Superfund Proposed Plan

U.S. Environmental Protection Agency, Region II

United States Avenue Burn Site
Operable Unit 2
Gibbsboro, New Jersey

July 2017

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the Preferred Alternative to address contaminated soil, sediment, and surface water at the United States Avenue Burn Superfund Site ("The Burn Site"). The Burn Site is located in Gibbsboro, New Jersey (Figure 1). The contamination is associated with the former Sherwin-Williams paint and varnish manufacturing plant located in Gibbsboro, New Jersey.

The Preferred Alternative calls for the excavation of sediment; and excavation and capping, as necessary, of soil. Excavated material will be disposed of offsite. Surface water will be monitored. Institutional controls will be implemented as needed. Groundwater contamination will be evaluated as a separate Operable Unit and addressed in a future Proposed Plan.

A comprehensive Remedial Investigation (RI) took place under a 1999 Administrative Order on Consent (AOC) with the Sherwin-Williams Company (Sherwin-Williams). The RI activities were conducted by Sherwin-Williams and were overseen by the U.S. Environmental Protection Agency (EPA). The RI included sampling of soil, sediment, surface water and groundwater throughout the Burn Site. The results of this investigation identified areas within the Burn Site where remedial action is required.

This Proposed Plan contains descriptions and evaluations of the cleanup alternatives considered for the Burn Site. This Proposed Plan was developed by EPA, the lead agency, in consultation with the New Jersey Department of Environmental Protection (NJDEP), the support agency. EPA, in consultation with NJDEP, will select a final remedy for contaminated soil, sediment, surface water after reviewing and considering all information submitted during the 30-day public comment period.

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MARK YOUR CALENDARS

PUBLIC COMMENT PERIOD
July 27 – August 28, 2017
EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING
August 10, 2017 from 7:00 P.M. to 9:00 P.M.
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 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 A.M. to 5 P.M. by appointment

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:

Julie Nace, Remedial Project Manger
U.S. EPA, Region 2
290 Broadway, 19th Floor
New York, NY 10007-1866
Telephone: 212-637-4126
Email: nace.julie@epa.gov

EPA's website for the United States Avenue Burn Site is: https://www.epa.gov/superfund/us-avenue-burn

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 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 Burn Site RI and Feasibility Study (FS) reports as well as other related documents contained in the Administrative Record. The location of the Administrative Record 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* in Gibbsboro and the *United States Avenue Burn Superfund Site* in Gibbsboro (Figure 2). The Sites represent source areas from which contaminated soil and sediment have migrated, predominantly through natural processes, to downgradient areas within Gibbsboro and Voorhees.

Sherwin-Williams/Hilliards Creek Superfund Site: The Sherwin-Williams/Hilliards Creek Superfund Site includes the Former Manufacturing Plant area, Hilliards Creek and Kirkwood Lake. The Former Manufacturing Plant area of the Sherwin-Williams/Hilliards Creek Superfund Site is approximately 20 acres in size and is comprised of commercial structures, undeveloped land and the southern portion of Silver Lake. The Former Manufacturing Plant area extends from the south shore of Silver Lake in Gibbsboro, New Jersey, and straddles the headwaters of Hilliards Creek. Hilliards Creek is formed by the outflow from Silver Lake. The outflow enters a culvert beneath a parking lot at the Former Manufacturing Plant and resurfaces on the south side of Foster Avenue, Gibbsboro. From this point, Hilliards Creek flows in a southerly direction through the Former Manufacturing Plant area and continues downstream through residential and undeveloped areas. At approximately one mile from its origin, Hilliards Creek empties into Kirkwood Lake. Kirkwood Lake is approximately 25 acres, located in Voorhees, New Jersey with residential properties lining its northern shore.

Route 561 Dump Site: The Route 561 Dump Site is located approximately 700 feet to the east of the Former Manufacturing Plant area. It includes retail businesses, a portion of a residential area, wooded vacant lots and a small creek. A fenced portion of the Route 561 Dump Site is located at the base of an earthen dam that forms Clement Lake. White Sand Branch is a small creek which originates at the dam and flows in a southwest direction for approximately 1,650 feet where it enters the fenced portion of the Burn Site.

United States Avenue Burn Superfund Site: The fenced portion of the Burn Site and its associated contamination is approximately thirteen acres in size and encloses the remaining 400 feet of White Sand Branch. A 500-foot portion of a small creek, Honey Run Brook, enters the Burn Site where it joins White Sand Branch before it passes beneath United States Avenue and enters Bridgewood Lake in Gibbsboro. The six-acre Bridgewood Lake empties through a culvert beneath Clementon Road and forms a 400-foot long tributary that joins Hilliards Creek at a point approximately 1,000 feet downstream from the Former Manufacturing Plant area.

SITE HISTORY

The former paint and varnish manufacturing plant property in Gibbsboro, New Jersey, was developed in the early 1800s as a saw mill, and later 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 Manufacturing Plant included wastewater lagoons,

above-ground storage tanks, a railroad line and spur, drum storage areas, and numerous production and warehouse buildings. The facility was closed in 1977 and was sold to a developer in 1981.

In 1978, after plant operations closed, NJDEP directed Sherwin-Williams to excavate and properly dispose of the waste material remaining in the lagoons. During the 1980s, NJDEP entered into several administrative orders with Sherwin-Williams to oversee the characterization of contaminated groundwater and a petroleum-like seep in the Former Manufacturing Plant area. During the 1990s, NJDEP discovered two additional source areas, the Route 561 Dump Site and the Burn Site. Contamination in both areas are attributable to historic dumping activities associated with the Former Manufacturing Plant.

In the mid-1990s, enforcement responsibilities for the Dump Site and the Burn Site were transferred from NJDEP to EPA. Under an AOC with EPA, Sherwin-Williams was directed to further characterize and delineate the extent of contamination associated with these areas and to fence them off to minimize the potential for human exposure. EPA proposed the Dump Site to the National Priorities List (NPL) in 1998[1]. The Burn Site was added to the NPL in 1999.

In 1998, EPA sampled the upper portions of Hilliards Creek and several residential properties. Contaminants (mainly lead and arsenic) were detected in these soil and sediment samples. EPA then entered into two additional AOCs with Sherwin-Williams in 1999. Under the first AOC, Sherwin-Williams conducted additional sampling of Hilliards Creek and Kirkwood Lake to further characterize the extent of contamination. This sampling, which concluded in 2003, included residential properties along Hilliards Creek and Kirkwood Lake. The second AOC, signed in September 1999, required Sherwin-Williams to conduct a Remedial Investigation/Feasibility Study (RI/FS) for the Route 561 Dump Site, the Burn Site and Hilliards Creek. The Sherwin-Williams/Hilliards Creek Site, which includes the Former Manufacturing Plant (FMP) area, Hilliards Creek and Kirkwood Lake, was added to the NPL in 2008.

SITE CHARACTERISTICS OF THE BURN SITE

The Burn Site is comprised of undeveloped properties, woodlands, wetlands and two small creeks. It has been subdivided into areas based on different phases of the investigation. These subdivisions are described below and shown on Figure 3.

Burn Site Fenced Area. The Burn Site Fenced Area is located on the east side of United States Avenue and is comprised of 12.7 acres surrounded by an eight-foot chain link fence. Sherwin-Williams installed the fence around the site in September 1995 pursuant to an EPA Administrative Order on Consent.

Burn Area. The Burn Area is approximately 0.4 acres of fenced area located within the northwest corner of the Burn Site Fenced Area. Historic burning of combustible waste, such as paint waste, spent solvents, empty pigment bags and broken pallets, was conducted in this area. This area was fenced by Sherwin-Williams in July 1995 pursuant to an NJDEP directive.

Landfill Area. The Landfill Area is located in the southern portion of the Burn Site Fenced Area. Material dredged from plant wastewater lagoons and facility trash were deposited in disposal pits within this area. Disposal activities in the Landfill Area were also conducted by the municipality which leased the property from Sherwin-Williams for that purpose. The majority of the sludge material was removed from the Landfill Area in 1979 pursuant to an NJDEP Administrative Order.

White Sand Branch. This is a small stream with headwaters originating at Clement Lake. It flows through the Route 561 Dump Site and along the south side of the Vacant Lot before it enters the northeast corner of the Burn Site. From there, it flows across the

[1] The *National Priorities List* (NPL) is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide EPA in determining which sites warrant further investigation. At some sites proposed for the NPL, EPA has entered into an enforcement agreement with a private party prior final placement on the NPL, whereby the private party agrees to proceed with Superfund investigations or cleanup at the site. In certain circumstances (including at the Dump Site), EPA has elected not to finalize the NPL listing as long as Superfund work proceeds in accordance with the enforcement agreement, but EPA maintains the site as "proposed" so that it can be quickly finalized on the NPL if conditions change.

northern portion of the Burn Site and joins Honey Run just east of U.S. Avenue, and discharges through a culvert beneath U.S. Avenue into Bridgewood Lake.

Honey Run. This is a small stream that runs from the southeastern corner of the Burn Site to the point where it joins White Sand Branch and discharges into Bridgewood Lake.

Railroad Track Area. This is the railroad track and the area between the railroad track and Bridgewood Lake, located west of U.S. Avenue. This area commences at the northern end of Bridgewood Lake and extends 600 feet to the south.

Summary of Burn Site Investigations

Pre-Remedial Investigation Activities

The investigations at the Burn Site were conducted in several phases. NJDEP investigated the Landfill Area in 1975 and in 1978 issued an Administrative Order for Sherwin-Williams to remove sludge and contaminated soil from the Landfill Area. Sherwin-Williams removed the majority of the waste in 1979.

In 1991 and 1992, Sherwin-Williams, under NJDEP direction, conducted an investigation of the Landfill Area of the Burn Site. This investigation was conducted as part of a larger investigation of the FMP.

In 1993, Sherwin-Williams conducted an additional phase of investigation of the FMP that included further sampling of the former Landfill Area. In addition, NJDEP conducted a site investigation within what is now termed the Burn Site Fenced Area in 1994, during which soil samples were collected from within the Burn Area, north of the Burn Area, and north of the Landfill Area, near Honey Run. Sediment and surface water samples were also collected along White Sand Branch and Honey Run.

In 1995, pursuant to an AOC with the EPA, Sherwin-Williams conducted an investigation of the Burn Site Fenced Area. A fence surrounding the Burn Site Fenced Area was installed in June 1995 as part of the EPA AOC. The 1995 investigation consisted of soil, sediment, and groundwater sampling.

In 1996, in response to a letter from EPA, Sherwin-Williams conducted soil sampling of the Railroad Track Area. Based on these results, the EPA issued a Unilateral Administrative Order to Sherwin-Williams to conduct a soil removal action in this area. The soil removal was conducted in 1997. Approximately 2,000 tons of soil and debris and 4,500 gallons of liquid (primarily rain water) were removed and disposed off-site.

Summary of the Remedial Investigation

The full results of the RI can be found in the Burn Site Remedial Investigation Report (February 2017) which is part of the Administrative Record.

RI sampling of soil, sediment and surface water by Sherwin-Williams, under EPA oversight, began in 2005 and continued to 2008. Additional groundwater sampling was conducted in 2010 and 2011 and supplemental sampling for the Baseline Ecological Risk Assessment took place in 2015.

Beginning in 2005, the RI for the Burn Site, which included all of the six subareas, was conducted in sequential phases; the scopes of later sampling phases were based on the results of prior phases of investigation.

The results of sample analyses were screened to determine if the levels of contamination posed a potential harm to human health and/or the environment. This was done by comparing the measured values of contaminants to standards that are protective of human health or ecological receptors.

The soil sample analytical results were compared to NJDEP's Residential Direct Contact Soil Remediation Standards (RDCSRS) referred to hereafter as residential cleanup goals, and the Non-residential Direct Contact Soil Remediation Standards (NRDCSRS), referred to hereafter as non-residential cleanup goals, depending on the zoning and land use. The sediment sample analytical results were compared to the lowest effect levels for ecological receptors and surface water results were compared to the New Jersey Surface Water Quality Standards (NJSWQS) for Fresh Water. In addition, a human health risk assessment and an ecological risk assessment were conducted to determine if levels of contaminants exceeded EPA's acceptable risk range. Explanations of the results of the human

health and ecological risk assessments are explained in separate sections later in this document.

The results of the RI showed that lead and arsenic are the major contaminants of concern in all media tested throughout the Burn Site. Other contaminants were also found and they were generally co-located with lead and arsenic.

Soil:

Soil samples were taken from over 200 sample locations from the ground surface to depths of approximately 34 feet.

Lead and arsenic are the main contaminants of concern and were found most frequently and at the greatest concentrations above the NJDEP RDCSRS. Other contaminants that were found in the soil above the standard include pentachlorophenol, hexavalent chromium and other metals, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs). These other contaminants were found less frequently and are co-located with lead and arsenic therefore they would be addressed with the cleanup goals for lead and arsenic. Based on the sampling results and comparison of that data to the NJDEP RDCSRS, lead and arsenic were identified as the main contaminants of concern in the soil.

The most highly contaminated soil was found at three locations within the Burn Site Fenced Area. These locations are the Landfill Area, White Sand Branch floodplain and the Burn Area. It is likely that there is contamination under United States Avenue since soil contamination was found in samples on both sides of United States Avenue between the Burn Site Fenced Area and the Railroad Track Area.

Contamination in soil is generally found at depths up to 8 feet but can be found in areas up to 28.5 feet deep. The concentration of lead in soils range from less than the NJDEP residential standard of 400 milligrams/kilogram (mg/kg) to levels exceeding over 20,000 mg/kg in the three areas with the highest contamination (Landfill, White Sand Branch Floodplain and the Burn Area). The concentration of arsenic in soil ranges from less than the NJDEP residential standard of 19 mg/kg to levels exceeding 1,000 mg/kg in the Burn Area.

WHAT ARE THE "CONTAMINANTS OF CONCERN" (COCs)?

EPA has identified two metals as the primary contaminants of concern at the Burn Site that pose the greatest potential risk to human health and the environment.
The primary contaminants of concern at the US Avenue Burn Site are lead and arsenic.

Lead: Lead was historically used as a pigment in paint. As a pigment, lead II chromate "chrome yellow" and lead II carbonate "white lead" being the most common. Lead is hazardous. At high levels of exposure lead can cause nervous system damage, stunted growth, kidney damage, and delayed development. Lead is considered a possible carcinogen.

Arsenic: Arsenic compounds began to be used in agriculture as ingredients in insecticides, rodenticides, herbicides, wood preservers and pigments in paints. Long-term exposure to high levels of inorganic arsenic (e.g. through drinking-water and food) are usually observed in the skin, and include pigmentation changes and skin lesions. Often, prolong exposure can lead to skin cancer. In addition to skin cancer, long-term exposure may lead to cancers of the bladder and lungs.

Sediment:

Sediment samples were taken from more than 30 locations in Honey Run within the Fenced Area and to the southeast outside the Fenced Area and the entirety of White Sand Branch located within the Fenced Area.

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

Lead and arsenic exceedances were found in sediment throughout Honey Run and White Sand Branch. The concentration of lead varies from below the lowest effect level for ecological receptors to 11,000 mg/kg. The arsenic levels varied from below the lowest effects

level for ecological receptors to over 500 mg/kg. For both metals, the highest values were found just south of the Burn Area.

Surface Water:

Surface water samples were collected from eight locations in the Burn Site Fenced Area and in Honey Run from the southeastern portion of the creek located outside of the Fenced Area. Analyses of the surface water showed exceedances of the NJSWQS for Fresh Water for aluminum, iron, zinc, cyanide, arsenic, lead, and cadmium. As with the other media, lead is the main contaminant of concern.

The concentrations of metals in surface water were compared to the NJSWQS for Fresh Water of 5.4 micrograms/Liter (µg/L) for lead and 150 µg/L for arsenic. The total lead and total arsenic values varied from below the NJSWQS for Fresh Water to over 33.5 µg/L for total lead and over 514 µg/L for total arsenic. The highest concentrations in surface water were found just west of where White Sand Branch meets Honey Run within the Burn Site Fenced Area.

SCOPE AND ROLE OF OPERABLE UNIT

Due to the complexity of multiple sites and varying land uses, EPA is addressing the cleanup of the Sherwin-Williams sites in several phases called operable units. Operable Unit 1 (OU1) consists of the Residential Properties associated with each of the three Sherwin-Williams Sites that are to be remediated in accordance with the Record of Decision which was signed in September 2015.

This Proposed Plan addresses Operable Unit 2 (OU2) of the Burn Site which consists of soil, sediments, and surface water. The soil located beneath United States Avenue will not removed as the road acts a protective cap and this is protective of human health.

Groundwater contamination will be evaluated as a separate Operable Unit and addressed in a future Proposed Plan.

PRINCIPAL THREAT WASTE

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.

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, Non-Aqueous Phase Liquids (NAPLs) 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.

SUMMARY OF SITE RISKS

As part of the RI/FS, a baseline risk assessment consisting of a human health risk assessment (HHRA) and a baseline ecological risk assessment (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 scenarios. They 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 concern (COCs), as well as the toxicity of these contaminants.

For the ecological risk assessment, representative ecological receptors were identified for each exposure area. Measurement and assessment endpoints were developed during the BERA to identify those receptors and areas where unacceptable risks are present.

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 concern (COCs) 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.

The site was divided into specific exposure areas that differed for the human health risk assessment and the ecological risk assessment.

For the human health risk assessments, the Burn Site was divided into five exposure areas. These exposure areas include the Burn Area, Burn Site Fenced Area, Landfill Area, Railroad Track Area and South Burn Site Area.

For the baseline ecological risk assessment, the Burn Site was evaluated based upon four defined ecological exposure areas: Burn Site West, Burn Site East, White Sand Branch and Honey Run Brook.

Human Health Risk Assessment

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

A four-step human health risk assessment process was used for assessing Site-related cancer risks and noncancer health hazards. The four-step process is comprised of: Hazard Identification of Chemicals of Concern (COCs), 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 Burn Site and associated exposure areas include a mix of residential and office/residential zoning. For the purposes of the HHRA, the Burn Site was divided into five separate exposure areas. These exposure areas are geographic designations created for the risk assessment in order to define areas with similar anticipated current and future land use or similar levels of contamination. The Burn Site exposure areas are shown in Figure 4 and include the following: Burn Area, Burn Site Fenced Area, Landfill Area, the Railroad Track Area, and South Burn Site Area. Two streams, White Sand Branch and Honey Run Brook, run through portions of the Burn Site. Exposure to sediment and surface water from these streams were assessed separately from each other, as part of the exposure area which they run through.

The majority of the Site is currently unused/vacant. A fence surrounding the Burn Area, Burn Site Fenced Area, and Landfill Area currently restricts access to these portions of the site, therefore all the receptor populations evaluated at these exposure areas were assumed to be future scenarios. Access to the Railroad Track Area and the South Burn Site Area are not restricted; exposure to these areas for passive

recreational activities such as walking, was considered for the current timeframe (adolescent and adult recreator). Since the future use of the site is largely unknown, the HHRA conservatively assumed that each exposure area could be developed for either commercial or residential use. As such, the following future receptor populations and routes of exposure were considered on all exposure areas of the Site:

- Adult Utility Worker and Construction Worker: incidental ingestion, dermal contact and inhalation of particulates and volatiles released from surface and subsurface soils; dermal contact with shallow groundwater.
- Adult Outdoor worker: incidental ingestion, dermal contact and inhalation of particulates and volatiles released from surface soils.
- Adolescent and Adult Recreator: 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 White Sand Branch and Honey Run Brook.
- Child and Adult Resident: incidental ingestion, dermal contact and inhalation of particulates and volatiles released from surface soils; ingestion, dermal contact and inhalation of vapors during showering and bathing from sitewide groundwater; incidental ingestion and dermal contact of sediments along with dermal contact with surface water while wading in White Sand Branch and Honey Run Brook.

For COCs other than lead, two types of toxic health effects were evaluated in the risk assessment: 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.

The total cancer and noncancer risk hazard estimates for all receptors summed across all pathways and media are summarized in Table 1. For overall completeness, exposure to sitewide groundwater was evaluated in the HHRA for the Site. However, since groundwater is not being addressed as part of this decision document, the result of the risk assessment associated with exposure to groundwater is not summarized below.

Summary of the Human Health Risk Assessment

This section provides an overview of the human health risks from the major COCs. A complete discussion of all risks from the Burn Site can be found in the Human Health Risk Assessment which is contained in the Administrative Record.

Surface Soil

Risks and hazards were evaluated for potential current and future exposure to surface soil on each exposure area. Table 1-1 below summarizes the receptor populations in each exposure area that were found to exceed EPA's cancer risk range and/or noncancer threshold criteria. COCs in surface soil varied per exposure area and the receptor populations evaluated. For the Burn Area, arsenic accounted for the majority of the risk and hazard; additional metals that contributed to elevated hazard estimates at the Burn Area included cadmium, copper, manganese, and zinc. The main COCs in the Burn Site Fenced Area were arsenic and hexavalent chromium.

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

Receptor	Hazard Index	Cancer Risk
Burn Site Fenced Area		
Future Resident (child/adult)	9	5.2E-04
The COCs in surface soil at the Burn Site Fenced Area were arsenic and hexavalent chromium.		
Burn Area		
Future Outdoor Worker	19	2.1E-03
Future Adolescent Recreator	20	9.5E-04
Future Adult Recreator	13	1.4E-03
Future Resident (child/adult)	251	1.0E-02
The COCs in surface soil at the Burn Area varied by receptor but included: arsenic and other metals.		

Surface and Subsurface Soil

Exposure to surface and subsurface soil by a future construction and utility worker present at each exposure area of the Burn Site were considered. As shown in Table 1-2, only the Burn Site Fenced Area and Burn Area were associated with cancer and noncancer estimates that exceeded EPA's threshold criteria. Arsenic was identified as the main COC for surface and subsurface soils at the Burn Site Fenced Area and Burn Area. In addition to arsenic, the presence of manganese also contributed to elevated hazard estimates for the construction worker on the Burn Area.

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

Receptor	Hazard Index	Cancer Risk
Burn Site Fenced Area		
Future Construction Worker	3	1.3E-05
The COC for surface/subsurface soil at the Burn Site Fenced Area was arsenic.		
Burn Area		
Future Utility Worker	4	6.0E-04
Future Construction Worker	102	6.0E-04
The COCs in surface/subsurface soil at the Burn Area varied by receptor but included: arsenic and manganese.		

Burn Site Suspect Material

Cancer risk and noncancer hazard was calculated for an adult and child resident who may come into contact with a solid material which was found on portions of the Burn Site. One sample of this material was analyzed and used to evaluate potential risks through direct contact exposures. Results of the risk assessment are summarized in Table 1-3. Pentachlorophenol was identified as the sole COC for the Burn Site suspect material.

Table 1-3: Summary of hazard and risk exceedances for the Burn Site Suspect Materials

Receptor	Hazard Index	Cancer Risk
Burn Site Suspect Material		
Future Resident (child/adult)	29	6.6E-03
The COC for the Burn Site Suspect Material was pentachlorophenol.		

Surface Water and Sediment

Exposure to surface water and sediments of the White Sand Branch and Honey Run Brook by future child and adult residents, along with future adolescent and adult recreator who may wade in these shallow streams were evaluated on the exposure areas which they run through. Results of the HHRA found that exposure to surface water and sediment did not exceed EPA's cancer risk range or noncancer threshold for any receptor evaluated. Therefore, there were no COCs identified in the surface water or sediment of White Sand Branch and Honey Run Brook.

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 for the other COCs. Consistent with EPA guidance, exposure to lead was evaluated separately from the other contaminants using appropriate blood lead modeling. The results of the lead risk evaluation conducted in the HHRA are summarized in Table 2.

The risk reduction goal considered in the HHRA was to limit the probability of a child's target blood lead level exceeding 10 micrograms per deciliter (µg/dL) to 5% or less. Since the HHRA was finalized, new scientific information has come to light which indicates that adverse health effects are evident at lower blood lead levels. To ensure that the proposed soil remedy is protective of human health, the lead cleanup goal selected for the site is based on an updated Regional risk reduction goal to limit the probability of a child's blood lead level exceeding 5 µg/dL to 5 % or less.

With the exception of the South Burn Site exposure area, lead was identified as a COC throughout the various exposure areas of the Burn Site for the child resident and construction worker. For a child resident, exposure to lead in various media including surface soil, sediment and/or groundwater resulted in predicted blood lead probabilities ranging from 92% to 100% exceeding the target blood lead level (BLL). The predicted probabilities of exceeding the target BLL for the construction worker exposed to surface and subsurface soils ranged from 8% to 100%. In addition, lead risks from exposure to surface soil by a recreator, adult resident and outdoor worker on the BA and adult resident on the RR area exceed the risk reduction goal (i.e., the probability of exceeding the target BLL was greater than 5% for these receptor populations). Lead was also identified as a COC for direct contact exposures with the Burn Site Suspect Material. In summary, as shown in Table 2, lead was identified as a COC for at least one receptor within the Burn Site Fenced, Landfill, Burn, and Railroad Track exposure areas.

Summary Conclusions of the HHRA

In summary, with the exception of the South Burn Site, exposure to metals in surface soils, subsurface soils, and sediments found at various exposure areas of the Burn Site were found to exceed EPA's threshold criteria. In general, arsenic and/or lead were the main COCs; however, exposure to other metals were also identified as exceeding cancer risk and noncancer hazard estimates at some of the exposure areas evaluated (e.g. hexavalent chromium at the Burn Site Fenced Area).

Based on the results of the human health risk assessment 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 surface soil, sediment, surface water and groundwater. Media concentrations were compared to ecological screening values as an indicator of the potential for adverse effects to ecological receptors by habitat type.

Exposure to both terrestrial wildlife in the upland exposure areas (Burn Site East and Burn Site West) through ingestion of contaminated soil and biota, and exposure of aquatic wildlife to contaminants in the White Sand Branch and Honey Run Brook exposure areas 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. The drivers of ecological risk were lead, arsenic, chromium and zinc.

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

Summary of the Baseline Ecological Risk Assessment

The BERA provided evidence that COCs, primarily arsenic, lead, chromium and zinc are present in both aquatic and terrestrial environments within several portions of the Burn Site and pose unacceptable ecological risk to wildlife receptors. The greatest potential for exposure and unacceptable risks to the aquatic community are indicated for localized elevated areas of arsenic, lead and zinc in White Sand Branch near the Burn Area, with much lower exposures and risks in Honey Run Brook. Overall, terrestrial wildlife risks are driven by elevated concentrations detected near the Burn Area in the Burn Site East and the northern portion of the Railroad Track Site in the Burn Site West. COC concentrations and risk decreases significantly with distance from these areas. 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 Burn Site. Similarly, the Spotted Sandpiper was identified as the receptor with the highest exposure and hazard quotient associated with the aquatic community in White Sand Branch.

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.

Based on the full risk assessment, it is EPA's current judgment that the Preferred Alternatives identified in this Proposed Plan are necessary to protect public health or the environment from actual or threatened releases of hazardous `substances into the environment.

REMEDIAL ACTION OBJECTIVES

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

Soil

- Prevent potential current and future unacceptable risks to human and ecological receptors resulting from uptake of soil contaminants by plants, ingestion of contaminated soils and food items by humans and ecological receptors, and direct contact with contaminated soils.

- Minimize migration of site-related contaminants in the soil to sediment, surface water and groundwater.

Sediment

- Prevent potential current and future unacceptable risks to ecological receptors resulting from uptake of sediment contaminants by plants, ingestion of contaminated sediments by humans and ecological receptors and direct contact with contaminated sediments.

- Minimize migration of site-related contaminants from the sediment to surface water.

To achieve RAOs, EPA has selected soil and sediment cleanup goals for the major COCs. The soil cleanup goals for the COCs are consistent with New Jersey human health direct contact standards or ecological risk-based goals.

The Burn Site is comprised of undeveloped properties that are zoned for office and residential development, and wetlands. Both areas currently contain ecological habitat. To meet the RAOs, specific soil cleanup goals listed below apply to different areas or land uses of the Site.

Soil ecological cleanup goals are based on the most sensitive terrestrial wildlife receptors and apply to the top foot of soil at all properties in the Burn Site that contain ecological habitat. Residential zoned properties contain ecological habitat. As a result, the ecological cleanup goals apply to the top foot of soil and residential cleanup goals apply through the remaining soil depth.

The soil and sediment cleanup goal for arsenic will be based on the ecological goal and will equal the background value of 19 mg/kg (that is also the NJDEP Residential Direct Contact Soil Remediation Standard).

The soil cleanup goals for lead in the top foot of soil is the ecological cleanup goal of 213 mg/kg since this value is lower than the human health direct contact cleanup goal of 400 mg/kg. The soil cleanup goal for lead below one foot in depth is the human health cleanup goal of 400 mg/kg. 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 sediment cleanup goal for lead is the ecological cleanup goal of 213 mg/kg that is based on the most sensitive wildlife receptor.
Site-specific impact to groundwater levels for unsaturated soil will be determined during remedial design. Saturated soil that contains lead at levels exceeding 1000 mg/kg are considered source areas to groundwater contamination.

The cleanup goals for the Burn Site are as follows:

Soil:

Arsenic:

- Non-residential cleanup goal: 19 mg/kg
- Residential cleanup goal: 19 mg/kg
- Ecological cleanup goal: 19 mg/kg

Lead:

- Residential cleanup goal: 400 mg/kg
- Ecological cleanup goal: 213 mg/kg

Sediment:

Arsenic: 19 mg/kg
Lead: 213 mg/kg

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected remedy be protective of human health and the environment, be cost effective, comply with other statutory laws, 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 or sediment remediation were identified and screened by 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 FS which is part of the Administrative Record.

The time frames below are for construction and do not include the time to negotiate with the responsible parties, design a remedy or the time to procure necessary contracts. 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.

For all soil and sediment alternatives, the Present Worth Cost includes the periodic present worth cost of five-year reviews.

Soil Alternatives:

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 soil at the Burn Site.

Alternative 2 – Institutional Controls and Monitoring

Capital Cost: *$319,000*
Annual O&M Cost: *$8,250*
Present Worth Cost: *$563,790*
Time Frame including O&M: *30 years*

This alternative would use Institutional Controls, such as deed notices, to prevent exposure to site contaminants and monitoring to assess any change in contaminant conditions over time. The existing fences in and around the Burn Site Area would be maintained, and a new fence would be installed around the Railroad Track Area. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Alternative 3 – Capping and Institutional Controls

Capital Cost:	*$6,221,305*
Annual O&M Cost:	*$22,000*
Present Worth Cost:	*$6,636,719*
Construction Time Frame:	*5 months*

This alternative would use soil or asphalt covers as the primary method to prevent exposure to contaminants in site soils. Two feet of soil would be excavated to allow the installation of a two-foot soil cap to prevent contact with soils that exceed the soil cleanup goals.

Approximately 9,500 cubic yards of soil would be excavated to accommodate a cap. The excavated soil would be transported to an appropriate disposal facility.

Institutional controls, such as a deed notice, would be required on all properties where residential soil standards are not met. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Alternative 4 – Excavation, Capping and Institutional Controls

Capital Cost:	*$18,723,716*
Annual O&M Cost:	*$22,000*
Present Worth Cost:	*$19,139,131*
Construction Timeframe:	*8 months*

The Burn Site consists of both residential and non-residential (United States Avenue) zoned areas. In this alternative, soil within the Burn Site that exceeds the residential cleanup goals, would be removed to approximately ten feet. Soil located below ten feet that exceeds the cleanup goals would be capped with clean soil. Remaining unsaturated soil that exceed site-specific impact-to-groundwater values would receive an impermeable cap. The impermeable cap would be expected to minimize surface water percolation through the soil thereby reducing the impact on groundwater. Several areas of saturated soil within the Site that are a source of groundwater contamination would be removed. Soil removal in these portions of the Site is estimated to extend to 12 feet. Removal of saturated soil that acts as a source of groundwater contamination would also result in areas of deep excavation, between four to twelve feet.

For the non-residential zoned area (United States Avenue), soil would not be removed and the asphalt roadway would serve as a cap, and institutional controls would be established to prevent exposure.

Institutional controls, such as deed notices, would be required for all residential areas and United States Avenue where residential standards are not met. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Approximately 60,000 cubic yards of soil would be removed under this alternative.

Alternative 5 -- Excavation and Institutional Controls

Capital Cost:	*$26,037,848*
Annual O&M:	*$4,950*
Present Worth Cost:	*$26,241,689*
Construction Timeframe:	*10 months*

The Burn Site consists of both residential and non-residential (United States Avenue) zoned areas. In this alternative, all soils exceeding the residential cleanup goals located within residentially zoned area would be removed. Any remaining soil that exceeds ecological cleanup goals in the top foot of soil outside the footprint of the residential soil cleanup goal excavation would also be removed.

Since all the accessible contaminated soils would be removed from excavated areas, no capping would be necessary in the excavated areas. There would be no need for a soil cap as all soils that exceed residential cleanup goals would be removed. There would also be no need for an impermeable cap to protect groundwater, as all unsaturated soil that exceed site-specific impact-to-groundwater values would be excavated. Soil removal in these portions of the Site is estimated to extend to 18 feet.

For the non-residential zoned area (United States Avenue), soil would not be removed and the asphalt roadway would serve as a cap, and institutional controls

would be established to minimize the potential for exposure.

Approximately 76,000 cubic yards of soil would be removed under this alternative.

Institutional controls, such as a deed notice, would be required on all properties where residential standards are not met. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Common Elements: Surface Water

Surface water monitoring is included as part of each 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.

Sediment Alternatives:

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 at the Burn Site.

Alternative 2 – Institutional Controls and Monitored Natural Recovery

Capital Cost:	*$229,680*
Annual O&M Cost:	*$11,000*
Present Worth Cost:	*$508,595*
Timeframe including O&M:	*30 years*

Under this alternative, no removal or capping of sediment would be conducted and exposure to contaminants would not be prevented. Periodic monitoring would be performed to determine if contaminant concentrations in surface sediment were declining to a level that is protective of ecological receptors. Institutional controls, such as a deed notice, would be required since contaminants remain above unrestricted levels. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Alternative 3 – Dredging, Capping and Natural Recovery

Capital Cost:	*$1,628,905*
Annual O&M Cost:	*$27,500*
Present Worth Cost:	*$2,112,570*
Construction Timeframe:	*3 months*

Under this Alternative, up to one foot of sediment containing contaminants at concentrations exceeding the ecological cleanup goals would be removed from White Sand Branch and Honey Run. In areas where one foot of sediment is removed to meet the ecological cleanup goals, natural sedimentation would be allowed to restore the stream to its previous elevation. A cap would be installed on areas of the stream where levels of contaminants exceeding the cleanup goals remain after excavation. The cap would consist of six inches of sand, covered by three inches of stone that would act as an armoring layer. Natural sedimentation would then fill in above the armoring layer and reestablish the previous elevation of the stream. Approximately 350 cubic yards of sediment would be removed under this alternative.

A minimum of five years of sampling would take place to confirm that restoration was successful and that contaminant levels remain below the cleanup goals.

Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Alternative 4 –Dredging

Capital Cost: *$1,574,335*
Annual O&M Cost: *$0*
Present Worth Cost: *$1,716,751*
Construction Timeframe: *4 months*

This alternative consists of removal of all sediment with site-related contaminants exceeding ecological cleanup goals from White Sand Branch beginning at the northeast corner of the Burn Site Fenced Area and extending to the location where White Sand Branch combines with Honey Run, from two sections of Honey Run. Sediment in the sections of Honey Run where COC were not detected above cleanup goals would undergo additional sampling during design to determine if sediment removal is needed in these sections. No capping of sediments would be necessary since all sediment exceeding the cleanup goals would be removed. Areas where sediment is removed would be backfilled with clean material and the area restored.

It is estimated that 825 cubic yards of sediment would be removed under this alternative. A minimum of five years of monitoring would be conducted to ensure that the concentration of contaminants in the sediments remain below the cleanup goals. Because no contamination would remain above unrestricted levels, five-year reviews would not be required.

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 profiles 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 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.

Evaluation of Soil Alternatives

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 protect human health by restricting

access to the contaminated soil through use of institutional controls, but such controls would not be protective of ecological receptors. It also would not address the source of groundwater contamination or prevent migration of soil contaminants to the surface water.

Alternatives 3, 4 and 5 provide an increasing progression of control of contaminated soil through a combination of excavation and capping. However, Alternative 3 would not completely control migration of soil contaminants at depth to groundwater since only shallow soil would be removed. In addition, Alternative 3 would not address sources of groundwater contamination in deep saturated soils that would be removed in Alternatives 4 and 5.

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

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

Alternative 1 and Alternative 2 would not meet chemical-specific ARARs.

Alternatives 4 and 5 would be in compliance with chemical-specific ARARs by removing contaminated soil both in the shallow and deep zones and through capping.

Action-specific ARARs would be met by Alternatives 3 through 5 during the construction phase by proper design and implementation of the action including disposal of excavated soil at the appropriate disposal facility.

3. Long-Term Effectiveness and Permanence

Alternatives 1 and 2 would not provide long-term effectiveness or permanent protection to ecological receptors, groundwater or surface water because the soil contaminants would remain uncontrolled.

Alternative 3 does not provide as great a degree of long-term effectiveness and permanence in controlling sources of groundwater contamination when compared to Alternatives 4 and 5 because deep saturated soil contamination that acts as a source to groundwater contamination will not be removed from the Burn Site Fenced Area.

By removing contaminants exceeding the cleanup goals from the White Sand Branch and Honey Run flood plain, and removing contaminated soil to a deeper depth, Alternative 4 would achieve a greater degree of long-term protectiveness and permanence than Alternative 3. In addition, Alternative 4 would require capping on portions of the Burn Site Fenced Area. Alternative 5 offers the greatest degree of long-term permanence by removing almost all contaminants and relying the least on capping.

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

Alternatives 1 and 2 would not reduce the toxicity, mobility or volume of soil contaminants since no material will be removed or capped.

For the soil alternatives that involve removal and/or capping of soil, there is no treatment of the contaminants and therefore, no reduction in toxicity. Removal of the contaminated soil would decrease the volume of contaminants at the Site and capping would decrease contaminant mobility. The excavated material would be transferred to a landfill without treatment and therefore the overall reduction of toxicity mobility or volume through treatment would not be achieved. The amount of contamination removed or capped increases progressively from Alternatives 3 to 5. Alternative 5 would leave the least amount of contamination on the Site, but would not reduce the toxicity mobility or volume of contaminants any more than the other alternatives.

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.

Alternatives 1 and 2 do not present any short-term risks to site workers or the environment because they do not include active remediation work.

Under Alternatives 3 through 5, potential adverse short-term effects to the community include increased traffic, noise, and road closures.

Risks to site workers, the community and the environment include potential short-term exposure to contaminants during excavation of soil. 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. Portions of the Site, such as Honey Run and White Sand Branch, consist of large areas of wetlands. Under Alternatives 3 through 5, it would be necessary to remove trees and vegetation as well as disrupt the small streams and associated wildlife.

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. Alternatives 3, 4 and 5 would take 5, 8, and 10 months, respectively, to complete. Among Alternatives 3 through 5, Alternative 3 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 take the longest time to implement and would have the highest potential for short-term adverse effects.

6. Implementability

Because Alternatives 1 and 2 would not entail any construction, they would be easily implemented.

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 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 Alternative 4 and 5 increases the implementation difficulties compared to Alternative 3.

In Alternatives 4 and 5, deep excavations to remove groundwater source areas in the Burn Site Fenced Area present implementability challenges. Alternative 5 presents greater implementability challenges than Alternative 4 due to the additional volume of soil to be removed.

In general, the amount of soil to be removed and area to be capped increases from Alternatives 3 to 5. Therefore, alternative 3 is the easiest to implement and alternatives 4 and 5 would be more difficult to implement.

7. Cost

The total estimated present worth costs increase with the amount of material removed. The estimated costs are $0 for Alternative 1, $563,790 for Alternative 2, $6,636,719 for Alternative 3, $19,139,131 for Alternative 4, and $26,241,689 for Alternative 5.

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 use institutional controls to protect human health by restricting access to the contaminated sediment during the time it takes for natural recovery. However, institutional controls would not be protective of ecological receptors because they do not control wildlife access. In addition, the amount of time to achieve natural recovery would be unacceptably long.

Alternative 3 would be protective because one foot of contaminated sediment would be removed and the remaining contaminated sediment would be capped.

Alternative 4 would be protective because sediment contamination above the cleanup goals would be removed.

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

Sediment cleanup goals are risk-based and, therefore, there are no chemical-specific ARARs. Alternatives 3 and 4 which require remedial action would comply with action and location specific ARARs that apply to

remediation and filling in floodplains, work in wetland areas, waste management, and storm water management.

3. Long-Term Effectiveness and Permanence

Alternatives 1 and 2 would allow existing contamination, and ecological exposures and risks to continue while natural recovery occurs. Natural recovery alone will not reduce surface sediment concentrations to levels that are protective of ecological receptors.

The cap associated with Alternative 3 would be installed in Honey Run and White Sand Branch. 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 be permanent as long as the cap remains in place. This alternative would require more maintenance to ensure long-term effectiveness.

Alternative 4 would remove all sediment contamination from the small streams within White Sand Branch and portions of Honey Run. Alternative 4 would be more effective and have a higher degree of permanence than Alternative 3 since all contaminated sediment would be removed under Alternative 4.

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

The major contamination in sediment at the Site is due to the presence of metals. All the alternatives, except No Action, involve removal and/or capping of the sediment. There is no treatment of the contaminants and, therefore, no reduction of toxicity. Removal of the contaminated sediment would decrease the volume and capping would decrease the mobility of any contamination at the Site. The excavated sediment would be transferred to a landfill without treatment.

Since removal and containment are the technologies that will be used for the remediation of sediment, none of the alternatives provide reduction of toxicity, mobility, or volume through treatment.

5. Short-Term Effectiveness

Alternatives 1 and 2 do not present any short-term risks to the community, site workers or the environment because these alternatives do not include any active remediation work.

Alternatives 3 and 4 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 3 and 4 due to removal of existing vegetation. There is little difference in the implementation time from the shortest (three months) to the longest (four months). Therefore, Alternatives 3 and 4 are equal in terms of short-term effectiveness.

6. Implementability

Sediment Alternatives 1 and 2 would not include any construction, and therefore they would be easily implemented.

Alternatives 3 and 4 require sediment removal and face similar implementability challenges. Such challenges include access to low lying saturated areas, control of surface water flow, controlling intrusion of groundwater into excavation areas, streambed stabilization and wetland restoration.

The implementability challenges increase with the length of White Sand Branch and Honey Run to be remediated and volume of sediment to be removed. Alternative 3 calls for the least amount of sediment removal and therefore presents the least amount of implementability challenges among the alternatives. In contrast, Alternative 4 poses the greatest implementability challenges since it requires the largest remediation area and involves deeper removal of sediment.

7. Cost

The total estimated present worth costs are $0 for

Alternative 1, $508,595 for Alternative 2, $2,112,570 for Alternative 3 and $1,716,751 for Alternative 4.

PREFERRED ALTERNATIVE

The preferred soil alternative for cleanup of the Burn Site is Alternative 4, Excavation, Capping and Institutional Controls. For the sediment, the preferred alternative is Alternative 4, 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 Alternative.

Soil:
The Preferred Soil Alternative 4 (Figure 5) involves excavation, capping, and off-site disposal of soil. The major components of the Preferred Soil Alternative include:

- Excavation, transportation and disposal of 60,000 cubic yards of contaminated soil;
- Excavation of soil to depths ranging from 2 feet to 12 feet.
- Installation of engineering controls;
- Restoration and revegetation of White Sand Branch and Honey Run flood plain; and
- Institutional controls, such as a deed notice, to prevent exposure to residual soil that exceed levels that allow for unrestricted use.

This alternative would remove soil within the saturated zones that contribute contaminants to groundwater. By removing these saturated soils, the concentrations of contaminants in groundwater that exceed ground water quality standards (GWQS) is anticipated to be reduced.

All surface soil (to a depth of one foot) within the ecological areas of the Burn Site will be removed if concentrations of contaminants are greater than the ecological cleanup goals.

In all other areas within the Burn Site except under United States Avenue, soil will be removed to meet residential standards at depths ranging from two feet to twelve feet. Soil beneath United States Avenue will remain under the paving which will serve as a cap.

Soil Alternative 4 was chosen because it has fewer uncertainties in addressing the source areas compared to Alternative 3 and will provide an equivalent degree of protection as Soil Alternative 5.

The Preferred Soil Alternative was selected over other alternatives because it is expected to achieve substantial and long-term risk reduction through off-site disposal, 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 would achieve cleanup goals that are protective for residential use on floodplain soils adjoining White Sand Branch. Though the remedy would be protective, it would not achieve levels that would allow for unrestricted use and therefore, institutional controls, such as deed notices would be required. Five-year reviews would be conducted since contamination would remain above levels that allow for unlimited use and unrestricted exposure.

Sediment:
The Preferred Sediment Alternative 4 (Figure 6) includes excavation of sediment with contaminant levels greater than the cleanup goals from Honey Run and White Sand Branch. The major components of the Preferred Sediment Alternative include:

- Construction of a stream diversion system to allow access to sediments;
- Excavation, transportation and disposal of 825 cubic yards of contaminated sediment;
- Dewatering and processing of excavated sediment; and
- Stream bank and revegetation and restoration.

Approximately three feet of sediment would be removed from White Sand Branch, beginning at the northeast corner of the Burn Site Fenced Area and extending to the location where White Sand Branch combines with Honey Run. Another three feet of sediment would be removed from Honey Run in the southeastern portion of the Site within areas that exceed cleanup goals. Under Sediment Alternative 4, additional sampling during design would determine the extent of sediment excavation within Honey Run.

After remediation of sediment, the stream banks, riparian zone and wetlands would 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 White Sand Branch and Honey Run. The Preferred Sediment Alternative 4 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 would 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 would be protective of human health and the environment, would comply with ARARs, would be cost-effective and would 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 $20,855,882.

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 the preferred alternatives of sediment and soil removal including off-site soil disposal. However, the state cannot concur with the capping and institutional control component of the preferred soil alternative unless 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 the Burn Site through meetings, the Administrative Record file for the Burn Site and announcements published in the local newspaper. EPA encourages the public to gain a more comprehensive understanding of the Site and the RI activities that have been conducted at them.

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 the United States Avenue Burn Site contact:

Julie Nace
Remedial Project Manager
Nace.Julie@epa.gov
(212) 637-4126

Pat Seppi
Community Relations
Seppi.Pat@epa.gov
(212) 637-3679

U.S. EPA
290 Broadway 19th Floor
New York, New York 10007-1866

On the Web at:
https://www.epa.gov/superfund/us-avenue-burn

LEGEND

SITE BOUNDARY

STATE PLANE COORDINATES (NAD83)
N 364543.977 , E 361661.885

0 2,000 4,000

SCALE: 1 " = 2,000 '

TITLE:

FIGURE 1
SITE LOCATION MAP

LOCATION:
UNITED STATES AVENUE BURN SITE
GIBBSBORO, CAMDEN COUNTY,
NEW JERSEY

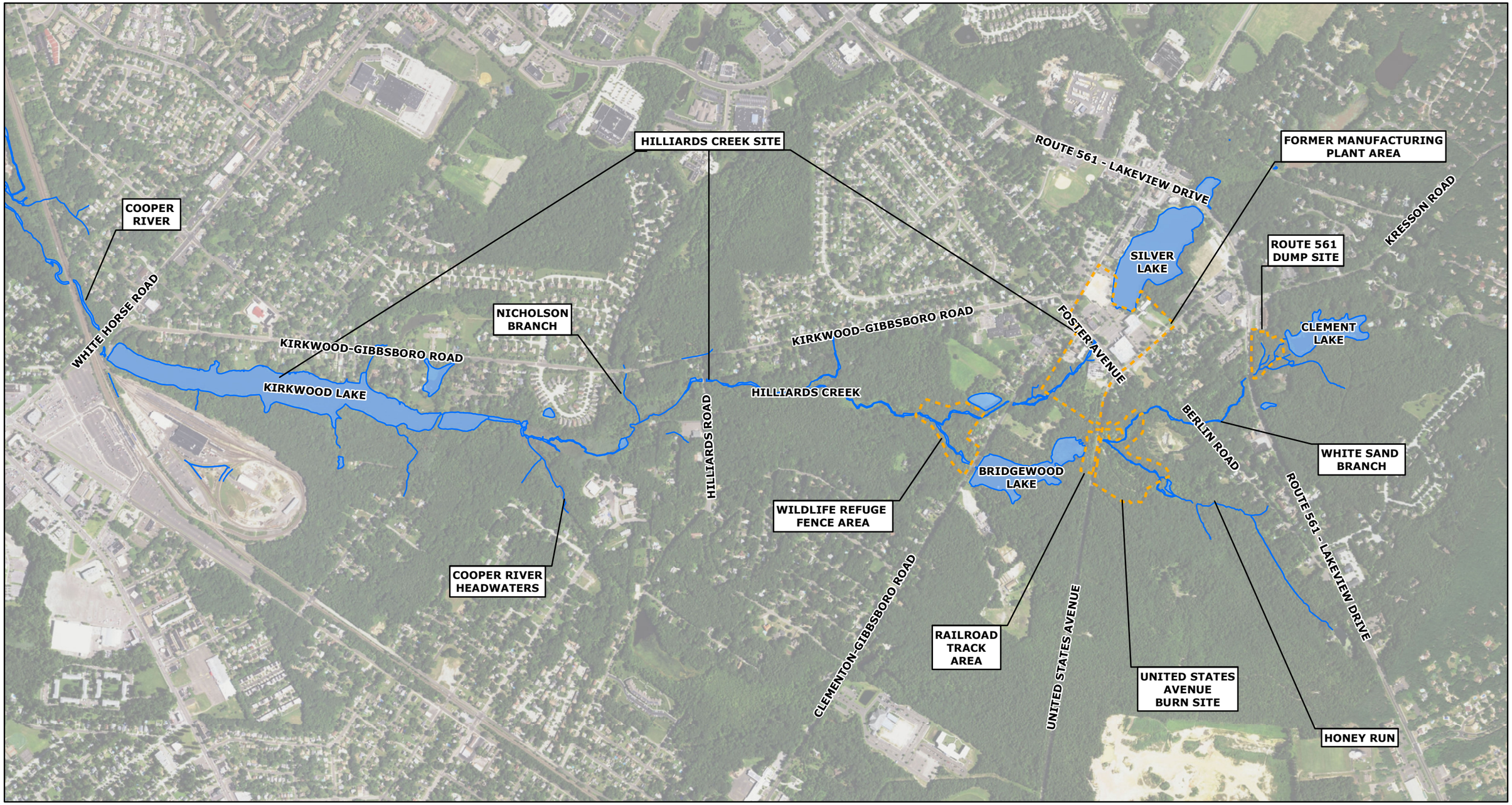
DATE:
01/17/2017

FILENAME:
204027_FIG1_BS_SITE_LOCATION.mxd

SOURCE:
1. SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

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

G:\204027_Sherwin-Williams_Gibbsboro\DATA_MNGT\GIS\Map_Documents\Burn_Site\REPORT FIGURES\204027_FIG1_BS_SITE_LOCATION.mxd



LEGEND

- SITE AREAS
- WATER BODIES
- STREAM CHANNEL

SOURCE:
1.SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY</ACP>
2. NJDEP OPEN WATER AREA OF CAMDEN COUNTY, NEW JERSEY 1986, DEPARTMENT OF ENVIRONMENTAL PROTECTION, 1998.

0 1,000 2,000

SCALE:1 " = 1,000 '

TITLE:
FIGURE 2
SHERWIN-WILLIAMS GIBBSBORO SITE LOCATION MAP

LOCATION:
UNITED STATES AVENUE BURN SITE
GIBBSBORO, CAMDEN COUNTY,
NEW JERSEY

DATE:
01/17/2017

FILENAME:
204027_FIG2_SW_SITE_LOCATION_MAP.mxd

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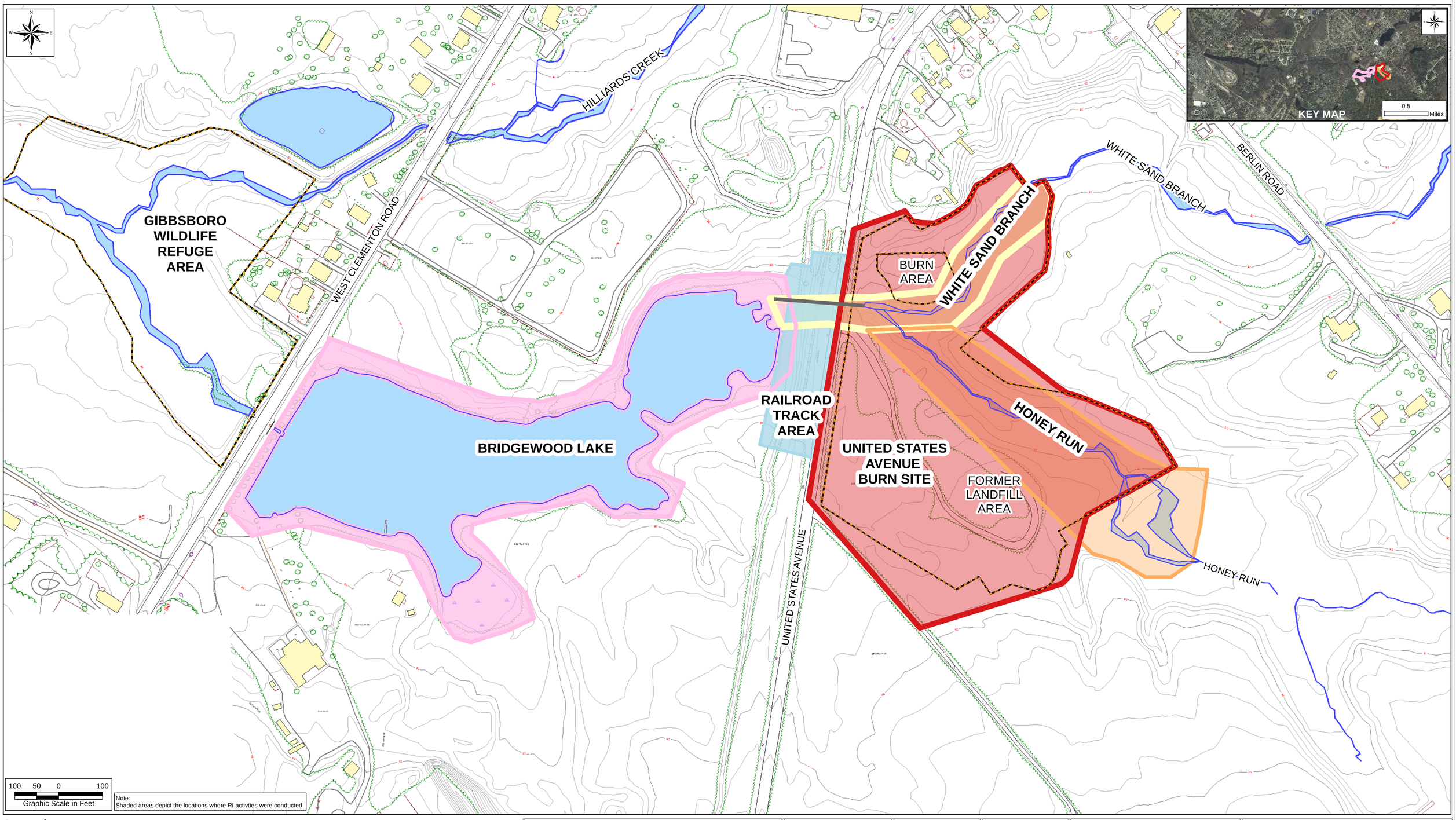

Legend

- Bridgewood Lake
- United States Avenue Burn Site
- Honey Run
- White Sand Branch
- Railroad Track Area
- Approximate Location of Culvert Under United States Avenue
- Fence Boundary
- Perennial Stream Channel

Weston Solutions, Inc.
205 Campus Drive Edison, New Jersey 08837-3939
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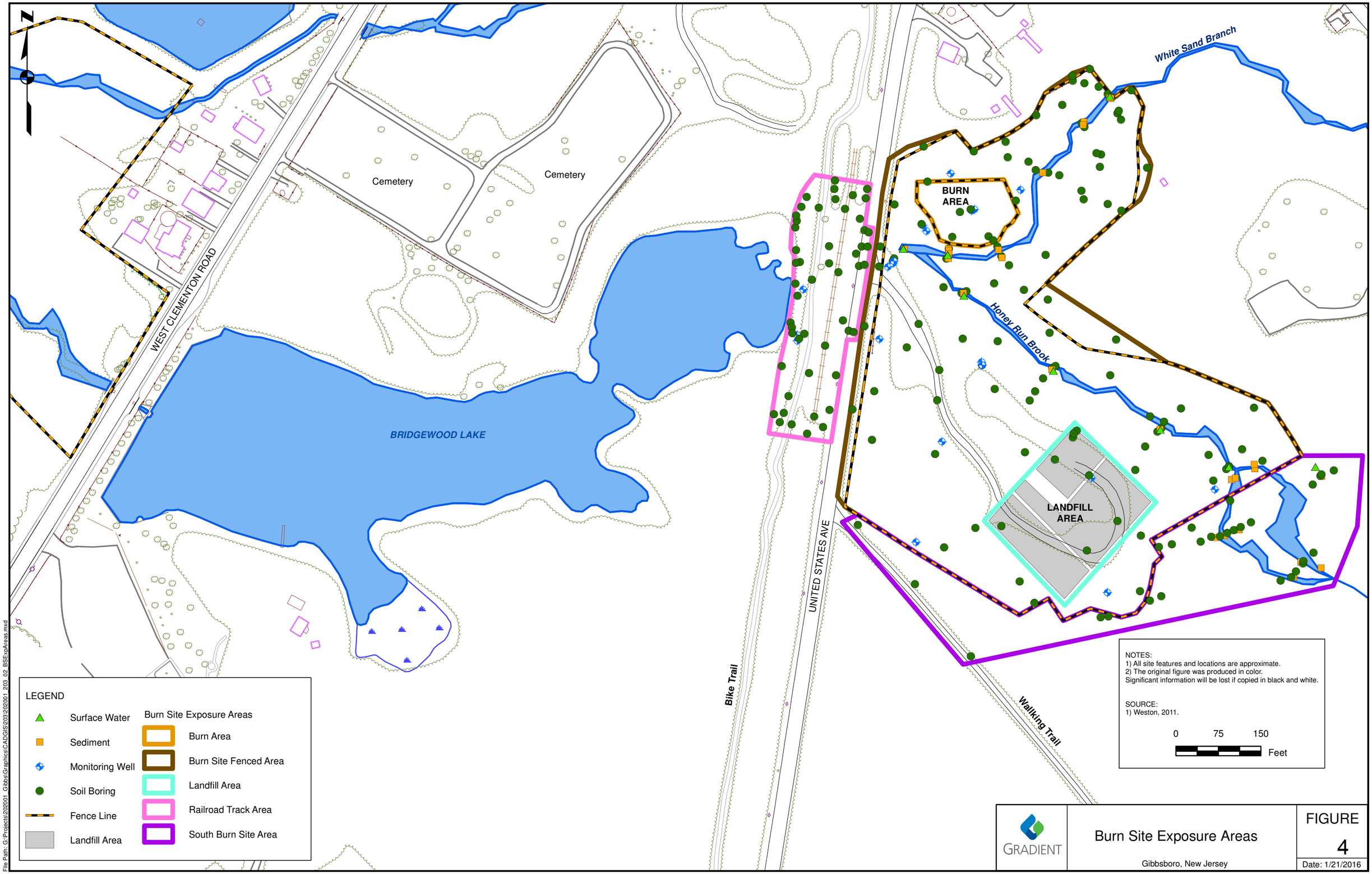
http://www.westonsolutions.com

REPORT DATE: February 2017	PROJECT MANAGER: S. Jones	CLIENT NAME: The Sherwin-Williams Company	DRAWING TITLE: UNITED STATES AVENUE BURN SITE KEY MAP
DRAWING: 19394_BS_Areas_Key_Map.mxd PATH: L:\SHERWIN\GIS\MXD\2017_02_BS_RIR\	CHECKED BY: A. Fischer		
REVISION No. 0	CONTRACT No. DELIVERY ORDER NO.	PROJECT NAME: United States Avenue Burn Site Remedial Investigation Report	
WORK ORDER No. 20076.022.086.0006	DRAWN/MODIFIED BY: P.DiTillio DATE CREATED: 2/3/2017		FIGURE: 3 SCALE: 1 " = 100 ' DATE: 2/28/2017



File Path: G:\Projects\202001_Gibbs\Graphics\CAD\GIS\203\202001_203_02_BSExpAreas.mxd

GRADIENT

Burn Site Exposure Areas

Gibbsboro, New Jersey

FIGURE 4

Date: 1/21/2016

WEST CLEMENTON ROAD

BRIDGEWOOD LAKE

WHITE SAND BRANCH

BURN AREA

HONEY RUN

UNITED STATES AVENUE

LANDFILL AREA

LEGEND

- PUBLIC ACCESS AREA
- RIPARIAN BUFFER (50 FEET)
- FENCE BOUNDARY
- AREAS TO BE CAPPED TO ADDRESS RDCSRS
- APPROXIMATE LOCATION OF CULVERT BENEATH U.S. AVENUE

REMOVAL AREAS

- 2 FT EXCAVATION DEPTH
- 4 FT EXCAVATION DEPTH
- 6 FT EXCAVATION DEPTH
- 8 FT EXCAVATION DEPTH
- 10 FT EXCAVATION DEPTH
- 12 FT EXCAVATION DEPTH

NOTES:
1.IN THE ECOLOGICAL HABITAT AREAS ALONG WHITE SAND BRANCH, HONEY RUN AND BRIDGEWOOD LAKE SURFICIAL SOIL (TOP 1 FOOT) EXCEEDING THE SOIL PRGS WOULD BE REMOVED. SUBSURFACE SOIL (DEEPER THAN 1 FOOT) EXCEEDING THE RDCSRS IN THESE AREAS WOULD ALSO BE REMOVED.
2.WEST OF U.S. AVENUE, SOIL OUTSIDE OF THE ECOLOGICAL HABITAT AREAS THAT EXCEEDS THE RDCSRS WOULD BE REMOVED.
3.ON THE BURN SITE SOIL OUTSIDE OF THE ECOLOGICAL HABITAT AREAS THAT EXCEEDS THE RDCSRS WOULD BE REMOVED TO THE DEPTH OF 6 FEET. LIMITED AREAS OF SATURATED SOIL THAT REPRESENT SOURCES OF GROUNDWATER CONTAMINATION FROM 6 TO 12 FEET WOULD BE REMOVED. SOIL AREAS WITH CONCENTRATIONS REMAINING IN PLACE EXCEEDING THE RDCSRS WILL BE CAPPED.

SOURCE:
1.BASEMAP, WESTON SOLUTIONS, 2016

0 100 200

SCALE: 1 " = 100 '

TITLE: FIGURE 5

SOIL ALTERNATIVE 4 – SOIL REMOVAL FOR HUMAN HEALTH AND ECOLOGICAL PROTECTION, GROUNDWATER SOURCE CONTROL, CAPPING AND INSTITUTIONAL CONTROLS

LOCATION:

UNITED STATES AVENUE BURN SITE
GIBBSBORO, CAMDEN COUNTY
NEW JERSEY

DATE: 06/28/2017

FILENAME: 204027_FIG23_BS_SOIL_ALTERNATE_4_REV2.mxd

THE ELM GROUP
345 WALL STREET, PRINCETON, NEW JERSEY 08540
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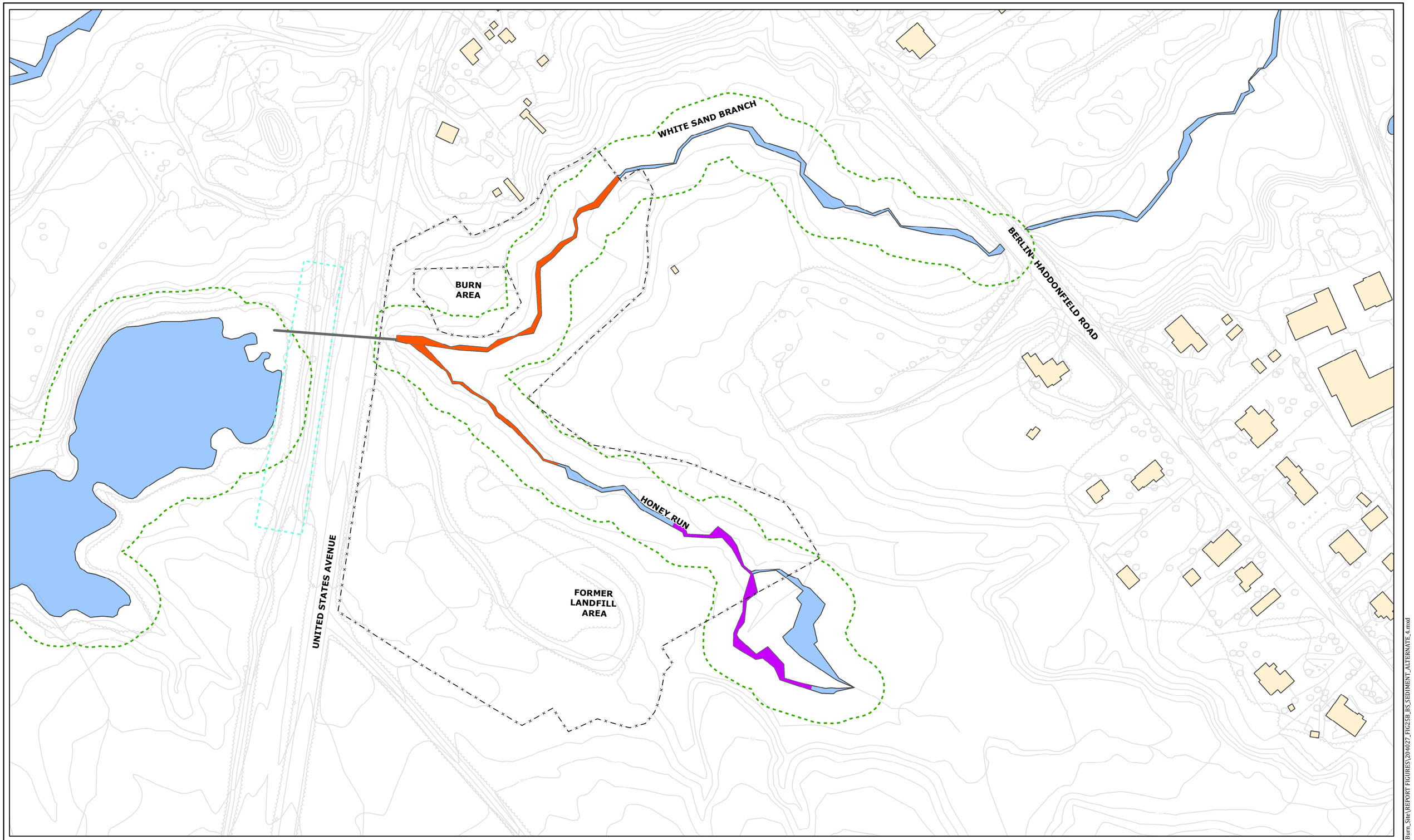

LEGEND

- PUBLIC ACCESS AREA
- RIPARIAN BUFFER (50 FEET, APPROXIMATE)
- FENCE BOUNDARY
- 2 FT EXCAVATION DEPTH
- 2.5 FT EXCAVATION DEPTH
- APPROXIMATE LOCATION OF CULVERT BENEATH U.S. AVENUE

SOURCE:
1.BASEMAP, WESTON SOLUTIONS, 2016

0 100 200

SCALE: 1 " = 100 '

TITLE:
FIGURE 6
SEDIMENT ALTERNATIVE 4 - REMOVAL OF ALL SEDIMENT
WITH CONTAMINANTS GREATER THAN PRGS

LOCATION:
UNITED STATES AVENUE BURN SITE
GIBBSBORO, CAMDEN COUNTY
NEW JERSEY

DATE:
01/18/2017

FILENAME:
204027_FIG25B_BS_SEDIMENT_ALTERNATE_4.mxd

THE ELM GROUP
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G:\204027_Sherwin-Williams_Gibbsboro\DATA_MNGT\GIS\Map_Documents\Burn_Site\REPORT FIGURES\204027_FIG25B_BS_SEDIMENT_ALTERNATE_4.mxd

Table 1 Summary of Total Cancer Risks and Non-Cancer Hazards by Exposure Area

Exposure Area	Utility Worker		Construction Worker		Outdoor Worker		Adolescent Recreator		Adult Recreator	
	Total Excess Lifetime Cancer Risk	Non-Cancer Hazard	Total Excess Lifetime Cancer Risk	Non-Cancer Hazard	Total Excess Lifetime Cancer Risk	Non-Cancer Hazard	Total Excess Lifetime Cancer Risk	Non-Cancer Hazard	Total Excess Lifetime Cancer Risk	Non-Cancer Hazard
BFA	2E-05	0.1	2E-05	**3**	6E-05	0.9				
BFA + HRB							4E-05	0.9	4E-05	0.6
BFA + WSB							5E-05	**1.1**	7E-05	0.8
LF	5E-06	0.1	5E-06	**2**	8E-06	0.3	4E-06	0.3	6E-06	0.2
BA	**6E-04**	**4**	**6E-04**	**102**	**2E-03**	**19**	**1E-03**	**20**	**1E-03**	**13**
SBS	4E-07	0.01	4E-07	0.4	3E-06	0.1	3E-06	0.1	4E-06	0.08
RR	8E-07	0.03	8E-07	0.8	6E-06	**1.2**	5E-06	0.9	4E-06	0.8

Exposure Area	Resident (All Media)			Resident (Soil Only)		
	Total Excess Lifetime Cancer Risk	Non-Cancer Hazard, Child	Non-Cancer Hazard, Adult	Total Excess Lifetime Cancer Risk	Non-Cancer Hazard, Child	Non-Cancer Hazard, Adult
BFA + HRB	**4E-02**	**375**	**309**	**5E-04**	**9**	**3**
BFA + WSB	**4E-02**	**376**	**309**	**5E-04**	**9**	**3**
LF	**3E-02**	**369**	**308**	5E-05	**4**	1
BA	**4E-02**	**616**	**348**	**1E-02**	**251**	**42**
BSSM	**7E-03**	**29**	**4**	**7E-03**	**29**	**4**
SBS	**3E-02**	**367**	**307**	2E-05	**2**	0.2
RR	**3E-02**	**372**	**312**	9E-05	**7**	**5**

Notes:

BOLD – Cancer Risk > 1 x 10^{-4} or Hazard Index > 1.

Blank – Receptor not evaluated in this exposure area.

Table 2 Summary of Lead Risks

Exposure Area	Exposed Media	Receptor	Lead EPC (mg/kg)	Child Lead Risk includes Groundwater Lead EPC[1]		Child Lead Risk includes IEUBK Default Water Conc.[2]	
				GM BLL (µg/dL)	Predicted Probability of BLL > 10 µg/dL (%)	GM BLL (µg/dL)	Predicted Probability of BLL > 10 µg/dL (%)
BFA + HRB	Soil (0-2 ft bgs) + Sediment (0-0.5 ft bgs)	Recreator	888	1.9	0.1%		
BFA + HRB	Soil (0-2 ft bgs) + Sediment (0-0.5 ft bgs)	Adult Resident	888	3.0	1%		
BFA + HRB	Soil (0-0.5 ft bgs) + Sediment (0-0.5 ft bgs)	Child Resident	573	21	**94%**	5.9	**13%**
BFA + WSB	Soil (0-2 ft bgs) + Sediment (0-0.5 ft bgs)	Recreator	1,449	2.4	0.5%		
BFA + WSB	Soil (0-2 ft bgs) + Sediment (0-0.5 ft bgs)	Adult Resident	1,129	3.6	3%		
BFA + WSB	Soil (0-0.5 ft bgs) + Sediment (0-0.5 ft bgs)	Child Resident	814	22	**95%**	7.7	**28%**
BFA	Soil (0-10 ft bgs)	Utility Worker	2,153	1.3	0.01%		
BFA	Soil (0-10 ft bgs)	Construction Worker	2,153	8.1	**29%**		
BFA	Soil (0-2 ft bgs)	Outdoor Worker	888	2.3	0.4%		
LF	Soil (0-2 ft bgs)	Recreator	653	1.6	0.06%		
LF	Soil (0-2 ft bgs)	Adult Resident	653	2.5	1%		
LF	Soil (0-0.5 ft bgs)	Child Resident	957	22	**95%**	8.6	**38%**
LF	Soil (0-10 ft bgs)	Utility Worker	4,055	1.5	0.04%		
LF	Soil (0-10 ft bgs)	Construction Worker	4,055	14	**67%**		
LF	Soil (0-2 ft bgs)	Outdoor Worker	653	2.0	0.2%		
BA	Soil (0-2 ft bgs)	Recreator	31,224	32	**96%**		
BA	Soil (0-2 ft bgs)	Adult Resident	31,224	73	**100%**		
BA	Soil (0-0.5 ft bgs)	Child Resident	55,600	Note 3	**100%**	Note 3	**100%**
BA	Soil (0-10 ft bgs)	Utility Worker	22,020	3.9	4%		
BA	Soil (0-10 ft bgs)	Construction Worker	22,020	73	**100%**		
BA	Soil (0-2 ft bgs)	Outdoor Worker	31,224	47	**99%**		
BSSM	Suspect Material	Adult Resident	783	2.8	1%		
BSSM	Suspect Material	Child Resident	783	21	**95%**	7.4	**26%**
RR	Soil (0-2 ft bgs)	Recreator	2,015	3.0	1%		
RR	Soil (0-2 ft bgs)	Adult Resident	2,015	5.6	**12%**		
RR	Soil (0-0.5 ft bgs)	Child Resident	298	19	**92%**	3.6	1%
RR	Soil (0-10 ft bgs)	Utility Worker	1,203	1.2	0.006%		
RR	Soil (0-10 ft bgs)	Construction Worker	1,203	5.0	**8%**		
RR	Soil (0-2 ft bgs)	Outdoor Worker	2,015	4.0	4%		

Notes:

BLL – Blood Lead Level; EPC – Exposure Point Concentration; ft bgs – Feet Below Ground Surface; GM – Geometric Mean; IEUBK – Integrated Exposure Uptake Biokinetic Model.

BOLD – Predicted probability > 5%.

(1) The sitewide groundwater EPC is 320 µg/L.

(2) The default drinking water concentration used by the IEUBK model is 4 µg/L.

(3) The EPC is outside of the range of values for which the IEUBK has been calibrated and validated; thus, the model will not estimate a BLL. Based on other results for other exposure areas, the probability is estimated as 100%.