# PHASE I ENVIRONMENTAL SITE ASSESSMENT

## 34-ACRE VACANT PARCEL
## GIBBSTOWN, NEW JERSEY

Prepared for:
**Delaware River Partners, LLC**

Prepared By:
**Ramboll Environ US Corporation**
**Princeton, New Jersey**

Date
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Project Number
**02-39079A**

RAMBOLL ENVIRON

## SIGNATURE AND ENVIRONMENTAL PROFESSIONAL STATEMENT

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312.

We have the specific qualifications based on education, training, and experience to assess a property of the nature, history and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Sharon E. Burkett
Senior Manager

Scott E. MacDonald
Principal

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## FIGURES



## APPENDICES

# 1. SUMMARY OF CONCLUSIONS

Ramboll Environ US Corporation (Ramboll Environ) was retained by Delaware River Partners, LLC (DRP) to perform a Phase I Environmental Site Assessment (ESA) of an approximately 34-acre vacant parcel (herein after referred to as the "the site", "the property", or "the 34-acre parcel") located between A-Line Road and North Repauno Avenue on the southern end of the former DuPont Repauno manufacturing facility located at 200 North Repauno Avenue[1] in Gibbstown, New Jersey (herein referred to as the "Repauno facility" or "Repauno site"). Ramboll Environ's assessment was conducted in connection with a potential property transaction and site redevelopment activities. The objective of the Phase I ESA, which was conducted in conformance with the scope and limitations of ASTM International's *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* E1527-13 (the "ASTM Standard"), was to identify Recognized Environmental Conditions (RECs), as defined in the ASTM Standard (see Section 2.1).

## 1.1 Site Summary

E. I. du Pont de Nemours and Company (DuPont) formerly owned and operated at the Repauno site– an approximately 1,900-acre former chemical manufacturing facility – located at 200 North Repauno Avenue in Gibbstown, Greenwich Township, Gloucester County, New Jersey. The Repauno facility, which operated from 1880 through 2000, historically manufactured explosives and other chemicals. In 1917, DuPont expanded operations to include the manufacturing of organic compounds. Explosives manufacturing ceased in 1950, at which time the Repauno facility began producing dimethyl terephthalate (DMT) and pyromellitic dianhydride (PMDA) that are primarily used for manufacturing polyester products and high temperature insulating films. DuPont also operated an industrial diamonds refining process at the Repauno facility. Explosives and chemical manufacturing operations were conducted in the northern portion of the Repauno site near the Delaware River. DuPont discontinued all organic manufacturing activities as of 1986 but leased 31 acres of the Repauno site to Repauno Products, which conducted sodium nitrate production operations from 1986 through 2006. In 1999, DuPont sold its industrial diamonds refining operation to Spring AG, which operated as Mypodiamonds. With the exception of Cardox Corp/Air Liquide, which produces dry ice at a leased plant directly north of the property, all other manufacturing operations at the Repauno site were discontinued by December 2006. Chemours Co. FC LLC (Chemours) became the owner of record of the Repauno site in April 2015.

The approximately 34-acre vacant property is located between A-Line Road and North Repauno Avenue in the southern portion of the Repauno site. The Repauno site surrounds the property to the north, east and west, although the manufacturing operations at the Repauno facility primarily took place to the north. Undeveloped wetland areas (currently designated for conservation easements) are present to the east and west. The 34-acre property is vacant, heavily vegetated land, and DuPont reported that this parcel has never been developed for manufacturing or used for any type of storage or disposal. A formerly occupied water treatment building (aka "C-Line Road Treatment Building") and associated infrastructure are present on the property together with several monitoring wells associated with ongoing investigations at the Repauno site.

[1] 200 North Repauno Avenue is the address of the former DuPont Repauno Chemical Company facility that includes the subject 34-acre property. The 34-acre parcel comprises part of the southernmost portion of the former Repauno site.

## 1.2 Recognized Environmental Conditions

Ramboll Environ performed a Phase I ESA of the approximately 34-acre property located between A-Line Road and North Repauno Avenue in the southern portion of the Repauno site located at 200 North Repauno Avenue in Gibbstown, New Jersey in conformance with the scope and limitations of the ASTM Standard. Any exceptions to, or deletions from, this practice are described in Section 6.2 of this report. This assessment has revealed the following REC in connection with the property:

- **Groundwater Contamination Originating from Off-Site Sources.** There is known groundwater contamination by volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) at the Repauno site associated with former DuPont manufacturing activities. An initial groundwater investigation conducted at the Repauno site in 1984 identified various organic constituents, including benzene, nitrobenzene, chlorobenzene and tetrachloroethene (PCE) in confined groundwater underlying the Repauno site. DuPont installed an interceptor well system (IWS) in 1985 as part of an interim remedial measure (IRM) to protect water quality in the Repauno site production wells[2] and in the nearby Greenwich Township City Well #5, located approximately 1,500 feet downgradient (south) of the site. These wells all draw water from the Lower Aquifer of the Magothy-Raritan-Potomac aquifer system. The interceptor well U11I01L (IW 46), which maintains hydraulic control of groundwater by inducing an inward hydraulic gradient, was designed to contain the dissolved-phase contaminant plume from migrating off the Repauno site. Groundwater extraction continues to date at rates of 200 to 300 gallons per minute (gpm). Extracted groundwater is treated using granular activated carbon (GAC) filters and discharged to the Delaware River via a ditch system and a NJPDES permitted outfall. Annual monitoring is conducted to monitor the effectiveness of the interceptor well at containing groundwater contamination and to verify that the constituents associated with the former industrial operations in the northern portion of the Repauno site do not migrate beyond the site boundary. Monitoring data indicate that the IWS is containing the plume and that organic constituents do not significantly affect other aquifers located beneath the southern portion of the Repauno site.

  Numerous wells are located throughout the Repauno site, including 38 wells screened either within the Lower-Middle Aquifer unit or the Lower Aquifer unit, which are monitored for either groundwater quality or water level measurements as part of the NJDEP-approved annual monitoring program. Of the 38 wells included in the monitoring program, 8 are located on the 34-acre parcel, 5 of which are used for water level measurements and one is also sampled for groundwater quality[3]. Historically (during the 1980s and early 1990s), groundwater samples were also collected from other wells on the 34-acre parcel, and VOCs were detected at levels above the New Jersey Ground Water Quality Standards (GWQS)[4]. Since the 1990s, organic constituents

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[2] PW-6 is located east of the subject Property, across North Repauno Avenue, and PW-3 is located southwest of the Property, beyond A-Line Road and the rail line.

[3] S09M01M2 (former MW-9), T10O01M2 (former OBS-5), Q09M01L (former MW-40), Q09M02L (former MW-41) and T08M01L (former MW-37).

[4] In 1985, PCE was detected at concentrations of up to 37 ug/L in Lower Middle Aquifer well T08M02M2 (MW-38) located in the eastern portion of the property, above the GWQS of 1 ug/L; in 1992, acrylonitrile was detected at 100 ug/L, above the GWQS of 2 ug/L; and in 1993, benzene (4.4 ug/L) and vinyl chloride (10 ug/L) were detected above their respective GWQS of 1 ug/L. In 1985, PCE was also detected in the samples from wells Q09M01L (MW-40) and Q09M02L (MW-41) located in the western portion of the property at concentrations up to 7.67 ug/L. Based on the most recent data available, (2012 [MW-40]-2015 [MW-41]), no VOCs were detected above the GWQS in these wells.

have only sporadically been detected in the wells located on the 34-acre parcel. In 2012, Lower-Middle Aquifer well Q09M02L (MW-41) located on the west side of the parcel was sampled, and PCE was detected at an estimated concentration (3 J ug/L), above its GWQS of 1 ug/L. No other VOCs have been detected at levels exceeding the GWQS in wells located on the 34-acre parcel during recent monitoring events[5].

The Repauno site has been subject to investigation, monitoring and remediation since the discovery of groundwater contamination in 1984. DuPont entered into an Administrative Consent Order (ACO) with the New Jersey Department of Environmental Protection (NJDEP) in December 1989, and has since conducted numerous phases of investigation under the oversight of the NJDEP. The investigations identified 12 Solid Waste Management Units (SWMUs) and 11 AOCs, including facility-wide groundwater impacts. In June 2006, the NJDEP approved a request for No Further Action (NFA) for non-manufacturing areas of the former Repauno site, including the 34-acre parcel. The data set indicates that groundwater and soil contamination associated with each of the SWMUs/AOCs is contained within the Repauno site boundaries and does not materially extend onto the 34-acre parcel. Chemours continues to monitor and recover contaminated groundwater as outlined in the ACO, including operation of the IWS for control of groundwater migration. Investigation of the Repauno site in accordance with the ACO is continuing under the direction of a licensed site remediation professional (LSRP) but with ongoing NJDEP oversight, including regulatory approval rights, with the ultimate goal of achieving a remedial action outcome (RAO) for the Repauno site. Chemours retains responsibility for cleanup of the SWMUs and AOCs, including groundwater.

## 1.3 Other Findings

Although not considered RECs based on currently available information, Ramboll Environ identified the following other findings. The term "other finding" is not defined by ASTM; rather, Ramboll Environ uses the term to connote areas of contingent risk that are not clearly defined by the ASTM Standard.

- **Asphalt-Paved Areas.** According to facility personnel and available documentation, the 34-acre parcel has never been used for industrial purposes. However, during the site visit, Ramboll Environ observed a large asphalt-paved area in the western, central portion of the property, the former purpose of which is unknown. The pavement was old and degraded, and small trees and other vegetation were growing through the asphalt. Aerial photographs show this area as cleared by at least 1953; pavement is visible beginning in 1970. Facility personnel indicated no knowledge regarding the use of this area and reason for the noted pavement. In addition, a two-lane, asphalt-paved road runs from A-Line Road east toward North Repauno Avenue. The road is visible on aerial photographs and topographic maps from the late 1930s through the early 1990s, and appears to lead toward storage bunkers previously located adjacent to the north of the 34-acre parcel in the area of the current Cardox/Air Liquide dry ice plant. At the time of Ramboll Environ's visit, the road was blocked at its intersection with A-Line Road and obscured with leaf litter and vegetation. Facility personnel[6] had no information regarding the purpose of this former road and its use remains unclear. Ramboll Environ requested information from Chemours. Chemours responded that the road appears to have been constructed to connect A-Line and C-Line roads. Chemours also indicated that no information has been identified

[5] However, it should be noted that Chemours has reported vinyl chloride concentrations as < 2 ug/L; as the GWQS is 1 ug/L, it is not clear if there could be vinyl chloride concentrations currently exceeding the GWQS.

[6] See Section 2.2.

regarding the asphalt paved area; all historical operations identified in this area were reportedly conducted on the Cardox area and east of the Cardox area north of the subject 34-acre parcel.

- **Mounds of Soil in Northern Portion of Property.** Several small mounds of soil are present in the northern portion of the site within about 50 to 100 feet south of the fence line between the site and the Cardox/Air Liquide dry ice plant. The mounds, which are about four feet high and heavily overgrown with vegetation, are generally positioned in a linear configuration across the northern portion of the parcel. Facility personnel had no information regarding the origin of the soil mounds or whether any soil sampling had been conducted. Ramboll Environ requested information from Chemours regarding the origin of the mounds and any associated analytical data. Chemours responded that the origin of the mounds is unknown and Chemours is not aware as to whether any testing has been conducted.
- **Listing of Adjacent Repauno Site on Environmental Databases with Open Status.** The adjacent Repauno site is listed on the New Jersey Spills and NJ Releases databases with more than 25 open spills or releases (other than releases to air) reported between 1987 and 2012. These incidents included releases of the following: up to 1,000 pounds of sulfuric acid; five gallons of sulfuric acid/oleum; 30 gallons oleum; 80 pounds sodium nitrite; five gallons of sodium nitrate; 20 gallons of sodium hydroxide; 10 gallons hydrogen peroxide; one gallon of fuel oil; 10 to 35 pounds of ammonia; 300 pounds of bulfuric/nitric acid; 1 gallon of caustic soda; 2 gallons of nitric acid/sulfuric acid; 100 gallons of hydraulic oil; up to 200 pounds of nitric acid; and 11 releases of unknown materials/amounts. The Repauno site is also listed for illegal dumping activities, although specific information of such activities was not provided. According to the database listings, none of the above spills or releases have been granted closure. However, according to the September 2015 PA/SI report and facility personnel, none of the reported spills or releases occurred on or near the subject 34-acre parcel.

A discussion of historical RECs and *de minimis* conditions identified during this review (if any) is presented in Section 6.0 of this report.

## 1.4 Non-scope Considerations

Ramboll Environ identified the following findings that relate to non-scope considerations (as discussed in Section 2.2), as detailed below:

- **Asbestos-Containing Materials (ACMs).** The water treatment building on the 34-acre parcel was constructed during the 1930s, before asbestos was phased out of use in many building material applications during the 1980s. Facility personnel indicated that a formal asbestos survey had been conducted and no ACMs were identified; however, no report was available for review. Ramboll Environ conducted visual observations of the interior and exterior of the treatment building and did not note presumed asbestos-containing material (PACM) (e.g., vinyl floor tile, thermal system insulation, spray-on wall texture); however, other materials that may contain asbestos (e.g., ceiling tiles, roofing materials) were present. The suspect ACM that were observed by Ramboll Environ did not appear to be extensively damaged, broken or deteriorated. Ramboll Environ requested information from Chemours regarding testing of building materials for asbestos. Chemours responded that it was unknown whether there had been any testing for hazardous building materials.

- **Lead-Based Paint.** Lead was a major ingredient in paint pigment prior to and through the 1940s. While other pigments were used in the 1950s, the use of lead in paint continued until the early 1970s. In 1978, the Consumer Products Safety Commission banned paint and other surface coating materials that are "lead-containing paint." Based on the construction date of the water treatment building during the 1930s, it is likely that lead-based paint was used historically on the structure. Facility personnel were not aware of the presence of any lead-based paint. Ramboll Environ observed the paint to be peeling and in generally poor condition, particularly on interior surfaces. Ramboll Environ requested information from Chemours regarding any testing of building materials for lead-based paint. Chemours responded that it was unknown whether there had been any testing for hazardous building materials.

# 2. INTRODUCTION

## 2.1 Purpose

Ramboll Environ was retained by DRP to conduct a Phase I ESA of a 34-acre vacant parcel located in the southern portion of 200 North Repauno Avenue in Gibbstown, New Jersey. Ramboll Environ's assessment was conducted in connection with a potential property transaction and site redevelopment activities. The purpose of the assessment was to identify RECs, which are defined in the ASTM Standard as:

> "The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. *De minimis* conditions are not recognized environmental conditions."

## 2.2 Scope of the Assessment

Ramboll Environ completed the following tasks, consistent with the ASTM Standard, during its Phase I ESA of the 34-acre parcel:

- A visit to the site by Sharon Burkett and Owen Zalme of Ramboll Environ on November 4, 2015 to observe the exterior and interior features of the site and to identify the uses and conditions specified in the ASTM Standard. In addition, Ramboll Environ observed the adjoining properties from the site or adjacent public thoroughfares. Photographs taken during the site visit are presented in Appendix A. Owen Zalme conducted a second visit to the site on May 2, 2016. The visit confirmed no significant changes to site conditions since the date of the prior visit.
- An interview during the site visit with Bob Soplop, Contract Coordinator for DuPont, who has worked at the Repauno site since 2001. The aforementioned individual is referred to herein as "facility personnel". The facility personnel interviewed by Ramboll Environ were identified by DuPont as having good knowledge of the uses and physical characteristics of the 34-acre parcel.
- A review of information contained in federal and state environmental databases, as obtained from the sources noted below:
  - A radius report prepared by Environmental Data Resources, Inc. (EDR, see Appendix B), which presents the results of searches of federal and state databases for the subject site, as well as properties near the subject site. The radius searched for each database, as well as the databases themselves, was selected in accordance with the ASTM Standard.
  - The United States Environmental Protection Agency's (USEPA's) Envirofacts database, which provides information contained in multiple USEPA regulatory databases. Because the Envirofacts database is organized by street address, and the 34-acre parcel does not have a unique street address, the address 200 North Repauno Avenue was searched (which includes both the site and the Repauno facility).
  - The USEPA's Enforcement and Compliance History Online (ECHO) database, which provides information on enforcement and compliance history. Because the ECHO database is organized by street address, and the 34-acre parcel does not have a unique street address, the address 200 North Repauno Avenue was searched (which includes both the 34-acre parcel and the Repauno site).

- The New Jersey Data Miner website which provides information related to environmental spills, releases and investigations.

- A review of standard historical sources (included as Appendix C) and local agency inquiries, as defined in the ASTM Standard. The following resources were reviewed:
  - Readily available historical sources, including (where available) historical topographic maps and aerial photographs, city directories, and Sanborn Maps, to develop a history of the previous uses of the parcel and surrounding area.
  - A review of publicly-available online information maintained by the Gloucester County Assessor's office in relation to the site.
  - A review of physical setting sources, as defined in the ASTM Standard, including:
  - The current United States Geological Survey (USGS) 7.5-minute topographic map that shows the area on which the parcel is located.
  - Geologic, hydrogeologic, or hydrologic sources as provided in the EDR radius report and in previous environmental reports for the site[7], as listed below.

- A review of documents provided to Ramboll Environ by DuPont related to investigations conducted at the Repauno site, including preliminary assessments and site investigation, remediation and monitoring data and reports and correspondence with regulatory agencies submitted on behalf of DuPont, as well as historical maps and photographs, and chemical use information.
  Ramboll Environ was provided with the following previous reports pertaining to the Repauno site:
  - *Revised Phase II Remedial Investigation Report, DuPont Repauno Plant, Gibbstown, New Jersey*, prepared by DuPont Environmental Remediation Services, dated January 29, 1996, revised May 30, 1997 ("the 1996 RIR");
  - *Phase III Remedial Investigation, DuPont Repauno Plant, Gibbstown, New Jersey*, prepared by DuPont Corporate Remediation Group, dated April 2000 (the 2000 Phase II RI report");
  - *Phase IV Remedial Investigation Report, DuPont Repauno Site, Gibbstown, New Jersey*, prepared by DuPont Corporate Remediation Group, an Alliance between DuPont and URS Diamond, dated September 2003 (the "2003 Phase IV RI report");
  - *Remedial Action Summary Report – No Further Action Areas, DuPont Repauno Site, Gibbstown, New Jersey*, prepared by DuPont Corporate Remediation Group, dated June 12, 2006 ("the 2006 Repauno RAR for NFA Areas";
  - *2012 Groundwater Progress Report, DuPont Repauno Site, Gibbstown, New Jersey*, prepared by URS Corporation (URS), dated April 2013 (the "2012 Groundwater Report";
  - *Draft Preliminary Assessment Report (PAR), Chemours Repauno Site, Gibbstown, New Jersey*, prepared by AECOM Environment (AECOM), dated June 2015 (the "2015 PA report");
  - *Preliminary Assessment Report/Site Investigation Work Plan (excluding the Redevelopment Area) Chemours Repauno Site, Gibbstown, New Jersey*, prepared by AECOM, dated September 2015 (the "2015 PA/SI report");

[7] The prior environmental reports relate to the larger Repauno site, which includes the subject 34-acre parcel.

- A review of any information provided by the user of this assessment, including information consistent with Appendix X3 of the ASTM Standard. Pertinent information, if any, is discussed in the appropriate sections of this report

Typically, ASTM suggests that information for a site be obtained from the local tax assessor office and building department as well as the New Jersey Department of Environmental Protection (NJDEP). Information held by these agencies would include records related to the entire former DuPont Repauno facility and would likely be voluminous. As key information from state and local agency records has already been aggregated in prior environmental reports for the Repauno site, an independent review of the files was not conducted. Information from prior reports is incorporated herein, as appropriate.

This assessment was conducted in accordance with the methodology specified in ASTM Standard E1527-13, as agreed upon by Ramboll Environ and DRP in October 2015. The standard ASTM scope was expanded to include a limited review of asbestos-containing materials (ACM) and lead-based paint.

## 2.3 Significant Assumptions

In conducting this review, no significant assumptions were made.

## 2.4 Reliance and General Limitations

This report has been prepared for the exclusive use of DRP and may not be relied upon by any other person or entity without Ramboll Environ's prior express written permission.

Under the ASTM Standard, this report is considered current only for a period of 180 days from the date of the site inspection. The conclusions presented in this report represent Ramboll Environ's best professional judgment based upon the information available and conditions existing as of the date of this report. In performing its assignment, Ramboll Environ must rely upon publicly available information, information provided by the client, and information provided by third parties. Accordingly, the conclusions in this report are valid only to the extent that the information provided to Ramboll Environ was accurate and complete. This review is not intended as legal advice, nor is it an exhaustive review of site conditions or facility compliance. Ramboll Environ makes no representations or warranties, expressed or implied, about the conditions of the site.

Ramboll Environ's scope of work for this assignment did not include collecting samples of any environmental media. As such, this review cannot rule out the existence of latent conditions including contamination not identified and defined by the data and information available for Ramboll Environ's review; however, this report is intended, consistent with normal standards of practice and care, to assist the client in identifying the risks of such latent conditions.

The scope of work for this assessment did not include an asbestos survey or inspection. According to federal OSHA regulations (29 CFR §1910.1001) and the Model Accreditation Plan (MAP; 40 CFR Part 763, Subpart E, Appendix C), the inspection, testing, evaluation, and/or sampling of suspect ACM must be conducted by an accredited inspector; these activities were not performed as part of this environmental review. Comments in this report regarding the condition of building materials at the site, including presumed or suspect ACM, represent only Ramboll Environ's observations at the time of the site visit and are not intended to be consistent with definitions regarding ACM condition in the Asbestos Hazard Emergency Response Act (AHERA) or in other federal or state asbestos regulations or industry standards.

Although a limited assessment of the potential for lead-based paint was conducted, the scope of work for this assessment did not include a formal lead-based-paint survey or inspection that requires testing, evaluation and sampling and laboratory analysis of suspect lead-based paint-coated surfaces by a licensed lead inspector and analytical laboratory. Ramboll Environ's assessment was limited to an evaluation of the likelihood of the presence of lead-based paint in the one building on the parcel based solely on the age of the building (constructed prior to 1978) and visual observations of the condition of painted surfaces in the building, and should not be considered a comprehensive lead paint survey.

Other issues considered outside the scope of the ASTM Standard and this review include radon, lead in drinking water, wetlands, polychlorinated biphenyls (PCBs) in building materials, cultural and historic resources, ecological resources, endangered species, and high voltage power lines.

# 3. SITE DESCRIPTION

## 3.1 Site Setting

The approximately 34-acre parcel is located between A-Line Road and North Repauno Avenue[8] in the southern portion of the approximately 1,900-acre former DuPont chemical manufacturing facility, which is located at 200 North Repauno Avenue in Gibbstown, Greenwich Township, Gloucester County, New Jersey, approximately ten miles southwest of Philadelphia, Pennsylvania (Figure 1). The Repauno facility, which operated from 1880 through 2000, was historically a manufacturing facility primarily for explosives and other chemicals. In 1917, DuPont expanded operations to include the manufacturing of organic compounds. Explosives manufacturing ceased in 1950, at which time the Repauno facility began producing DMT and PMDA that are primarily used for manufacturing polyester products and high temperature insulating films. Explosives and chemical manufacturing operations were conducted in the northern portion of the Repauno facility near the Delaware River. DuPont discontinued all organic manufacturing activities at the Repauno facility as of 1986 but leased 31 acres of the Repauno facility to Repauno Products, which conducted sodium nitrate production operations from 1986 through 2006. In 1999, DuPont sold its industrial diamonds refining operation to Spring AG, which operated as Mypodiamonds. With the exception of Cardox Corp/Air Liquide that produces dry ice at its leased plant directly north of the 34-acre parcel, all other manufacturing operations were discontinued by December 2006.

The subject 34-acre parcel is vacant, heavily vegetated land, and reportedly has never been developed for manufacturing or used for associated storage or disposal purposes. A formerly-occupied water treatment building and associated infrastructure (e.g., an out-of-service sodium hypochlorite/caustic tank) are present on the property together with several monitoring wells associated with ongoing investigations at the Repauno site (Figure 2). The target 34-acre parcel is currently part of one of the Repauno site tax parcels identified as Block 8, Lot 4, and does not currently have a street address separate from the Repauno site. It is Ramboll Environ's understanding that the property may be subdivided from the Repauno site in the near future and leased by DRP. The property is in a zoned manufacturing district ("MD"). Because the assumed intention is to subdivide and develop the 34-acre parcel, the Repauno site is defined in this report as the adjacent property to the north, northeast and west.

The 34-acre parcel is bounded to the east by North Repauno Avenue, the Repauno Daycare Center and residential properties. A-Line Road, a private road owned by DuPont, borders the property on the south and west sides. An Atlantic City Electric substation is located to the southwest. A chain-link fence marks the northern property boundary, separating the 34-acre parcel from the north-adjacent Cardox/Air Liquide dry ice plant and a formerly developed area of the Repauno site. A variable-width utility easement runs along the eastern half of the northern property boundary.

The 34-acre parcel is accessed from North Repauno Avenue at the eastern property boundary and from A-Line Road at the western and southwestern property boundary. From North Repauno Avenue an unpaved road cuts west and southwest across the southern portion of the parcel to A-Line Road. Remnants of other unpaved and asphalt-paved roads traverse the central portion of the property, and an unused, heavily overgrown two-lane, asphalt-paved road runs west to east from A-Line Road to at least the center of the northern portion of the property. This former road is blocked at its intersection with A-Line Road and obscured by leaf litter and fallen trees in the center of the property. The central

[8] North Repauno Avenue is also known as "C-Line Road" within the Repauno site.

portion of the site is an open area with minimal vegetation; Ramboll Environ observed remnants of degraded asphalt pavement and piles of logs, wood chips and other wood debris in this area. Likewise, Ramboll Environ observed highly degraded asphalt pavement covering a wide area in the more sparsely vegetated west-central portion of the property.

Several utility easements bisect the 34-acre parcel, including a 60-foot wide Atlantic City Electric Company easement that runs southwest to northeast across the property to bring electricity to the Repauno facility and two smaller electrical lines that also cross the property. An underground water line crosses the property, allowing water from the Repauno facility's production well (PW-3R) southwest of the site to be delivered to the Repauno facility. Sun Gas Pipeline markers, a control box and valve pits are present in the west-central portion of the parcel, along A-Line Road. A small brick building formerly used as a water treatment building (the "treatment building" or "C-Line Road treatment building") and associated former sodium hypochlorite (caustic) tank are present along North Repauno Avenue on the eastern side of the site. A fenced enclosure, which formerly housed transformers, is located behind the treatment building. A brick wall on the site along North Repauno Avenue holds the Repauno facility sign. Eight monitoring wells associated with the investigation of the Repauno site are present on the property including a cluster of three wells along A-Line Road (MW-40, MW-41, MW-42), a cluster of three wells in the central eastern portion of the property south of the adjacent daycare facility (MW-37, MW-38, MW-39), and two wells in the northeastern portion of the property north of the treatment building (OBS-5 and MW-9). Well locations on the property are shown on Figure 3.

The area north of the treatment building is landscaped with grass and trees. A heavily forested wetland area is present in the northwestern portion of the site. The remainder of the property is vegetated with grass and trees. Several piles of soil are present in the northern portion of the site within about 50 to 100 feet south of the fence line. The piles, which are about four feet high and heavily overgrown with vegetation, are generally positioned in a linear configuration. Ramboll Environ observed a small amount of miscellaneous debris (wood, rail ties, old furniture, and general trash) in the central portion of the site. In addition, Ramboll Environ observed evidence of a recent subsurface investigation (a small pile of hydrated bentonite grout) in this area. A narrow drainage ditch runs east to west through the wooded northern portion of the property and appears to discharge to a drainage ditch along A-Line Road. A metal culvert pipe in this area appears to convey water beneath A-Line Road to wetlands and drainage channels west of the property. With the exception of these drainage ditches, no surface water bodies are present on the parcel.

Table 1 provides an overview of physical setting and utility information for the property.

Table 1: Physical Setting and Utility Information

| Conditions | Source | Description |
|---|---|---|
| **Topography** | | |
| Elevation (above mean sea level) | USGS topographic map (Bridgeport, NJ, 1995); Google Earth | Ranges from approximately 0 feet at the central portion of the western border to 13 feet near the southeastern property corner. |

**Table 1: Physical Setting and Utility Information**

| Conditions | Source | Description |
|---|---|---|
| Topographic Gradient | USGS topographic map; visual observations | Relatively flat on-property, with a gentle downward slope to the west. Regional topography slopes gently downward to the north toward the Delaware River. |
| **Hydrology** | | |
| Surface Water Runoff | Visual observations | Surface water flows by sheet flow according to the property's topography and percolates into the ground surface at unpaved areas. Surface water in the northern wooded portion of the property enters a shallow drainage ditch, which enters a drainage ditch along the northern portion of A-Line Road just south of the Cardox/Air Liquide dry ice plant. A metal culvert pipe in this area appears to convey water beneath A-Line Road to wetlands and drainage channels west of the property. |
| Nearest Surface Water Body to the Property | USGS topographic map; Visual observations | Wiggins Pond is located approximately one tenth mile east of the property. Nehonsey Brook is located approximately one-third mile to the west. Nehonsey Brook flows west, then north, discharging into Sand Ditch which ultimately discharges to the Delaware River located approximately one mile north of the property. |
| Flood Plain | Facility personnel; FEMA* | Facility personnel reported no known occurrences of flooding at the site. The property is located within a 100-year flood zone. |
| Wetlands | NWI*; Visual observations | State-designated wetlands are present in the southwestern portion of the property, and federally-designated wetlands are present in the northern portion of the property. Designated wetland areas surround the parcel to the north, east, west and southwest.<br><br>Approximately 6.7 acres of wetlands were previously delineated on the site. The delineated wetlands were verified by a Letter of Interpretation (LOI) issued on November 28, 2007 by the NJDEP. The LOI established the resource classification of the delineated wetlands, including those within 150 feet of the parcel, as either ordinary or intermediate (DLUR File No.0807-07-0002.1 FWW070001). An extension of the LOI was issued on January 31, 2013, with an expiration date of November 17, 2017 (DLUR No. 0807-07-0002.1-FWW120001). This renewed/reissued LOI also changed the resource value of the off-site wetland, located to the west of A-Line Road, to an exceptional resource value wetland. The corresponding 150-foot wetlands buffer associated with exceptional resource value wetlands extends onto the site. The location of the wetlands in relation to the proposed development for the site is shown on Figure 4.<br><br>Ramboll Environ identified suspected wetlands in the northern portion of the property during the site visit. The property was dry at the time of the site visit with the exception of a low-lying drainage swale along A-Line Road in the northwestern corner of the property that contained water. |

Table 1: Physical Setting and Utility Information

| Conditions | Source | Description |
|---|---|---|
| **Geology and Hydrogeology** | | |
| Presumed Direction of Shallow Groundwater Flow | USGS topographic map; 2000 Phase III RIR; 2003 Phase IV RI Report; and 2012 Groundwater Progress Report | In general, the property is underlain by three aquifers of the Magothy-Raritan Potomaç Aquifer (MRPA) system that are separated by two confining units: the Upper (or water table) Aquifer, the Middle Aquifer, and the Lower Aquifer. The Middle Aquifer is locally subdivided into the Upper-Middle and Lower-Middle Aquifers, which are also separated by a confining unit.<br>Information in the 2000 Phase III RIR and the 2012 Groundwater Progress Report indicates that shallow groundwater in the Upper Aquifer flows from north to south across the site. A groundwater divide is mapped north of the property in the vicinity of B-Line road; groundwater south of the divide flows to the south across the property, and groundwater north of the divide flows north. Groundwater flow in the deeper aquifer zones flows toward the interceptor well located northeast of the property and production well PW-6 located east of the property (screened in both the Lower-Middle Aquifer and Lower Aquifer). |
| Depth to Groundwater | 2012 Groundwater Report | Shallow groundwater was encountered at depths of less than 10 feet below ground surface in the monitoring wells on the property during the 2012 groundwater investigation. |
| On-Property Wells | Facility personnel; Visual observations; June 2015 PA report; 2012 Groundwater Report | Eight monitoring wells are present at the property associated with the investigations conducted at the Repauno site. A cluster of three wells is located in the central western portion of the property near A-Line Road (MW-40, MW-41, MW-42), a cluster of three wells is located in the central eastern portion of the property (MW-37, MW-38, MW-39) and two wells (OBS-5 and MW-9) are located in the northern portion of the east side of the property north of the treatment building. |
| Nearest Groundwater Supply Wells | EDR radius report; facility personnel | Twenty-five federally registered wells are present within one mile of the site; none are registered as public supply wells. One private well which supplies water to the Repauno facility (PW-3R) is located within one eighth mile southwest of the site; water lines cross the property. The Gibbstown municipal well (Well #5) is located between one quarter and one half mile southeast of the property. In addition, the former Repauno facility production well PW-6 (T09P01M1) is located east of the site across North Repauno Avenue, and Repauno site interceptor well IW-46 (U11R01L) is located northeast of the property across North Repauno Avenue, near the Administration Building. The Repauno site interceptor well was designed and installed in 1985 to prevent organic compounds in groundwater from migrating off the Repauno site. Treated groundwater from the interceptor well is discharged via a permitted outfall northwest of the property. |

| Table 1: Physical Setting and Utility Information | | |
|---|---|---|
| **Conditions** | **Source** | **Description** |
| Geologic Conditions | NCSS*; 2003 Phase IV RI report | The site lies within the lowland subprovince of the Atlantic Coastal Plain physiographic province. The area is underlain by bedrock consisting of Paleozoic and Precambrian schist of the Wissahickon Formation. Cretaceous and Cenozoic unconsolidated sediments consisting of sand and gravel, sand, silt and clay overly the Wissahickon Formation. The unconsolidated sediments range from approximately 100 feet thick near the Delaware River to nearly 200 feet thick along the southern property boundary. The sediment also thickens toward the southeast. These units make up the Magothy-Raritan-Potomac Aquifer (MRPA) system, a major water-bearing aquifer system in the area that is used extensively for potable and industrial water supply. Regionally, groundwater in the aquifer system flows from the Delaware River inland due to regional pumping.<br>The shallow soils, classified as "Udorthents", are deep, well drained to excessively drained sands and gravels with high infiltration rates in the central and southern portion of the property. Mannington mucky silt loam is present in the northern portion of the property. Mannington soils are very poorly drained, clayey with a high water table, or are shallow to an impervious layer. |
| **Site Utility Information** | | |
| Heating and Cooling Equipment | Facility personnel; Ramboll Environ observations | N/A; there is no heating or cooling equipment at the site. |
| Electricity Supplier | Facility personnel; Ramboll Environ observations | There is no electrical service provided to the site. Atlantic City Electric power transmission lines traverse the property through designated utility easements. |
| Natural Gas Supplier | Facility personnel; Ramboll Environ observations | N/A; there is no natural gas service at the site. |
| Use of Fuel Oil for Building Heat | Facility personnel; Ramboll Environ observations | No current or former use of fuel oil reported. |
| Water Supplier | Facility personnel; Ramboll Environ observations | No current or former water service on the site; a private well located southwest of the property provides water to the larger Repauno facility, and water lines cross the property. A formerly-occupied water treatment building and caustic AST are located along North Repauno Avenue on the eastern side of the property; the treatment system was taken out of service and the AST cleaned and closed in 2009. |

| Table 1: Physical Setting and Utility Information | | |
|---|---|---|
| **Conditions** | **Source** | **Description** |
| Sanitary Sewer | Facility personnel; Ramboll Environ observations | N/A; there is no sanitary sewer service at the property. |
| Septic Systems | Facility personnel; Ramboll Environ observations; 1925 aerial photograph | No current or former septic systems were reported. However, the property was formerly in agricultural use and at least one structure remained on the property through at least 1925; as such; the possibility that septic systems may have been used at the property cannot be ruled out. Ramboll Environ did not observe evidence of former septic systems during the property visit. |
| Notes:<br>FEMA = Federal Emergency Management Agency; NCSS = National Cooperative Soil Survey ; NWI = National Wetlands Inventory<br>* - Source was provided in the EDR radius report. | | |

## 3.2 Current Use of Property

### 3.2.1 Current Operations

The property is undeveloped heavily vegetated land. No waste, process wastewater or air emissions are generated from the property. Storm water flows by sheet flow according to the property's topography, infiltrates into the ground in unpaved areas or collects in a narrow unpaved drainage swale that appears to convey storm water to the wetland area in the northern portion of the property. A culvert beneath A-Line Road appears to convey storm water to the wetland areas and Nehonsey Brook and Sand Ditch west of A-Line Road and the railroad tracks. There are no storm drains on the property. A small brick building is present on the west side of North Repauno Avenue; the building housed the water treatment system for water from the Repauno facility's production well. The treatment system and adjacent caustic AST were closed and taken out of service in 2009. Eight wells associated with ongoing investigations at the Repauno site are present on the 34-acre parcel.

According to facility personnel and available documentation, there have been no manufacturing, storage or disposal operations conducted at the property.

## 3.3 Current Uses of Adjoining Properties

The site is located in a mixed industrial, commercial and residential land use area. The nearest residential area is located immediately southeast of the property. Based on discussions with facility personnel, Ramboll Environ's visual observations from the property boundary and public rights-of-way, and a limited review of publicly available information, a general determination of the current use of adjacent properties was developed, as described Table 2.

Table 2: Current Use of Adjacent Properties

| Direction | Property/Land Use | Ramboll Environ's Observations |
|---|---|---|
| North | A dry ice manufacturing facility (the "Cardox/Air Liquide dry ice plant") is present directly north of the property, beyond which is the larger former Repauno facility, and the Delaware River. A formerly developed area of the Repauno site is present north of the property and east of the ice plant. | Several large ASTs and rail cars are located on the Cardox/Air Liquide dry ice plant site. Ramboll Environ did not observe indications of leaking or impacts from the ASTs and rail cars on this adjacent site. Ramboll Environ observed a concrete building foundation and staged tankers labeled "waste" on the land east of the ice plant at the time of the site visit. |
| East | Residential properties and a daycare center (Repauno Daycare) are located adjacent to the east, followed by North Repauno Avenue. The Repauno facility Administration Building and additional residences are located further to the East. | No apparent exterior manufacturing or chemical storage observations were observed, except for two ASTs associated with the Repauno site interceptor well treatment system are located east of Repauno Avenue. Residential areas consist of single-family homes. No concerns were noted. The Repauno site interceptor well is located northeast of the property, across North Repauno Avenue. |
| South | A-Line Road, across which are railroad tracks and the city of Gibbstown. | No apparent exterior manufacturing or chemical storage operations were noted. |
| West | A-Line Road, across which are railroad tracks and the Atlantic City Electric substation. | The Atlantic City Electric Substation is present to the southwest; no apparent chemical storage operations were noted. Pipeline markers for Sun Gas Pipeline were observed in the wooded area west of the railroad tracks. |

Notes:

During the site visit, Ramboll Environ walked or drove by the borders of these properties that are shared with the site. Ramboll Environ did not enter the neighboring properties.

# 4. REVIEW OF PUBLIC RECORDS AND OTHER INFORMATION SOURCES

## 4.1 Environmental Regulatory Database Review

Ramboll Environ contracted with EDR in October 2015 to prepare of summary of listings in federal and state agency databases for the site and facilities within applicable radii of the site, as specified by the ASTM standard.[9] A copy of the EDR radius report is presented in Appendix B.

### 4.1.1 Database Review for Site

Ramboll Environ reviewed the results of the state and federal environmental database searches performed by EDR (see Appendix B) and also searched the NJDEP Data Miner database. The property is located in the southern portion of the larger former Repauno site for which there are numerous database listings. Ramboll Environ reviewed the database listings for the Repauno site and verified that none appeared to be associated with the 34-acre parcel. A discussion of the listings associated with the former Repauno site is presented in Section 4.1.2.

### 4.1.2 Database Review for Surrounding Properties

There are several listings in the EDR report for off-property facilities within applicable ASTM search radii, most of which are associated with the Repauno site and other entities historically located within the Repauno site boundaries (e.g., Mypodiamonds, Repauno Products, General Chemical). Several of these listings (i.e., RCRA hazardous waste generators, FINDS, AIRS, USTs, ASTs, compliance listings), by themselves, are not necessarily indicative of a contamination concern and, therefore, are not discussed herein and were not further evaluated for purposes of this assessment. A number of facilities appear on databases indicating potential contamination concerns (i.e., RCRA Corrective Action [CORRACTS], 2020 Corrective [COR] Action, RCRA Treatment, Storage, and Disposal Facility [TSDF], New Jersey [NJ] SPILLS, NJ Release, State Hazardous Waste Site [SHWS], NJ Brownfields, NJ Institutional Control [IC], EPA Watchlist, NJ HIST Hazardous Waste Site [HWS], NJ Industrial Site Recovery Act [ISRA], National Priority List [NPL], CERCLIS, CERCLIS-No Further Remedial Action Planned [NFRAP], Engineering Controls [EC], leaking UST [LUST], Voluntary Cleanup Program [VCP], and Solid Waste Facility [SWF/LF]). Of the sites representing a potential environmental concern, Ramboll Environ has discussed in Table 3 below only 1) facilities that are located adjoining to the property; and 2) facilities that are located potentially upgradient of the property and have not been issued regulatory closure for all listings of concern.

[9] EDR uses the term "radii" to refer to the ASTM terminology "approximate minimum search distance" in the environmental database report.

Table 3: Summary of Pertinent Database Listings for Surrounding Properties

| Listing Name or Address and Location Relative to the Property | Summary of Information Contained in Database | Ramboll Environ's Comments |
|---|---|---|
| **Listings for Adjoining Sites [1]** | | |
| DuPont Repauno Plant (a.k.a. Repauno Plant, Repauno Products, LLC, I E DuPont De Nemours)<br>(Adjoining to the north/northwest) | CERCLIS-NFRAP: The Repauno site was subject to CERCLIS (discovery in June 1981 with a preliminary assessment (PA) conducted in May 1985.) The Repauno site was archived and granted NFRAP status after the PA in May 1985.<br>NJ Brownfields: The Repauno site was assigned to the Brownfields program in May 1999; however, no additional information is listed.<br>NJ SHWS/NJ HIST HWS: No specific information is listed, but the facility is identified with an active status and as having on-site contamination.<br>NJ IC: Issued in January 2002 in association with the presence of the following compounds at the Repauno site: arsenic, benzene, lead, mercury, nitrobenzene, PCE, vinyl chloride, and xylene. The listing does not indicate if the above compounds are present in soil and/or groundwater or what property restrictions are associated with the IC.<br>NJ NJEMS: No specific information pertaining to the NJ NJEMS is listed.<br>CORRACTS/2020 COR ACTION: The Repauno site is undergoing RCRA corrective action. Stabilization measures have been implemented and groundwater is being extracted and treated. The migration of groundwater is listed as being under control.<br>RCRA TSDF: No specific information is provided regarding the Repauno site's TSDF listing.<br>NJ SPILLS: Over 25 spills were reported at the Repauno site between 1987 and 2012, including releases of the following: up to 1,000 pounds of sulfuric acid; five gallons of sulfuric acid/oleum; 30 gallons oleum; 80 pounds sodium nitrite; five gallons of sodium nitrate; 20 gallons of sodium hydroxide; 10 gallons hydrogen peroxide; one gallon of fuel oil; 10 to 35 pounds of ammonia; 300 pounds of bulfuric/nitric acid; 1 gallon of caustic soda; 2 gallons of nitric acid/sulfuric acid; 100 gallons of hydraulic oil; up to 200 pounds of nitric acid; and 11 releases of unknown materials/amounts. According to the database listings, none of these releases have been granted closure.<br>NJ Release: Over 170 incidents were reported at the Repauno site between 1987 and 2012, primarily for releases to air. The listings include releases of up to | Various documents pertaining to the adjacent Repauno site have been reviewed; a discussion is provided in Section 4.4. |

| Table 3: Summary of Pertinent Database Listings for Surrounding Properties | | |
|---|---|---|
| **Listing Name or Address and Location Relative to the Property** | **Summary of Information Contained in Database** | **Ramboll Environ's Comments** |
| | 100 pounds of various gases, including ammonia, anhydrous ammonia, nitrogen oxide, nitric acid, or sulfuric acid. One of the releases is associated with abandoned drums in the Delaware River in 1989; however, no specific information is listed. Another listing documents illegal dumping activities at the Repauno site in 2004; however, no specific information is listed. According to the listings, none of the releases have been granted closure.<br>NJ ISRA: Several occupants of the Repauno site, including Mypodiamond, Inc., Repauno Products, and General Chemical triggered ISRA reporting requirements between 2002 and 2006.<br>EPA WATCH LIST: The property was listed on the EPA Watch List in June, July, and August 2013 in association with violations of the Clean Water Act (CWA). | |
| Mypodiamond, Inc. and General Chemical<br>(Adjoining to the north/northwest) | NJ NJEMS: Mypodiamond, Inc. and General Chemical are listed on the NJEMS database; however, no specific information pertaining to these tenants is provided in the listing. | Various documents pertaining to the adjacent Repauno site that included tenants Mypodiamond and General Chemical have been reviewed and are further discussed in Section 4.4. Because these entities operated on a portion of the Repauno site located approximately one mile from the property near the Delaware River and an interceptor well captures groundwater contamination from the Repauno site, this off-property listing does not appear to represent a significant concern to the subject property. |

| Table 3: Summary of Pertinent Database Listings for Surrounding Properties | | |
|---|---|---|
| **Listing Name or Address and Location Relative to the Property** | **Summary of Information Contained in Database** | **Ramboll Environ's Comments** |
| US Salt Repauno<br>(Adjoining to the north) | NJ SPILLS: A spill of an unknown amount of diesel fuel was reported entering the sewer system in this facility's parking lot in 1990. According to the database listing, the listing has not been granted regulatory closure. | Various documents pertaining to the adjacent Repauno site that included US Salt Repauno have been reviewed. A discussion is included in Section 4.4. Because this entity operated on a portion of the Repauno site located approximately one mile from the subject 34-acre parcel near the Delaware River and an interceptor well captures groundwater contamination from the Repauno site, this off-property listing does not appear to represent a significant concern to the subject property. |
| **Listings for Non-Adjoining Sites [2]** | | |
| The EDR database search report did not identify any potentially upgradient, off-site, non-adjoining properties that are listed with open status on databases indicative of a contamination concern. | | |

Notes:

[1] Ramboll Environ's analysis of adjoining sites was based on observations made during the property reconnaissance (as discussed in Table 2) and location information for off-property listings as presented in the EDR report. The discussion of adjoining and non-adjoining sites does not include (if applicable) listings for certain databases that are (by themselves) not necessarily indicative of a contamination concern (e.g., compliance listings without indication of a release or chemical mishandling, such as RCRA hazardous waste generators or registered storage tanks). Also, for purposes of this analysis, Ramboll Environ considers as "adjoining" properties that are immediately adjacent, even if separated by a road or other physical barrier.

[2] As noted in Table 1, shallow groundwater beneath the Repauno site and the 34-acre parcel generally flows from north to south due to the influence of pumping wells. A groundwater divide is mapped north of the property in the vicinity of B-Line Road; groundwater south of the divide flows to the south across the property and groundwater north of the divide flows north. As such, shallow groundwater from the Repauno site north of the parcel does not appear to be impacting the subject parcel. Groundwater flow in the deeper aquifer zones flows toward the Repauno site interceptor well located northeast of the subject parcel. Within this section, Ramboll Environ did not discuss herein any off-site non-adjoining property that is listed on a database indicative of a contamination concern but for which regulatory closure has been issued, as the issuance of regulatory closure suggests that impacts to the subject property from the noted off-site property are unlikely. Finally, Ramboll Environ did not discuss herein any off-property non-adjoining site that is presumed to be downgradient or crossgradient of the subject property. This analysis was based on the assumption that a hazardous material released to the subsurface generally does not migrate laterally within the unsaturated soil for a significant distance, but a hazardous material can migrate in the groundwater in a generally downgradient direction; however, the direction of groundwater flow may be affected by localized topographic, hydraulic, and hydrogeologic conditions.

The EDR report indicates that poor or inadequate address information was available for several facilities located in the vicinity of the property; therefore, these facilities could not be readily mapped by EDR. Because the location of these facilities with respect to the property could not be evaluated, Ramboll Environ is limited in its ability to express an opinion regarding the potential for impact to the property from these facilities. It was beyond the scope of this review to accurately locate each of the unmapped facilities identified by EDR; however, Ramboll Environ reviewed the list of unmapped facilities and noted that DuPont and E.I. DuPont are listed for two releases. Although no information was provided regarding the unmapped DuPont releases on the Repauno site, the releases likely occurred in the developed northern portion of the Repauno site, and not on the 34-acre parcel. In addition, the Repauno Preschool Daycare Center adjacent to the east of the site is listed on the Facility Index System (FINDS) database; listing on the FINDS database is not indicative of a contamination concern.

## 4.2 Historical Uses of the Site and Adjacent Properties

### 4.2.1 Past Uses of the Site

Based on Ramboll Environ's review of readily available historic information (Table 4) and discussions with facility personnel, the subject 34-acre parcel was historically undeveloped wooded land or in agricultural use through at least the 1880s when it was acquired by DuPont, and has reportedly never been developed for industrial use. In the 1925 aerial photograph, the central and southern portions of the property appear to be farmland with at least one small structure in the central portion of the site and another structure at the southern end of the property along A-Line Road; the northern portion of the property appears to be wooded land. An unpaved road runs through the south-central portion of the site, turning west toward A-Line Road and the railroad tracks located to the west. Other unpaved roads or paths also cut across the site. The 1925 aerial photo also shows North Repauno Avenue to the east and residences present adjacent to the east of the site along North Repauno Avenue. The Repauno facility, with numerous buildings and infrastructure, is visible along the Delaware River with undeveloped land between the subject parcel and the developed portion of the Repauno site. The 1925 aerial photograph also shows an elongated structure in the area north of the property (location of the current ice plant). The 1937 aerial photograph shows the property as undeveloped land. The treatment building along North Repauno Avenue is the only structure visible on the property; however, the southern portion of the property appears disturbed in the 1937 photograph. The 1937 aerial photograph also shows an aviation marker (HI-X)[10] on the ground in the northeastern portion of the site near the entrance to the Repauno facility. A paved road is also visible heading from A-Line Road toward the east across the property, and additional unpaved roads are present throughout the central and southern portions of the property. During the 1970s, a large area in the central-western section of the parcel was cleared, and by the early 1980s, a portion of this cleared area appears to have been paved.

The Repauno facility, which operated from 1880 through 2000, was historically a manufacturing facility for explosives. In 1917, DuPont expanded operations to include the manufacturing of organic compounds. Explosives manufacturing ceased in 1950, at which time the Repauno facility began producing DMT and PMDA that are primarily used for manufacturing polyester products and high temperature insulating films. Explosives and chemical manufacturing operations were conducted in the northern portion of the Repauno site near the Delaware River. DuPont discontinued all organic

[10] The HI-X symbol was an aviation symbol used during the 1930s to warn aviators of the presence of a high explosives facility where landing was prohibited and certain altitudes were required. The 30-foot high letters were required to be painted on the ground in light colored reflective paint.

manufacturing activities at the Repauno facility as of 1986 but leased 31 acres of the Repauno site to Repauno Products that conducted sodium nitrate production operations from 1986 through 2006. In 1999, DuPont sold its industrial diamonds refining operation to Spring AG, which operated as Mypodiamonds. With the exception of Cardox Corp/Air Liquide which produces dry ice at its leased plant directly north of the subject parcel, all other manufacturing operations at the Repauno site were discontinued in December 2006. As of April 2015, Chemours is the owner of record of the Repauno site, including the subject property.

A summary of Ramboll Environ's key observations from the available historical sources is presented in Table 4.

Table 4: Summary of Key Observations from Historical Sources for the Property

| Historical Source | Key Observations Regarding Site History |
|---|---|
| Aerial Photographs and Satellite Imagery [1]<br>1925*, 1931, 1937, 1946*, 1951*, 1953, 1954*, 1958, 1971, 1973, 1975*, 1979*, 1980, 1982, 1990*, 1992, 1993, 1997, 1999, 2002, 2003, 2004, 2005, 2006, 2008, 2010, 2011) | In the 1925 aerial photograph, the central and southern portions of the property appear to be farmland with at least one small structure in the central portion of the site and another structure at the southern end of the site along A-Line Road; the northern portion of the site appears to be wooded land. An unpaved road runs through the south central portion of the property, turning west toward A-Line Road and the railroad tracks, which are present to the west. By 1937, the treatment building is visible on the east side of the parcel together with an aviation marker (HI-X). Additionally, on the 1937 aerial photograph, a paved road is visible heading from A-Line Road toward the east across the property, and the southern portion of the site appears disturbed. The remainder of the parcel appears as undeveloped land covered primarily in low-lying vegetation (southern portion) or dense wooded growth (northern portion). By 1958, unpaved roadways are present throughout the central and southern portions of the property. The 1970s aerial photographs show a large area in the central-western section of the property as cleared, and by the early 1980s, a portion of this cleared area appears to have been paved. Aside from the treatment building along North Repauno Avenue, no structures are shown on the site. |
| Topographic Maps<br>(1898, 1901, 1944, 1953, 1955, 1967, 1986, 1990, 1994, 1995) | With the exception of railroad tracks located along the western property border, the remainder of the parcel is denoted as undeveloped or wooded land on the 1898 and 1901 topographic maps. On the 1944 to 1990 topographic maps, two roadways were noted extending east to west across the northern portion of the property. On the 1994 and 1995 topographic maps, these roadways were no longer evident. |
| City Directory Abstracts<br>(1970, 1975, 1980, 1985, 1992, 1995, 1999, 2003, 2008, 2013) | No separate address is assigned to the 34-acre parcel. However, as discussed below, the site is part of a larger former DuPont facility (the "Repauno site") located to the north. DuPont Co., DuPont Company Repauno Plant, Mypodiamond, Repauno Products, LLC, and/or E.I. DuPont De Nemours & Co. are listed at 200 North Repauno Avenue on the 1995 through 2008 city directories. |
| Tax Assessor Website | Tax assessor records available online indicate that Chemours Co FC LLC acquired the Repauno site, including the 34-acre parcel, (a portion of Block 8, Lot 4) from E.I.DuPont De Nemours & Co. on April 9, 2015. The property is zoned MD (Manufacturing District) and described as "Chemical Plant". |

| Table 4: Summary of Key Observations from Historical Sources for the Property | |
|---|---|
| **Historical Source** | **Key Observations Regarding Site History** |

Notes:

[1] In addition to aerial photographs provided by EDR and DuPont, Ramboll Environ viewed historical satellite imagery provided via Google Earth. Printed copies were not obtained, and imagery dates were not independently verified.

*Aerial photograph provided by DuPont.

EDR reported that Sanborn fire insurance map coverage is not available for the site.

### 4.2.2 Past Uses of Adjacent Sites

The properties in the vicinity of the site have primarily been used for residential (east and south) and industrial purposes (north, west and northeast) since as early as the 1880s. Prior to 1880, the surrounding properties were in agricultural use. Notable operations on surrounding sites include the former DuPont Repauno chemical manufacturing facility surrounding the property to the north, northeast and west (manufacturing operations occurred primarily to the north and northeast along the Delaware River; wetland areas were to the west), and explosives bunkers (1930s through early 1960s) and the Cardox/Air Liquide dry ice plant (1965 to present) adjacent to the north of the site.

By the late 1800s/early 1900s, the Sand Ditch and wetland areas were located west of the site and railroad tracks were present to the south. The site and area to the north consisted of forested land. By 1925, A-Line Road was present west of the site. By 1931, residential structures were developed east and south of the site, along with the current day care building present to the east (former DuPont administrative building); the remaining areas surrounding the site are part of the former Repauno site and appeared to be covered in a combination of low-lying vegetation and dense wooded growth at this time. By the late 1930s, a building was present on the Repauno site north of the subject parcel in the area of the current ice plant, and structures of unknown use were present to the northeast. The 1937 aerial photograph shows aviation markers (HI-X), warning aviators of the presence of a high explosives facility, on the ground surrounding the former Repauno site; one marker was present in the northeastern portion of the parcel near the entrance to the Repauno facility. By 1946, four rectangular buildings (explosives bunkers) had been constructed north of the property in a line, east to west, in the area of the current dry ice plant; one building, perpendicular to the others, was present and east of the other buildings. By the early 1950s, the current administration building was relocated across North Repauno Avenue east of the site and the former administration building later became a child daycare center. The former explosives bunkers north of the property were removed and the original portion of the adjacent dry ice plant was developed north of the property by the mid-1960s. In addition, the electrical substation located to the southwest was developed during this time.

## 4.3 Review of Local and State Agency Information

Typically, ASTM suggests that information for the site be obtained from the local tax assessor office and building department as well as the New Jersey Department of Environmental Protection (NJDEP). Information held by these agencies would include records related to the entire former DuPont Repauno site and would likely be voluminous. As key information from state and local agency records has already been aggregated in prior environmental reports for the Repauno site, an independent review of the files was not conducted; information from these sources that pertains to the 34-acre parcel is incorporated into the body of this report. Ramboll Environ reviewed online records pertaining to the

site from the Gloucester County Tax Assessor and Zoning Department. An overview of the findings of this review is presented in Table 5.

**Table 5: Local Agency Information for the Site**

| Agency Contacted / Document Reviewed | Information Obtained |
|---|---|
| Gloucester County Tax Assessor | Tax assessor records available online indicate that Chemours Co FC LLC acquired the Repauno site, including the 34-acre parcel (a portion of Block 8, Lot 4) from E.I.DuPont De Nemours & Co on April 9, 2015. |
| Gloucester County Zoning Records | Based on a review of the Gloucester County Tax Assessor Online website, the site is zoned "MD" (Manufacturing District), as is the Repauno site to the north, northeast and west. |

## 4.4 Previous Environmental Assessments and Activities

Based on a review of historical documents and interviews with facility personnel, no prior Phase I environmental assessments, UST closures, or remediation activities are known to have been conducted at the 34-acre parcel. However, numerous prior site evaluations, sampling, and/or remediation activities have been conducted at the Repauno site in response to known releases, contamination and historical waste disposal practices, and some sampling has been conducted on the subject property as part of these efforts. Pertinent historical and site-related information contained in the prior reports has been incorporated into other sections of this report where relevant. The Repauno site is subject to an ACO, and is also being addressed pursuant to RCRA regulations given the presence of various SWMUs. Although the Repauno site has been subject to direct NJDEP oversight given the ACO and regulatory framework, more recently the New Jersey Site Remediation Reform Act (SRRA) required that DuPont retain an LSRP to certify remedial activities at the site. Although due to the requirements of the RCRA program the NJDEP has retained its traditional review and approval role even with the parallel LSRP component of the project, and will ultimately issue no further action approvals for remedial actions completed at the property, the LSRP will also have to issue Response Action Outcomes. This parallel structure also applies to the ISRA case that was triggered at the property due to a contract of sale executed by DuPont and a prospective purchaser.

- **Summary of Remedial Activities at the Repauno Site.** DuPont entered into an Administrative Consent Order (ACO) with the NJDEP on December 11, 1989. The ACO identified 12 solid waste management units (SWMUs) and 11 areas of concern (AOCs) at the Repauno site (Figure 5). The SWMUs included former operating and disposal areas on the Repauno site, including the closed industrial landfill, tar pits, explosives manufacturing area, nitrobenzene production area (NBA), DMT/PMDA area, iron oxide pile, the plant area drainage ditch system, and Repauno Facility-wide groundwater. A complete listing of SWMUs and AOCs is included in Appendix D.

  As part of the ACO, Phase I and Phase II Remedial Investigations (RI) were conducted at the Repauno site in 1992 and 1995, respectively. The Phase I RI included sampling of all SWMUs and AOCs identified in the AOC, and the results were submitted to the NJDEP. The Phase II RI focused on high priority SWMUs and AOCs identified during the Phase I RI where potential exposure of site-related constituents to off-site receptors could occur through groundwater migration. A Baseline Ecological Evaluation (BEE) was also conducted, and the results of the Phase II RI and BEE were submitted to the NJDEP in the Phase II RI report. A Phase III RI conducted in 1999

focused on investigating the main source areas throughout the Repauno site, and the results were submitted to NJDEP in the 2000 Phase III RI report. The Phase IV RI focused on completing Repauno site-wide investigations and conducting an ecological investigation. The Phase IV RI report was submitted to NJDEP in May 2002, and a revised report and the ecological investigation report were submitted in September 2003.

In 2005, the NJDEP determined that the RI phase was complete and requested a remedial action selection report (RASR) for the Repauno site. NJDEP also approved a remedial action report for the closure of the Repauno site's sanitary landfill. A Remedial Action Selection Report (RASR) prioritized remedial actions and recommended appropriate remedial actions for the AOCs and SWMUs identified in the ACO, and was submitted to NJDEP and approved in 2006. During 2006 and 2007, NJDEP approved the Remedial Action Work Plan for the Redevelopment Area and the AOC D (former nitrobenzene production area) RASR Addendum. The NJDEP also approved the 2006 Remedial Action Summary Report, which determined that No Further Action (NFA) was warranted for several of the SWMUs and AOCs, as well as the White Sluice Conservation Easement west of the subject property and the Wiggin's Pond Conservation Easement east of the property. In addition, the 2006 Remedial Action Summary Report documented that No Further Action was warranted for areas where no prior manufacturing, associated storage or disposal have occurred, including the target 34-acre parcel.

Since 2006, remedial activities have been and are continuing to be performed at the Repauno site pursuant to approved work plans. On August 7, 2015, Chemours submitted a PAR /SI Work Plan to NJDEP which addressed only the Redevelopment Area (RDA) portion of the Repauno site along the Delaware River north of the subject parcel. Chemours also submitted a PA/SI report for the entire Repauno site except the RDA in September 2015. According to the September 2015 PA/SI report, all SWMUs and AOCs have been investigated, characterized and delineated in accordance with the ACO and under the direction of the LSRP and the NJDEP. Formal NJDEP approval is pending.

- **Groundwater Remediation Activities (1985 – Present).** In 1984, organic constituents, including benzene, nitrobenzene, chlorobenzene, and PCE were detected at concentrations above the GWQS in groundwater collected from a Repauno facility production well (PW-6/T09P01M1) located east of the 34-acre parcel across North Repauno Avenue. Because of the proximity of the well to the City of Gibbstown's municipal well, DuPont installed an interceptor well (IW-46/U11R01L) in 1985 to prevent organic compounds in groundwater in the confined aquifer from migrating off site to the south of the Repauno site. Source areas for the most significant contamination include the former Nitrobenzene Production Area (AOC D), the Former PMDA/DMT Production Area (AOC C), the Sanitary landfill (SWMU 11), Former Testing Ground 3 in the Former Explosives Manufacturing Area (AOC F), the Acid Area (AOC A) and the Iron Oxide Pile Area (SWMU 8). Areas south of these operational areas have also been impacted to some degree over time due to natural groundwater flow. Remediation activities are ongoing throughout the former Repauno site in compliance with an ACO issued by NJDEP in December 1989. The interceptor well has operated continuously since 1985, and an ongoing annual groundwater monitoring program monitors the effectiveness of the interceptor well in containing the groundwater contamination. Monitoring data collected since 1984 indicate that the interceptor well is containing the organic compound plume in the confined aquifer and that organic constituents do not significantly impact other aquifers located under the southern portion of the Repauno site, including the subject property. In fact, organic constituents have only been sporadically detected within the Lower-Middle Aquifer. Groundwater recovered by the interceptor well and production well PW-6 is treated with activated carbon and discharged via piping that traverses the Repauno site north of

the subject property and discharges to the Repauno site ditch system (Sand Ditch) northwest of the subject property, ultimately discharging to the Delaware River via a NJPDES permitted outfall.

Numerous wells are located throughout the Repauno site, including 38 wells screened either within the Lower-Middle Aquifer unit or in the Lower Aquifer unit that are monitored for either groundwater quality or water level measurements as part of the NJDEP-approved annual monitoring program. Of the 38 wells included in the monitoring program, 8 are present on the 34-acre parcel, 5 of which are used for water level measurements and one is also sampled for groundwater quality data[11] (Figure 6). Groundwater contour maps from the August 2013 monitoring event for the Lower Middle Aquifer Zone and the Lower Aquifer Zone show that in general, groundwater from the formerly developed portions of the Repauno site north of the subject property is captured by the IWS and does not extend onto the 34-acre parcel (see Figures 7 and 8). Groundwater beneath the subject property flows from southwest to northeast where it is captured by the IWS.

Ten monitoring wells are sampled annually, including T08M01L (MW-37) located on the 34-acre parcel. Historically (during the 1980s and early 1990s), groundwater samples were also collected from other wells on the property, and VOCs were detected at levels above the GWQS[12]. Figure 9 shows the extent of organic constituents in groundwater in the Lower Aquifer in 1995; the area of the plume includes the northeastern-most portion of the subject property. Since the 1990s, organic constituents have only sporadically been detected in the wells located on the 34-acre parcel. In 2012, Lower-Middle Aquifer well Q09M02L (MW-41) located on the west side of the parcel was sampled, and PCE was detected at an estimated concentration (3 J ug/L), above its GWQS of 1 ug/L (Figure 10). No other VOCs have been detected at levels exceeding the GWQS in wells located on the 34-acre parcel during recent monitoring events[13].

## 4.5 User-Provided Information

Ramboll Environ provided DRP with a User Questionnaire (consistent with Appendix X3 of the ASTM Standard) that requested information relating to environmental liens, AULs, specialized knowledge of the property, property value diminution, chain-of-title, or any other commonly known or obvious indications of property contamination, that was not otherwise provided to Ramboll Environ. The user did not provide any information that was not otherwise obtained and reviewed by Ramboll Environ.

[11] S09M01M2 (former MW-9), T10O01M2 (former OBS-5), Q09M01L (former MW-40), Q09M02L (former MW-41) and T08M01L (former MW-37).

[12] In 1985, PCE was detected at concentrations of up to 37 ug/L in Lower-Middle Aquifer well T08M02M2 (MW-38) located in the eastern portion of the Property, above the GWQS of 1 ug/L; in 1992, acrylonitrile was detected at 100 ug/L, above the GWQS of 2 ug/L; and in 1993, benzene (4.4 ug/L) and vinyl chloride (10 ug/L) were detected above their respective GWQS of 1 ug/L. In 1985, PCE was also detected in the samples from wells Q09M01L (MW-40) and Q09M02L (MW-41) located in the western portion of the Property at concentrations up to 7.67 ug/L. Based on the most recent data available, (2012 [MW-40] -2015 [MW-41]), no VOCs were detected above the GWQS.

[13] However, it should be noted that Chemours has reported vinyl chloride concentrations as < 2 ug/L; as the GWQS is 1 ug/L, it is not clear if there could be vinyl chloride concentrations currently exceeding the GWQS.

# 5. SITE RECONNAISSANCE

## 5.1 Methodology and Limiting Conditions

Ramboll Environ conducted a visit to the property on November 4, 2015. During the site visit, observations of both the interior of the treatment building and exterior portions of the property were made to evaluate if any RECs, as defined in Chapter 2, are present. Ramboll Environ did not observe the roof of the building.

## 5.2 General Site Setting and Observations

Ramboll Environ made observations concerning all of the interior and exterior issues specified in Sections 9.4.2 through 9.4.4 of the ASTM E1527-13 Standard. The presence or absence of each issue of environmental interest or concern is noted in Table 6. Additional information regarding observed and historical items is provided in the sections following the table.

Table 6: Summary of Site Reconnaissance Observations

| Issue | ASTM Section | Observation |
|---|---|---|
| **Interior and Exterior Issues** | | |
| Current use(s) of the site | 9.4.2.1 | See Section 3.2 |
| Past use(s) of the site | 9.4.2.2 | See Section 4.2 |
| Hazardous substances and petroleum products used, treated, stored, disposed of, or generated on the property in connection with identified present or past uses | 9.4.2.3 | Absent |
| Storage tanks:<br>Underground storage tanks (fill ports, vent pipes, manholes)<br>Aboveground storage tanks | 9.4.2.4 | (see Section 5.2.1)<br>Absent<br>**Present** |
| Odors (strong, pungent or noxious) | 9.4.2.5 | Absent |
| Pools of liquid, standing surface water or sumps | 9.4.2.6 | **Present** (see Section 5.2.2) |
| Drums of hazardous substances or petroleum products (five-gallon, 55-gallon or totes) | 9.4.2.7 | Absent |
| Hazardous substance and petroleum product containers (not necessarily in connection with identified uses) | 9.4.2.8 | Absent |
| Unidentified substance containers suspected of containing hazardous substances or petroleum products | 9.4.2.9 | Absent |

| Table 6: Summary of Site Reconnaissance Observations | | |
|---|---|---|
| **Issue** | **ASTM Section** | **Observation** |
| Polychlorinated biphenyls (PCBs)<br>Electrical equipment on-site (e.g., transformers, capacitors)<br>Electrical equipment known or likely to contain PCBs<br>Hydraulic equipment on-site (e.g., elevators, truck dock lifts)<br>Hydraulic equipment known or likely to contain PCBs | 9.4.2.10 | (see Section 5.2.3)<br>**Present**<br>Possible<br>Absent<br>Absent |
| **Interior Issues** | | |
| Heating/cooling systems | 9.4.3.1 | Absent |
| Stains or corrosion on interior floors, walls or ceilings (except for staining from water) | 9.4.3.2 | Absent |
| Floor drains and interior sumps | 9.4.3.3 | Absent |
| **Exterior Issues** | | |
| Pits, ponds or lagoons on site or on adjacent sites | 9.4.4.1 | **Present** (see Section 5.2.4) |
| Stained soil or pavement | 9.4.4.2 | Absent |
| Stressed vegetation (from other than insufficient water) | 9.4.4.3 | Absent |
| On-site solid waste disposal; areas apparently filled or graded by non-natural causes; or mounds or depressions suggesting solid waste disposal | 9.4.4.4 | **Present** (see Section 5.2.5) |
| Wastewater or other liquid (including storm water) or any discharge into a drain, ditch, underground injection system or stream on or adjacent to the property | 9.4.4.5 | **Present** (see Section 3.2.1) |
| Wells (including dry wells, irrigation wells, injection wells, abandoned wells, or other wells) | 9.4.4.6 | **Present** (see Section 5.2.6) |
| Septic systems or cesspools | 9.4.4.7 | Absent |
| **Non-Scope Considerations** | | |
| Asbestos Containing Materials | N/A | **Present** (see Section 5.2.7) |
| Lead-Based Paint | N/A | **Present** (see Section 5.2.8) |

Table 6: Summary of Site Reconnaissance Observations

| Issue | ASTM Section | Observation |
|---|---|---|

Notes:

Observations noted in this table and discussed further below are based on information obtained during the site visit and from a review of the sources summarized in Section 4.

See the ASTM Standard for a detailed description of the issues included in each referenced ASTM section.

Per the ASTM Standard, fluorescent light ballasts likely to contain PCBs do not need to be noted.

N/A – Not applicable

### 5.2.1 Aboveground Storage Tanks

An approximately 20,000-gallon steel AST is located outside the water treatment building along North Repauno Avenue. The tank, which formerly held sodium hypochlorite (caustic) for use in water treatment, was emptied, cleaned and taken out of service in October 2009. The tank is situated on concrete and surrounded by a concrete containment dike. Facility personnel reported that there are no current or former underground transfer lines used to convey the materials from the tank. Facility personnel were not aware of any leaks or spills relating to the AST, and Ramboll Environ did not observe evidence of staining or past releases at the time of the site visit.

### 5.2.2 Pools of Liquid, Standing Surface Water, or Sumps

Shallow standing water was present in a drainage swale located along A-Line Road in the northwestern portion of the property at the time of the site visit. This water, which is present in a low-lying wetland area of the property, was the result of recent precipitation preceding the site visit. Ramboll Environ observed a railroad tie and metal debris in the drainage swale, but visual evaluation of the water surface did not indicate an oil sheen.

### 5.2.3 Polychlorinated Biphenyls (PCBs)

Facility personnel were not aware of on-site equipment that is known to contain polychlorinated biphenyls (PCBs). Six pole-mounted transformers are present on the property. Three units are located on one pole near the water treatment building, one unit is located on a pole near the access gate on A-Line Road, and two units are located on poles in the central portion of the property. The units are not labeled as to their PCB content; however, facility personnel indicated that none of the transformers contain PCBs. The September 2015 PA report proposed further evaluation of two pole-mounted transformers east of A-Line Road for potential PCB impacts to soil. The current status of this investigation is unknown. Ramboll Environ saw no indication of leaks or releases from electrical equipment observed during the property visit.

According to facility personnel, three pad-mounted transformers were previously located on a concrete pad within a fenced enclosure located behind the treatment building along North Repauno Avenue on the eastern side of the property but were replaced with pole-mounted units after operations at the Repauno facility ceased. Facility personnel indicated that no spills or releases of transformer fluid were known to have occurred, and Ramboll Environ observed no staining in this area. Because the installation date of the prior units is unknown and may predate the 1979 federal ban on the manufacture of PCBs, it is possible that the transformer oils may have contained PCBs.
Ramboll Environ requested information from Chemours regarding the PCB content of the former pad-

mounted transformers and the results of any sampling conducted in this area. Chemours provided information on the transformers, including DuPont inspection records. According to the 2015 PA report, all transformer oils contained less than 50 ppm of PCBs (e.g., "non-PCB"), and transformers were maintained by DuPont and inspected at least annually. DuPont correspondence dated 1990 indicates that there had never been a discharge of PCBs to the ground surface. As indicated in Tables 9.13 and 9.15, the transformers are reported to contain less than 50 ppm of PCBs, and no investigation of these features has previously been conducted. Investigation of the transformer areas has been proposed by Chemours' LSRP as part of the ongoing ISRA investigations of the broader Repauno site.

### 5.2.4 Pits, Ponds, and Lagoons

Other than drainage swales, which are located along A-Line Road in the northwestern corner of the property, no natural or man-made surface water bodies were observed on the subject site. A metering pit for the broader Repauno site's water line was previously located north of the water treatment building along North Repauno Avenue. According to facility personnel, the pit was used only for metering drinking water being provided to the Repauno facility and was filled with concrete at the time the treatment system was taken out of service in 2009.

Wiggins Pond is located on the Wiggins Pond Conservation Easement Area adjacent to the east side of the site across North Repauno Avenue, and the Sand Ditch and adjoining marsh areas are located to the west beyond A-Line Road and the rail line.

### 5.2.5 Solid Waste Disposal Areas or Areas Filled by Non-Natural Causes

Several small mounds of soil are present in the northern portion of the site within about 50 to 100 feet south of the fence line between the 34-acre parcel and the adjacent Cardox/Air Liquide dry ice plant. The mounds, which are about four feet high and heavily overgrown with vegetation, are generally positioned in a linear configuration across the northern portion of the site. Facility personnel were not aware of the origin of the soil mounds or whether any sampling had been conducted. Ramboll Environ requested information from Chemours regarding the origin of the mounds and any associated analytical data. At the time of this report, Ramboll Environ was still awaiting a reply. In addition, Ramboll Environ observed several piles of logs, wood chips, and other wood debris in the central portion of the site, concrete footings near the northern fence line, a small pile of rail ties in the northwestern portion of the property, and a small amount of general trash and debris (old furniture, bottles, trash) scattered across the property.

### 5.2.6 Wells

Ramboll Environ observed three monitoring wells on the western side of the property near A-Line Road, three monitoring wells on the central-eastern side of the property, and two wells on the northern portion of the eastern side of the property north of the treatment building. According to facility personnel and available documentation, the wells were installed to monitor the groundwater flow patterns in the shallow Upper Aquifer and deeper aquifers (Middle and Lower Aquifers) and the effectiveness of the interceptor well installed at the Repauno site in 1985 in controlling migration of groundwater contamination from the Repauno site. Certain wells, including MW-37 in the eastern portion of the 34-acre parcel, are monitored annually as part of the Repauno site's ongoing remedial efforts.

### 5.2.7 Asbestos Containing Materials (ACMs)

Although an asbestos inspection and sampling of suspect building materials in conformance with established protocols (as outlined in 40 CFR §763), applicable state or local regulations, or industry standards, were beyond our scope of work, Ramboll Environ made limited visual observations[14] of representative building materials in those areas accessed during the site tour to identify readily apparent PACM and suspect ACM. OSHA's definition of PACM is limited to thermal system insulation (TSI) and surfacing materials present in buildings constructed before 1981. Vinyl floor tiles are not considered PACM, but OSHA nonetheless requires that asphalt and vinyl floor tiles present in buildings constructed before 1981 be treated similarly to PACM. The term suspect ACM is not defined by OSHA but can include numerous building materials manufactured using asbestos currently or in the past (e.g., ceiling tiles, roofing materials, joint compound), as well as TSI, surfacing materials, and flooring materials installed after 1981.

According to facility personnel, an asbestos survey was performed of all buildings at the Repauno facility, including the treatment building on the 34-acre parcel, and no ACM was detected; however, a report documenting the findings of the survey was not available for review. Ramboll Environ requested the asbestos survey from Chemours. Chemours responded that it was unknown whether there had been any testing for hazardous building materials.

The water treatment building was constructed in approximately the 1930s, before asbestos was generally phased out of use in many building material applications during the 1980s. Because the treatment building was constructed prior to 1981 and the asbestos survey results are not available, TSI, surfacing materials and floor tiles must be treated as PACM. During the site visit, Ramboll Environ did not observe any materials that would be considered PACM or other materials potentially considered suspect ACM (i.e., ceiling tile, transite panels). Based on the building age, the roofing materials may be considered suspect ACM. The suspect ACM that were observed by Ramboll Environ did not appear to be extensively damaged, broken or deteriorated.

There are no regulatory requirements to remove PACM/suspect ACM or evaluate whether building materials contain asbestos, unless the materials are damaged and have the potential to release fibers or the materials have the potential to be disturbed during renovation or demolition activities. Ramboll Environ did not observe any obviously damaged building materials.

### 5.2.8 Lead-Based Paint

Lead was a major ingredient in paint pigment prior to and through the 1940s. While other pigments were used in the 1950s, the use of lead in paint continued until the early 1970s. In 1978, the Consumer Products Safety Commission banned paint and other surfacing coating materials that are "lead-containing paint." Based on the construction date of the water treatment building in the 1930s, it is likely that lead-based paint was used historically on the building. Facility personnel were not aware of the presence of any lead-based paint on the treatment building. Ramboll Environ observed the paint in the treatment building to be peeling and in generally poor condition. Ramboll Environ requested information from Chemours regarding any testing of building materials for lead-based paint.

[14] Ramboll Environ did not observe all building materials or formally survey the facility to determine the presence and condition of PACM and suspect ACM. Due to access and safety constraints, Ramboll Environ did not access the roof of the building.

Chemours responded that it was unknown whether there had been any testing for hazardous building materials.

# 6. FINDINGS, OPINION, AND CONCLUSIONS

Ramboll Environ performed a Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527-13 of the 34-acre vacant parcel situated in the southern portion of the Repauno site located at 200 North Repauno Avenue in Gibbstown, New Jersey in November 2015. The objective of the ESA was to identify RECs, as defined in the ASTM Standard. A list of key definitions presented in the ASTM Standard is provided in Chapter 8 at the end of this report. Any exceptions to, or deletions from, this practice are described in Section 6.3.

## 6.1 Findings, Opinions, and Conclusions

### 6.1.1 Recognized Environmental Conditions

Ramboll Environ has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E1527-13 of the 34-acre vacant parcel situated in the southern portion of the Repauno Facility located at 200 North Repauno Avenue in Gibbstown, New Jersey. Any exceptions to, or deletions from, this practice are described in Section 6.3 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the property, except for the following.

- **Groundwater Contamination Originating from Off-Site Sources.** There is known groundwater contamination by VOCs and SVOCs at the Repauno site associated with former DuPont manufacturing activities. An initial groundwater investigation conducted at the Repauno site in 1984 identified various organic constituents, including benzene, nitrobenzene, chlorobenzene and PCE in confined groundwater underlying the Repauno site. DuPont installed an IWS in 1985 as part of an IRM to protect water quality in the Repauno site production wells[15] and in the nearby Greenwich Township City Well #5, located approximately 1,500 feet downgradient (south) of the site. These wells all draw water from the Lower Aquifer of the Magothy-Raritan-Potomac aquifer system. The interceptor well U11I01L (IW 46), which maintains hydraulic control of groundwater by inducing an inward hydraulic gradient, was designed to contain the dissolved-phase contaminant plume from migrating off the Repauno site. Groundwater extraction continues to date at rates of 200 to 300 gpm. Extracted groundwater is treated using GAC filters and discharged to the Delaware River via a ditch system and a NJPDES permitted outfall. Annual monitoring is conducted to monitor the effectiveness of the interceptor well at containing groundwater contamination and to verify that the constituents associated with the former industrial operations in the northern portion of the Repauno site do not migrate beyond the site boundary. Monitoring data indicate that the IWS is containing the plume and that organic constituents do not significantly affect other aquifers located beneath the southern portion of the Repauno site.

  Numerous wells are located throughout the Repauno site, including 38 wells screened either within the Lower-Middle Aquifer unit or the Lower Aquifer unit, which are monitored for either groundwater quality or water level measurements as part of the NJDEP-approved annual monitoring program. Of the 38 wells included in the monitoring program, 8 are located on the 34-acre parcel, 5 of which are used for water level measurements and one is also sampled for

[15] PW-6 is located east of the subject Property, across North Repauno Avenue, and PW-3 is located southwest of the Property, beyond A-Line Road and the rail line.

groundwater quality[16]. Historically (during the 1980s and early 1990s), groundwater samples were also collected from other wells on the 34-acre parcel, and VOCs were detected at levels above the New Jersey GWQS[17]. Since the 1990s, organic constituents have only sporadically been detected in the wells located on the 34-acre parcel. In 2012, Lower- Middle Aquifer well Q09M02L (MW-41) located on the west side of the parcel was sampled, and PCE was detected at an estimated concentration (3 J ug/L), above its GWQS of 1 ug/L. No other VOCs have been detected at levels exceeding the GWQS in wells located on the 34-acre parcel during recent monitoring events[18].

The Repauno site has been subject to investigation, monitoring and remediation since the discovery of groundwater contamination in 1984. DuPont entered into an ACO with the NJDEP in December 1989, and has since conducted numerous phases of investigation under the oversight of the NJDEP. The investigations identified 12 SWMUs and 11 AOCs, including facility-wide groundwater impacts. In June 2006, the NJDEP approved a request for NFA for non-manufacturing areas of the former Repauno site, including the 34-acre parcel. The data set indicates that groundwater and soil contamination associated with each of the SWMUs/AOCs is contained within the Repauno site boundaries and does not materially extend onto the 34-acre parcel. Chemours continues to monitor and recover contaminated groundwater as outlined in the ACO, including operation of the IWS for control of groundwater migration. Investigation of the Repauno site in accordance with the ACO is continuing under the direction of a LSRP but with ongoing NJDEP oversight, including regulatory approval rights, with the ultimate goal of achieving a RAO for the Repauno site. Chemours retains responsibility for cleanup of the SWMUs and AOCs, including groundwater.

### 6.1.2 Other Findings

In addition to the findings discussed above, the following additional findings related to potential contamination concerns were identified:

- **Asphalt-Paved Areas.** According to facility personnel and available documentation, the 34-acre parcel has never been used for industrial purposes. However, during the site visit, Ramboll Environ observed a large asphalt-paved area in the western, central portion of the property, the former purpose of which is unknown. The pavement was old and degraded, and small trees and other vegetation were growing through the asphalt. Aerial photographs show this area as cleared by at least 1953; pavement is visible beginning in 1970. Facility personnel indicated no knowledge regarding the use of this area and reason for the noted pavement. In addition, a two-lane, asphalt-paved road runs from A-Line Road east toward North Repauno Avenue. The road is visible on aerial photographs and topographic maps from the late 1930s

[16] S09M01M2 (former MW-9), T10O01M2 (former OBS-5), Q09M01L (former MW-40), Q09M02L (former MW-41) and T08M01L (former MW-37).

[17] In 1985, PCE was detected at concentrations of up to 37 ug/L in Lower Middle Aquifer well T08M02M2 (MW-38) located in the eastern portion of the property, above the GWQS of 1 ug/L; in 1992, acrylonitrile was detected at 100 ug/L, above the GWQS of 2 ug/L; and in 1993, benzene (4.4 ug/L) and vinyl chloride (10 ug/L) were detected above their respective GWQS of 1 ug/L. In 1985, PCE was also detected in the samples from wells Q09M01L (MW-40) and Q09M02L (MW-41) located in the western portion of the property at concentrations up to 7.67 ug/L. Based on the most recent data available, (2012 [MW-40]-2015 [MW-41]), no VOCs were detected above the GWQS in these wells.

[18] However, it should be noted that Chemours has reported vinyl chloride concentrations as < 2 ug/L; as the GWQS is 1 ug/L, it is not clear if there could be vinyl chloride concentrations currently exceeding the GWQS.

through the early 1990s, and appears to lead toward storage bunkers previously located adjacent and to the north of the 34-acre parcel in the area of the current Cardox/Air Liquide dry ice plant. At the time of Ramboll Environ's visit, the road was blocked at its intersection with A-Line Road and obscured with leaf litter and vegetation. Facility personnel had no information regarding the purpose of this former road and its use remains unclear. Ramboll Environ requested information from Chemours. Chemours responded that the road appears to have been constructed to connect A-Line and C-Line roads. Chemours also indicated that no information has been identified regarding the asphalt paved area; all historical operations identified in this area were reportedly conducted on the Cardox area and east of the Cardox area north of the subject 34-acre parcel.

- **Mounds of Soil in Northern Portion of Property.** Several small mounds of soil are present in the northern portion of the site within about 50 to 100 feet south of the fence line between the site and the Cardox/Air Liquide dry ice plant. The mounds, which are about four feet high and heavily overgrown with vegetation, are generally positioned in a linear configuration. Facility personnel had no information regarding the origin of the soil mounds or whether any soil sampling had been conducted. Ramboll Environ requested information from Chemours regarding the origin of the mounds and any associated analytical data. Chemours responded that the origin of the mounds is unknown and the Company is uncertain as to whether any testing has been conducted.
- **Listing of Adjacent Repauno Site on Environmental Databases with Open Status.** The adjacent Repauno site is listed on the New Jersey Spills and NJ Releases databases with more than 25 open spills or releases (other than releases to air) reported between 1987 and 2012. These incidents included releases of the following: up to 1,000 pounds of sulfuric acid; five gallons of sulfuric acid/oleum; 30 gallons oleum; 80 pounds sodium nitrite; five gallons of sodium nitrate; 20 gallons of sodium hydroxide; 10 gallons hydrogen peroxide; one gallon of fuel oil; 10 to 35 pounds of ammonia; 300 pounds of bulfuric/nitric acid; 1 gallon of caustic soda; 2 gallons of nitric acid/sulfuric acid; 100 gallons of hydraulic oil; up to 200 pounds of nitric acid; and 11 releases of unknown materials/amounts. The Repauno site is also listed for illegal dumping activities, although specific information of such activities was not provided. According to the database listings, none of the above spills or releases have been granted closure. However, according to the September 2015 PA/SI report and facility personnel, none of the reported spills or releases occurred on or near the subject 34-acre parcel.

### 6.1.3 *De Minimis* Conditions

*De minimis* conditions are those that do not represent a material risk of harm to public health or the environment and that generally would not be the subject of enforcement action if brought to the attention of appropriate governmental agencies. Ramboll Environ identified the following *de minimis* conditions related to the site:

- **Historical Agricultural Use of the Property.** Based on Ramboll Environ's review of historical information sources, the 34-acre parcel was historically used for agricultural purposes from prior to 1880 through at least 1925. Ramboll Environ was not provided with any specific information regarding historical agricultural chemical use, but pesticides or other agricultural chemicals may have been applied on the property. It is possible that residual concentrations of agricultural chemicals may be present in soil and potentially groundwater. If residual concentrations of these chemicals are present, it is unlikely that they would be the subject of regulatory scrutiny in the context of a non-residential land use scenario. As such, Ramboll Environ characterizes this finding as a *de minimis* condition, provided the property use remains industrial and the property is not re-zoned for residential use.

### 6.1.4 Non-scope Considerations

Ramboll Environ identified the following findings that relate to non-scope considerations (as discussed in Section 2.1), as detailed below:

- **Asbestos-Containing Materials.** The water treatment building on the 34-acre parcel was constructed during the 1930s, before asbestos was phased out of use in many building material applications during the 1980s. Facility personnel indicated that a formal asbestos survey had been conducted and no ACMs were identified; however, no report was available for review. Ramboll Environ conducted visual observations of the interior and exterior of the treatment building and did not note PACM (e.g., vinyl floor tile, thermal system insulation, spray-on wall texture); however, other materials that may contain asbestos (e.g., ceiling tiles, roofing materials) were present. The suspect ACM that were observed by Ramboll Environ did not appear to be extensively damaged, broken or deteriorated. Ramboll Environ requested information from Chemours regarding testing of building materials for asbestos. Chemours responded that it was unknown whether there had been any testing for hazardous building materials.
- **Lead-Based Paint.** Lead was a major ingredient in paint pigment prior to and through the 1940s. While other pigments were used in the 1950s, the use of lead in paint continued until the early 1970s. In 1978, the Consumer Products Safety Commission banned paint and other surface coating materials that are "lead-containing paint." Based on the construction date of the water treatment building during the 1930s, it is likely that lead-based paint was used historically on the structure. Facility personnel were not aware of the presence of any lead-based paint. Ramboll Environ observed the paint to be peeling and in generally poor condition, particularly on interior surfaces. Ramboll Environ requested information from Chemours regarding any testing of building materials for lead-based paint. Chemours responded that it was unknown whether there had been any testing for hazardous building materials.

## 6.2 Analysis of Data Gaps

The ASTM Standard defines a data gap as "a lack of or inability to obtain information required by the practice despite good faith efforts by the environmental professional to gather such information." A data gap is only significant if other information obtained during the ESA, or professional experience, raises reasonable concerns and affects the ability of the environmental professional to identify whether a given issue is a REC. The ASTM Standard requires that the ESA report identify and comment on significant data gaps.

Limiting conditions and deviations to the ASTM Standard for the assessment are discussed below:

- Due to extended age of the site, it was not possible to interview representatives dating back to the site's first developed use prior to 1925.
- Historical information, such as aerial photographs, was not readily available to characterize the property from the present back to the property's obvious first developed use or 1940, whichever is earlier. The earliest readily available historical source that would indicate specific uses is an aerial photograph dated 1925 which shows that at least a portion of the property was already developed for agricultural uses. ASTM defines agricultural site use as a "developed" site use.
- Ramboll Environ did not observe the roof of the treatment building due to access and safety constraints.

- As it is a user requirement, Ramboll Environ did not conduct a review of records to identify whether any environmental liens or activity and use limitations (AULs) have been imposed on the parcel.

None of the exceptions, deletions, deviations, or site reconnaissance limitations noted above is considered to represent a significant data gap.

# 7. REFERENCES

## 7.1 Documents

EDR. 2015. "Aerial Photography Print Service: Inquiry Number 4429246.9". October 5.

EDR. 2015. "City Directory, Abstract, Inquiry Number 4429246.5". October 5.

EDR. 2015. "Historical Topographic Map Report, Inquiry Number 4429246.4". October 5.

EDR. 2015. "Radius Map, Inquiry Number: 4429246.2s". October 5.

EDR. 2015. "Sanborn® Map Report, Inquiry Number 4429246.3". October 5.

DuPont Environmental Remediation Services. 1996. Revised Phase II Remedial Investigation Report, DuPont Repauno Plant, Gibbstown, New Jersey, January 29.

DuPont Corporate Remediation Group. 2000. Phase III Remedial Investigation, DuPont Repauno Plant, Gibbstown, New Jersey. April.

DuPont Corporate Remediation Group. 2003. Phase IV Remedial Investigation Report, DuPont Repauno Site, Gibbstown, New Jersey. September.

DuPont Corporate Remediation Group. 2006. Remedial Action Summary Report – No Further Action Areas, DuPont Repauno Site, Gibbstown, New Jersey. June 12.

URS Corporation (URS). 2013. 2012 Groundwater Progress Report, DuPont Repauno Site, Gibbstown, New Jersey. April.

AECOM Environment (AECOM). 2015. Draft Preliminary Assessment Report, Chemours Repauno Site, Gibbstown, New Jersey. June.

AECOM. 2015. Preliminary Assessment Report/Site Investigation Work Plan (excluding the Redevelopment Area) Chemours Repauno Site, Gibbstown, New Jersey. September.

## 7.2 Interviews

Bob Soplop. DuPont. 2015. Personal interview. November 4.

# 8. ASTM DEFINITIONS

The following definitions are presented in the ASTM Standard:

**REC - Recognized Environmental Condition:**

The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: 1) due to release to the environment; 2) under conditions indicative of a release to the environment; or 3) under conditions that pose a material threat of a future release to the environment.

**CREC - Controlled Recognized Environmental Condition:**

A recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls.

**HREC - Historical Recognized Environmental Condition:**

A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls.

***De minimis* Condition:**

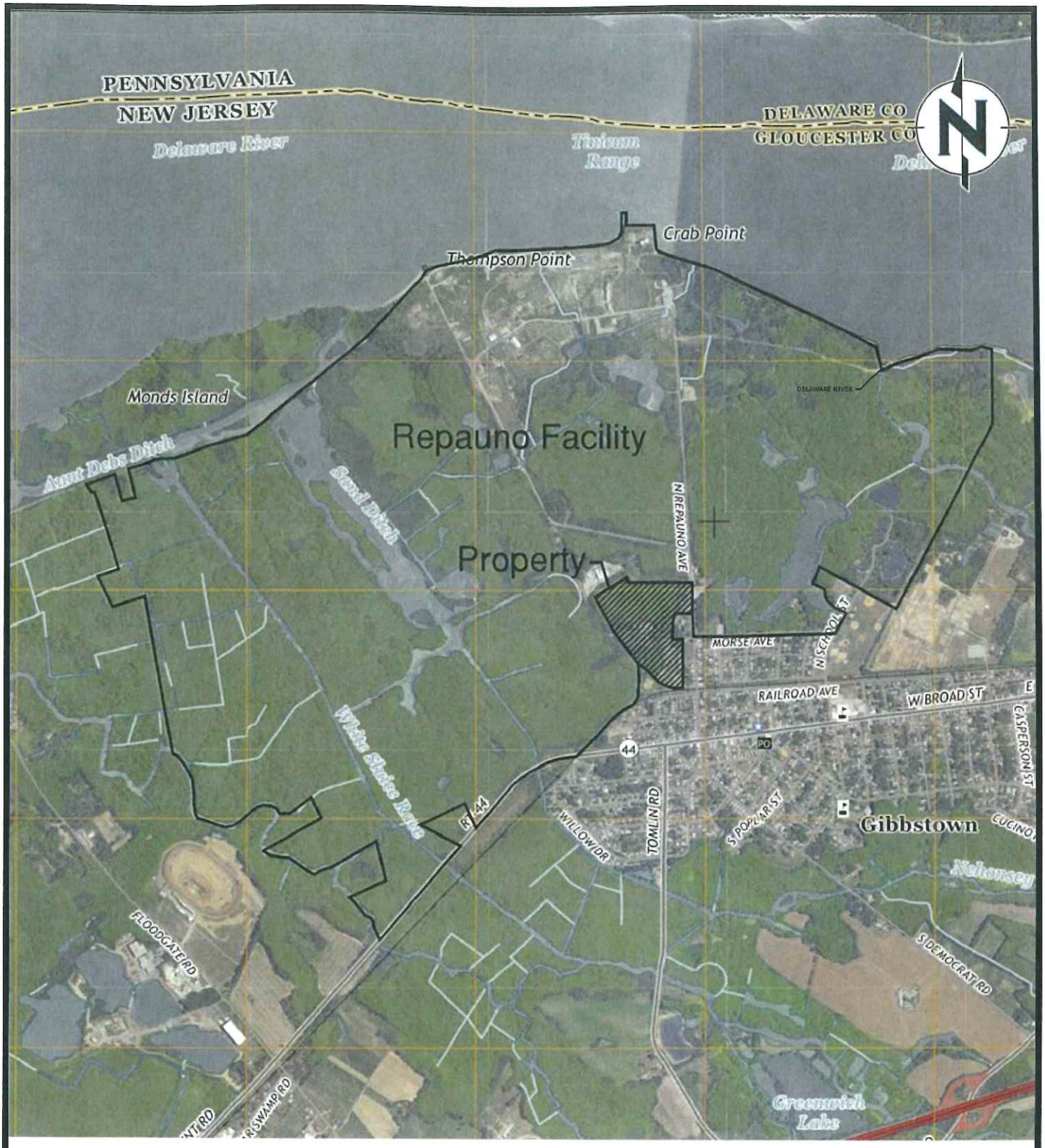
A condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

**Significant Data Gap:**

A lack of or inability to obtain information required by the practice despite good faith efforts by the environmental professional to gather such information.

*Please note that the term "other finding" is not defined by ASTM; rather, Ramboll Environ uses the term to connote areas of contingent risk that are not clearly defined by the ASTM Standard.*

02-39079A\PRIN_WP\41061v3




SCALE 1:24000

0 0.5 1
Kilometers

0 1/2 1
Miles

2000 0 2000 4000
Feet

Source: U.S. Geological Survey 7.5 minute (topographic) quadrangle; Bridgeport, New Jersey.

TPENNISI 12/31/15 F:\0239079_REPAUNO < SITE LOCATION MAP_0239079 >

RAMBOLL ENVIRON

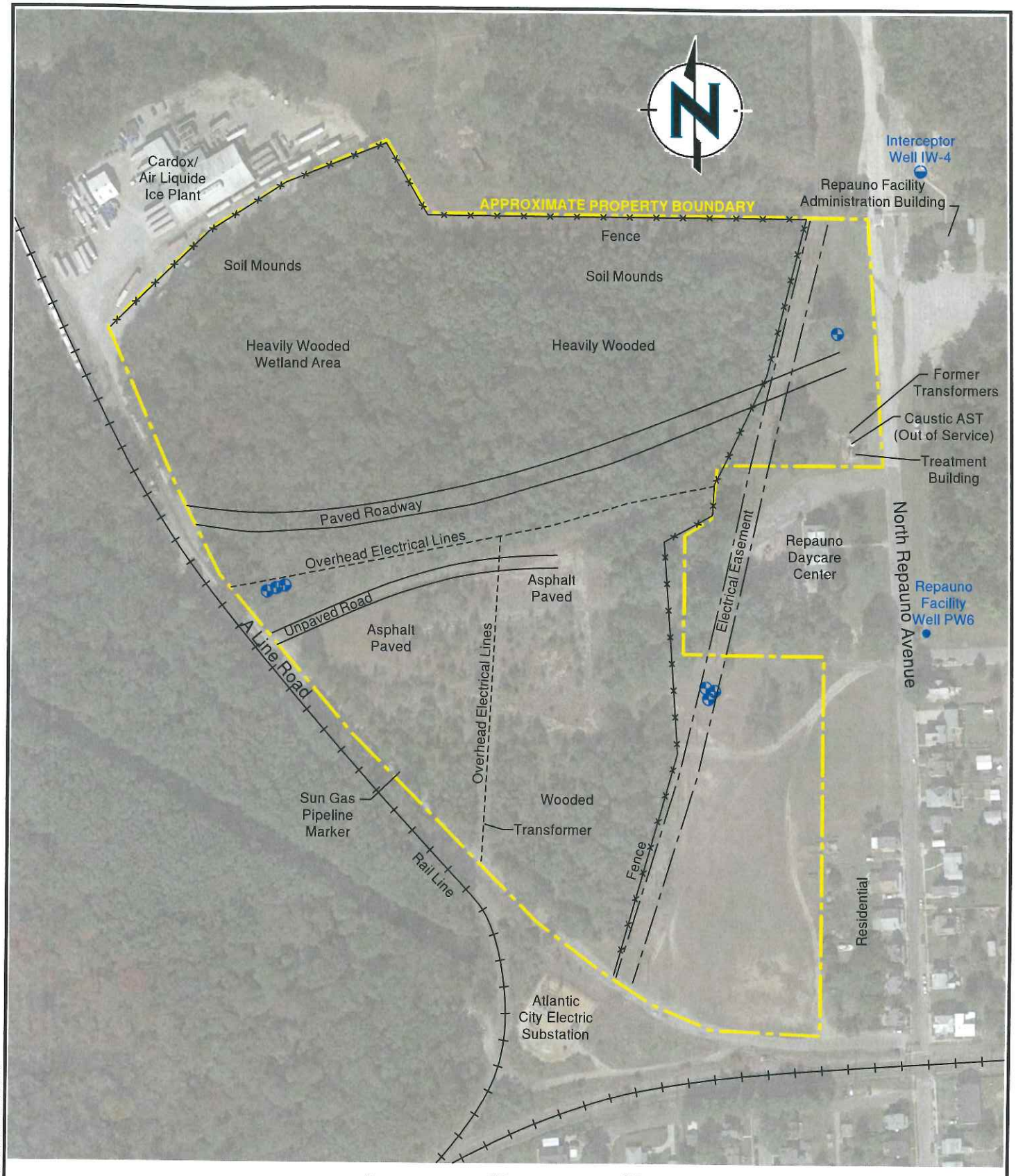
DRAFTED BY: TSP | DATE: 12/31/2015

# SITE LOCATION MAP

34-ACRE PARCEL
GIBBSTOWN, NEW JERSEY

FIGURE
1

PROJECT: 0239079A




Aerial Photograph Source: © Google 2015; dated October 2011.

C:\PROJECTS\GIBBSTOWN NJ\SITE LAYOUT GIBBSTOWN2.DWG

RAMBOLL ENVIRON

DRAFTED BY: GMILES | DATE: 11/30/2015

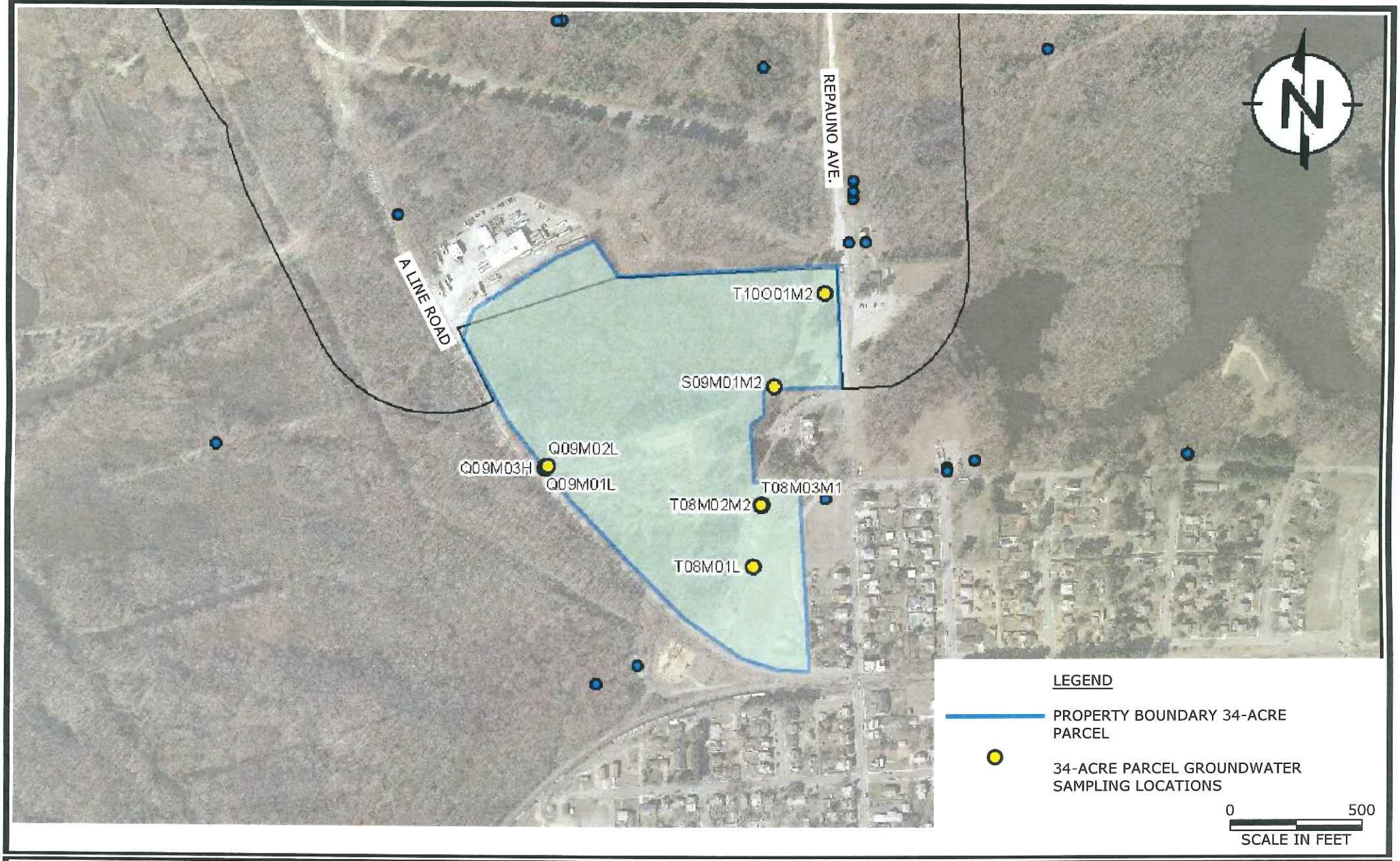
# Site Layout

**34-Acre Vacant Parcel**
**Gibbstown, New Jersey**

Figure
**2**

PROJECT: 02-39079A

TPENNISI 4/6/16 F:\0239079_REPAUNO < SMPL_(GW LOCATIONS)_0239079 >




RAMBOLL ENVIRON

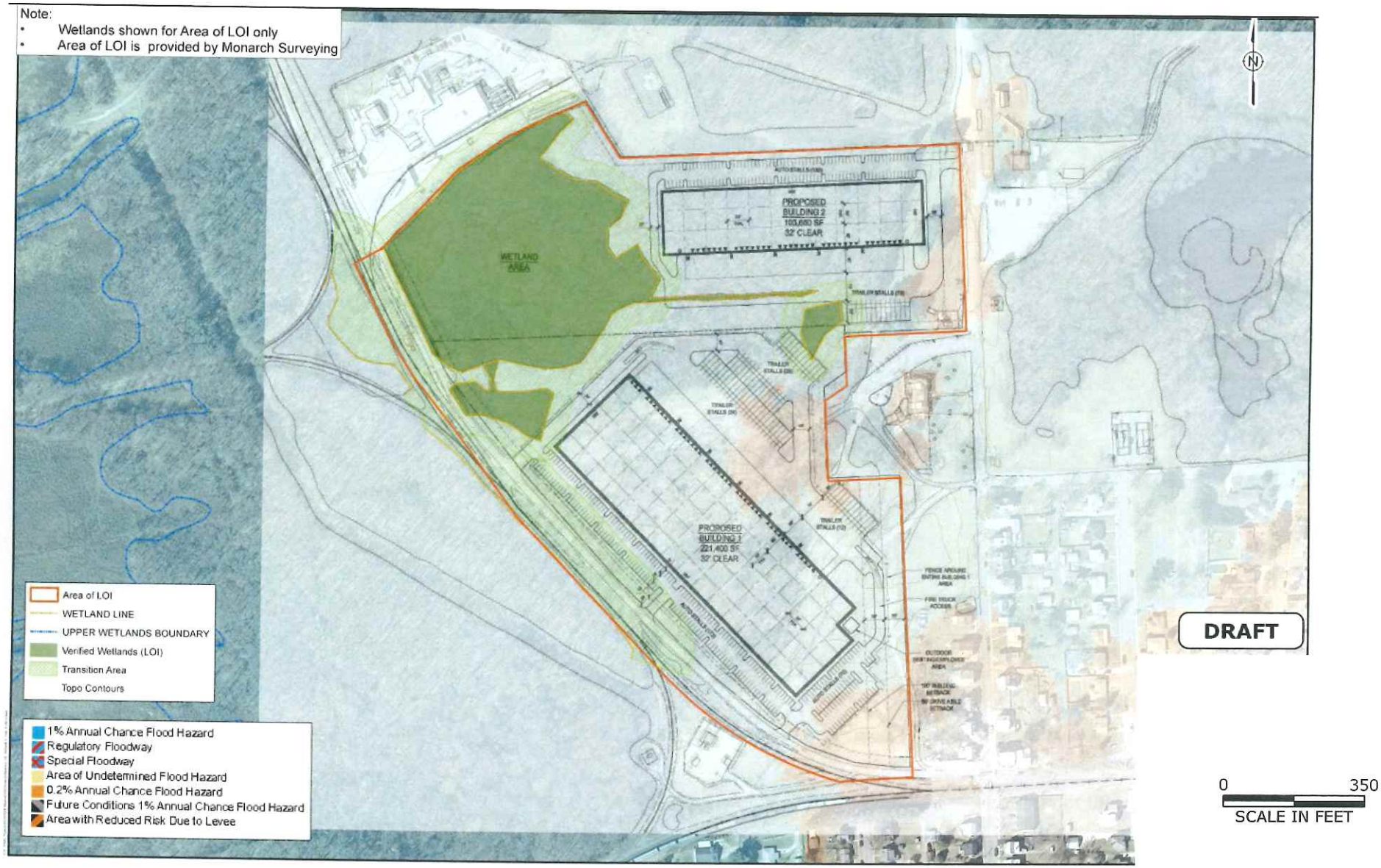
DRAFTED BY: KPM | DATE: 12/17/2015

# GROUNDWATER SAMPLING LOCATIONS

34-ACRE PARCEL
GIBBSTOWN, NEW JERSEY

FIGURE
3

PROJECT: 0239079A




RAMBOLL ENVIRON

DRAFTED BY: KPM | DATE: 12/18/2015

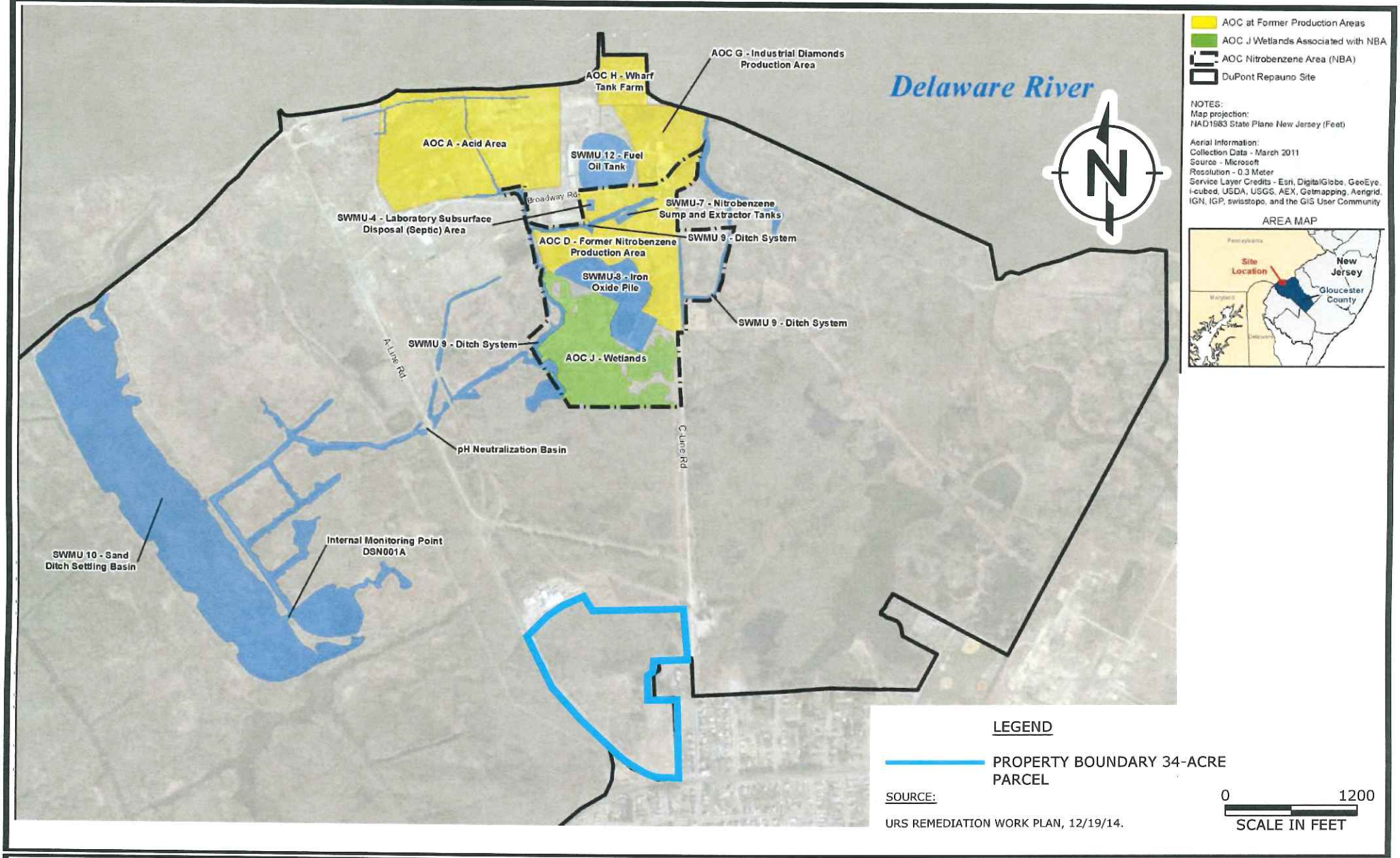
# WETLANDS & PROPOSED DEVELOPMENT

34-ACRE PARCEL
GIBBSTOWN, NEW JERSEY

FIGURE
**4**

PROJECT: 0239079A

TPENNISI 12/30/15 F:\0239079_REPAUNO < SWMU & AOC_(REPAUNO FACILITY)_0239079 >




RAMBOLL ENVIRON

DRAFTED BY: KPM | DATE: 12/17/2015

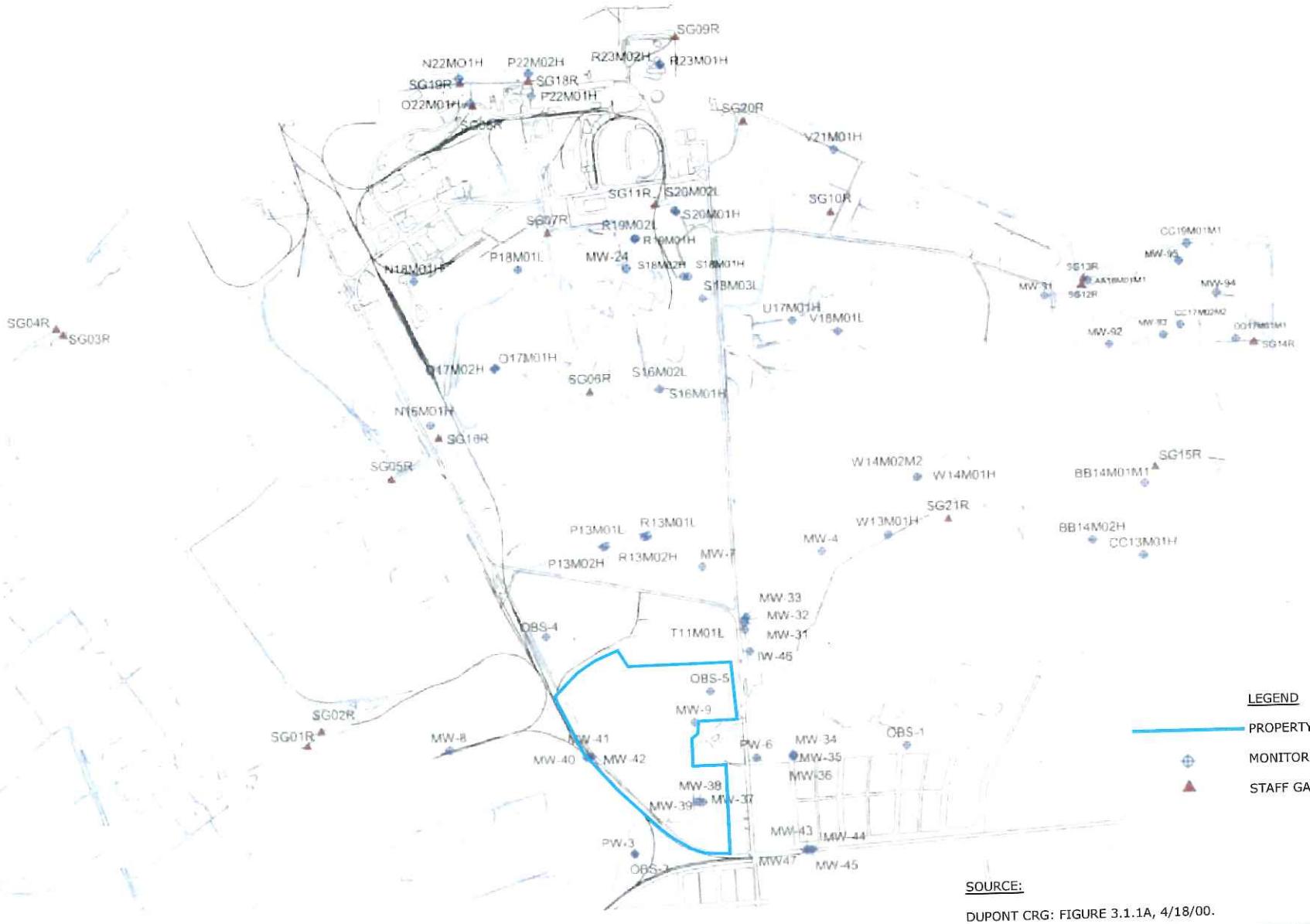
# SWMU AND AOC LOCATION MAP

REPAUNO SITE
34-ACRE PARCEL
GIBBSTOWN, NEW JERSEY

FIGURE
**5**

PROJECT: 0239079A

TPENNISI 12/30/15 F:\0239079_REPAUNO < SMPL_(MONITOR WELL & STAFF GAUGE LOCS)_0239079 >




SOURCE:

DUPONT CRG: FIGURE 3.1.1A, 4/18/00.

RAMBOLL ENVIRON

DRAFTED BY: KPM | DATE: 12/18/2015

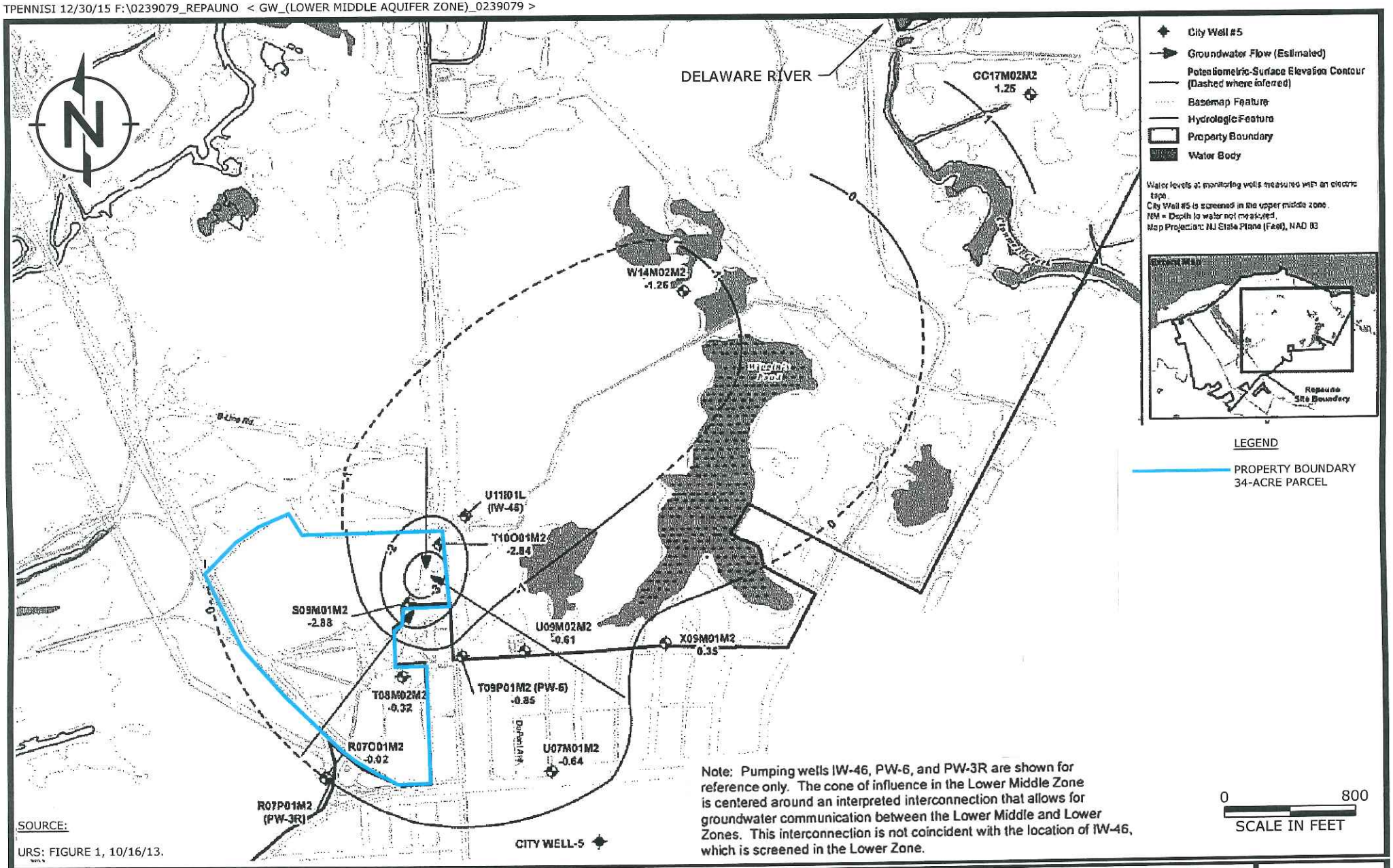
# MONITOR WELL AND STAFF GAUGE LOCATIONS

REPAUNO SITE
34-ACRE PARCEL
GIBBSTOWN, NEW JERSEY

FIGURE
6

PROJECT: 0239079A

TPENNISI 12/30/15 F:\0239079_REPAUNO < GW_(LOWER MIDDLE AQUIFER ZONE)_0239079 >




RAMBOLL ENVIRON

DRAFTED BY: KPM | DATE: 12/18/2015

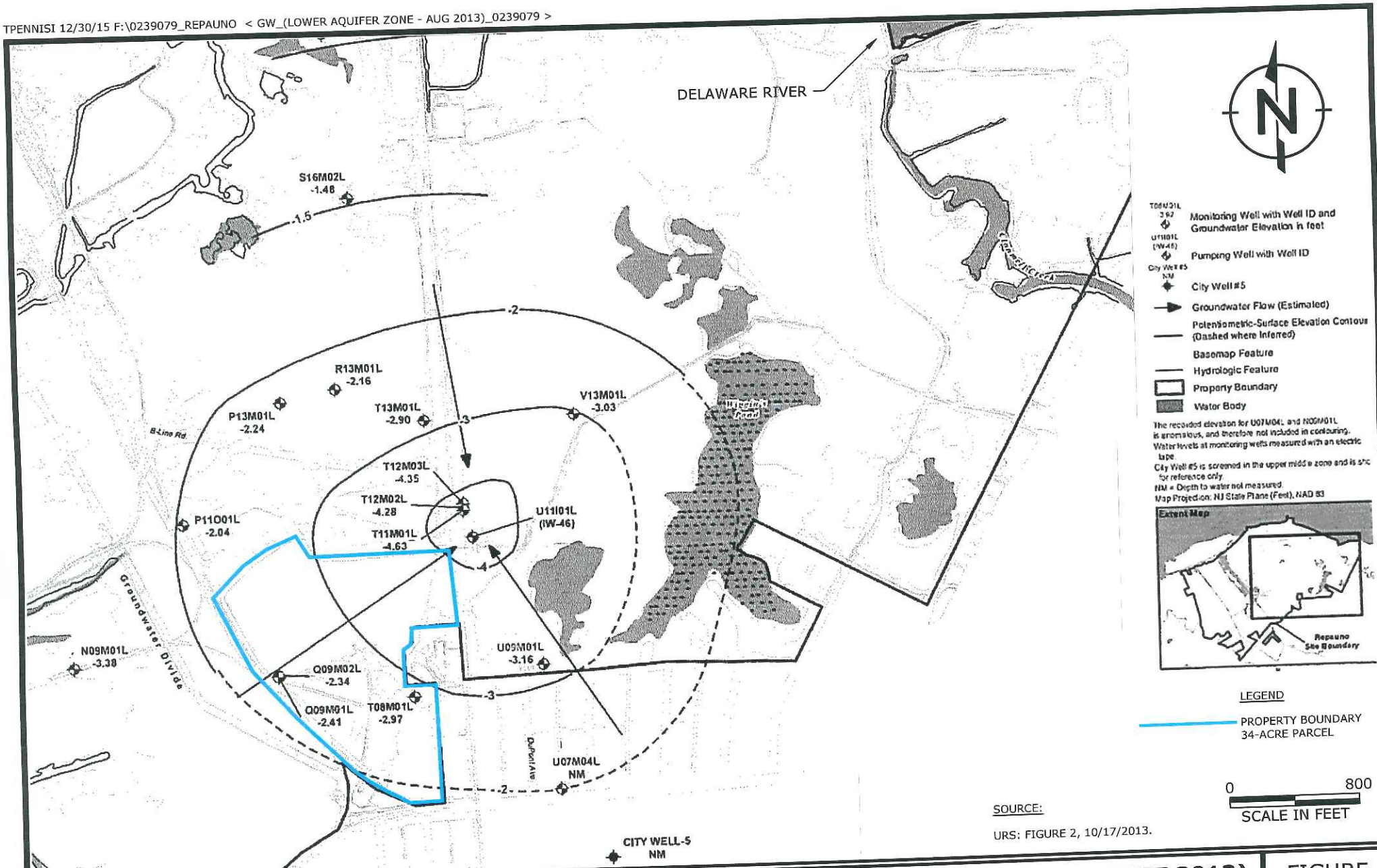
# GROUNDWATER CONTOUR MAP (LOWER MIDDLE AQUIFER ZONE)

REPAUNO SITE
34-ACRE PARCEL
GIBBSTOWN, NEW JERSEY

FIGURE
**7**

PROJECT: 0239079A

TPENNISI 12/30/15 F:\0239079_REPAUNO < GW_(LOWER AQUIFER ZONE - AUG 2013)_0239079 >




SOURCE:

URS: FIGURE 2, 10/17/2013.

RAMBOLL ENVIRON

# GROUNDWATER CONTOUR MAP (LOWER AQUIFER ZONE - AUGUST 2013)

REPAUNO SITE
34-ACRE PARCEL
GIBBSTOWN, NEW JERSEY

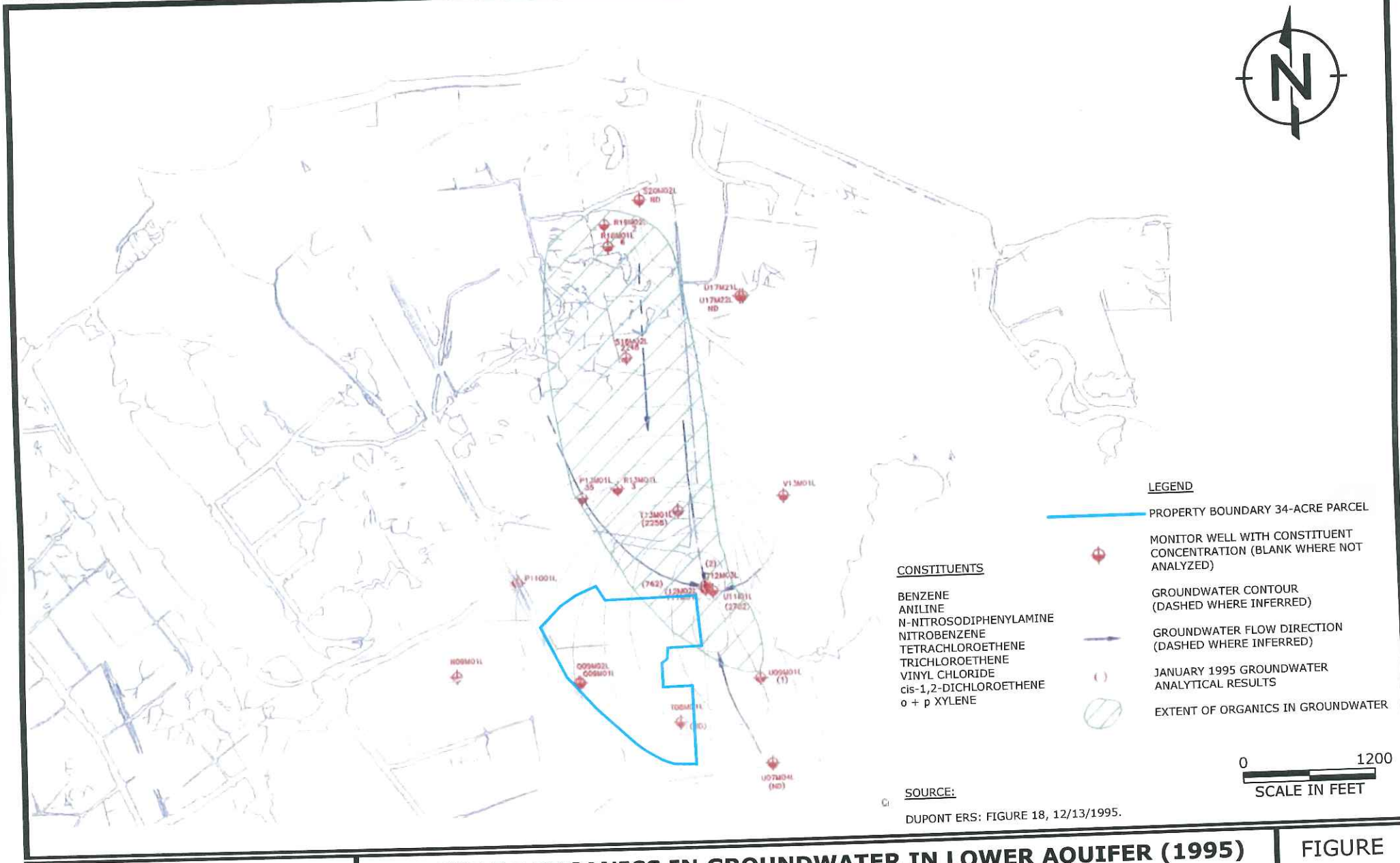
FIGURE
8

PROJECT: 0239079

DRAFTED BY: KPM

DATE: 12/18/2015

TPENNISI 12/30/15 F:\0239079_REPAUNO < DATA_ORGANICS_GW_(LOWER AQUIFER-1995)_0239079 >




RAMBOLL ENVIRON

# EXTENT OF ORGANICS IN GROUNDWATER IN LOWER AQUIFER (1995)

REPAUNO SITE
34-ACRE PARCEL
GIBBSTOWN, NEW JERSEY

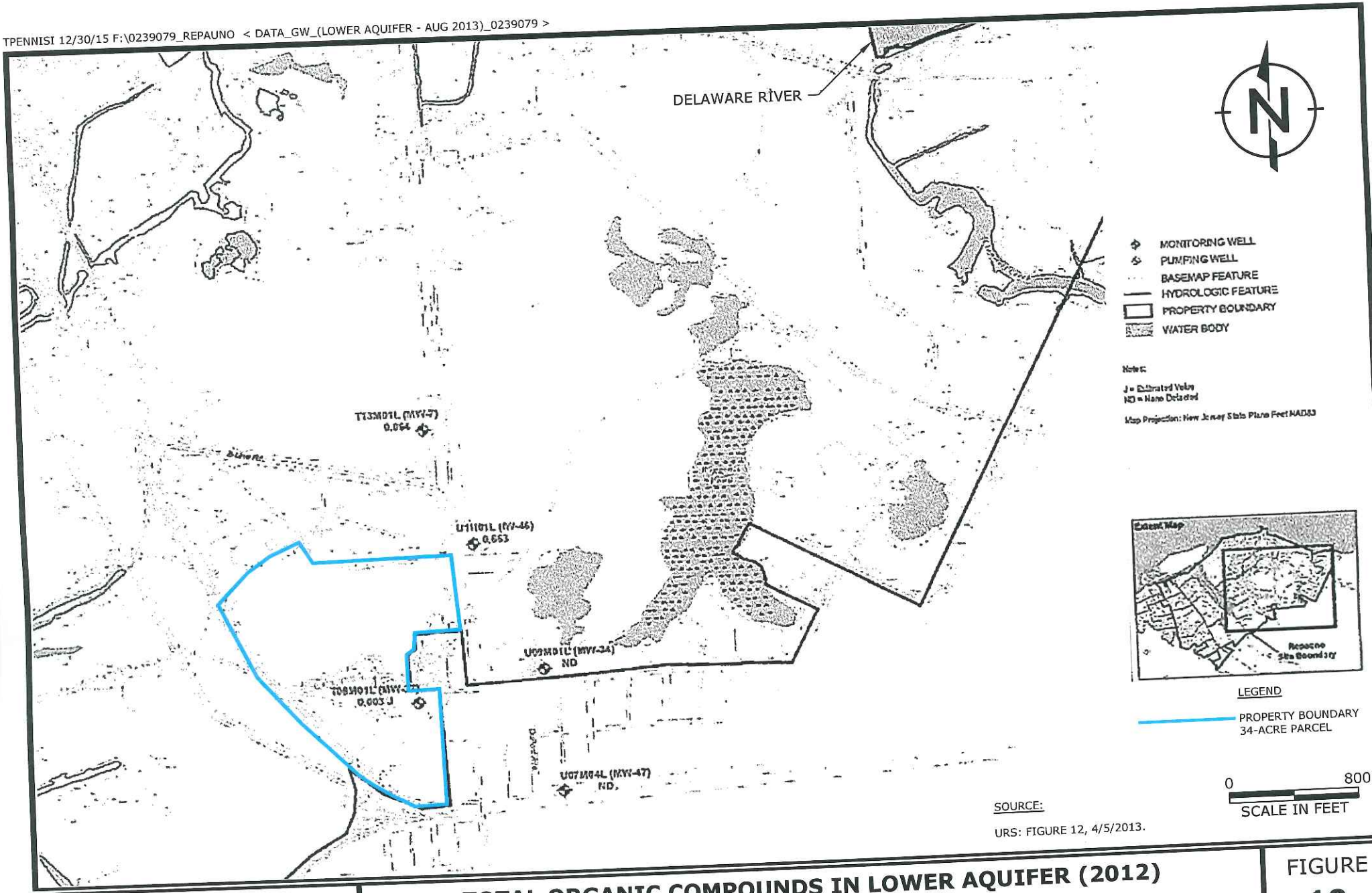
FIGURE
9

PROJECT: 0239079A

DRAFTED BY: KPM

DATE: 12/17/2015

TPENNISI 12/30/15 F:\0239079_REPAUNO < DATA_GW_(LOWER AQUIFER - AUG 2013)_0239079 >




SOURCE:

URS: FIGURE 12, 4/5/2013.

# TOTAL ORGANIC COMPOUNDS IN LOWER AQUIFER (2012)

REPAUNO SITE
34-ACRE PARCEL
GIBBSTOWN, NEW JERSEY

RAMBOLL ENVIRON

DRAFTED BY: KPM

DATE: 12/18/2015

FIGURE
10

PROJECT: 0239079

Photo 1: Eastern portion of the property (facing south)

Photo 2: Monitoring wells in the eastern portion of the property (facing north)

02-39079A\PRIN_WP\41065v1

Photo 3: Sun gas pipeline markers, controls, and valve pits east of A-Line Road on the west side of the property.

Photo 4: Northern portion of property along ice plant fence line.

Photo 5: Wooded area in northwestern portion of property, just south of ice plant

Photo 6: Concrete debris (old footings) near ice plant fence in northern portion of property.

Photo 7: Soil mounds in wooded area south of ice plant.

Photo 8: View of north central portion of property

Photo 9: Paved area in central portion of the property; log pile in the distance

Photo 10: Power transmission lines and downed trees in the central portion of the property.

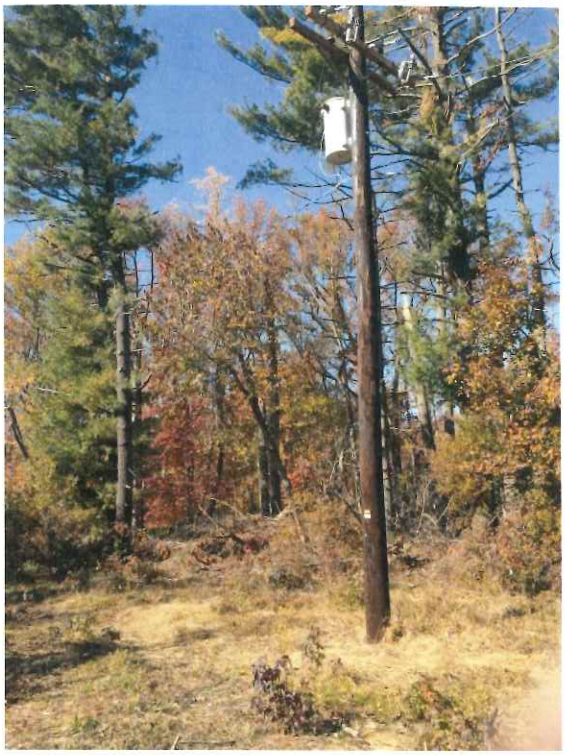


Photo 11: Pole-mounted transformer in central portion of property

Photo 12: Paved roadway in central portion of property

Photo 13: Debris (old furniture) in central portion of property.

Photo 14: Recent boring in central portion of property.

Photo 15: Old timbers and concrete debris in central portion of property.

Photo 16: Pole-mounted transformer near A-Line road in western portion of Property.

Photo 17: Looking north along A-Line Road along the west side of the property.

Photo 18: Old pavement in the west central portion of the property, with trees growing through degraded asphalt.

Photo 19: Three monitoring wells near A-Line Road in the western central portion of the property.

Photo 20: Pile of old timbers or rail ties in west-central portion of property.

Photo 21: Paved two-lane roadway in northern portion of property.

Photo 22: Former entrance to paved two-lane roadway from A –Line Road in northern portion of property. Note bollards in distance blocking road access.

Photo 23: Drainage ditch along A-Line Road in northwestern portion of property. Note rail tie and metal debris in ditch.

Photo 24: Former treatment building and treatment tank (currently out of service) along North Repauno Avenue on the eastern side of the property.

| RAMBOLL ENVIRON | **Site Photographs**<br>Vacant 34-acre Property<br>200 N. Repauno Ave., Gibbstown, New Jersey<br>November 4, 2015 |
|---|---|

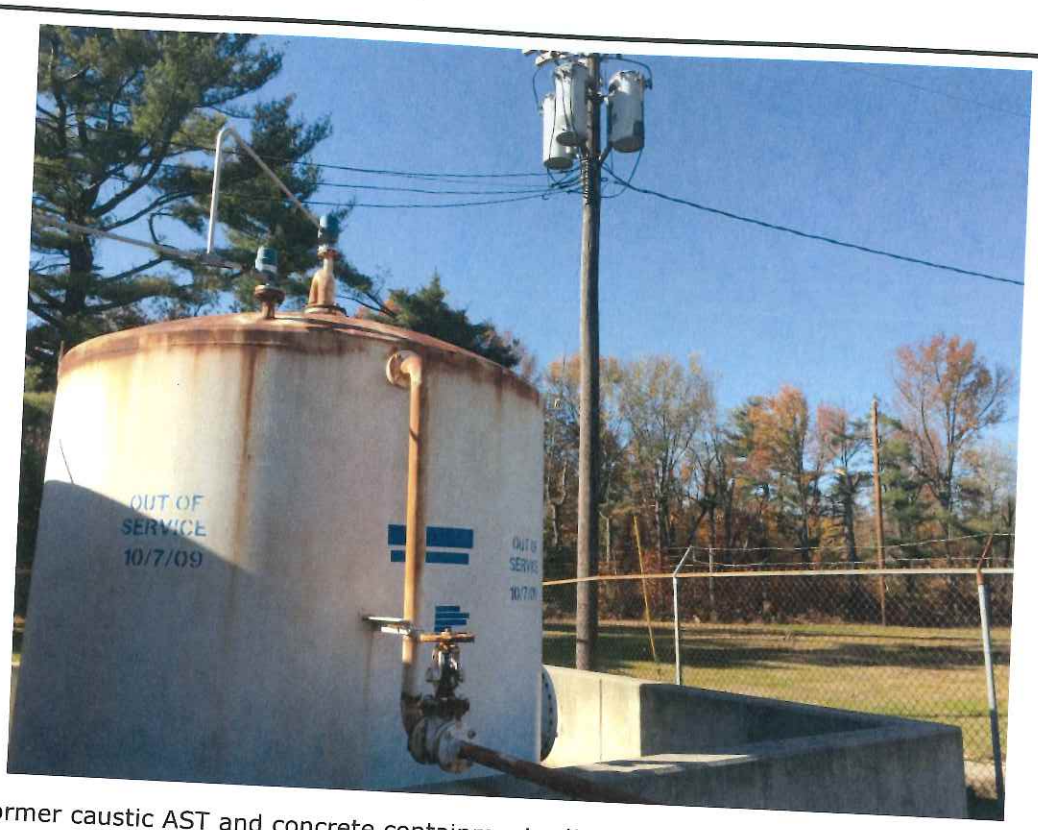



Photo 27: Former caustic AST and concrete containment adjacent to treatment building. Three pole-mounted transformers in background.

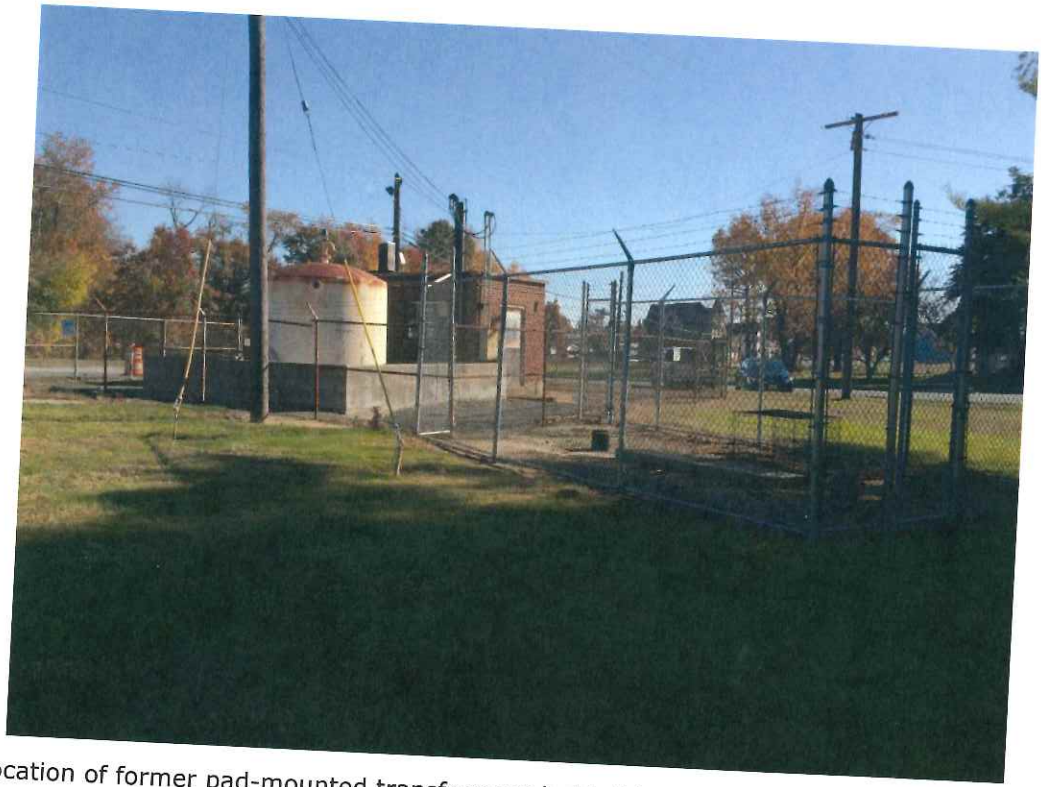


Photo 28: Location of former pad-mounted transformers behind former treatment building.

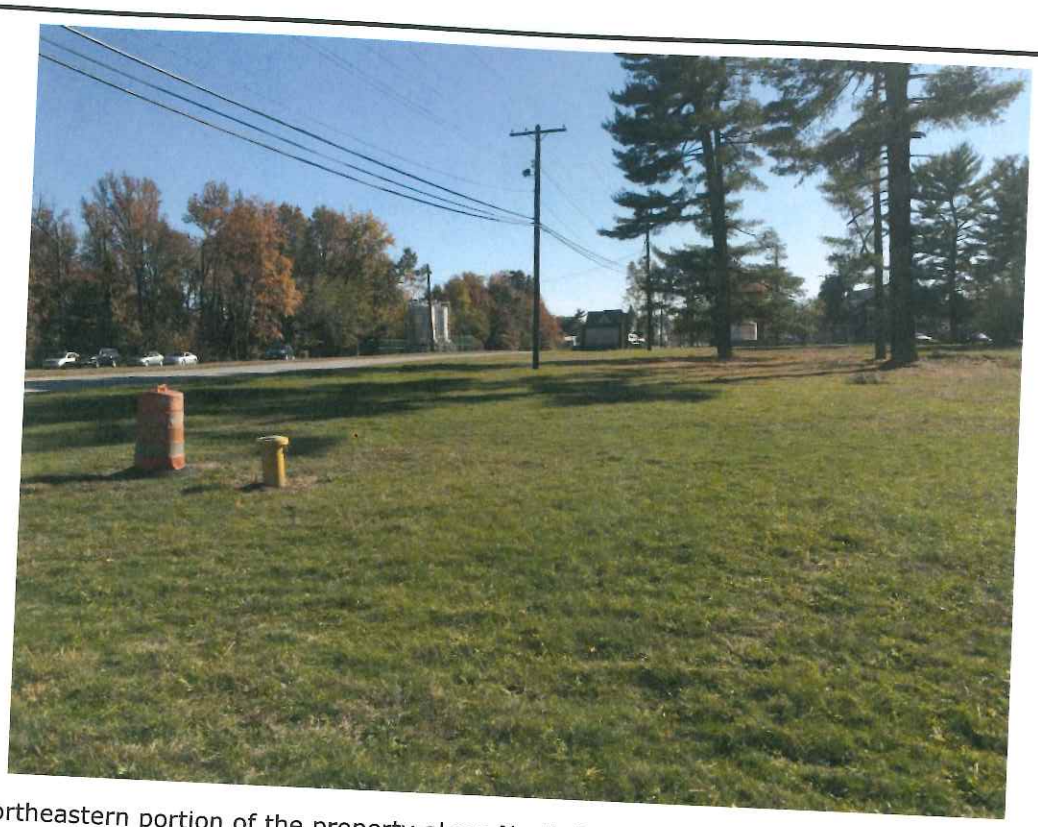


Photo 29: Northeastern portion of the property along North Repauno Avenue, facing south. Monitoring well in foreground.


Photo 30: Northeastern portion of the property along North Repauno Avenue, facing north.

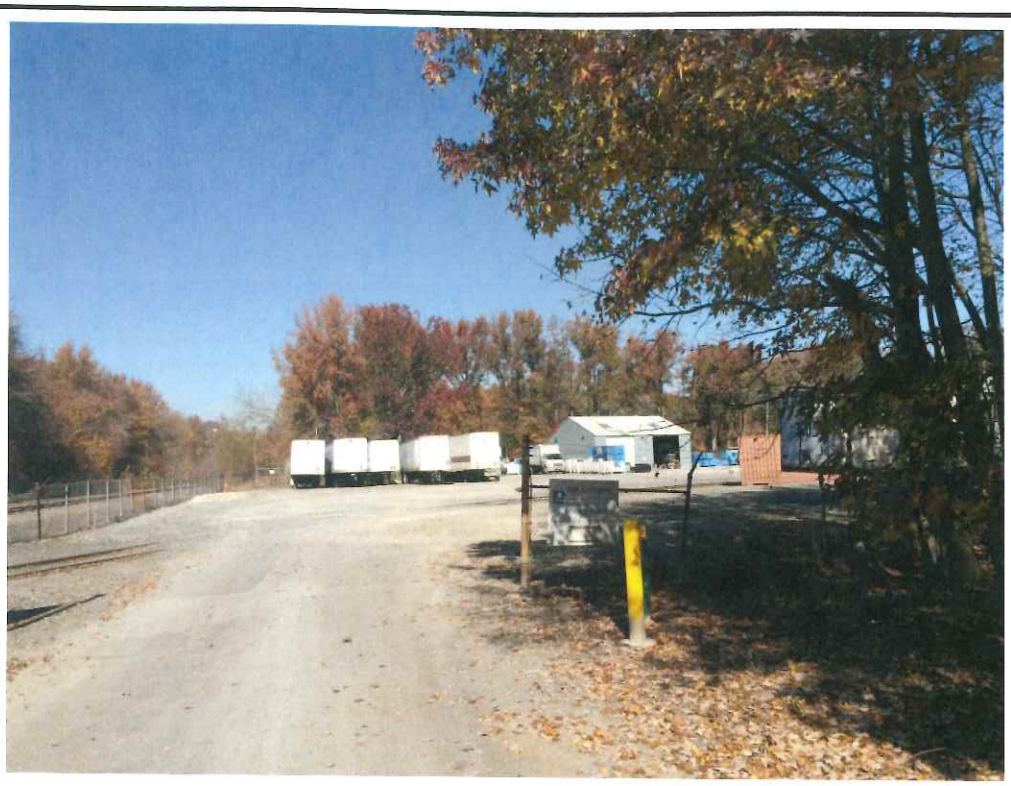


Photo 31: North adjacent ice plant.

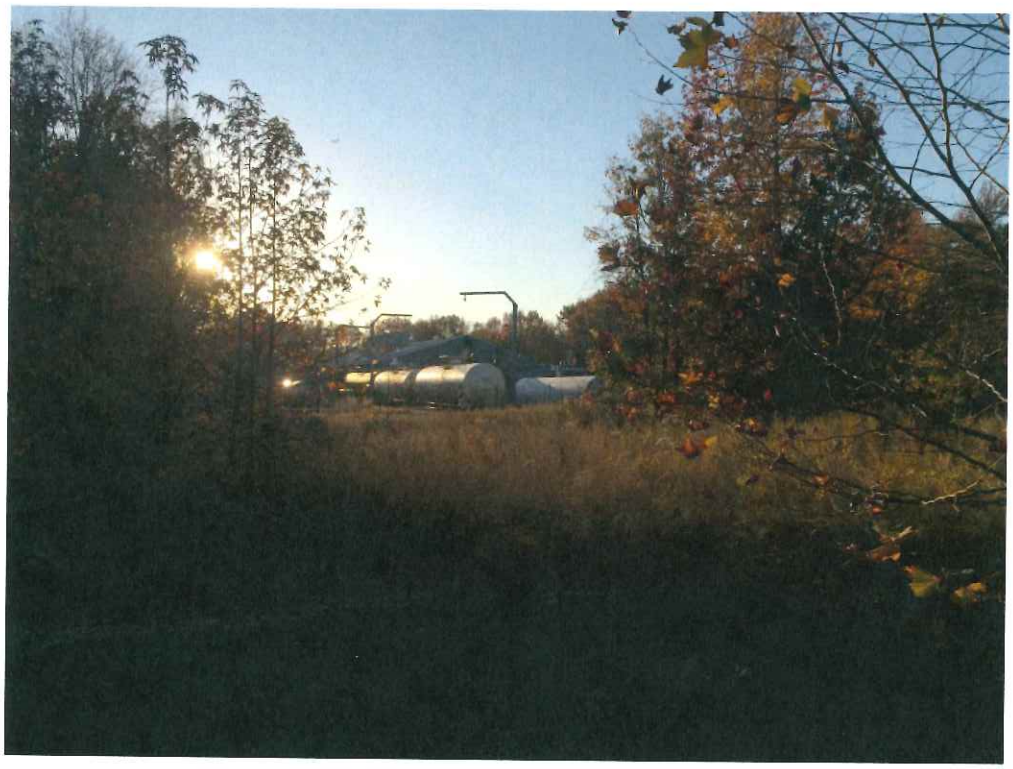


Photo 32: ASTs and rail cars at north adjacent ice plant.


Photo 33: Empty portable AST, asphalt pavement, and piles of wood chips on north adjacent property.

Photo 34: East adjacent residential properties along North Repauno Avenue. Photo taken looking east from property.

Photo 35: East adjacent property: Repauno Daycare Center

Photo 36: View to the east of east-adjacent North Repauno Avenue and DuPont administration building.

Photo 37: View to the southwest of A-Line Road and west adjacent railroad.

Photo 38: Drainage ditch cutting east-west across the center of the property.

| | |
|---|---|
| RAMBOLL ENVIRON | **Site Photographs**<br>Vacant 34-acre Property<br>200 N. Repauno Ave., Gibbstown, New Jersey<br>November 4, 2015 |

# APPENDIX B

# ENVIRONMENTAL DATABASE REPORT CAN BE PROVIDED UPON REQUEST

## NOTES ON ENVIRONMENTAL DATABASE REPORT

EDR conducted its searches for the standard environmental record sources and the minimum search distances, as specified by the ASTM Standard. The ASTM Standard uses the terminology "approximate minimum search distance" to refer to the radii searched in the environmental database report.

EDR conducted the search of environmental databases in October 2015. Because the environmental databases themselves are sometimes not updated by the specific regulatory agencies for periods of up to one year or more (depending on the database and the state), the database search conducted herein will not necessarily list any facility or site for which an environmental investigation/listing has been initiated subsequent to the last update.

# APPENDIX D
# REPAUNO SITE SWMUS AND AOCS

***Solid Waste Management Units (SWMUs) at the Repauno Facility***

- SWMU 1 Diamonds Waste Acid Tank.
- SWMU 2 PMDA Filtrate Waste Tank.
- SWMU 3 Terephthalic Acid Basin.
- SWMU 4 Laboratory Subsurface Disposal (Septic) Area.
- SWMU 5 Nitrobenzene Sumps and Extractor Tanks.
- SWMU 6 Iron Oxide Pile.
- SWMU 7 Sanitary Landfill.
- SWMU 9 Ditch System.
- SWMU 10 Sand Ditch Settling Basin.
- SWMU 11 Industrial Landfill.
- SWMU 12 Fuel Oil Tank.

***Areas of Concern (AOCs) at the Repauno Facility***

- AOC A Acid Area.
- AOC B Cardox Area.
- AOC C Former Nitrobenzene Production Area.
- AOC D Former Explosives Area - Testing Ground 3.
- AOC E Ammonia Oxidation Plant.
- AOC F Former Explosives Manufacturing (Eastern Laboratory Areas).
- AOC G Industrial Diamonds Production Area.
- AOC H Wharf Tank Farm.
- AOC I Atlantic City Electric Plant.
- AOC J Wetlands.
- AOC K Creeks and Surface Water Bodies.

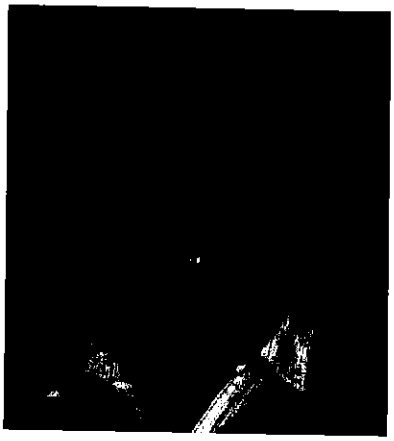
RAMBOLL ENVIRON

ENVIRONMENT
& HEALTH

# SHARON E BURKETT

**Manager 9**

Sharon Burkett has more than 20 years of experience in environmental investigation and remediation, environmental due diligence, and litigation support. She has conducted and managed soil and groundwater investigation and remediation activities involving various chemicals and non aqueous phase liquids at numerous sites throughout North America. She has conducted several hundred Phase I environmental site assessments (ESAs) and compliance reviews, and has assisted private equity firms, manufacturing companies, real estate investment firms and lenders in the evaluation of potential environmental liabilities associated with merger and acquisition (M&A) targets with assets in North and South America, Europe and the UK. Sharon has also provided litigation support in cost allocation and cost recovery matters related to remediation of environmental contamination and adequacy of site investigation and remediation




**CONTACT INFORMATION**
**Sharon E Burkett**

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+1 (609) 2439832

Ramboll Environ
101 Carnegie Center
Suite 200
Princeton, 08540
United States of America


## YEARS IN RAMBOLL

21

## EDUCATION

1988-1991
**MS, Geology (Hydrogeology)**
Washington State University, Pullman, Washington

1984-1988
**BA, Geology**
Franklin & Marshall College, Lancaster, Pennsylvania

## PROJECTS

### Environmental Due Diligence

- Assisted private equity firms, manufacturing companies, real estate investment firms and lenders in the evaluation of potential environmental liabilities associated with numerous merger and acquisition (M&A) targets involving single site transactions and multiple site portfolios with facilities located throughout North and South America, Europe and the United Kingdom.

- Conducted due diligence environmental assessments and regulatory compliance audits of several hundred industrial and commercial facilities located throughout the United States to assess on- and off-site liabilities. Facilities have included metal working facilities, cogeneration plants, warehouses, office buildings, electronic equipment assembly plants, chemical and plastics manufacturing facilities, trucking terminals, food processing facilities, pharmaceutical and cosmetic manufacturing companies, service stations, aerospace design and testing facilities, landfills, incinerators, agricultural properties, and chemical storage and manufacturing facilities.
- Managed due diligence review of oil and gas asset areas located in the central and western United States involving several hundred operating and non-operating wells and associated assets and provided an assessment of the magnitude of potential environmental liabilities.
- Conducted pre-purchase limited audits and desktop environmental evaluations of several hundred properties from historical documentation to establish the magnitude of potential environmental liabilities.
- Conducted preliminary assessments (PA) and site investigations (SI) for New Jersey properties to comply with ISRA requirements.
- Performed environmental due diligence of salt mines including mines located in Louisana and Ohio. Performed limited review of health and safety considerations, reviewed multimedia air, water, wastewater and other permitting considerations at each site. Evaluated potential contamination concerns associated with the facilities. Evaluated potential cost liabilities and provided remediation cost estimates.
- Developed realistic and worst case remediation cost estimates for numerous industrial facilities based on review of environmental documentation.
- Performed environmental due diligence of an engine and turbine manufacturing and testing facility in Long Island, New York.
- Conducted environmental due diligence at several commercial bakery and food service facilities as part of potential acquisitions.
- Conducted environmental, health and safety (EHS) regulatory compliance evaluation of a large transportation company including a review of site operations, environmental concerns, and health and safety programs, and evaluated the facility's compliance with state and federal requirements. Sharon also assisted in preparing a comprehensive compliance manual for the facility.
- Assisted private equity firms, manufacturing companies, real estate investment trusts, and various lenders in the evaluation of potential environmental liabilities associated with sites targeted for acquisition located throughout North America and Europe. Evaluations typically included the completion of Phase I Environmental Assessments in accordance with ASTM 1527-05, compliance reviews, evaluation of third party liabilities, and estimation of environmental liability estimates.
- Performed preliminary environmental evaluations of several land parcels considered for commercial development to determine the potential for soil or ground water contamination.
- Prepared General Information Notices (GINs) and Preliminary Assessment (PA) reports for numerous newspaper printing facilities, chemical companies, paint manufacturers, pharmaceutical companies and other industrial facilities under New Jersey's Industrial Site Recovery Act (ISRA). Designed and supervised site investigation activities and preparation of Site Investigation (SI) reports for submittal to NJDEP in support of No Further Action (NFA) for the sites.
- Prepared site documentation under New Jersey's ISRA program for a property with a long industrial and commercial history. Ultimately secured a determination of non-applicability for current and former operations, saving the client from potential fines for failure to file appropriate documentation during prior property transactions.

**Site Investigation and Remediation**

- Managed and performed soil and groundwater investigations and remediation activities for numerous industrial, commercial and waste disposal facilities throughout North America involving petroleum hydrocarbons, chlorinated volatile organic compounds, metals and non-aqueous phase liquid contamination, and assisted clients in obtaining regulatory closure.
- Conducted Phase II Environmental Site Assessments of industrial facilities in New Jersey, Pennsylvania, Illinois, Connecticut, Washington, Oregon, North Carolina, and South Carolina which included the installation of monitoring wells, and collection of soil, sediment and ground water samples.
- Performed numerous field investigations including the installation of temporary and permanent ground water monitoring wells, completion of soil borings and sampling of surface water, sediment, air, ground water and soil.
- Evaluated analytical sampling data and prepared technical reports summarizing results of field investigations. Developed remedial action work plans.
- Prepared response letters to NJDEP comments on work plans and reports; performed soil sampling to delineate the extent of VOC and metals contamination in soil at a former pharmaceutical company in New Jersey, prepared summary reports describing the results of the investigations and compliance averaging for submittal to the NJDEP.
- Evaluated the results of previous investigations; prepared and implemented a work plan for characterization of volatile organic compound contamination in soil, ground water, surface water, and sediment at an industrial facility in North Carolina; evaluated data, and assisted in the preparation of a corrective action plan in support of no-action for soil and monitored natural attenuation for chlorinated solvents in ground water at the site. Supervised quarterly ground water monitoring program and prepared reports to NCDEHNR describing the results of the investigations.
- Performed subsurface investigations to determine the source and extent of chlorinated solvent contamination in ground water at several dry cleaning establishments.
- Participated in design, analysis and implementation of alternative remedial approaches for various ground water contamination sites including 2-phase extraction, monitored natural attenuation, and enhanced biodegradation methods (HRG, ORC) for achieving cost-effective cleanups. Sites have included UST facilities, dry cleaners, and industrial tank farms.
- Assisted in the ongoing implementation of a Remedial Action program for VOC contaminated ground water at a New Jersey ISRA industrial site; evaluated ground water chemical data and prepared quarterly site progress reports. Prepared a soil reuse proposal, a review of remedial measures undertaken at the site, and a modifications to and renewal of the Water Allocation Permit for submittal to the NJDEP.
- Implemented a detailed ground water investigation that identified and characterized the extent of metals and chlorinated VOC contamination in soil and ground water at a former metal plating facility in Connecticut. Supervised the installation of bedrock monitoring wells, conducted soil gas surveys and soil sampling to characterize potential contaminant source areas, conducted slug tests, packer tests, and pumping tests. Analyzed data using AQTESOLV to determine aquifer hydraulic parameters; evaluated hydrogeologic and chemical data obtained during the field investigations and prepared reports describing these data for submittal to the CTDEP.
- Managed projects under ISRA and Spill Compensation and Control Act (NJ Spill Act) at several sites in New Jersey. Sites include paint manufacturing, tank cleaning, combustion research facility, landfills, gas stations, and agricultural areas. Work has included the completion of preliminary assessments, site investigations, remedial investigations, and preparation and implementation of remedial action work plans.

- Prepared and implemented cleanup plans involving excavation and off-site disposal of both hazardous and nonhazardous contaminated soil at several industrial facilities.
- Managed the investigation and remediation of soil contamination associated with operations at a former paint manufacturing facility pursuant to New Jersey's ISRA statute. Managed investigation and removal of numerous USTs from the property.
- Developed cost estimates and managed remedial action work plans to address soil and groundwater contamination at several industrial and commercial sites. Remedial actions have included soil excavation, in-situ remedial techniques, groundwater recovery and treatment, and monitored natural attenuation.
- Developed classification exception area proposals for several properties with known groundwater contamination.

**Litigation Support**

- Provided technical support as part of litigation involving the source and extent of a free phase and dissolved phase ground water contaminant plume at an operating underground storage tank site in New Jersey. Performed field work including drilling, soil sampling, hydrophobic dye testing, and ground water sampling. Prepared cost estimates for site investigation and plume delineation work at the site; prepared a report describing these activities, the extent of contamination, and recommendations and costs for future site remedial actions. Implemented monitored natural attenuation approach for site cleanup including evaluation of monitoring data and product fingerprinting data to estimate the age of release. Assisted in the preparation of expert reports for submittal to the Court.
- Provided litigation support in support of a major glass manufacturer against a claim from a successive owner of a site in southern New Jersey for voiding the property sale and purchase agreement due to violations of that agreement and preconditions imposed by the New Jersey Environmental Cleanup Responsibility Act (ECRA) and the Industrial Site Recovery Act (ISRA). The current site owner alleged that the former site owner had not proceeded in a manner that would result in closure of the ECRA/ISRA obligations, addressed adequately the extensive volumes of fill (nearly 40-feet thick in certain locations) underlying the site that the claimant believed constituted hazardous waste requiring excavation and disposal at estimated costs greatly exceeding $10 million and that more recent building demolition represented illegal landfilling. Evaluated numerous reports spanning 25 years that included investigation and remediation of soil, groundwater, fill, free product, sediment, surface water and wetlands to rebut the opinions offered by claimant's experts. In the rebuttal report, provided detailed information regarding the ECRA/ISRA statute and process, the appropriateness of the investigation and remediation conducted to date, and historic and current hazardous and non-hazardous landfill regulations, and established that the fill underlying the site represented neither a hazardous waste nor required removal.
- Provided technical support in a litigation case involving cost recovery for environmental characterization investigations undertaken at several industrial facilities.
- Assisted with litigation support for a project involving the defense of a property owner held liable under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) for contamination of a municipal supply well and private potable supply wells. Developed an expert report which evaluated the potential preferential pathway for downward migration of contaminants due to monitoring wells installed with long open-hole intervals.
- Provided technical support as part of a litigation case involving cost allocation for associated with cleanup of a petroleum hydrocarbon plume impacting numerous residential potable wells and municipal supply wells. Assisted in preparation of expert report in support of allocation of costs at this site with a long and complex ownership and operational history.

- Provided third party oversight in reviewing and evaluating regulatory compliance of investigative and remedial work performed by others including adverse parties or EPA contractors on sites in litigation or under the Superfund statute.
- Provided litigation support in support of cost allocation for remedial actions at former manufactured gas plants across the United States.

## COURSES/CERTIFICATIONS

Certified Hydrogeologist - Washington
OSHA 40-hour Hazardous Waste Operations and Emergency Response Standard - HAZWOPER
Professional Geologist - Washington
OSHA 8-hour Supervisor - HAZWOPER
Subsurface Evaluator Certification - New Jersey

## PUBLICATIONS & PRESENTATIONS

North, Robert W., Sharon E. Burkett, and M. Jennifer Sincock. 2001. Effective Enhancement of Biological Degradation of Tetrachloroethene (PCE) in Ground Water. Presentation at the Sixth International Battelle Symposium on In Situ and On-Site Bioremediation, San Diego. June 4-7, 2001.

Sincock, M.J., S.E. Burkett, and R.W. North. 2001. Chlorinated Solvent Remediation and Plume Management at a Dry Cleaning Facility using an Enhanced InSitu Biodegradation Technology. Presentation at the 2001 International Containment and Remediation Technology Conference, Orlando. June 10-13, 2001

Funk, W., B.C. Moore, S.E. Burkett, and S.T.J. Juul. 1998. Newman Lake Restoration Phase II. State of Washington Water Research Center, Washington State University. Pullman, Washington. Report #87. 90 pp. May.

Eyre, K., M.D. Wilkins, and S. Burkett. 1997. Intrinsic Bioremediation of BTEX and MTBE at a Petroleum Service Station Site. Presentation at the spring meeting at the American Geophysical Union, Baltimore. May 27.

Burkett, S.E. 1991. Groundwater and water and nutrient budget studies of Newman Lake, Washington. Master's Thesis, Washington State University.

## MEMBERSHIPS

National Ground Water Association (NGWA)
New Jersey Water Environment Association (NJWEA)
Society of Women Environmental Professionals (SWEP)

RAMBOLL ENVIRON

ENVIRONMENT & HEALTH

# SCOTT E MACDONALD

## Principal

Scott MacDonald has 30 years of experience in advising private and public companies, law firms and private equity and other financial sector clients on a broad array of environmental matters both domestically and internationally. Specific areas of expertise include risk-based multimedia investigations and remediation under RCRA, CERCLA, New Jersey's ISRA (formerly ECRA) and other state regulatory programs; groundwater quality assessments; chemical fate and transport studies; environmental risk management through liability assessments, EHS compliance auditing, assessment of environmental management systems, due diligence, international finance and insurance underwriting projects, and NEPA or state-equivalent assessments; and technical and strategic support for environmental litigation and arbitration matters. In the area of litigation support Scott has provided expert witness testimony on a range of issues related to the performance or non-performance of environmental obligations; the defense against claims for primary restoration and compensatory damages for groundwater in natural resource damages (NRD) litigation; private-party cost-recovery actions as related to the source, distribution and fate of soil and groundwater contamination; underground storage tanks; CERCLA cost recovery actions; and insurance coverage disputes. Scott has also provided technical assistance in international arbitration matters conducted pursuant to the Inter-American Commercial Arbitration Commission and the International Court of Arbitration of the International Chamber of Commerce. Select examples from his primary practice areas are provided below.


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United States of America


### EDUCATION

1984 MA, Geology, Rice University

1977 BA, Geology, Duke University

### SITE SOLUTIONS

- Designed and implemented soil and groundwater remedial investigations and cleanup plans at dozens of industrial, commercial and waste disposal facilities throughout the US involving petroleum hydrocarbons, volatile organic compounds, chlorinated solvents, polychlorinated biphenyls and metals contamination.
- Directed compliance with the Environmental Cleanup Responsibility Act (ECRA) and the Industrial Site Recovery Act (ISRA) at numerous sites in New Jersey for clients in various industries. These sites have included chemical manufacturing, storage and distribution facilities; petroleum pipeline terminals; a resin and specialty chemicals manufacturing facility; a precious metals refinery; and

printing and publishing facilities. Work has included conducting preliminary assessments, site investigations and remedial investigations; preparing and implementing remedial action work plans; and providing guidance on ECRA/ISRA compliance issues.

- Directed an extensive soil and groundwater investigation under New Jersey's former ECRA and current ISRA at a former precious metals (PM) processing and reclamation facility in Newark, New Jersey. Approximately 75 areas of concern were identified at the site. Built on a 40-acre portion of a former city of Newark municipal landfill, developed a comprehensive risk-based argument supporting limited active soil remediation and pursued an initial remedial strategy based on a statistical comparison between background metal and PAH data and levels present in areas of former industrial activity. Implemented a revised remedial program to address only impacts known or believed to have resulted from prior on-site industrial activities. Soil contamination resulting from historic fill was addressed by a deed notice with engineering controls; metals-impacted groundwater was addressed via a classification exception area of indeterminate duration, given that the contamination resulted from the historic fill.
- Directed a site-wide remedial investigation of soil and groundwater quality at a coating resin manufacturing facility in Newark, New Jersey under New Jersey's former ECRA and ISRA. Designed and implemented a multi-million- dollar, low-temperature thermal desorption remedial program designed to address toluene, ethylbenzene and xylene (TEX) and PAH soil contamination associated with prior industrial operations, including sources of adverse groundwater impacts. Subsequent soil and groundwater sampling confirmed that the remedial action fully achieved the remedial goals to the NJDEP's satisfaction. Assisted with follow-up investigations of several issues that developed following the cleanup program, including ongoing groundwater quality assessment and free product recovery, evaluation of petroleum impacts from underground storage tanks removed after the soil cleanup program and historic fill/deed notice issues with the current owner. Addressed these impacts through injection of oxygen release compound (ORC) in a gallery of points upgradient of the building and at accessible locations within the production area and installed a pneumatic free-product recovery system to address the TEX product beneath the main manufacturing building.
- Served as Principal-in-Charge of a brownfield redevelopment project in the Ironbound section of Newark, New Jersey, vacant since the economic decline of northern New Jersey industry in the mid-1980s. ENVIRON played a key role in the successful completion of negotiations with numerous interested parties for the sale and redevelopment of the site. This 40-acre industrial property was contaminated by heavy metals and organic chemicals from more than 50 years of filling and subsequent industrial activity. Using data from 10 years of extensive investigations, exposure assessment and groundwater modeling, ENVIRON demonstrated that there was no significant risk to on-site construction workers, future employees or ecological receptors. ENVIRON has since worked closely with the current owner to complete the approved site capping remedy, environmental permitting, and negotiations with state and Newark officials to expedite construction of a beverage bottling facility that will ultimately employ 1,000 people.
- Assessed impacts of radiological contamination to soils, groundwater and creek sediments at two large industrial facilities in New Jersey.
- Assisted the former owner of a rubber glove manufacturing facility in responding to an Administrative Order from USEPA pursuant to Section 3013 of the RCRA. This assistance included the review and evaluation of the potential for releases of hazardous wastes from 12 solid waste management units (SWMUs) that were identified by the USEPA in its Visual Site Inspection Report. Examined available data, developed appropriate responses to USEPA concerns and met with representatives of the USEPA Region IV to discuss possible actions to address the SWMUs. Successfully negotiated an agreement with the agency that eliminated the need for further investigation of many of the SWMUs and proposed a limited sampling program for the remaining SWMUs.
- Assisted the PRP and its counsel for the Chemical Leaman Tank Lines (CLTL) Superfund site in developing an alternative groundwater remedy for the site. The site overlies a major water supply aquifer in southern New Jersey and an extensive plume of volatile organic compounds is present beneath the site and surrounding area. The entire plume is over 3000 feet long and

over 1500' wide. The ROD-mandated remedy involved pumping and treating the entire plume at a flow rate of 550 gallons per minute and discharging the treated water to the Delaware River via a 3.5 mile pipeline. The estimated costs of the ROD-mandated remedy were in excess of $25-million. ENVIRON reviewed all of the available site data, conducted groundwater modeling, designed and reviewed the results of a supplemental groundwater investigation, and assisted in the development and negotiation of a strategic approach for modifying the pump and treat remedy with USEPA Region II. Based on the negotiations and information presented, USEPA stayed the construction of the pump and treat remedy pending the development of an alternative remedial action work plan for groundwater. Developed an alternative groundwater remedy, which included the use of chemical oxidation and enhanced *in situ* bioremediation to destroy contaminant mass (including DNAPL) in and around the source areas; and a significantly reduced pumping program, which was developed using optimization techniques, to provide containment of the plume. The alternative has been accepted by USEPA.

- Represented a PRP at a multi-party Superfund site as a member of the PRP Technical Committee. Participated in the oversight of soil remediation activities, the design of the groundwater remediation system and negotiations with USEPA Region II.

**ENVIRONMENTAL RISK MANAGEMENT**

- Designed, directed and conducted comprehensive Phase I environmental site assessment and EHS compliance audits of various industrial and commercial sites and hazardous waste treatment, storage and disposal facilities throughout the US, Canada, Mexico, South America, Asia Pacific, Europe and Africa. These assessments have been conducted on behalf of US and international companies, financial institutions, venture capital groups and law firms and collectively represents a transactional value in excess of several billion dollars. The purpose of these assessments has been to identify environmental concerns that could result in potentially significant liabilities, identify areas of non-compliance with current and anticipated future applicable environmental regulations, estimate the present value of identified environmental liabilities and make recommendations on ways to reduce such liabilities. The facilities assessed represent every major SIC Code including refinery, chemicals, pharmaceuticals, automotive, utilities, steel, metal fabrication, food, pulp and paper, mining, metal plating, textiles, furniture, printing, electronics and electrical power generation.
- Conducted a review of Newmont Mining Corporation (Newmont) Royalty Asset Portfolio facilities. Newmont's Royalty Asset Portfolio includes interests in precious and base metal properties (Mineral Royalties) and in oil and natural gas properties (Oil and Gas Royalties). ENVIRON's due diligence consisted of a review of documents present in a virtual data room containing environmental-related information, a review of publicly available databases, as appropriate, for the US. Royalty Assets, and a review of environmental information in publicly available US Securities and Exchange Commission (SEC) filings, including annual and interim reports to stockholders and 10 Q/10 K Statements, as applicable; telephone interviews with personnel at regulatory agencies with jurisdiction over remediation issues for selected US facilities; and telephone interviews with Newmont Mining personnel with HS&E responsibilities.
- On behalf of a potential purchaser, ENVIRON completed an environmental due diligence review of a group of gold mines located in the Randfontein mining district of South Africa in late 2007. As part of the review, ENVIRON reviewed extensive documentation concerning the mining sites and conducted interviews of key company personnel as well as consultants working for the target company. As part of the due diligence review, ENVIRON identified areas of potential environmental concern associated with the designated assets and ongoing operations as well as the proposed remining/reprocessing of the tailings dumps. ENVIRON also assessed compliance with regulatory programs and evaluated the company's closure cost estimates and the adequacy of its reserves for environmental compliance. Finally, ENVIRON assessed the potential for significant third party claims due to historic releases to the surrounding environment.
- In January 2008, ENVIRON completed a due diligence assessment of several coal mining sites in South Africa on behalf of a potential purchaser. As part of the assessment, ENVIRON

reviewed documentation on the mining sites and their compliance with South Africa's coal mining regulations, conducted site visits and interviewed key company personnel. For this assignment, ENVIRON assessed the target company's compliance with South African mine permitting requirements, reviewed the adequacy of its financial reserves for mine closures, evaluated the potential for acid mine drainage issues to develop at any of the mine sites and reviewed the company's controls for air emissions and surface/groundwater discharges.

- Performed numerous environmental evaluations of land parcels considered for commercial development to determine the extent of possible soil or groundwater contamination.
- Directed a major environmental assessment project, under the National Environmental Protection Act (NEPA), on behalf of a confidential client pursuing US DOE grant and loan funding to support construction of several battery manufacturing facilities in the Midwest. Responsibilities include site selection and screening; assisting in the design of the manufacturing facilities to meet local, state and federal regulations; review of existing background, permitting and compliance documents related to wetlands and protected areas, cultural resources, visual or aesthetic resources, threatened and endangered species, land development constraints, traffic, noise, and various environmental regulatory programs; preparation and completion of the DOE loan and grant environmental questionnaires; meetings with personnel from DOE's NEPA Compliance Division to discuss the scope of the environmental assessment (EA) and presentation of initial findings; and preparation of a draft EA for NEPA compliance. The draft EA analyzes the consequences of the proposed action and alternatives on the human and natural environment and recommended mitigation strategies for potential adverse impacts.
- Directed an environmental assessment to analyze the potential environmental consequences of the White River Oil Shale research, development and demonstration project (referred to as the "RD&D Project") as proposed by the Oil Shale Exploration Company, LLC (OSEC) for the 160-acre White River Mine lease site. The EA assisted the Bureau of Land Management (BLM) in project planning and ensuring compliance with NEPA, and in making a determination as to whether any "significant" impacts may result from the analyzed actions. The purpose of the proposed action was to lease 160 acres of public land for a research, development and demonstration project that will inform and advance knowledge of commercially viable production, development and recovery technologies consistent with sound environmental management. Major components of the proposed project with the potential for environmental impacts and which were considered in the EA include: oil shale mining, including the mining methods, quantity of material mined, and the surface handling, crushing and stockpiling of the raw oil shale; oil shale processing; handling, storage and disposal of spent shale, process water and other wastes; infrastructure development, including water and energy supplies, water and sewer treatment facilities, and other on-site construction activities. The key environmental issues addressed include potential impacts from air emissions; wastewater generation and treatment; water supply and usage; energy supply construction and usage (electricity, propane and natural gas); material and waste handling (including spent shale); and site operational management (e.g., mine dewatering, mine ventilation, dust from crusher). The EA analyzed the consequences of the proposed action and alternatives on the human and natural environment and recommended mitigation strategies for potential adverse impacts. The potential application of carbon sequestration was also evaluated as part of this work and host sites identified.

**ENVIRONMENTAL DISPUTES**

- Provided expert litigation assistance, including **arbitration hearing testimony**, in support of a major glass manufacturer against a claim from a successive owner of a site in southern New Jersey for voiding the 2000 property sale and purchase agreement due to violations of that agreement and preconditions imposed by the New Jersey ECRA and ISRA. In addition, the claimant was seeking compensatory damages of approximately $500,000. In the subject claim, the current site owner alleged that the former site owner had not proceeded in a manner that would result in closure of the ECRA/ISRA obligations, addressed adequately extensive volumes of fill (nearly 40-feet thick in certain locations) underlying the site that the claimant believed constituted hazardous waste requiring excavation and disposal at estimated

costs greatly exceeding $10 million and that more recent building demolition represented illegal landfilling. Evaluated numerous reports spanning 25 years that included investigation and remediation of soil, groundwater, fill, free product, sediment, surface water and wetlands to rebut the opinions offered by claimant's experts. In the rebuttal report and arbitration testimony, provided detailed information regarding the ECRA/ISRA statute and process, the appropriateness of the investigation and remediation conducted to date, and historic and current hazardous and non-hazardous landfill regulations, and established that the fill underlying the site represented neither a hazardous waste nor required removal.

- **Arbitration assistance to the government of Panama:** Ramboll Environ provided technical assistance to the government of Panama and its legal advisers in an arbitration involving the impact of new economic legislation on a pre-existing contract for oil refinery services, as well as environmental contamination caused by refinery activities. The arbitration was conducted pursuant to the provisions of the Inter-American Commercial Arbitration Commission. My work included site inspection, sampling and estimation of response costs to address environmental contamination associated with refinery operations in order to comply with national environmental standards, and the preparation of an expert report.

  **Arbitration assistance to a confidential client:** Ramboll Environ provided technical assistance to an industrial client in a post-acquisition dispute regarding contractual obligations under a Share Purchase Agreement. The arbitration was conducted pursuant to the provisions of the International Court of Arbitration of the International Chamber of Commerce. My work included oversight of pre-closing environmental due diligence and post-closing EHS compliance audits for sites in Brazil, Italy and Spain, remedial investigations of sites in Spain with known or suspected environmental impairment, and the preparation of a Witness Statement highlighting areas of environmental liabilities and regulatory noncompliance.

- Assisted the former owner of a shopping center in negotiations with the New Jersey Department of Environmental Protection (NJDEP) Office of Natural Resource Recovery (ONRR) regarding settlement of natural resource damages (NRD) claims due to perchloroethylene (PCE) groundwater contamination associated with a former dry cleaner at the shopping center. ENVIRON had previously developed a Classification Exception Area (CEA) proposal for the PCE plume as part of a natural attenuation remedy that the NJDEP had approved for the site. After the NJDEP approved the CEA, the ONRR submitted a demand to the client to settle an NRD claim based on ONRR's valuation of the groundwater injury using a settlement formula that calculated the monetary damages based on the conservative CEA boundary, which extended beyond where groundwater contamination was known to exist. ENVIRON met with the ONRR and negotiated a revised NRD settlement of approximately 50 percent of the initial demand using the current plume configuration, not its projected extent or the footprint of the CEA.

- Provided expert litigation assistance, including trial testimony, in support of a confidential client's defense against a claim from NJDEP for primary restoration costs and compensatory damages for groundwater at a former resin and chemical manufacturing facility. In the subject claim, the NJDEP sought compensation on the order of $32-million under its Natural Resource Restoration program for alleged loss of groundwater resources due to chlorinated volatile organic compound (VOC) contamination of shallow and intermediate bedrock aquifer zones. As part of its claim, the NJDEP proposed that an ongoing active groundwater extraction and treatment remedy be accelerated to compress the projected time to achieve pre-discharge conditions in groundwater in an area where groundwater is not, and cannot be, used for drinking water purposes. Evaluated historical soil and groundwater quality data, and the scope and progress of the ongoing active groundwater remediation, to rebut the opinions offered by Plaintiff's experts. In the rebuttal report and trial testimony, provided detailed analyses regarding the site geology and hydrogeology to refute contaminated groundwater volume estimates derived from an inflated aquifer porosity estimate, the extent of groundwater contamination over time, the extent to which the overall improvement resulting from the active cleanup program failed to support the proposed expedited enhanced remedy, and the reasons for which the bedrock zones at issue were not a viable drinking water resource and did not impacts such resources.

- Provided expert litigation assistance, including trial testimony, in support of a confidential client's defense against a claim from NJDEP for primary restoration costs and compensatory

damages for groundwater at a former adhesives manufacturing facility. In the subject claim, the NJDEP sought compensation on the order of $9-million under its Natural Resource Restoration program for alleged loss of groundwater resources due to chlorinated volatile organic compound (VOC) contamination of the overburden aquifer. The restoration activities proposed by the NJDEP were designed to achieve non-detectable VOC concentrations in soil and pre-discharge conditions in groundwater in an area where groundwater is not, and cannot be, used for drinking water purposes. Evaluated historical soil and groundwater quality data, and the scope and outcome of multiple phases of active groundwater remediation, to rebut the opinions offered by Plaintiff's experts. In the rebuttal report and trial testimony, provided detailed analyses regarding the source and extent of groundwater contamination over time, the extent to which available soil and groundwater data failed to support the proposed remedies, the efficacy of an *in situ* groundwater remedial action to address residual impacts, and the reasons for which the overburden is not a viable drinking water resource.

- Retained as an expert in an insurance cost recovery matter involving an electronics equipment production facility related to disputed coverage for actions taken to address soil and groundwater contamination under RCRA. Evaluated hazardous waste management units and other areas using site-specific information regarding the source and timing of known and/or potential releases and impacts relative to the policy period, and also considered the driver for the remedial work that was previously completed, the degree to which post-policy impacts may have contributed to the identified contamination, and any relevant evidence that may have been lost given the extended period of time between identification of those impacts and the policy holder's filing of claims. Directed contaminant transport calculations to determine timing of impacts. Evaluated the additional obligations associated with a remedial investigation/feasibility study (RI/FS) Order on Consent for the site and its factual accuracy. Supervised detailed cost analyses of projected future remedial expenses and developed reasonable alternate remedial projections. Made presentation to neutral third-party mediator regarding the extent of releases during the policy period.
- Retained as an expert in a private party cost recovery matter related to the source(s) of chlorinated hydrocarbon contamination at a former metal parts production facility adjacent to a CERCLA site. Evaluated the history of on-site virgin and waste solvent handling and storage, as well as the lateral and vertical distribution of soil contamination, in support of the conclusion that a single on-site former underground storage tank represented the most likely source of the impacts. Identified the lack of repaving in the former underground storage tank area as the source of a perched water condition that enhanced lateral and vertical transport of the pre-existing chlorinated hydrocarbon soil contamination. Prepared an expert report and assisted outside counsel in mediation efforts.
- Retained an as expert in a toxic tort and residential home habitability litigation matter related to a residents' claims that a release of elemental mercury during the replacement of a pressure regulator on a natural gas meter in the home's basement caused the home to be uninhabitable and also resulted in health problems for the former occupants. Evaluated the scope and adequacy of remedial efforts undertaken to address the release, and the validity of post-remedial air sampling data in assessing the habitability of the home. Prepared an expert report and gave oral deposition testimony.
- Retained as an expert in a professional malpractice insurance matter regarding the state of the practice of environmental due diligence evaluation, including applicable industry guidance, in the early 1990s related to a claim that an auditor completing an environmental site assessment at that time did not properly identify "recognized environmental conditions." Subsequent investigations of the property identified significant groundwater contamination resulting from former discharges to a sump in a vapor degreaser pit. Prepared an expert report.
- Retained as an expert as part of a contract dispute to evaluate known or suspected environmental impairments at a petroleum refinery located in Colon, Panama. Evaluated the history of facility operations, the results of site investigations and expected costs for restoration of the environmental contamination located at and near the refinery site. Considered international cleanup standards/norms as well as Panamanian regulations. This work included preparation for testimony to an international tribunal.

- Retained as an expert in an insurance cost recovery matter involving an electronics equipment production facility related to disputed coverage for actions taken to address soil and groundwater contamination under RCRA. Reviewed the nature of sampling, the timing of potential releases, regulatory triggers and evidentiary losses, given the time elapsed between known or potential releases and the filing of the claim, as well as a settlement report and remedial cost estimates prepared as part of the settlement negotiations. Evaluated deposition testimony and affidavits regarding past and future remedial action costs, and prepared rebuttal documents regarding those costs. Gave testimony to a third-party mediator.
- Retained as an expert in an ongoing litigation matter related to soil and groundwater contamination at a solvent blending facility with more than 30 former underground storage tanks (USTs). The operator of this facility is seeking recovery for past and future environmental remediation costs, alleging that a preponderance of site contamination resulted from a catastrophic release of methylene chloride due to the failure of a single UST following completion of a vacuum-based integrity test. The work performed included evaluation of the historical distribution of methylene chloride and other solvents in groundwater at the site, the nature and type of remedial investigations, the scope and timing of remedial actions, and preparation of an expert report. ENVIRON determined that the UST testing results and contaminant profiles were inconsistent with the alleged tank failure theory. Rather, multiple industrial sources and releases likely contributed to adverse groundwater impacts over time, and that delays in historical remedial investigations and actions most likely materially exacerbated the distribution of contamination, potentially enabling off-site migration of contaminated groundwater and contamination of underlying aquifers. Prepared an expert report and gave oral deposition testimony.
- Retained as an expert in a cost recovery matter involving a resin manufacturing facility. The work performed included evaluation of the nature and sources of contamination, as well as the migration and persistence of contaminants given site conditions. Prepared an expert report, gave oral depositions and prepared for trial testimony.
- Retained as an expert involving the defense of a former property owner held liable for property devaluation due to groundwater contamination allegedly associated with operations of former underground storage tanks at the property. As part of this case, the work performed included the review of documents related to environmental investigations and cleanup conducted at the property and at off-site, adjacent properties, preparation of an expert report opining on the source(s) of groundwater contamination and preparation for trial testimony. The age of the tanks, nature of materials contained in the tanks, actions taken at the time of tank removal and subsurface conditions were considered as part of this assignment.
- Retained as an expert by a PRP of a multi-party Superfund site to develop a groundwater allocation scheme reflecting the contribution to chlorinated hydrocarbon contamination from the Superfund site versus off-site industrial properties located within the groundwater plume. An additional level of complexity was inherent in this assignment since ENVIRON's client had liability for the Superfund site proper but was also the owner of a contaminated property located within the plume. The nature of site activities, including the use of USTs, contaminants detected, subsurface conditions and other relevant factors were considered. Technical arguments were presented before a third-party neutral.
- Co-managed a large litigation support project involving the defense of a former owner of nine industrial facilities contaminated with volatile organic compounds, polychlorinated biphenyls and metals. Participated in the development of technical strategies, preparation of an expert report and development of deposition questions.
- Provided deposition testimony regarding site investigation and remediation activities at an electronic components manufacturing facility on behalf of an industrial client in an insurance litigation case.
- Managed a litigation support project involving the defense of a former property owner held liable for the radiological contamination of soil. Reviewed site investigation data and results of site cleanup activities, developed technical strategies and prepared an expert report.

- Managed a litigation support project involving the defense of a property owner held liable for costs associated with the investigation and remediation of PCB-contaminated materials. As part of this cost recovery case, the work performed included the review of documentation of the environmental investigation and cleanup and preparation of an expert report providing opinion as to whether the work conducted was necessary and reasonable with respect to applicable federal, state and local regulations.

**Prior to joining ENVIRON, Scott was a lead hydrogeologist and project manager at ERM-Southwest, Inc. in Houston, Texas, where he managed remedial groundwater investigations at several Superfund and other hazardous waste sites, refineries and petrochemical plants.**

- Developed a technical approach for conducting a groundwater migration management remedial investigation at a Texas Superfund site. Developed a comprehensive work plan, a quality assurance/quality control plan, a health and safety plan, and a schedule for implementation; and provided technical support for developing a source control feasibility study work plan, which included risk assessment, remedial concept development and cost evaluation.
- Provided technical support for critiquing a USEPA RI/FS at an Oklahoma Superfund site. Assisted in developing a work plan for geological studies pertaining to the feasibility of on site containment of wastes.
- Managed numerous remedial groundwater investigations at hazardous waste sites to detect groundwater contamination and identify potential lateral and vertical migration pathways.
- Coordinated groundwater assessments and remedial investigations at various Gulf Coast refineries, petrochemical plants, and abandoned waste sites.
- Prepared an alternate concentration limits (ACL) demonstration for a major Gulf Coast refinery.
- Prepared geology reports and groundwater monitoring system designs required by the RCRA Part B permit applications for several major oil and petrochemical companies.
- Prepared stratigraphic cross-sections and completed hydrogeologic models to estimate groundwater flow velocity and potential contaminant migration as part of groundwater assessments and RCRA Part B permitting requirements.

## CREDENTIALS

Registrations and Certifications

Professional Geologist: Pennsylvania

Professional Affiliations and Activities

Member, Association of Groundwater Scientists and Engineers

Member, Environmental Law Institute

## PUBLICATIONS & PRESENTATIONS

MacDonald, S.E. 2007. Forensics for Litigators: Presented at the New Jersey Law Center, a seminar sponsored by the New Jersey Institute for Continuing Legal Education, New Brunswick, NJ. November.

MacDonald, S.E. 2000. Environmental Due Diligence of Impaired Properties. Presented at Government Institutes Conference: Brownfields Redevelopment Programs in the 21st Century, Washington, D.C. September.

MacDonald, S.E. 1999. Doing Diligence: Environmental Due Diligence as Risk Management. Presented at Managing Environmental Risks in Financial Transactions, a seminar sponsored by Milbank, Tweed, Hadley & McCloy, Los Angeles, CA. May.

Highland, J.H., M.A. Scott, and S.E. MacDonald. 1988. Field investigations: Value and interpretation of results. Paper presented at the First Annual Environmental Claims and Litigation Conference, Executive Enterprises, Inc., Washington, D.C. October.

MacDonald, S.E., and S.R. Vokey. 1988. Practical Aspect of Hazardous Waste Management. Lecture series given for industry, San Diego, CA. March.

MacDonald, S.E., and R.C. Bost. 1987. Fundamentals of hydrogeological investigations. Lecture series given for the Houston Geological Society, Houston, Texas.

Bost, G.A., R.C. Bost, S.E. MacDonald, J.M. Schmittle, S.C. Evans, and S.H. Calhoun. 1986. Topographic influence of impermeable subsurface strata on design of remedial measures for a shallow aquifer with multiphase contamination. In Proceedings of the Seventh Annual Meeting of the Society of Environmental Toxicology and Chemistry, Arlington, Virginia, November.

Bost, G.A., S.E. MacDonald, and R.C. Bost. 1986. Implications of analytical results on interpretation of contaminant migration in a multiphase groundwater source. In Proceedings of the Seventh Annual Meeting of the Society of Environmental Toxicology and Chemistry, Arlington, Virginia, November.

MacDonald, S.E., and J.B. Anderson. 1986. Paleoceanographic implications of terrigenous deposits on the Maurice Ewing Bank, southwest Atlantic Ocean. Marine Geology 71:259-287.