Vineland Chemical Company Superfund Site
Blackwater Branch Exposed Sediment/Soil

Vineland, New Jersey

Superfund Proposed Plan

July 2016

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes the remedial alternatives that the United States Environmental Protection Agency (EPA) considered for amending the approach to remediate contaminated exposed sediment/soil of the Blackwater Branch floodplain that are associated with the Vineland Chemical Company Superfund site located in Vineland, New Jersey. This Plan also identifies EPA's Preferred Alternative along with the reasons for this preference.

This Proposed Plan includes summaries of cleanup alternatives evaluated for use at the affected floodplain areas. This Proposed Plan was developed by EPA, the lead agency for the site, in consultation with the New Jersey Department of Environmental Protection (NJDEP), the support agency. As described herein, there are larger issues related to groundwater contamination at the site that are still being evaluated. As such, this Proposed Plan describes interim alternatives for the Blackwater Branch floodplain that may be revisited at a future date. EPA, in consultation with NJDEP, will select an interim remedial action that amends the current remedy for exposed sediment/soil of the Blackwater Branch floodplain 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 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 in accordance with 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 Focused Feasibility Study (FFS) and other related documents contained in the publicly available Administrative Record for the site. EPA encourages the public to review these documents to gain a more comprehensive understanding of the site and Superfund activities that have been conducted. The current remedy for this portion of the site, selected in a 1989 Record of Decision (ROD), consists of dredging, excavation, and disposal of contaminated sediment and soil in the Blackwater Branch floodplain. The Preferred Alternative identified in this Proposed

MARK YOUR CALENDARS

Public Comment Period
July 22 –August 22, 2016

EPA will accept written comments on the Proposed Plan during the public comment period. Written comments should be addressed to:

Hunter Young
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 18th Floor
New York, NY 10007
Email: young.hunter@epa.gov

Written comments must be postmarked no later than August 22, 2016.

Public Meeting
August 8, 2016 at 6:30 P.M.
EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at:

Vineland City Hall – City Council Chambers
640 E Wood St, Vineland, NJ 08360

In addition, select documents from the administrative record are available on-line at:

www.epa.gov/superfund/vineland-chemical

395948

Plan would amend that ROD to require implementation of in-situ treatment technologies to prevent recontamination of the exposed sediment/soil (which is generally defined as sediment located above the average high water line), excavation of localized areas of sediment/soil in the Blackwater Branch floodplain with significantly elevated concentrations of contaminants, and performance monitoring to assure the remedy is effective and to assess the need for additional in-situ treatment and/or excavation.

COMMUNITY ROLE IN SELECTION PROCESS

This Proposed Plan is being issued to inform the public of EPA's proposed alternative and to solicit public comments pertaining to all of the remedial alternatives evaluated, including the Preferred Alternative. Changes to the Preferred Alternative, or a change to another alternative, may be made if public comments or additional data indicate that such a change would result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comments on all of the alternatives considered in the Proposed Plan, because EPA may select a remedy other than the Preferred Alternative. This Proposed Plan has been made available to the public for a public comment period that concludes on August 20, 2016.

A public meeting will be held during the public comment period to present the information regarding the investigations of the Blackwater Branch floodplain, including the conclusions of studies performed to assess treatment options and the FFS, to elaborate further on the reasons for proposing the Preferred Alternative, and to receive public comments. The public meeting will include a presentation by EPA of the Preferred Alternative and other cleanup options.

Information on the public meeting and submitting written comments can be found in the "Mark Your Calendar" text box on Page 1.

Comments received at the public meeting, as well as written comments received during the comment period, will be documented in the Responsiveness Summary section of the ROD Amendment. The ROD Amendment is the document that presents which alternative has been selected and the basis for the selection of the remedy.

SCOPE AND ROLE OF RESPONSE ACTION

The site is divided into four operable units (Figure 2). The 1989 ROD selected remedies to address each of the operable units, and several parts of the cleanup work specified in the ROD have already been completed.

Operable Unit 1 (OU1) consisted of the control of source material at the former Vineland Chemical Company plant site. To address arsenic-contaminated soil, EPA constructed a soil washing facility that processed 70 tons of excavated soil per hour. The facility processed over 400,000 tons of arsenic-contaminated soil and sediment, and the remaining waste was disposed of at a permitted off-site disposal facility. The soil remedy was completed in 2014.

OU2 relates to management of the migration of contamination through groundwater. To address contaminated groundwater, EPA constructed a system to pump out and treat about two million gallons of contaminated groundwater daily. Operation of the facility began in the spring of 2000 and is ongoing. The pump-and-treat operation is capturing the majority of the flow of arsenic-contaminated groundwater from the plant site. The treated groundwater continues to meet the site's cleanup goal. Operation of the pump-and-treat system was transferred to NJDEP in October 2014.

The primary objective of the response action described herein involves portions of OU3, which relates to addressing contamination associated with the sediment/soil in the river areas, including the Maurice River, the Blackwater Branch of the Maurice River and their associated floodplains. Initial cleanup activities were completed for OU3 in December 2012. However, monitoring since that time has shown that certain areas of exposed sediment/soil of the Blackwater Branch floodplain have become re-contaminated with arsenic above the cleanup goals identified in the 1989 ROD due to arsenic in groundwater reaching the sediment/soil during the ongoing implementation of the OU2 remedy. As such, additional actions may be required to address this portion of OU3; alternatives are evaluated herein. This Proposed Plan does not fully address the Maurice River or the submerged sediment of the Blackwater Branch, which are also portions of OU3 of the site. These portions are still under review.

OU4 of the site relates to Union Lake, an 870-acre impoundment on the Maurice River. The upstream remedial activities will be evaluated prior to proceeding with active cleanup of the lake. Arsenic contamination in sediment has been found in the lake. Surface water samples had elevated arsenic concentrations only when agitated (mixed with contaminated sediment). Beach monitoring in Union Lake began in the early 2000s and will continue until it is concluded that there are no further impacts to the lake. To date, no unacceptable risks to beach users have been identified.

Future amendments to the 1989 ROD may be required, including for the remainder of OU3.

SITE BACKGROUND

Site Description

The Vineland Chemical Company Superfund site is located in the northwestern portion of Vineland, in Cumberland County, south central New Jersey, in an area of mixed industrial, low-density residential and agricultural properties (Figure 1). The site is bordered immediately to the north by other industrial properties and the Blackwater Branch, a perennial stream that flows westward to the Maurice River.

The Blackwater Branch of the Maurice River flows northeast to southwest, in proximity to, and partially through, the site itself. A floodplain lies immediately adjacent to the Blackwater Branch along the entire length of the tributary extending to the Maurice River. This area is the subject of this Proposed Plan.

Site History

The Vineland Chemical Company operated from 1949 to 1994 and produced arsenical herbicides and fungicides. There were seventeen buildings on the plant site, some of which were used by the Vineland Chemical Company for various manufacturing purposes.

As early as 1966, the New Jersey Department of Health observed untreated wastewater being discharged into unlined lagoons at the site. This wastewater was contaminated with arsenic at concentrations up to 67,000 parts per billion (ppb). Waste salts containing 1-2 percent arsenic were stored outside in uncovered piles. Precipitation dissolved some of these salts and carried them into the groundwater and eventually into nearby surface water bodies. Contaminated sediment was mapped 1.5 miles downstream in Blackwater Branch to its confluence with the Maurice River and then 7.5 miles downstream to Union Lake.

The site was added to the EPA's National Priorities List (NPL) in September 1984. A Remedial Investigation and Feasibility Study (RI/FS) was completed in 1989 to identify the types, quantities, and locations of contaminants, and to develop ways to correct the problems posed by the contaminants.

Based on the RI/FS findings, EPA implemented a number of response actions that included securing the site with a perimeter fence and removing thousands of gallons of arsenic solutions and demolition of eight buildings.

A ROD for the site was signed in 1989 and determined that actual or threatened releases of hazardous substances from the site, if not addressed by implementing the response actions selected in the ROD, may present an existing or potential threat to public health, welfare or the environment. The ROD divided the site into four operable units (OUs) as described in the "Scope and Role of Action" section above.

Enforcement History

Potentially responsible parties (PRPs) identified for the site include the Vineland Chemical Company and its owners.

In 1994, the PRPs entered into a judicial consent decree with EPA. The consent decree assured that the PRPs funded the remedial work to the maximum extent possible.

SITE CHARACTERISTICS

The site is located in the Atlantic Coastal Plain physiographic province, which consists of a seaward-dipping wedge of unconsolidated sediment (sand, silt, clay, and gravel) that range in age from Cretaceous to Quaternary periods. Locally, the site is situated on a relatively level plain that slopes slightly from the southeast toward the northwest with topographic elevations that range from 65 to 75 feet above mean sea level.

Groundwater levels vary seasonally at the site with an average of approximately 10 feet below ground surface (bgs), and a typical minimum and maximum of between 4 and 19 feet bgs. When the groundwater treatment plant is not in operation, groundwater south of the Blackwater Branch moves in an east to west direction with groundwater discharging at several locations along Blackwater Branch. Under pumping conditions, the direction of flow is somewhat altered to a more southeast to northwest flow direction south of Blackwater Branch, and a northeast to southwest flow direction north of Blackwater Branch. Groundwater that is not captured by the recovery system discharges to Blackwater Branch.

RESULTS OF THE REMEDIAL STUDIES

Implementation of 1989 ROD Remedy for OU3

The excavation and treatment of arsenic impacted sediment from the Blackwater Branch and its floodplain were carried out in four phases from 2006 through 2012. Phase I encompassed the area east of North Mill Road and adjacent to the chemical plant site. Phase II encompassed the area west of North Mill Road and east of Route 55. Phase III encompassed the area west of Route 55 and east of the Maurice River Parkway. Phase IV encompassed the stream and floodplain west of the Maurice River Parkway to the Maurice River.

In each phase, the Blackwater Branch was diverted to a clean location before excavation of the contaminated material was performed. Once material with arsenic concentrations exceeding 20 milligrams/kilogram (mg/kg), the value identified in the 1989 ROD, was removed, the excavated area was backfilled with clean material and stream flow was restored to the re-constructed stream channel.

Soon after arsenic excavation in the floodplain of Phases 1 and 2 was completed in 2009, iron staining along the banks and within the Blackwater Branch was observed in certain locations. Sediment and seep water samples taken at a few of these iron-stained locations were analyzed in 2010 to determine if these iron-stained sediment also contained arsenic. Phase 1 samples were taken after excavation, backfilling and flow had been restored to the channel. Phase 2 samples were collected after excavation and backfilling in the floodplain had occurred, but before flow was restored to the original creek channel.

The sediment samples that were co-located with the seep samples contained arsenic just above the floodplain sediment goal of the 1989 ROD (20 mg/kg). These results provided evidence that arsenic is seeping into the Blackwater Branch floodplain at some of the locations sampled even with the pump and treat system in operation, contaminating exposed sediment. The OU3 remedy was selected based on the assumption that groundwater discharging into the Blackwater Branch floodplain would not impact the exposed sediment. Sampling of surface sediment was performed between 2011 and 2012 along Phases 2, 3 and 4, soon after stream restoration and prior to re-diverting the surface water back to the stream. Samples were biased toward the iron-stained sediment. Results indicate that arsenic in surface sediment samples accumulated soon after restoration and concentrations exceed the 20 mg/kg ROD goal for exposed sediment. Due to extensive arsenic exceedances along the Phase 4 segment of the Blackwater Branch, surface water was not re-diverted back to this section of the Blackwater Branch. The Blackwater Branch was eventually re-diverted back to a stream alignment that was similar to the original but followed an alternate path around the areas where the arsenic exceedances were encountered.

Additional sediment sampling was conducted in Phases 1 and 2 between 2013 and 2015. Samples were biased to locations that were iron-stained and were collected from floodplain areas as well as locations near the banks of the Blackwater Branch where sediment is likely to be exposed during periods of low water level conditions. During this time period, operation of the pump and treat system varied between full pumping, no pumping and partial pumping. Concentrations of arsenic in sediment samples exceeded 20 mg/kg while the pump and treat system was fully operational as well as while the pump and treat system was shut down.

In summary, sediment samples collected between 2010 and 2015 demonstrated that groundwater that is discharging to the Blackwater Branch in certain areas is recontaminating the sediments due to localized geochemical conditions that result in the dissolved arsenic precipitating out as the groundwater discharges into the branch sediment. Over time, larger areas of sediment may become recontaminated. It should be noted that despite the elevated arsenic concentrations in the floodplain, surface water arsenic concentrations have not been found to be elevated.

Bench Scale Studies

Once it was determined that implementation of the OU3 remedy would not prevent recontamination of the floodplain sediment/soil, preliminary bench scale (laboratory) testing was conducted to evaluate the viability of in-situ (in-ground) treatment as a method of controlling recontamination. In-situ treatments evaluated at the bench scale focused on creating conditions for which the accumulation of arsenic in sediment would be unfavorable either by reducing the movement of arsenic to the sediment/soil of the floodplain or by reducing the availability of areas onto which arsenic can accumulate through bonding with the sediment.

Results of the bench scale studies indicated that several methods of in-situ treatment can reduce arsenic accumulation in sediment/soil so that concentrations in the Blackwater Branch floodplain would remain below cleanup goals. These methods include in-situ treatment with oxygen (such as by air sparging or the use of peroxide), in-situ treatment with iron, and/or in-situ pH adjustment.

In 2015, pilot (in-field) testing of in-situ treatment options was initiated, and the preliminary results of this testing are favorable. Because the results show that the in-situ treatment is working, the pilot study will continue and will remain operational until an amended remedy is implemented.

PRINCIPAL THREATS

Although arsenic in groundwater is acting as a source of recontamination of the exposed sediment/soil of the Blackwater Branch floodplain, groundwater is generally not considered to be a source material under the conceptual definition of a principal threat (see related box “What is a “Principal Threat”?). The arsenic in groundwater can also be reliably immobilized through in-situ treatment. As such, the groundwater is not considered a principal threat waste for this OU of the site.

SUMMARY OF SITE RISKS

As part of the FFS, human health and ecological risk evaluations were conducted for the exposed sediment/soil of the Blackwater Branch floodplain to estimate risks associated with current and future site conditions. Three separate areas with contamination were identified with unique geochemical conditions known as Areas A, B, and C (Figure 3).

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 groundwater, surface water or air, or acts as a source for direct exposure. Contaminated groundwater generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in groundwater 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.

Human Health Risk Assessment

As part of the FFS for OU3, a human health risk assessment (HHRA) process was used for assessing site-related cancer risks and non-cancer health hazards associated with exposure to arsenic in the sediment/soil. 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 reviewed post-excavation exposed sediment/soil data collected between 2012 and 2015 in the Blackwater Branch floodplain against current risk-based screening levels (RSLs). A screening evaluation was conducted for the future recreational user, or recreator, in the Blackwater Branch floodplain to assess the protectiveness of the remedy that was selected in the original 1989 Record of Decision for OU3.

Calculation of risk-based RSLs for sediment/soil (which looks at exposure through ingestion, dermal contact with and inhalation of contaminated sediment/soil) were based on standardized equations that combine exposure information and assumptions with available toxicity data. Recreator exposure parameters were used to best approximate site exposure during future recreational use of the Blackwater Branch. Any current site user (e.g., treatment plant worker or trespasser) would have less frequent exposures, and thereby lower risks, than these future receptors. A reasonable maximum exposure scenario of 4 hours per day and 40 days per year was considered, in line with the 1989 Baseline Risk Assessment's evaluation of recreational use.

The maximum detected arsenic concentrations in all three areas of the Blackwater Branch floodplain are greater than the human health-based RSLs, which indicates the potential for unacceptable risk and adverse health effects from recreational exposure to exposed Blackwater Branch sediment/soil. Additionally, the maximum concentrations of arsenic in all three areas of the Blackwater Branch floodplain exceed the site 1989 cleanup level of 20 mg/kg for arsenic in exposed sediment by an order of magnitude or more.

A semi-quantitative screening evaluation was conducted for Area A of the Blackwater Branch floodplain. The results indicate that the current remedy is likely not protective of human health for a future recreator. The estimated cancer risk for a child and adult recreator utilizing the Blackwater Branch in this area would equal 2 x10^{-4}, exceeding the 10^{-4} lifetime excess cancer risk end of the risk range. The non-cancer hazard estimate for a child recreator is 5, exceeding EPA's non-cancer hazard index of 1.

Ecological Risk Assessment

A different approach was used in evaluating ecological risk associated with contamination in the exposed sediment/soil of the Blackwater Branch floodplain in comparison to the evaluation of human health risks. As is stated above, maximum concentrations of arsenic in all three areas of the Blackwater Branch floodplain exceed the site 1989 cleanup level of 20 mg/kg for arsenic in exposed sediment/soil by an order of magnitude or more. As such, an evaluation was conducted to determine whether cleanup of the floodplain to concentrations below the 1989 ROD goal would be protective of the environment.

The floodplain soil is considered to be representative of a terrestrial environment, thus concentrations of arsenic were compared to EPA's Ecological Soil Screening Level (Eco-SSLs), which are concentrations of contaminants in soil that are protective of ecological receptors that commonly come into contact with and/or consume biota that live in or on soil. As such, these values are presumed to provide adequate protection of

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 non-cancer 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 non-cancer 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 COCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer 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 non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a non-cancer 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.

terrestrial avian and mammalian receptors. The EPA Eco SSLs for arsenic are 18 mg/kg for plants, 43 mg/kg for avian receptors and 46 mg/kg for mammalian receptors.

Comparison of these screening levels to the 1989 ROD goal of 20 mg/kg for arsenic shows that this value is protective for avian and mammalian receptors. The only ecological value in exceedance of 20 mg/kg is the value that was derived to be protective to plants (18 mg/kg). However, arsenic concentrations at or below background values (20 mg/kg in 1989, 19 mg/kg currently) are not considered COPCs. Conversely, since concentrations above 46 mg/kg are present, this review shows that there is a potential risk to ecological receptors.

Risk Assessment Summary

It is EPA's judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in this Proposed Plan, is necessary to limit potential human health and ecological risks from actual or threatened releases of hazardous substances into the environment.

FOCUSED FEASIBILITY STUDY

The FFS was prepared to evaluate alternative remedial actions for OU3. During the FFS phase, remedial action objectives (RAOs) are developed, preliminary remediation goals (PRGs) are identified, technologies are screened based on overall implementability, effectiveness and cost, and remedial alternatives are assembled and analyzed in detail with respect to the nine criteria for remedy selection under the NCP at 40 C.F.R. Part 300.430.

Remedial Action Objectives

RAOs describe what the proposed remedy is expected to accomplish. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs), to-be-considered standards and guidance, and site-specific risk-based levels.

The 1989 ROD identified the following RAO for the sediment in OU3:

- Minimize public exposure, either through containment, removal, or institutional controls, for those areas with unacceptably high sediment arsenic concentrations.

This overall RAO for OU3 remains in effect. The specific RAOs for the remedial alternatives discussed in this Proposed Plan are:

- Reduce concentrations of arsenic in the exposed sediment/soil in the Blackwater Branch floodplain to below acceptable levels of risk.
- Prevent recontamination of exposed sediment/soil of the Blackwater Branch floodplain from site-related groundwater contamination.

Due to the existence of larger groundwater contamination issues at this site, it is EPA's expectation that the remedy described in this Proposed Plan will be revisited at a future date. Therefore, this action is considered an interim remedial action.

Preliminary Remediation Goal

To achieve RAOs, EPA has selected a soil cleanup goal for the exposed sediment/soil. The soil cleanup goal for the COPC is consistent with New Jersey Residential Direct Contact Soil Remediation Standards (NJRDCSRS). Therefore, the PRG for the COPC in exposed sediment/soil of the Blackwater Branch floodplain is as follows:

- Arsenic: 19 mg/kg

The 1989 ROD identified a Preliminary Remediation Goal of 20 mg/kg for arsenic in exposed sediment. Since then, the state of New Jersey has conducted a much more robust study of statewide levels of arsenic in soil, and from this study a statewide concentration of 19 mg/kg has been established. EPA has evaluated the protectiveness of 19 mg/kg and the PRG for arsenic in the exposed sediment/soil has been modified to meet the current New Jersey Soil Remediation Standard.

The PRG will become the final remediation goal when EPA makes a final decision to select an amended remedy for the exposed sediment/soil of the Blackwater Branch floodplain, after taking into consideration public comments.

Remedial Alternatives

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions be protective of human health and the environment, be cost-effective, and use permanent solutions, alternative treatment technologies, and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which use, as a principal element, treatment to permanently and significantly reduce the volume, toxicity or mobility of the hazardous substances, pollutants, and contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must require a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

Remedial alternatives for the site are summarized below. Capital costs are those expenditures that are required to construct a remedial alternative. Operation and maintenance costs are those post-construction costs necessary to ensure or verify the continued effectiveness of a remedial alternative and are estimated on an annual basis. Present worth is the amount of money which, if invested in the current year, would be sufficient to cover all the costs over time associated with a project, calculated using a discount rate of seven percent and a 10-year time interval. Construction time is the time required to construct and implement the alternative and does not include the time required to design the remedy, negotiate performance of the remedy, or procure contracts for design and construction.

- Alternative 1: No Further Action
- Alternative 2: Ongoing Hot Spot Excavation
- Alternative 3: In-Situ Treatment, Hot Spot Excavation, and Performance Monitoring

Alternative 1 - No Action

The NCP requires that a “No Action” alternative be evaluated to establish a baseline for comparison with other remedial alternatives. Under this alternative, no further action would be implemented, and the current status of the site would remain unchanged. A Classification Exception Area for the site already exists to restrict use of groundwater. Signs are posted in accessible areas of Blackwater Branch and the Maurice River advising the public that sediment is contaminated with arsenic and there are risks associated with prolonged exposure of arsenic. With the exception of the existing security fences, engineering controls would not be implemented to prevent site access or exposure to site contaminants.

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

Alternative 2 – Ongoing Hot Spot Excavation

This alternative consists of periodic excavation and off-site disposal of the exposed sediment/soil of the Blackwater Branch floodplain as the arsenic concentrations exceed the PRG. Excavated sediment/soil would be transported and disposed of off-site.

The sediment/soil would be sampled to determine if they need to be disposed of as either hazardous waste or non-hazardous waste. Treatment of sediment/soil, if needed, would be conducted at and by the approved disposal facility.

Total Capital Cost:	$1,160,646
Annual O&M:	$4,642,584
Present Worth Cost:	$33,768,213
Construction Time Frame:	Constant

Alternative 3 – In-Situ Treatment, Hot Spot Excavation, and Performance Monitoring

This alternative consists of installation of in-situ treatment technologies to prevent recontamination of the exposed sediment/soil to concentrations above PRGs, hot-spot excavations to remove exposed sediment/soil in the Blackwater Branch floodplain above PRGs, and performance monitoring to assure the remedy is effective and assess the need for additional in-situ treatment and/or excavation. In-situ technologies are those technologies that are implemented in place, rather than removing the contamination and treating it.

The in-situ technology used may vary across the site and will depend on the geochemistry and subsurface conditions in each particular location. Examples of such technologies include air sparging in iron rich groundwater environments and iron chloride injection

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 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.

in addition to air sparging or peroxide injection in iron poor groundwater environments. In-situ technologies may also include pH adjustments and/or the installation of material into the ground which will intercept the groundwater flow and passively capture the contamination, also known as 'reactive barriers'. Final selection of the in-situ treatment technology appropriate for each area of the site will be made after further studies during remedial design.

In addition, the need for excavation of the exposed sediment/soil before and/or after in-situ treatment for each area of the site will be determined during the remedial design and further refined during implementation of the remedial action through performance monitoring.

Total Capital Cost:	$7,281,988
Annual O&M Year:	$745,569
Present Worth Cost:	$14,897,663
Construction Time Frame:	1 year

COMPARATIVE EVALUATION OF ALTERNATIVES

EPA uses nine criteria to evaluate the remedial alternatives individually and against each other to select a remedy. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. Each alternative must meet the first two threshold criteria, which are overall protection of human health and the environment, and compliance with ARARs. Alternatives that meet the threshold criteria are then analyzed against five primary balancing criteria: long-term effectiveness and permanence; reduction to toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. State and community acceptance are modifying criteria that are also considered in remedy selection. A detailed analysis assessing the alternatives against each of the nine evaluation criteria is in the FFS.

Overall Protection of Human Health and the Environment

Alternative 1 does not protect human health and the environment because no action is taken to prevent exposure to sediment/soil that exceeds risk based cleanup levels for arsenic.

Alternative 2 is protective of human health and the environment because sediment/soil is removed as it reaches arsenic concentrations that exceed the risk based cleanup goals.

Alternative 3 is protective of human health and the environment because in-situ treatment systems are installed and operated that prevent recontamination of sediment/soil with arsenic, and sediment/soil currently exceeding risk based arsenic concentrations are removed and disposed of off-site.

Compliance with ARARs

Alternative 1 (No action) would not comply with ARARs in that it would leave exposed sediment/soil in place that exceed NJRDCSRS and pose unacceptable risk to human health and the environment.

Alternatives 2 and 3 provide compliance with chemical-specific ARARs by removing contaminated soil above NJRDCSRS. Alternative 2 would accomplish this by removal of sediment/soil that exceeds ARARs, and Alternative 3 would accomplish this by in-situ treatment that would prevent groundwater from recontaminating the sediment/soil. Location-specific ARARs and Action-specific ARARs would both be met by proper design and implementation of the respective components such as general construction standards and waste handling requirements. The Location-specific ARARs and Action-specific ARARs for the disposal phase would be met with proper selection of the disposal facility.

Long-Term Effectiveness and Permanence

Although the three alternatives are interim remedial actions, they were evaluated for long-term effectiveness and permanence.

Alternative 1 does not provide adequate controls of risks to human health over the long-term because there is no mechanism to prevent future exposure.

Alternative 2 is only effective in the long-term with a high level of constant maintenance. It does not treat the source of contamination, and although steps would be taken to protect the surrounding community, there would be nearly continuous operation of construction equipment and hauling of contaminated soil off-site for an indefinite period of time.

Alternative 3 is effective in the long-term in that it prevents recontamination of the exposed sediment/soil in the Blackwater Branch floodplain.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives 1 and 2 do not reduce the toxicity, mobility, or volume of contaminants through treatment and therefore do not meet EPAs preference for treatment.

Alternative 3 does not reduce the overall volume of arsenic but does reduce the mobility of arsenic in the groundwater, which reduces the volume entering the Blackwater Branch floodplain. This effectively reduces the toxicity of the groundwater entering the Blackwater Branch floodplain.

Short-Term Effectiveness

There would be no short-term impact to the local community or the environment for Alternative 1.

The construction and implementation activities involved in Alternative 2 would be frequent and would have almost continuous impact on the local community with truck traffic to haul contaminated sediment/soil for off-site disposal.

Alternative 3 would have some impacts to the nearby community due to truck traffic to haul contaminated sediment/soil off-site and drilling activities to install the in-situ treatment systems. However, these impacts would be relatively short term and ongoing long term treatment activities at the site are expected to have minimal impact to the community.

Implementability

All the alternatives are easily implemented. There are no special techniques, materials, or labor required to implement Alternative 2.

Cost

For Alternative 2, each time sediment/soil needs to be excavated it is estimated it will cost $1,160,000. Assuming this has to be performed every 3 months, that is an annual cost of $4,642,584. The present worth cost over a 10-year period is estimated to be $33,768,213.

The estimated capital cost of Alternative 3 is $7,281,988. The annual O&M cost is estimated to be $745,569 the first year and an annual cost of $557,670 for the following years. This alternative also includes an annual monitoring cost of $213,438 the first year, $135,461 the second year and $95,663 for the following years. The 10-year present worth value of this alternative is $14,897,663.

State Acceptance

The State of New Jersey concurs with EPA's Preferred Alternative as presented in this Proposed Plan.

Community Acceptance

Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and will be described in the ROD Amendment. Based on public comment, the Preferred Alternative could be modified from the version presented in this proposed plan. The ROD Amendment formalizes the selected remedy after EPA has considered all comments received during the public comment period.

PREFERRED ALTERNATIVE

The Preferred Alternative for achieving remedial action objectives for the exposed sediment/soil of the Blackwater Branch floodplain impacted by site-related contamination is Alternative 3 (In-Situ Treatment, Hot Spot Excavation, and Performance Monitoring). This alternative consists of installation of in-situ treatment technologies to prevent recontamination of the exposed sediment/soil to concentrations above PRGs, excavation of localized areas of sediment/soil in the Blackwater Branch floodplain with concentrations of contaminants above PRGs, and performance monitoring to assure the remedy is effective and assess the need for additional in-situ treatment and/or excavation. This is considered an interim remedial action that will be revisited at a future date once the long-term effectiveness as a part of the remedy for all operable units of the site is evaluated.

The in-situ technology that will be used depends on the geochemistry and subsurface conditions in each particular location. The actual technology will be selected during the Remedial Design. For the purposes of cost estimation the following were used as representative technologies: air sparging in iron rich groundwater environments; iron chloride injection in addition to air sparging in iron poor groundwater environments; sodium bicarbonate or sodium hydroxide injections for pH adjustments. As noted above, the final selection of the in-situ treatment technology appropriate for each area of the site will be made after further studies during remedial design.

The selection of the Preferred Alternative is accomplished through the evaluation of the nine criteria as specified in the NCP. Alternative 3 satisfies the two threshold criteria and achieves the best combination of the five balancing criteria of the comparative analysis. This alternative is preferred because it will achieve the RAOs in the shortest amount of time. Monitoring will provide the data to ensure that the RAOs and PRGs are achieved.

The EPA and NJDEP expect the Preferred Alternative to satisfy the following statutory requirements of CERCLA Section 121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost effective; 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element. EPA will assess the modifying criteria of community acceptance in the Record of Decision Amendment following the close of the public comment period.

FOR FURTHER INFORMATION

The Administrative Record file, which contains copies of the Proposed Plan and supporting documentation is available at the following locations:

EPA Region 2 Superfund Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308
Hours: Monday-Friday – 9 A.M. to 5 P.M.

Vineland City Library
1058 East Landis Ave.
Vineland, New Jersey 08360
For Library Hours:
http://www.vinelandlibrary.org/

In addition, select documents from the administrative record are available on-line at:

www.epa.gov/superfund/vineland-chemical
In addition, select documents from the administrative record are available on-line at:

http://www.epa.gov/region2/superfund/npl/vineland/

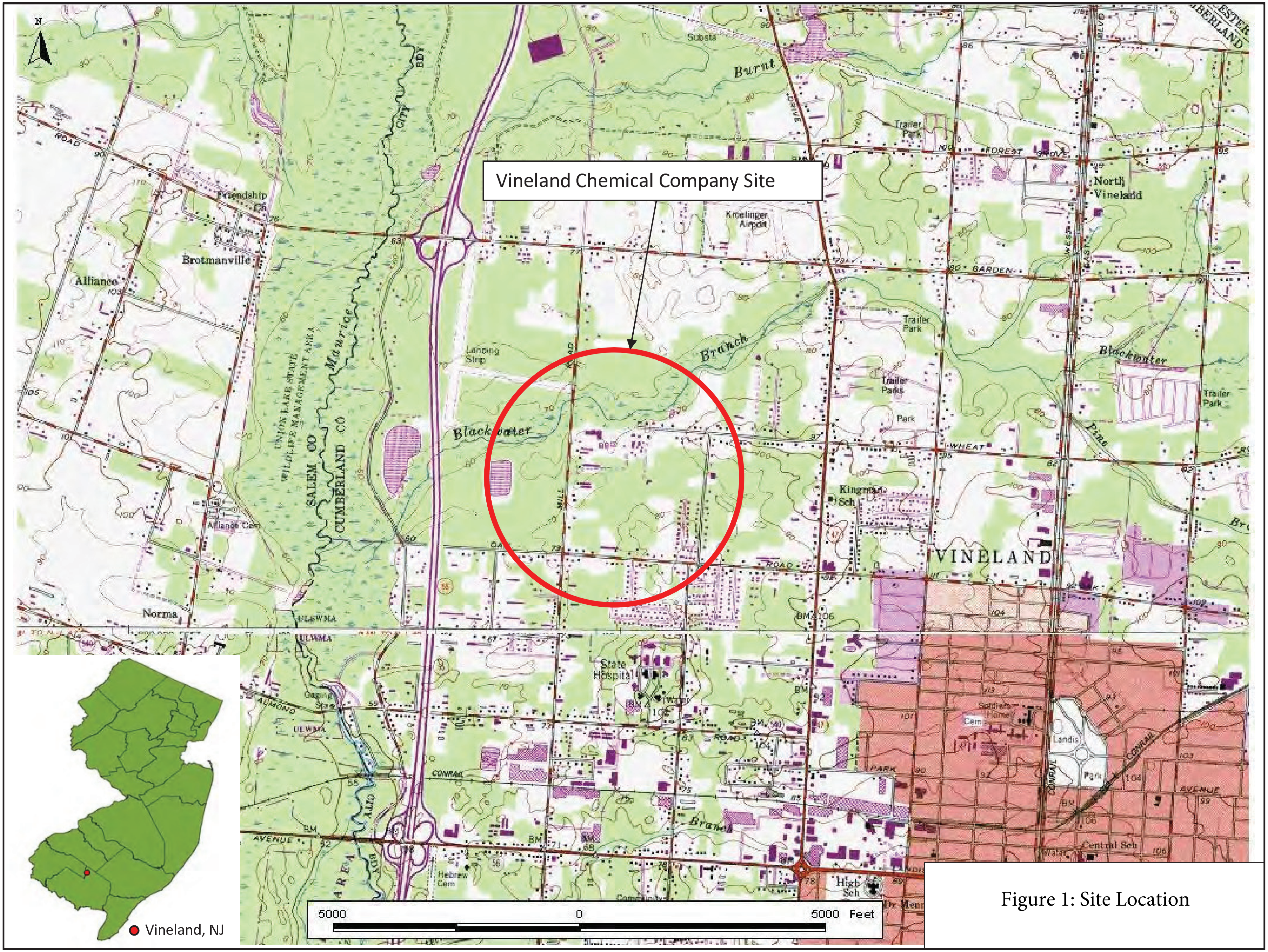

Figure 1: Site Location

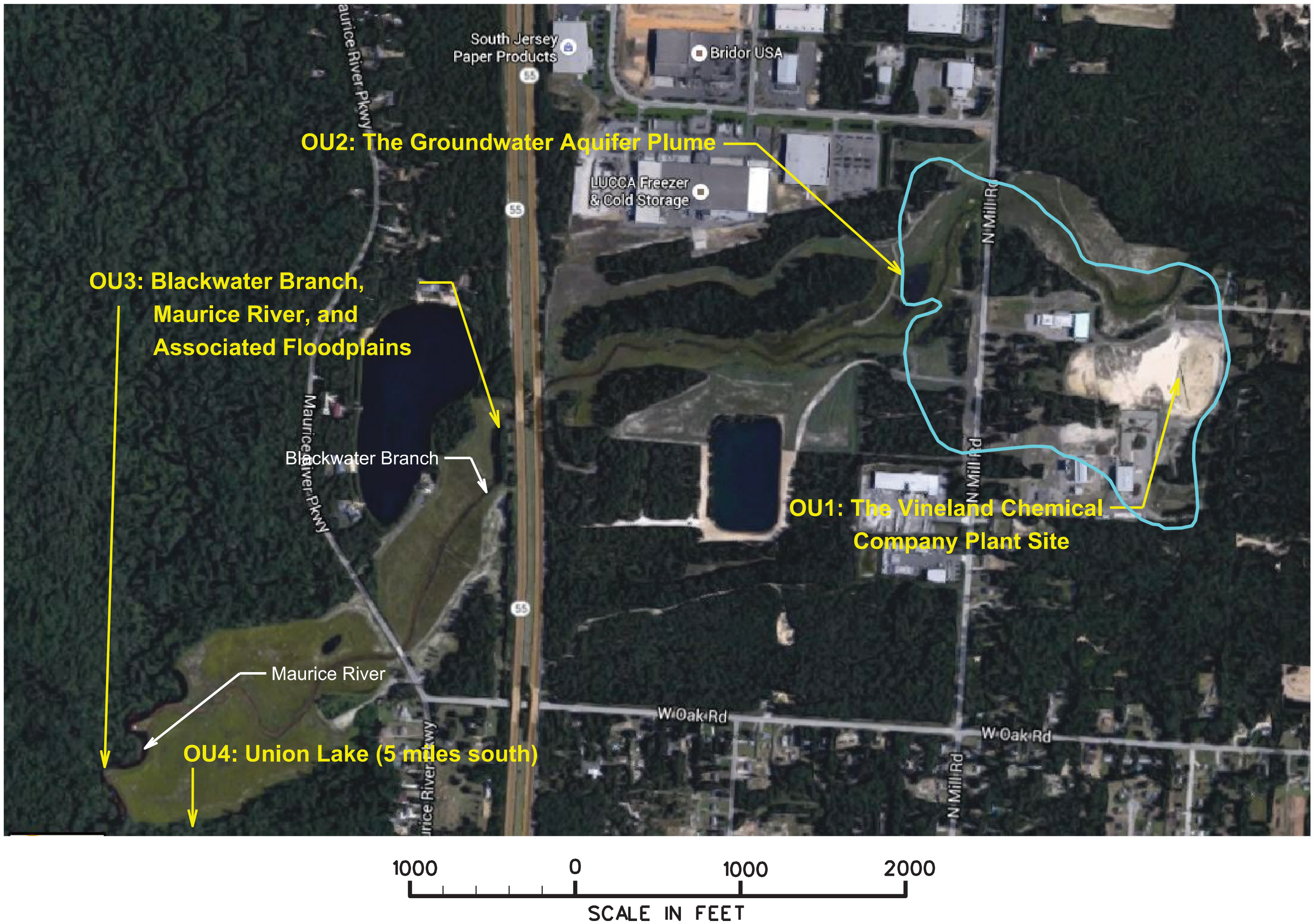

Figure 2: Operable Unit Identification

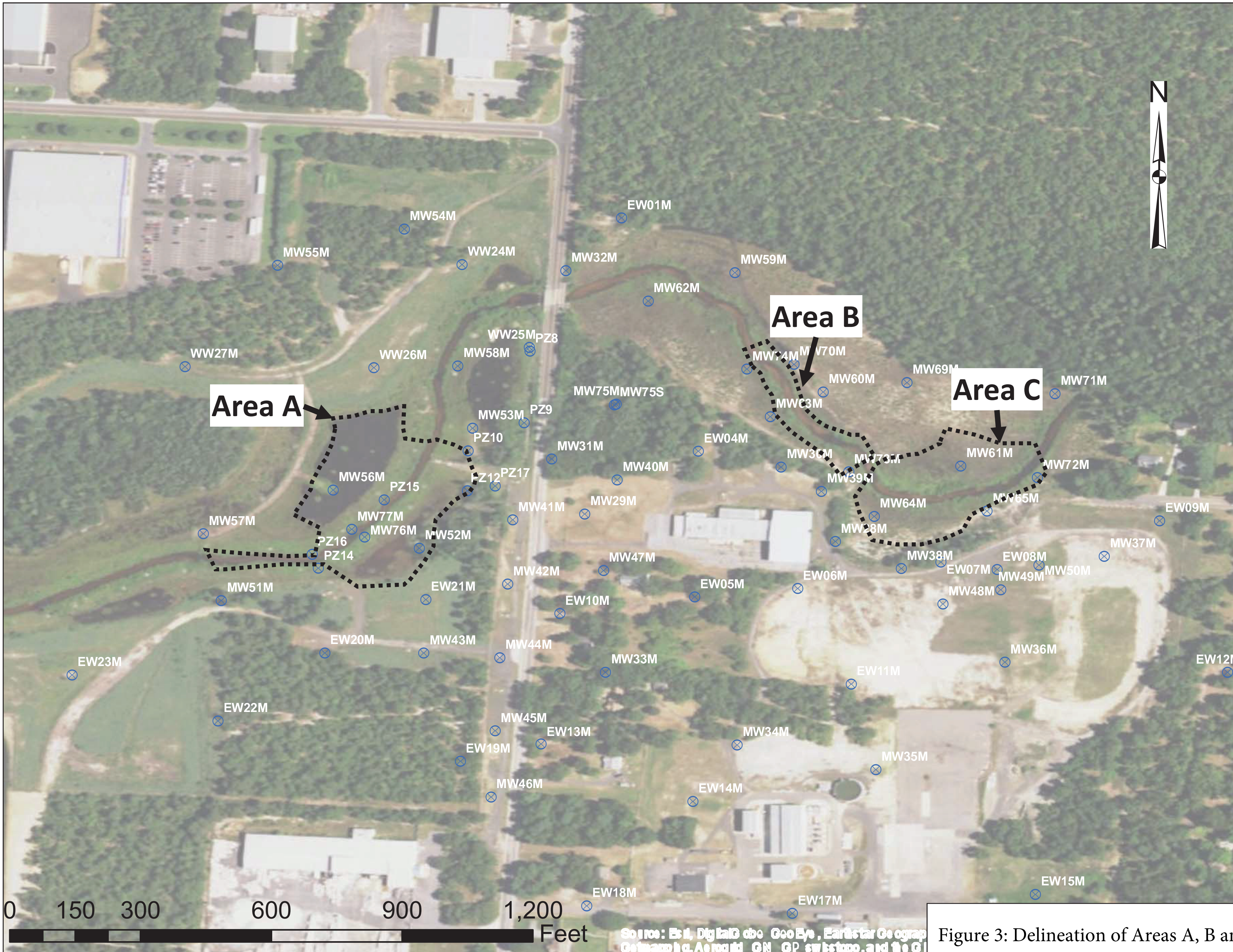

Figure 3: Delineation of Areas A, B and C