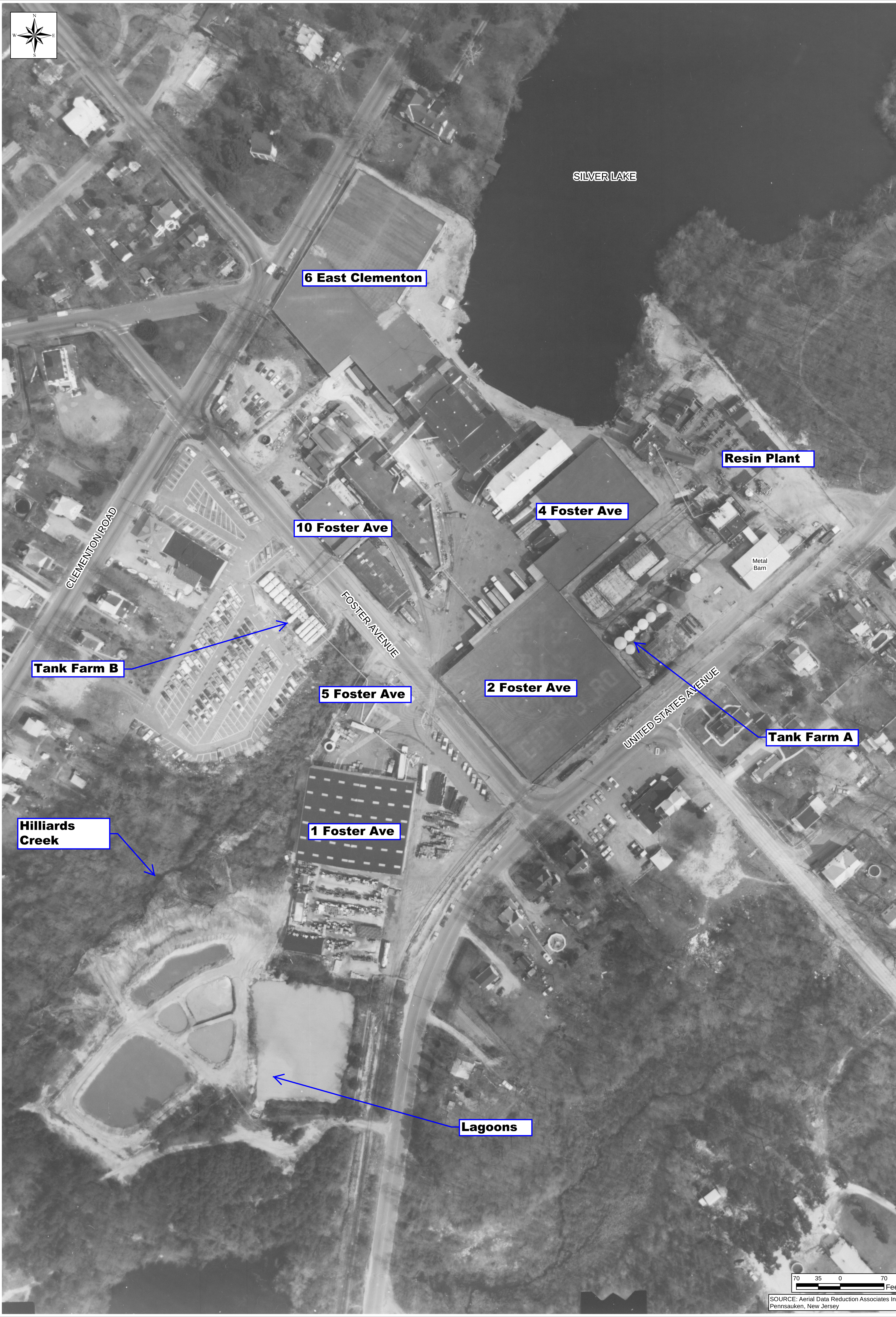
PROJECT NAME: Former Manufacturing Plant Feasibility Study	TITLE: COMPREHENSIVE SITE MAP
CLIENT NAME: The Sherwin-Williams Company	
REPORT DATE: January 2019	DATE: 1/10/2019
	FIGURE #: 1



Weston Solutions, Inc. 205 Campus Drive Edison, New Jersey 08837-3939 TEL: (732) 417-5800 Fax: (732) 417-5801 http://www.westonsolutions.com	REPORT DATE: February 2014	PROJECT MANAGER: S. Jones	CLIENT NAME: The Sherwin-Williams Company	DRAWING TITLE: FORMER MANUFACTURING PLANT 1975 AERIAL PHOTOGRAPH
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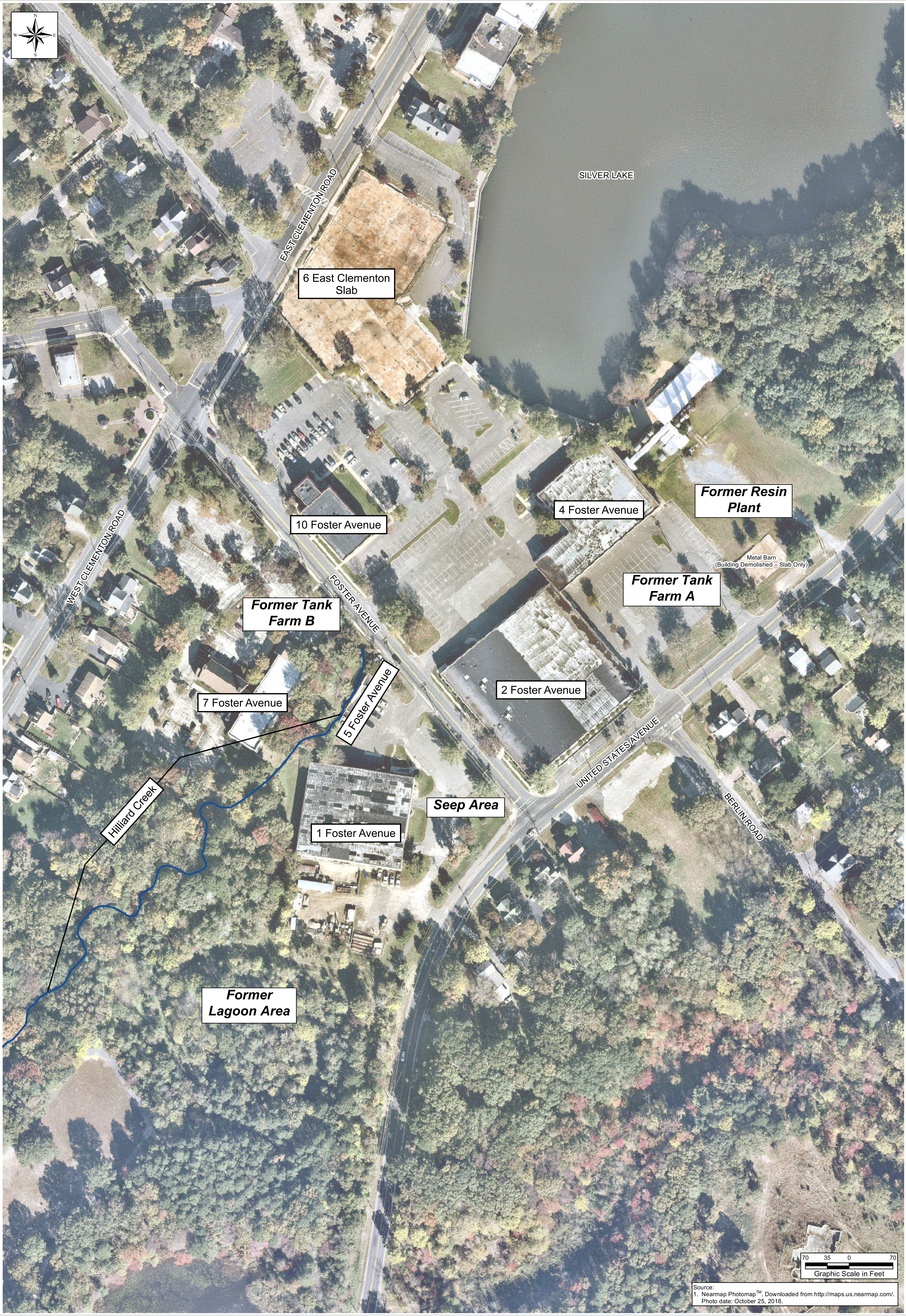
	REVISION No. 0	CONTRACT No. DELIVERY ORDER NO.	PROJECT NAME: Sherwin-Williams Remedial Investigation	
	WORK ORDER No. 20076.022.048.0002	DRAWN/MODIFIED BY: K. Heulitt DATE CREATED: 2-6-2014		Figure 2 — SCALE: 1" = 70' — DATE: 2-6-2014



Source:
1. Nearmap Photomap™. Downloaded from http://maps.us.nearmap.com/. Photo date: October 25, 2018.

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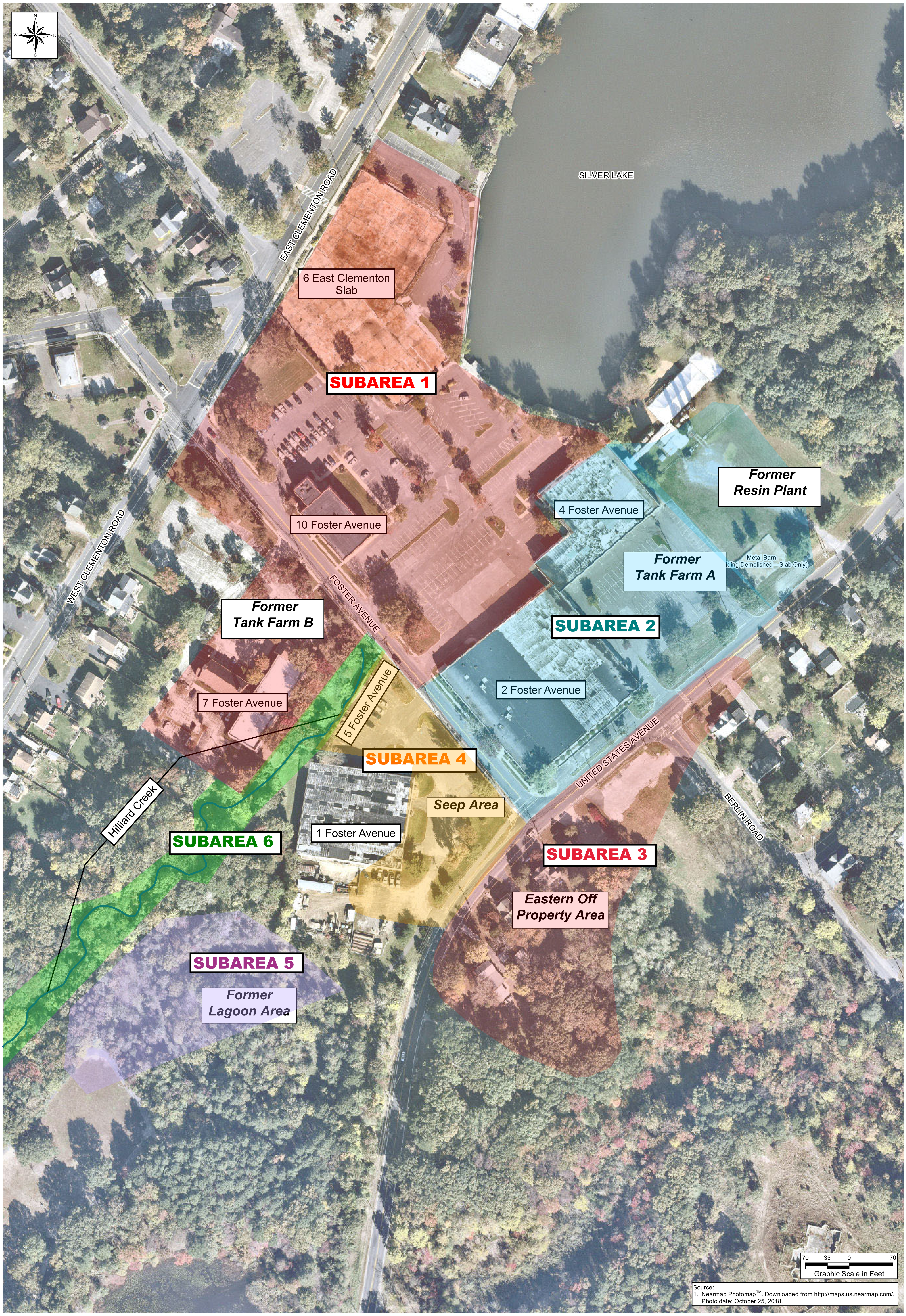
Weston Solutions, Inc.
205 Campus Drive Edison, New Jersey 08837-3939
TEL: (732) 417-5800 Fax: (732) 417-5801
http://www.westonsolutions.com

REPORT DATE: February 2019	PROJECT MANAGER: D. Kane	CLIENT NAME: The Sherwin-Williams Company	**Figure 3: Site Layout**
DRAWING: 23525_FMP_Site_Aerial_Hist_Labels.mxd PATH: L:\SHERWIN\GIS\MXD\2019_02_FMP\	CHECKED BY: A. Fischer		
REVISION No. 0	CONTRACT No. DELIVERY ORDER NO.	PROJECT NAME: Sherwin-Williams Remedial Investigation	
WORK ORDER No. 20076.022.090.0001	DRAWN/MODIFIED BY: J. Heaton DATE CREATED: 2/13/2019		ATTACHMENT: 2 SCALE: 1" = 70' DATE: 2/13/2019



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http://www.westonsolutions.com

REPORT DATE: February 2019	PROJECT MANAGER: D. Kane	CLIENT NAME: The Sherwin-Williams Company	
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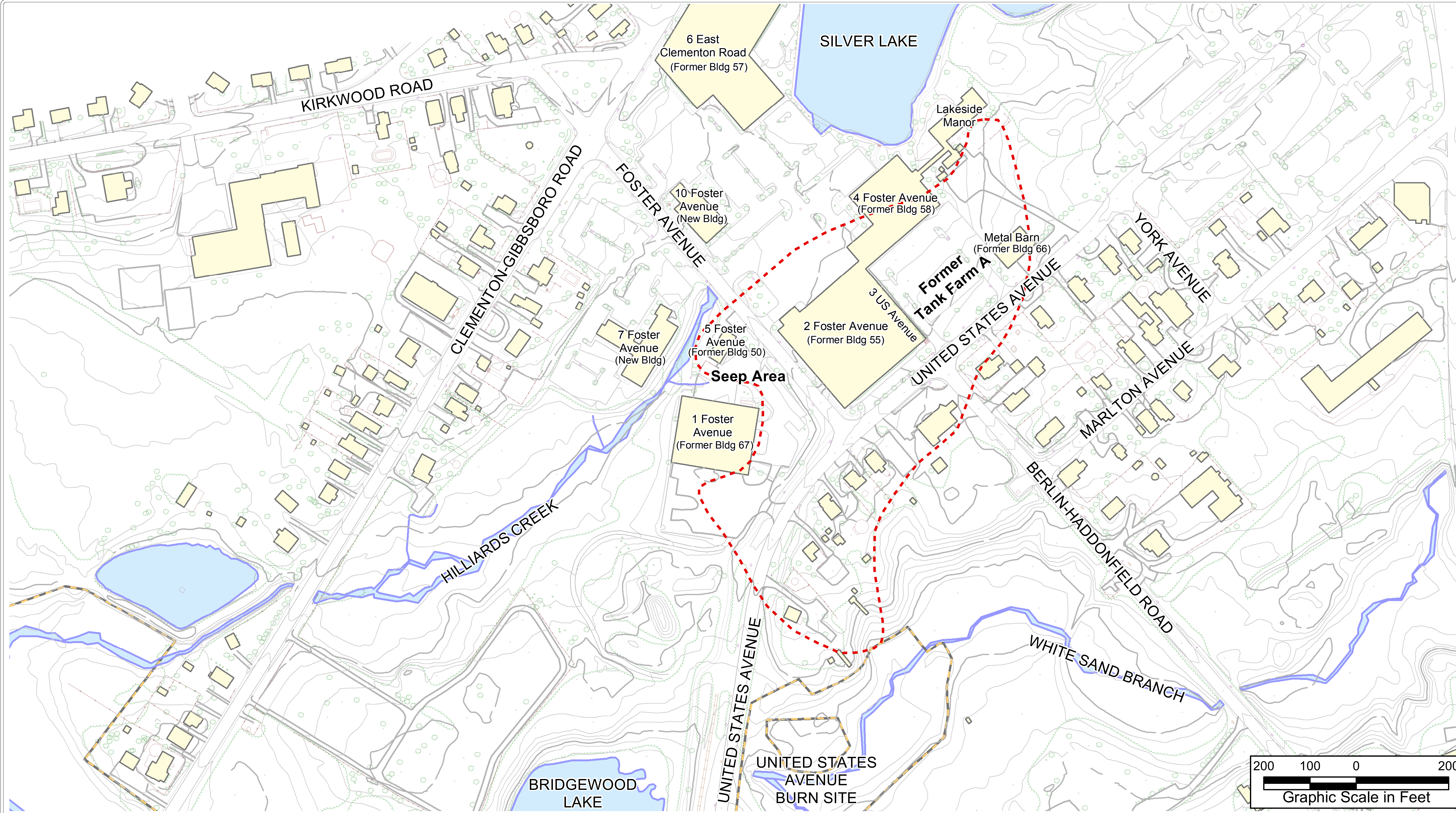
REVISION No. 0	CONTRACT No. DELIVERY ORDER NO.	PROJECT NAME: Sherwin-Williams Remedial Investigation	
WORK ORDER No. 20076.022.090.0001	DRAWN/MODIFIED BY: J. Heaton DATE CREATED: 2/13/2019		

Figure 4:

Site Sub Areas

ATTACHMENT: 2 | SCALE: 1" = 70' | DATE: 2/13/2019



Legend

Inferred Extent of LNAPL

Source:
EHS Support. Figure 6: Interpreted Extent of LNAPL. Undated.

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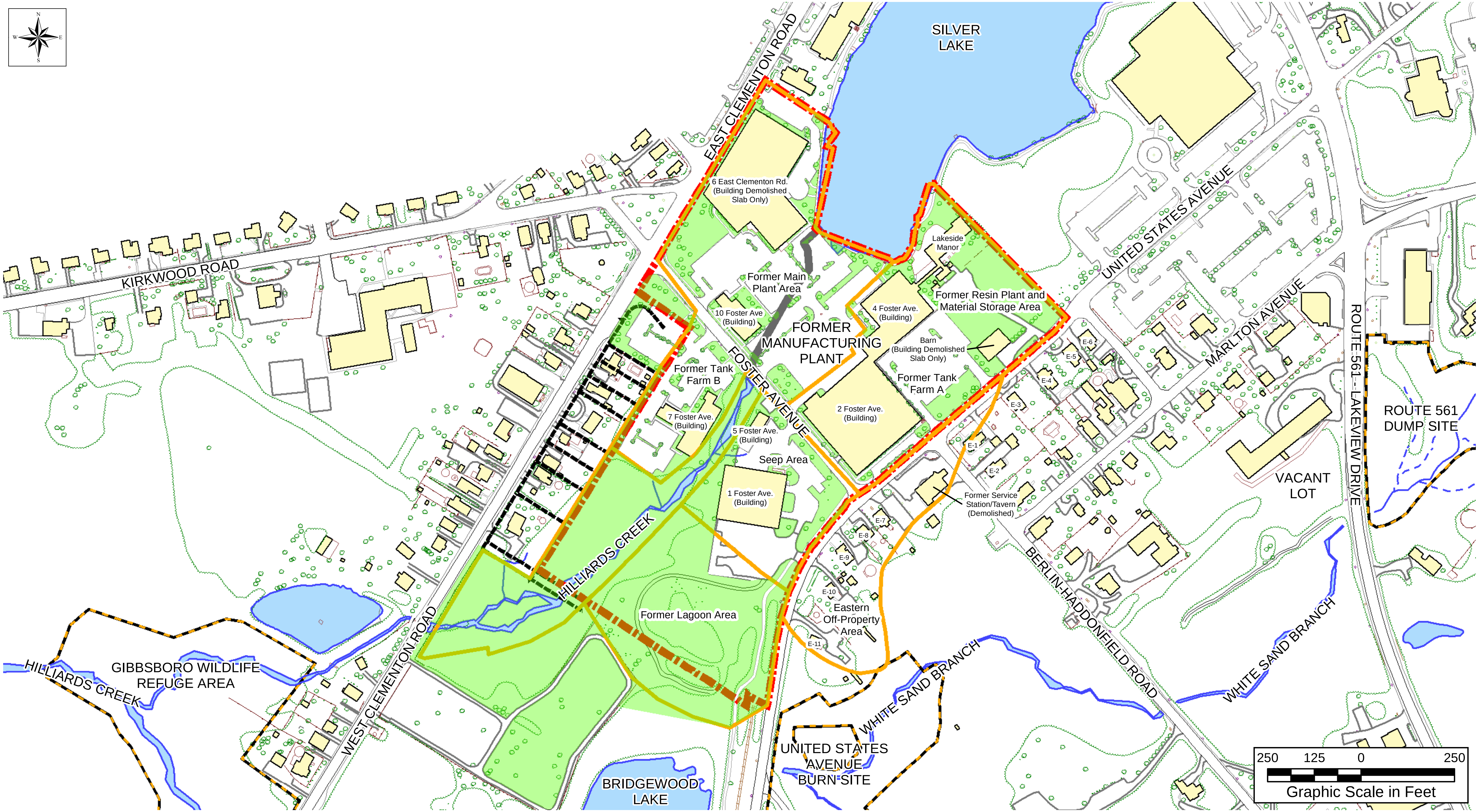
Sherwin Williams

PROJECT NAME: Former Manufacturing Plant LNAPL Investigation Report	TITLE: EXTENT OF LNAPL
CLIENT NAME: The Sherwin-Williams Company	
REPORT DATE: May 2019	WESTON SOLUTIONS
DATE: 5/30/2019	FIGURE #: 5



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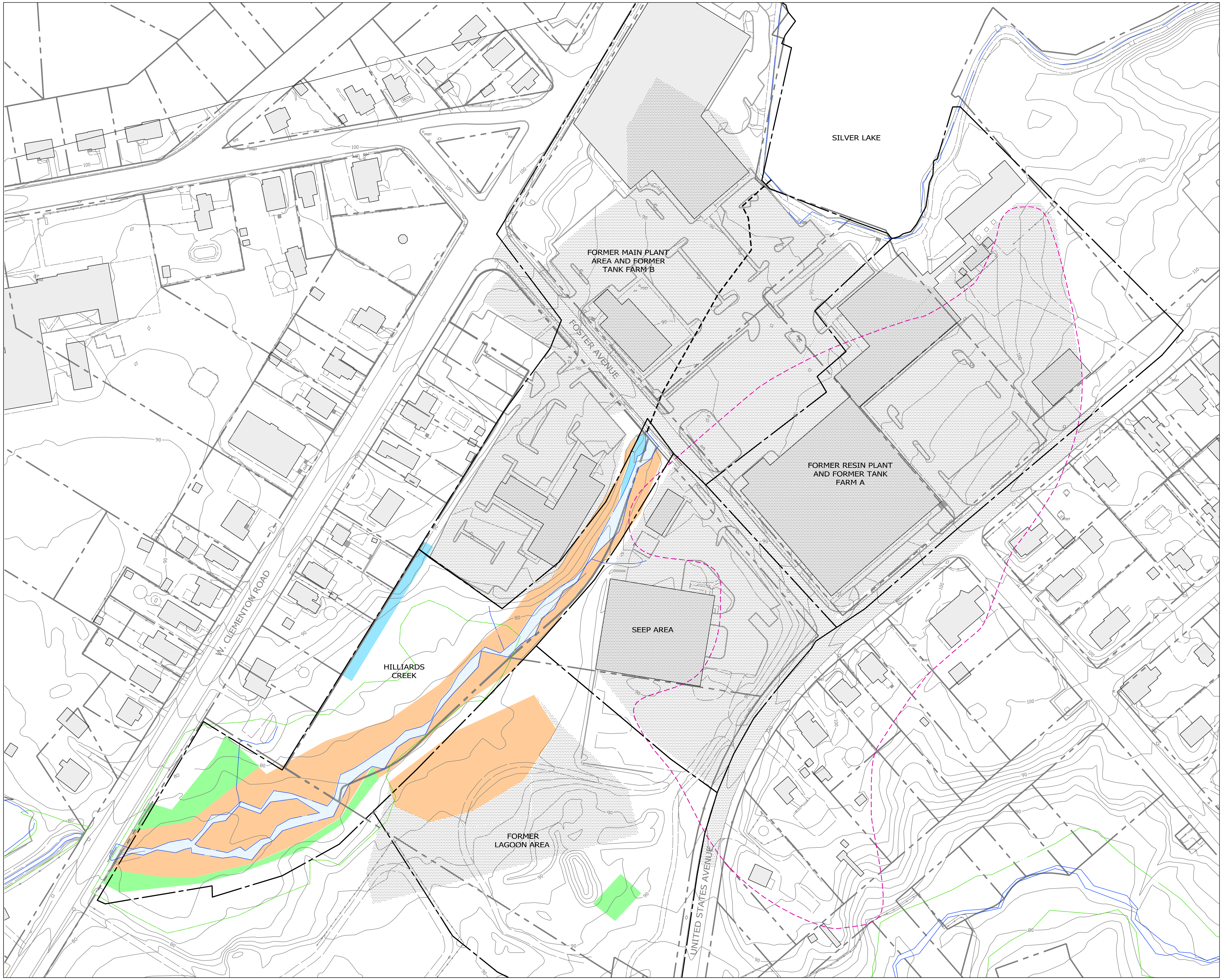
Legend

- Former Manufacturing Plant Remedial Units
- Former Manufacturing Plant Extent
- Unpaved Areas
- Surveyed Property Boundary (2015)
- Approximate Location of Silver Lake Conveyance

SHERWIN WILLIAMS

PROJECT NAME: Former Manufacturing Plant Feasibility Study	TITLE: FORMER MANUFACTURING PLANT PAVED vs. VEGETATED COVER
CLIENT NAME: The Sherwin-Williams Company	
REPORT DATE: May 2019	WESTON SOLUTIONS · DATE: 4/26/2019 · FIGURE #: 6



LEGEND

- INTERPRETED EXTENT OF LNAPL
- PROPERTY LINE
- FORMER MANUFACTURING PLANT REMEDIAL UNITS
- 1-FOOT EXCAVATION FOR PRGs AND NO CAP
- 2-FOOT EXCAVATION FOR PRGs AND RDCSRS AND NO CAP
- 2-FOOT EXCAVATION FOR PRGs AND CAP FOR CONSTITUENTS GREATER THAN RDCSRS AT DEPTHS GREATER THAN 2 FEET
- EXISTING SURFACE COVER REMAINS AND IS MAINTAINED AS CAP

NOTES:
1. PRG - PRELIMINARY REMEDIATION GOALS.
2. RDCSRS - NEW JERSEY DEPARTMENT ENVIRONMENTAL PROTECTION RESIDENTIAL DIRECT CONTACT SOIL REMEDIATION STANDARDS.
3. ALL CAPS REPRESENT ENGINEERING CONTROLS.
4. DEED NOTICES ARE TO BE ESTABLISHED AS INSTITUTIONAL CONTROLS FOR ALL PROPERTIES WITH A CAP.
5. LNAPL MANUAL RECOVERY TO BE IMPLEMENTED FOR THE SEEP AREA AND THE FORMER RESIN PLANT AND TANK FARM A UTILIZING EXISTING MONITORING WELLS.

SOURCE:
1. BASEMAP, WESTON SOLUTIONS, 2016.
2. PARCELS OF CAMDEN COUNTY, NEW JERSEY 2016, CAMDEN COUNTY IMPROVEMENT AUTHORITY, 2/26/2014, GIS SHP FILE http://njgin.state.nj.us/NJ_NJGINExplorer/DataDownloads.jsp

0 70 140

SCALE: 1" = 70'

TITLE:

FIGURE 7
SOIL REMEDIAL ALTERNATIVE 2

LOCATION:

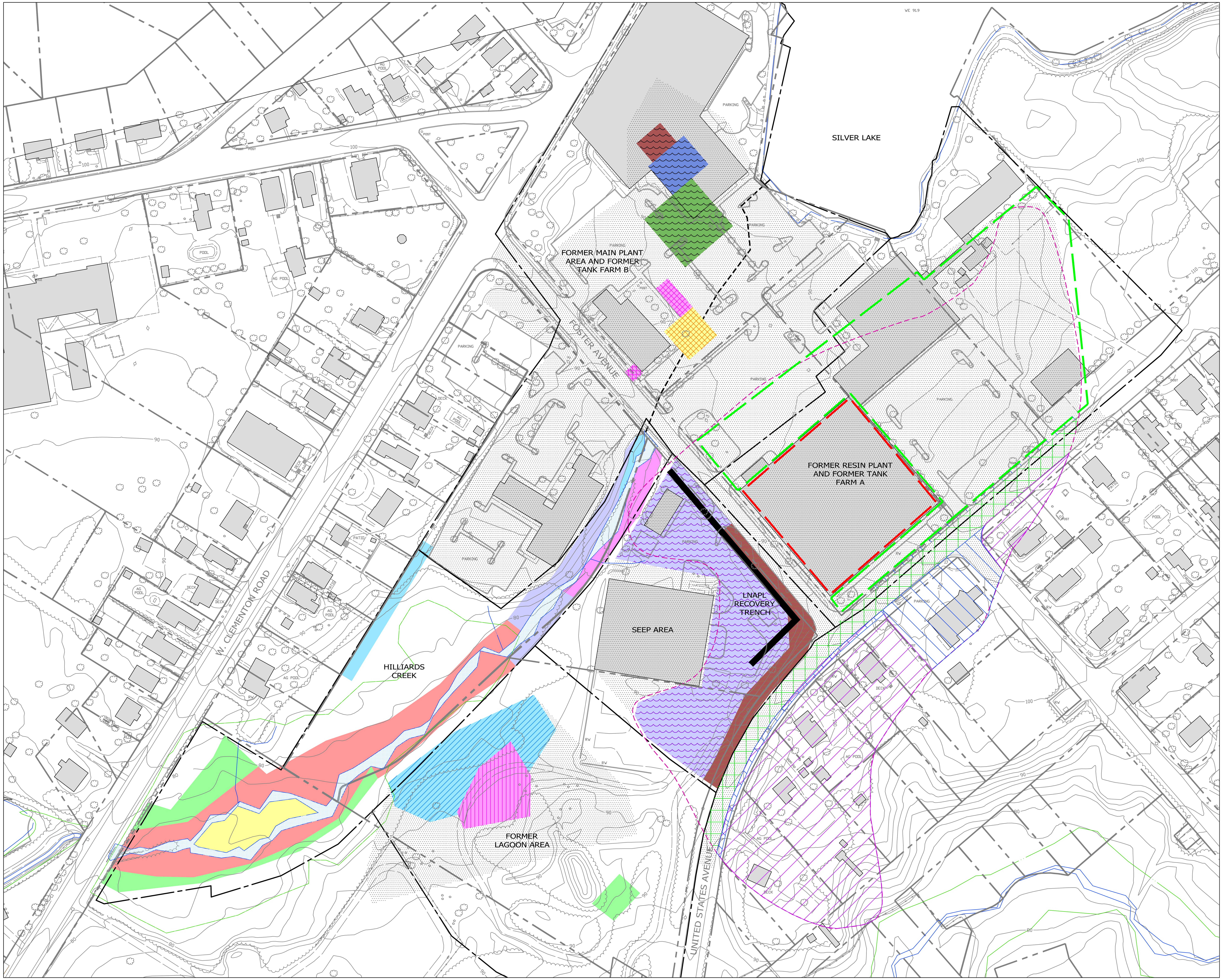
THE SHERWIN-WILLIAMS COMPANY
FORMER MANUFACTURING PLANT
GIBBSBORO, NEW JERSEY

DATE: 1/10/19

FILENAME: 204027_FMP_FS_SOIL

LAYOUT: SOIL_ALT2_R1

THE ELM GROUP
345 WALL STREET, PRINCETON, NEW JERSEY 08540
4936 YORK ROAD, SUITE 1000, HOLICONG, PENNSYLVANIA 18928
612 MAIN STREET, BOONTON, NEW JERSEY 07005
2436 EMRICK BOULEVARD, BETHLEHEM, PENNSYLVANIA 18020
www.ExploreELM.com



LEGEND

- INTERPRETED EXTENT OF LNAPL
- PROPERTY LINE
- FORMER MANUFACTURING PLANT REMEDIAL UNITS
- 1-FOOT EXCAVATION FOR PRGs AND NO CAP
- 2-FOOT EXCAVATION FOR PRGs AND RDCSRS AND NO CAP
- 3-FOOT EXCAVATION FOR PRGs AND RDCSRS AND NO CAP
- 4-FOOT EXCAVATION FOR PRGS AND RDCSRS AND NO CAP
- 5-FOOT EXCAVATION FOR PRGs AND RDCSRS AND NO CAP
- 6-FOOT EXCAVATION FOR PRGS AND RDCSRS AND NO CAP
- 2-FOOT EXCAVATION FOR PRGs AND RDCSRS AND CAP FOR CONSTITUENTS GREATER THAN RDCSRS AT DEPTHS GREATER THAN 2 FEET
- 6-FOOT EXCAVATION FOR PRGS AND RDCSRS AND CAP FOR CONSTITUENTS GREATER THAN RDCSRS AT DEPTHS GREATER THAN 6 FEET
- 4-FOOT EXCAVATION FOR TSCA COMPLIANCE AND CAP FOR CONSTITUENTS GREATER THAN RDCSRS AT DEPTHS GREATER THAN 4 FEET
- 6-FOOT EXCAVATION FOR TSCA COMPLIANCE AND CAP FOR CONSTITUENTS GREATER THAN RDCSRS AT DEPTHS GREATER THAN 6 FEET
- 5-FOOT EXCAVATION FOR GROUND WATER SOURCE CONTROL AND NO CAP
- 10-FOOT EXCAVATION FOR GROUND WATER SOURCE CONTROL AND NO CAP
- 12-FOOT EXCAVATION FOR GROUND WATER SOURCE CONTROL AND NO CAP
- 15-FOOT EXCAVATION FOR GROUND WATER SOURCE CONTROL AND NO CAP
- EXISTING SURFACE COVER REMAINS AND IS MAINTAINED AS CAP
- EXTENT OF LNAPL EXTRACTION RECOVERY SYSTEM
- EXTENT OF LNAPL BIOREMEDIATION TREATMENT AREA
- AMENDMENT INJECTIONS USING DIRECT-PUSH
- SOIL GAS EXTRACTION AND PRESSURIZED AMENDMENT INJECTIONS
- CONTINGENT AMENDMENT INJECTIONS USING DIRECT-PUSH

NOTES:

1. PRG - PRELIMINARY REMEDIATION GOALS.
2. RDCSRS - NEW JERSEY DEPARTMENT ENVIRONMENTAL PROTECTION RESIDENTIAL DIRECT CONTACT SOIL REMEDIATION STANDARDS.
3. ALL CAPS REPRESENT ENGINEERING CONTROLS.
4. DEED NOTICES ARE TO BE ESTABLISHED AS INSTITUTIONAL CONTROLS FOR PORTIONS OF FOSTER AVENUE AND UNITED STATES AVENUE.
5. PRGs APPLY TO THE TOP 1 FOOT OF SOIL IN UNDEVELOPED AREAS.
6. TSCA-EPA TOXIC SUBSTANCE COMPLIANCE ACT (40 CFR 760) - REMOVAL OF POLYCHLORINATED BIPHENYLS (PCBs) ABOVE 50 mg/Kg.
7. EASTERN OFF-PROPERTY AREA ALTERNATIVE 2 IS ENHANCED LNAPL BIODEGRADATION AND SOIL GAS REMOVAL.
8. EASTERN OFF-PROPERTY AREA ALTERNATIVE 2 INJECTION WELLS AND SOIL GAS EXTRACTIONS WELLS TO BE INSTALLED ON THE FORMER TAVERN/SERVICE STATION PROPERTY AND ON WEST SIDE OF UNITED STATES AVENUE.
9. EASTERN OFF-PROPERTY AREA ALTERNATIVE 2 PRESSURIZED NUTRIENT INJECTION WELLS TO BE INSTALLED ALONG THE UNITED STATES AVENUE RIGHT OF WAY EAST OF UNITED STATES AVENUE AND SOUTH OF THE FORMER TAVERN/SERVICE STATION.
10. EASTERN OFF-PROPERTY AREA ALTERNATIVE 2 DIRECT-PUSH NUTRIENT INJECTIONS WOULD BE INSTALLED BENEATH PROPERTIES E-1, E-7, E-8, E-9, E-10 AND E-11 WHERE LNAPL IS PRESENT.
11. OPERATION OF A NUTRIENT INJECTION AND SOIL GAS RECOVERY SYSTEMS.

SOURCE:

1. BASEMAP, WESTON SOLUTIONS, 2016.
2. PARCELS OF CAMDEN COUNTY, NEW JERSEY 2016, CAMDEN COUNTY IMPROVEMENT AUTHORITY, 2/26/2014, GIS SHP FILE http://njgin.state.nj.us/NJ_NJGINExplorer/DataDownloads.jsp

0 70 140

SCALE: 1" = 70'

TITLE:

FIGURE 8
SOIL REMEDIAL ALTERNATIVE 3 AND EASTERN OFF-PROPERTY AREA ALTERNATIVE 2

LOCATION:

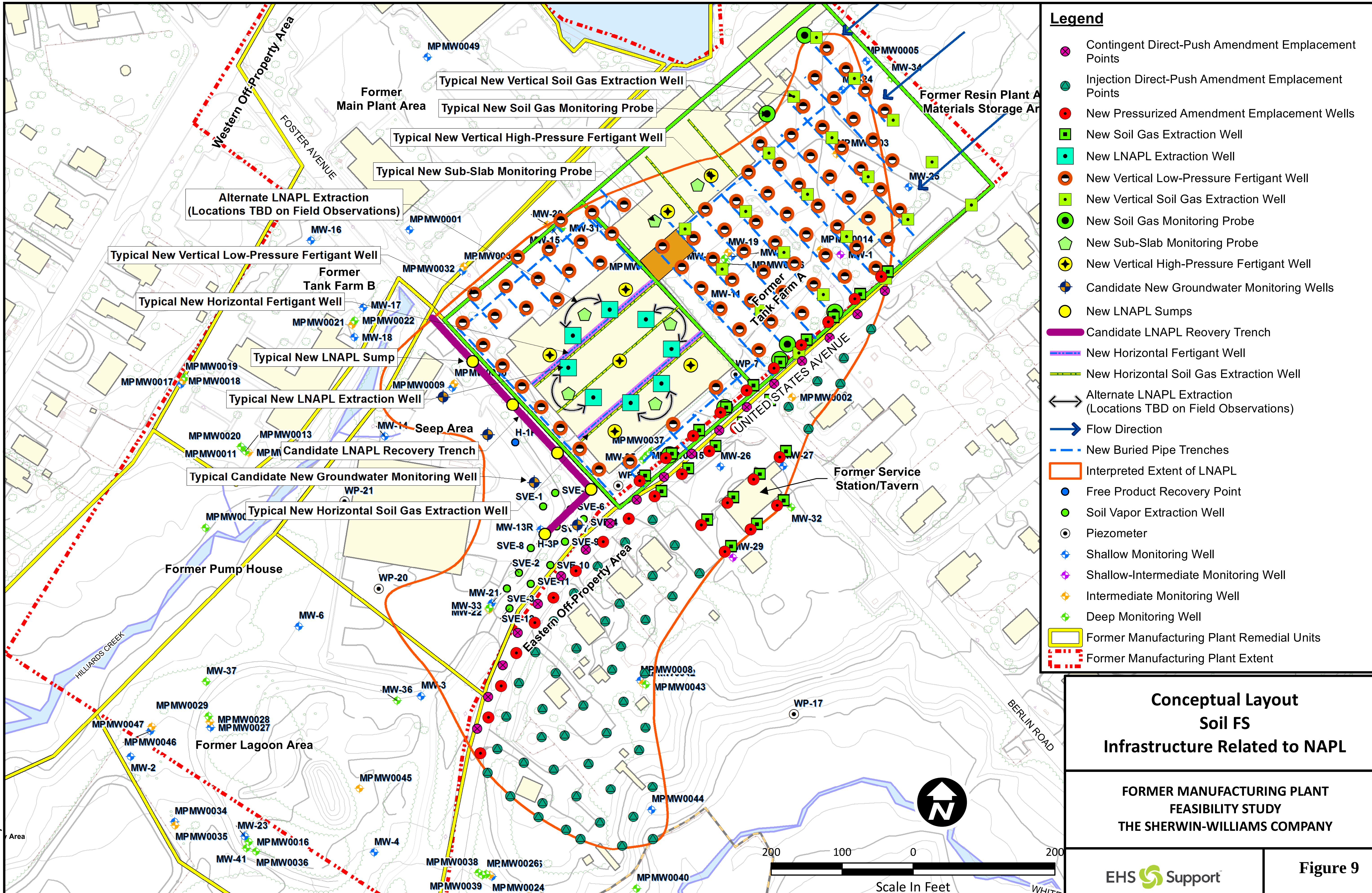
THE SHERWIN-WILLIAMS COMPANY
FORMER MANUFACTURING PLANT
GIBBSBORO, NEW JERSEY

DATE: 7/19/19

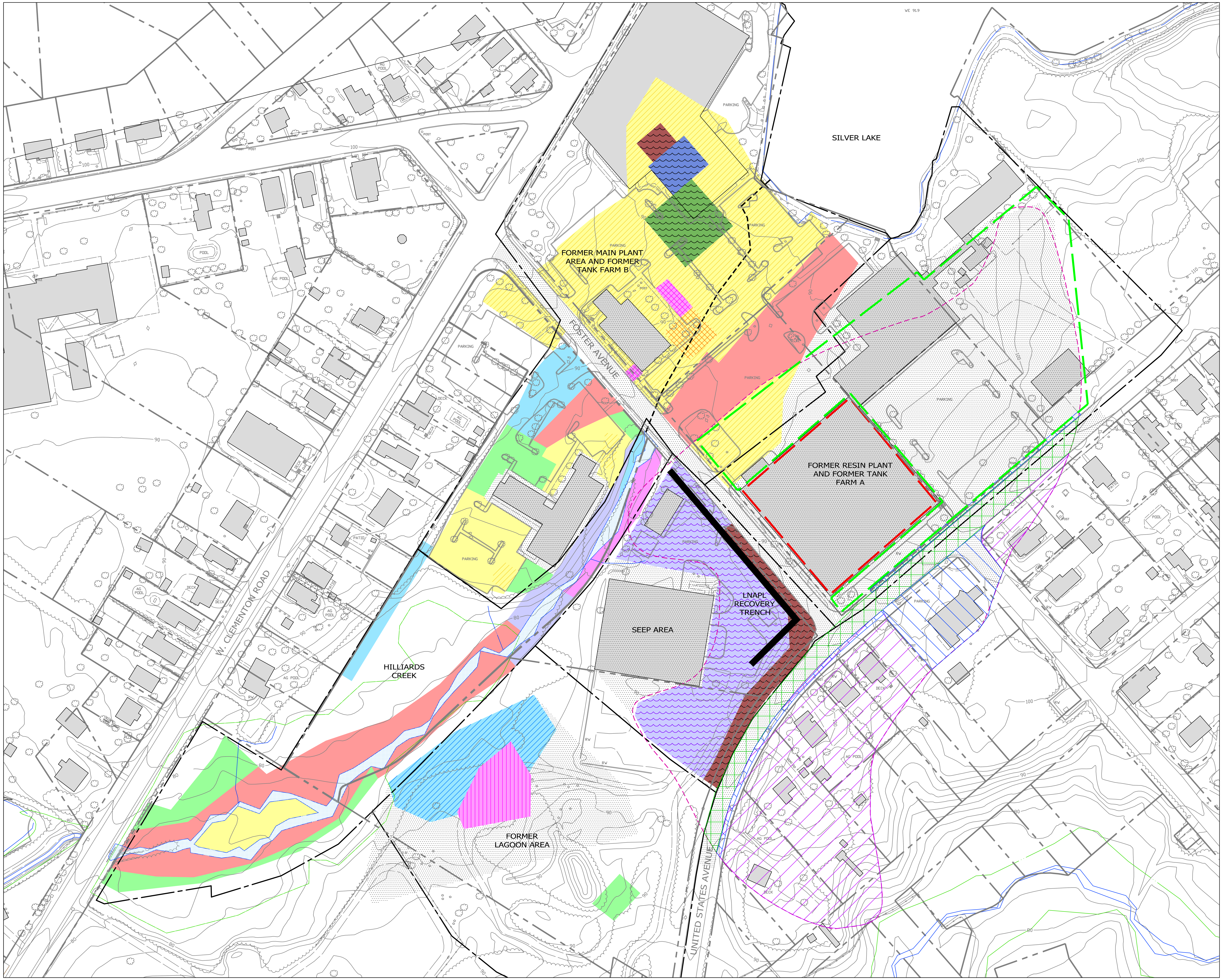
FILENAME: 204027_FMP_FS_SOIL_REV3

LAYOUT: SOIL ALT3 EOP ALT2

THE ELM GROUP
345 WALL STREET, PRINCETON, NEW JERSEY 08540
4936 YORK ROAD, SUITE 1000, HOLICONG, PENNSYLVANIA 18928
612 MAIN STREET, BOONTON, NEW JERSEY 07005
2436 EMRICK BOULEVARD, BETHLEHEM, PENNSYLVANIA 18020
www.ExploreELM.com



Legend
Contingent Direct-Push Amendment Emplacement Points
Injection Direct-Push Amendment Emplacement Points
New Pressurized Amendment Emplacement Wells
New Soil Gas Extraction Well
New LNAPL Extraction Well
New Vertical Low-Pressure Fertigant Well
New Vertical Soil Gas Extraction Well
New Soil Gas Monitoring Probe
New Sub-Slab Monitoring Probe
New Vertical High-Pressure Fertigant Well
Candidate New Groundwater Monitoring Wells
New LNAPL Sumps
Candidate LNAPL Reovery Trench
New Horizontal Fertigant Well
New Horizontal Soil Gas Extraction Well
Alternate LNAPL Extraction (Locations TBD on Field Observations)
Flow Direction
New Buried Pipe Trenches
Interpreted Extent of LNAPL
Free Product Recovery Point
Soil Vapor Extraction Well
Piezometer
Shallow Monitoring Well
Shallow-Intermediate Monitoring Well
Intermediate Monitoring Well
Deep Monitoring Well
Former Manufacturing Plant Remedial Units
Former Manufacturing Plant Extent
Typical New Vertical Soil Gas Extraction Well
Typical New Soil Gas Monitoring Probe
Typical New Vertical High-Pressure Fertigant Well
Typical New Sub-Slab Monitoring Probe
Alternate LNAPL Extraction (Locations TBD on Field Observations)
Typical New Vertical Low-Pressure Fertigant Well
Typical New Horizontal Fertigant Well
Typical New LNAPL Sump
Typical New LNAPL Extraction Well
Candidate LNAPL Recovery Trench
Typical Candidate New Groundwater Monitoring Well
Typical New Horizontal Soil Gas Extraction Well
Former Main Plant Area
Former Tank Farm B
Former Tank Farm A
Former Resin Plant A Materials Storage Ar
Former Service Station/Tavern
Former Pump House
Former Lagoon Area
Seep Area
Western Off-Property Area
Eastern Off-Property Area
FOSTER AVENUE
UNITED STATES AVENUE
BERLIN ROAD
HILLIARDS CREEK
200 100 0 200
Scale In Feet
Reviewed By:
Conceptual Layout
Soil FS
Infrastructure Related to NAPL
FORMER MANUFACTURING PLANT
FEASIBILITY STUDY
THE SHERWIN-WILLIAMS COMPANY
EHS Support
Figure 9
Printed 6/3/2019 2:31:39 PM by Mick.Osburn



LEGEND

- INTERPRETED EXTENT OF LNAPL
- PROPERTY LINE
- FORMER MANUFACTURING PLANT REMEDIAL UNITS
- 1-FOOT EXCAVATION FOR PRGs AND RDCSRS AND NO CAP
- 2-FOOT EXCAVATION FOR PRGs AND RDCSRS AND NO CAP
- 3-FOOT EXCAVATION FOR PRGs AND RDCSRS AND NO CAP
- 4-FOOT EXCAVATION FOR PRGS AND RDCSRS AND NO CAP
- 5-FOOT EXCAVATION FOR PRGs AND RDCSRS AND NO CAP
- 6-FOOT EXCAVATION FOR PRGS AND RDCSRS AND NO CAP
- 2-FOOT EXCAVATION FOR PRGs AND RDCSRS AND CAP FOR CONSTITUENTS GREATER THAN RDCSRS AT DEPTHS GREATER THAN 2 FEET
- 4-FOOT EXCAVATION FOR RDCSRS AND CAP FOR CONSTITUENTS GREATER THAN RDCSRS AT DEPTHS GREATER THAN 4 FEET
- 6-FOOT EXCAVATION FOR PRGS AND RDCSRS AND CAP FOR CONSTITUENTS GREATER THAN RDCSRS AT DEPTHS GREATER THAN 6 FEET
- 4-FOOT EXCAVATION FOR TSCA COMPLIANCE AND CAP FOR CONSTITUENTS GREATER THAN RDCSRS AT DEPTHS GREATER THAN 4 FEET
- 6-FOOT EXCAVATION FOR TSCA COMPLIANCE AND CAP FOR CONSTITUENTS GREATER THAN RDCSRS AT DEPTHS GREATER THAN 6 FEET
- 5-FOOT EXCAVATION FOR GROUND WATER SOURCE CONTROL AND NO CAP
- 10-FOOT EXCAVATION FOR GROUND WATER SOURCE CONTROL AND NO CAP
- 12-FOOT EXCAVATION FOR GROUND WATER SOURCE CONTROL AND NO CAP
- 15-FOOT EXCAVATION FOR GROUND WATER SOURCE CONTROL AND NO CAP
- EXISTING SURFACE COVER REMAINS AND IS MAINTAINED AS CAP
- EXTENT OF LNAPL EXTRACTION RECOVERY SYSTEM
- EXTENT OF LNAPL BIOREMEDIATION TREATMENT AREA
- AMENDMENT INJECTIONS USING DIRECT-PUSH
- SOIL GAS EXTRACTION AND PRESSURIZED AMENDMENT INJECTIONS
- CONTINGENT AMENDMENT INJECTIONS USING DIRECT-PUSH

NOTES:

1. PRG - PRELIMINARY REMEDIATION GOALS.
2. RDCSRS - NEW JERSEY DEPARTMENT ENVIRONMENTAL PROTECTION RESIDENTIAL DIRECT CONTACT SOIL REMEDIATION STANDARDS.
3. ALL CAPS REPRESENT ENGINEERING CONTROLS.
4. DEED NOTICES ARE TO BE ESTABLISHED AS INSTITUTIONAL CONTROLS FOR PORTIONS OF FOSTER AVENUE AND UNITED STATES AVENUE.
5. PRGs APPLY TO THE TOP 1 FOOT OF SOIL IN UNDEVELOPED AREAS.
6. TSCA-EPA TOXIC SUBSTANCE COMPLIANCE ACT (40 CFR 760) - REMOVAL OF POLYCHLORINATED BIPHENYLS (PCBs) ABOVE 50 mg/Kg.
7. EASTERN OFF-PROPERTY AREA ALTERNATIVE 2 IS ENHANCED LNAPL BIODEGRADATION AND SOIL GAS REMOVAL.
8. EASTERN OFF-PROPERTY AREA ALTERNATIVE 2 INJECTION WELLS AND SOIL GAS EXTRACTIONS WELLS TO BE INSTALLED ON THE FORMER TAVERN/SERVICE STATION PROPERTY AND ON WEST SIDE OF UNITED STATES AVENUE.
9. EASTERN OFF-PROPERTY AREA ALTERNATIVE 2 PRESSURIZED NUTRIENT INJECTION WELLS TO BE INSTALLED ALONG THE UNITED STATES AVENUE RIGHT OF WAY EAST OF UNITED STATES AVENUE AND SOUTH OF THE FORMER TAVERN/SERVICE STATION.
10. EASTERN OFF-PROPERTY AREA ALTERNATIVE 2 DIRECT-PUSH NUTRIENT INJECTIONS WOULD BE INSTALLED BENEATH PROPERTIES E-1, E-7, E-8, E-9, E-10 AND E-11 WHERE LNAPL IS PRESENT.
11. OPERATION OF A NUTRIENT INJECTION AND SOIL GAS RECOVERY SYSTEMS.

SOURCE:

1. BASEMAP, WESTON SOLUTIONS, 2016.
2. PARCELS OF CAMDEN COUNTY, NEW JERSEY 2016, CAMDEN COUNTY IMPROVEMENT AUTHORITY, 2/26/2014, GIS SHP FILE http://njgin.state.nj.us/NJ_NJGINExplorer/DataDownloads.jsp

0 70 140

SCALE: 1" = 70'

TITLE:

FIGURE 10
SOIL ALTERNATIVE 4

LOCATION:

THE SHERWIN-WILLIAMS COMPANY
FORMER MANUFACTURING PLANT
GIBBSBORO, NEW JERSEY

DATE: 9/30/2019

FILENAME: 204027_FMP_FS_SOIL_ALT3_rev1

LAYOUT: EPA_FIG10

THE ELM GROUP

345 WALL STREET, PRINCETON, NEW JERSEY 08540
4936 YORK ROAD, SUITE 1000, HOLICONG, PENNSYLVANIA 18928
612 MAIN STREET, BOONTON, NEW JERSEY 07005
2436 EMRICK BOULEVARD, BETHLEHEM, PENNSYLVANIA 18020
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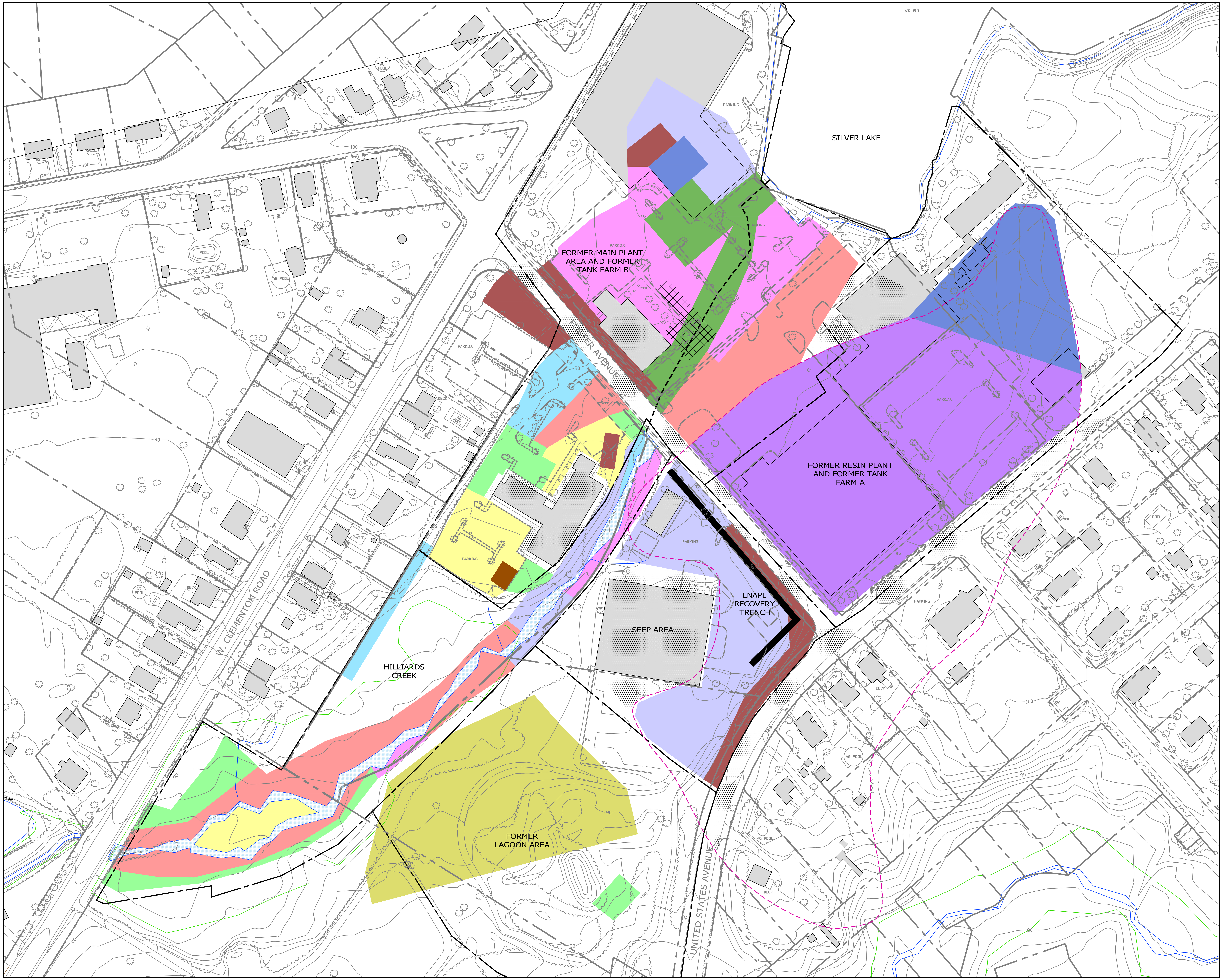

LEGEND

- INTERPRETED EXTENT OF LNAPL
- PROPERTY LINE
- FORMER MANUFACTURING PLANT REMEDIAL UNITS
- 1-FOOT EXCAVATION AND NO CAP
- 2-FOOT EXCAVATION AND NO CAP
- 3-FOOT EXCAVATION AND NO CAP
- 4-FOOT EXCAVATION AND NO CAP
- 5-FOOT EXCAVATION AND NO CAP
- 6-FOOT EXCAVATION AND NO CAP
- 8-FOOT EXCAVATION AND NO CAP
- 10-FOOT EXCAVATION AND NO CAP
- 12-FOOT EXCAVATION AND NO CAP
- 15-FOOT EXCAVATION AND NO CAP
- 20-FOOT EXCAVATION AND NO CAP
- 25-FOOT EXCAVATION AND NO CAP
- TSCA PCB 4 AND 6-FOOT EXCAVATIONS
- EXISTING SURFACE COVER REMAINS AND IS MAINTAINED AS CAP

NOTES:
1. PRG - PRELIMINARY REMEDIATION GOALS.
2. RDCSRS - NEW JERSEY DEPARTMENT ENVIRONMENTAL PROTECTION RESIDENTIAL DIRECT CONTACT SOIL REMEDIATION STANDARDS.
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5. PRGs APPLY TO THE TOP 1 FOOT OF SOIL IN UNDEVELOPED AREAS.
6. TSCA-EPA TOXIC SUBSTANCE COMPLIANCE ACT (40 CFR 760) - REMOVAL OF POLYCHLORINATED BIPHENYLS (PCBs) ABOVE 50 mg/Kg.

SOURCE:
1. BASEMAP, WESTON SOLUTIONS, 2016.
2. PARCELS OF CAMDEN COUNTY, NEW JERSEY 2016, CAMDEN COUNTY IMPROVEMENT AUTHORITY, 2/26/2014, GIS SHP FILE http://njgin.state.nj.us/NJ_NJGINExplorer/DataDownloads.jsp

0 70 140
SCALE: 1" = 70'

TITLE:
FIGURE 11
SOIL REMEDIAL ALTERNATIVE 5

LOCATION:
THE SHERWIN-WILLIAMS COMPANY
FORMER MANUFACTURING PLANT
GIBBSBORO, NEW JERSEY

DATE: 9/30/2019
FILENAME: 204027_FMP_FS_SOIL_REV4
LAYOUT: EPA FIG 11

THE ELM GROUP
345 WALL STREET, PRINCETON, NEW JERSEY 08540
4936 YORK ROAD, SUITE 1000, HOLICONG, PENNSYLVANIA 18928
612 MAIN STREET, BOONTON, NEW JERSEY 07005
2436 EMRICK BOULEVARD, BETHLEHEM, PENNSYLVANIA 18020
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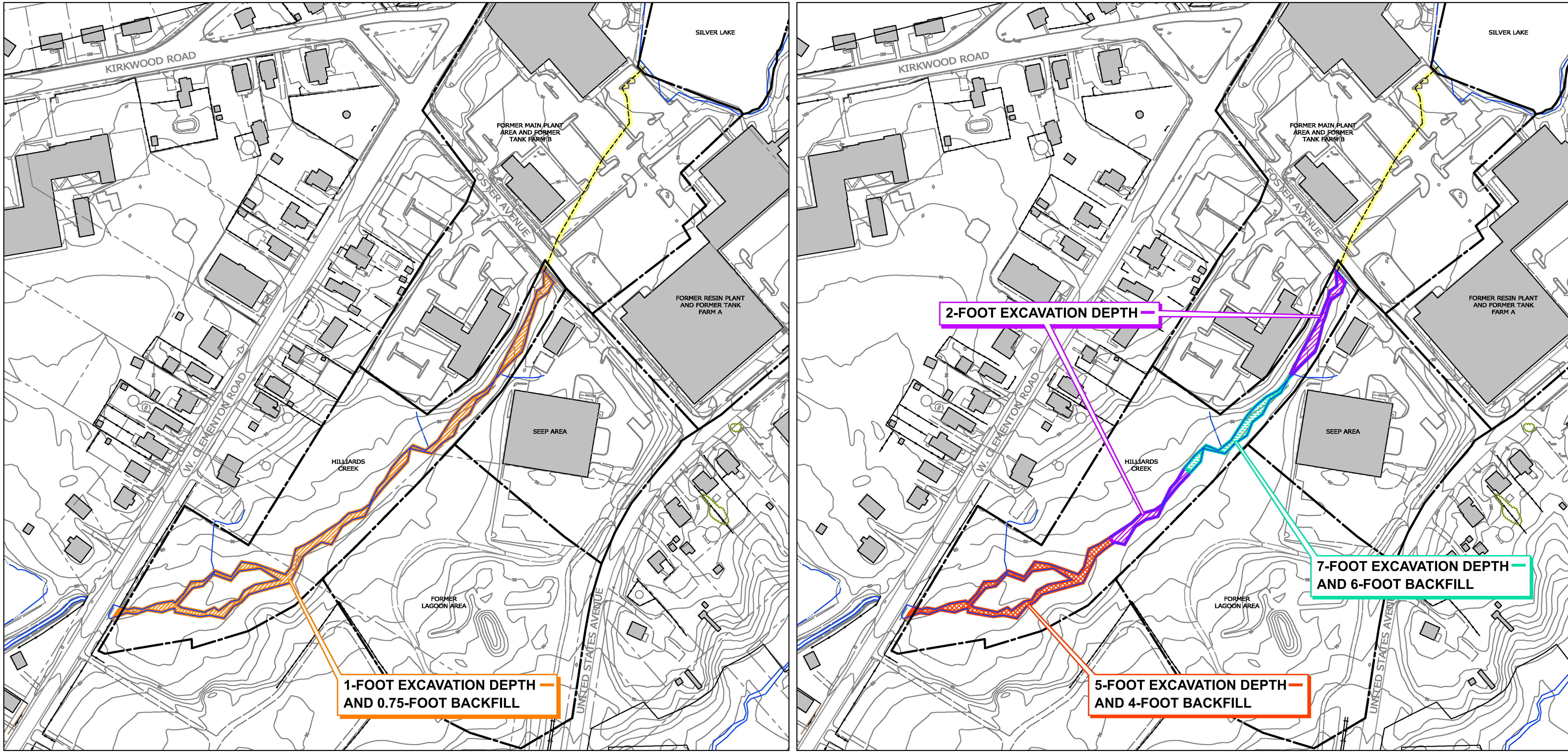
SEDIMENT ALTERNATIVE 2 | **SEDIMENT ALTERNATIVE 3**



0 300 ft

SCALE (ft)

N

NOTES:

1. PRGs - PRELIMINARY REMEDIATION GOALS.
2. PROPOSED EXCAVATIONS ARE TO REMEDIATE ALL SEDIMENT WITH CONTAMINANT CONCENTRATIONS EXCEEDING THE PRGs.

SOURCE:

1. BASEMAP, WESTON SOLUTIONS, 2016.

LEGEND

- FORMER MANUFACTURING PLANT REMEDIAL UNITS
- SILVER LAKE CONVEYANCE
- REMOVAL OF ALL SEDIMENT FROM CONVEYANCE LINE

Figure 12

Sediment Alternatives 2 Versus 3

THE SHERWIN-WILLIAMS COMPANY
FORMER MANUFACTURING PLANT
GIBBSBORO, NEW JERSEY