RECORD OF DECISION

Operable Unit One
New Cassel/Hicksville Ground Water Contamination Superfund Site
Towns of North Hempstead, Hempstead and Oyster Bay,
Nassau County New York

United States Environmental Protection Agency
Region 2
New York, New York
September 2013

692289

R2-0012323

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

New Cassel/Hicksville Ground Water Contamination Superfund Site
Towns of North Hempstead, Hempstead, and Oyster Bay, Nassau County, New York

Superfund Site Identification Number: NY0001095363
Operable Unit 01

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA's) selection of an interim remedy for OU1 of the New Cassel/Hicksville Ground Water Contamination Superfund site (Site), in the Towns of North Hempstead, Hempstead, and Oyster Bay, New York, which is being chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. §§ 9601-9675, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the OU1 remedy. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selected remedy is based.

The New York State Department of Environmental Conservation (NYSDEC) was consulted on the proposed remedy in accordance with CERCLA Section 121(f), 42 U.S.C. § 9621(f), and concurs with the selected remedy (see Appendix IV).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The response action in this ROD represents the first remedial phase, or first operable unit (OU), for the Site. It actively addresses groundwater contamination in the area downgradient of Old Country Road, Grand Boulevard, and the New Cassel Industrial Area (NCIA) and is considered an interim remedy which is intended to address only this portion of the Site. The EPA anticipates conducting a separate investigation of one or more additional OUs to address groundwater contamination at the Site, including in the far-field area farther downgradient of the portion of the plume addressed in this OU1. Additional planned OUs for the Site include, but may not be limited to, areas of groundwater contamination impacting the Hicksville water supply wells 5-2, 5-3, 4-2, 8-1, 8-3, 9-3 and Hempstead-Levittown water supply well 2A.

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The major components of the selected remedy include the following:

- A combination of (a) in-situ treatment of groundwater via in-well vapor stripping and (b) extraction of groundwater via pumping and ex-situ treatment of extracted groundwater prior to discharge to a publicly owned treatment works or reinjection to groundwater (to be determined during design). The purpose is to establish containment and effectuate removal of contaminant mass where concentrations of total volatile organic compound concentrations are greater than 100 micrograms per liter;

- In-situ chemical treatment, such as in-situ chemical oxidation, to target high concentration contaminant areas, as appropriate;

- Implementation of long-term monitoring to track and monitor changes in groundwater contamination in OU1 to ensure the remedial action objectives are attained;

- Development of a Site Management Plan to ensure proper management of the remedy post-construction. The Site Management Plan will include provisions for any operation and maintenance and long-term monitoring required for the remedy, as well as periodic certifications; and

- Institutional controls consisting of any existing local requirements that prevent installation of drinking water wells, and informational devices to limit exposure to contaminated groundwater.

Individual facilities within the NCIA are considered to be among the sources of groundwater contamination for OU1. Response actions which are addressing sources of contamination in the NCIA are being conducted at those upgradient facilities, and they continue to be overseen by NYSDEC under its state hazardous waste cleanup program. The on-going, State-authorized response actions at the NCIA facilities are not part of this OU1, although the successful completion (*i.e.*, source control or cleanup) of addressing the source area(s) at the upgradient individual NCIA facilities, under NYSDEC oversight are anticipated and was assumed in evaluating the potential for attaining the objectives of the selected remedial alternative in this ROD. In the event that theses sources are not successfully addressed, the EPA may elect to evaluate additional options at individual NCIA facilities pursuant to CERCLA in a future operable unit to ensure the effectiveness of the selected remedy.

The environmental benefits of this remedy may be enhanced by giving consideration, during the design phase, to technologies and practices that are sustainable in accordance with the EPA Region 2's Clean and Green Energy Policy[1]. This will include consideration of green remediation technologies and practices, including granular activated carbon regeneration.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA Section 121, 42 U.S.C. § 9621, in that it: 1) is protective of human health and the environment; 2) meets a level or standard of control of the hazardous substances, pollutants and contaminants which at

[1] See http://epa.gov/region2/superfund/green_remediation.

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least attains the legally applicable or relevant and appropriate requirements under federal and state laws (unless a statutory waiver is justified); 3) is cost-effective; and 4) utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances as a principal element (or justify not satisfying the preference).

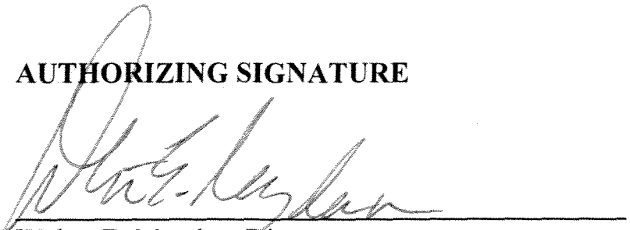
This remedy will result in hazardous substances, pollutants, or contaminants remaining at this OU until performance standards are attained, and as such, use and exposure must be limited until such standards are met. Since it may take more than five years to attain the cleanup levels, policy reviews pursuant to Section 121(c) of CERCLA will be conducted no less often than once every five years after the completion of construction to ensure that remedy is, or will be, protective of human health and environment.

DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record for this Site.

- ✓ A discussion of the current nature and extent of groundwater contamination is included in Section 5.8;
- ✓ Chemicals of concern and their respective concentrations may be found in Section 7 "Summary of Site Risks" and Table 7 in Appendix II;
- ✓ Potential adverse effects associated with exposure to Site contaminants may be found in Section 7 "Summary of Site Risks";
- ✓ A discussion of cleanup levels for chemicals of concern may be found in Section 8 "Remedial Action Objectives" and in Table 7 in Appendix II;
- ✓ A discussion of principal threat waste is contained in Section 11 "Principal Threat Wastes";
- ✓ Current and reasonably-anticipated future land use assumptions are discussed in Section 6 "Current and Potential Future Land and Resources Uses";
- ✓ Estimated capital, annual operation and maintenance, and total present worth costs are discussed in Section 9 "Descriptions of Alternatives"; and
- ✓ Key Factors in detailed analyses of viable remedial alternatives (*e.g.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria) may be found in Section 10 "Comparative Analysis of Alternatives" and Section 13 "Statutory Determinations."

AUTHORIZING SIGNATURE



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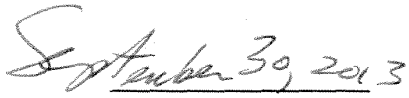

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DECISION SUMMARY

1. SITE NAME, LOCATION, AND DESCRIPTION

The New Cassel/Hicksville Ground Water Contamination Superfund site (Site) comprises a widespread area of groundwater contamination within the Towns of North Hempstead, Hempstead, and Oyster Bay, Nassau County, New York. The Site is estimated to include approximately 6.5 square miles that has been characterized by volatile organic compound (VOC) contaminated groundwater that has impacted several water supply wells, including four Town of Hempstead wells (Bowling Green 1 and 2, Roosevelt Field 10, and Levittown 2A), six Hicksville water supply wells (4-2, 5-2, 5-3, 8-1, 8-3, and 9-3), and one Village of Westbury water supply well (11). Analytical results of groundwater samples from the Site have revealed concentrations of VOCs in excess of the EPA's promulgated health-based protective maximum contaminant levels (MCLs), which are enforceable standards for various drinking water contaminants and New York State's standards.

This Record of Decision (ROD) addresses a discrete portion of contaminated groundwater downgradient of the New Cassel Industrial Area (NCIA), which is managed and referred to as Operable Unit 1 (OU1) of the Site. The Site's OU1 is located within the Towns of North Hempstead and Hempstead. OU1 is located primarily in Salisbury, an unincorporated area of the Town of Hempstead; however the portion of OU1 north of Grand Boulevard is located within the Hamlet of New Cassel in the Town of North Hempstead. A Site location map, which highlights the area encompassing OU1, is provided as Figure 1 in Appendix I.

The area comprising OU1 includes approximately 211 acres and consists of residential properties, as well as some commercial areas. Upgradient of OU1, the NCIA encompasses approximately 170 acres of land. The NCIA is bounded by the Long Island Railroad to the north, Frost Street to the east, Old Country Road to the south and Grand Boulevard to the southwest.

The Town of Hempstead's Bowling Green Water District operates Wells 1 and 2 on property located within OU1. The Bowling Green Water District has been treating groundwater pumped from these two wells since 1990, when a granular activated carbon (GAC) system was installed. Five years later the treatment system was supplemented with an air stripper, and the treatment systems continue to be in operation. The Town of Hempstead continues to maintain monitoring and treatment activities to address VOC contamination prior to its distribution to the drinking water system.

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

In 1986, as part of a county-wide groundwater investigation, Nassau County Department of Health identified extensive groundwater contamination throughout the NCIA. Groundwater data revealed that contaminants from the NCIA impacted the Bowling Green Water District water supply, which is comprised of two water supply (extraction) wells and is approximately 1,000 feet downgradient of the NCIA[2]. The NCIA was developed for industrial use during the 1950s

[2] Both of the Bowling Green water supply wells were constructed in 1975 and have a permitted pumping capacity of 1,400 gallons per minute.

through the 1970s and remains densely populated with an estimated 200 industrial and commercial properties. Review of Nassau County Department of Health and New York State Department of Environmental Conservation (NYSDEC) reports indicates that leach pools and/or dry wells located on upgradient properties in the NCIA were generally used for disposal of wastewater at these facilities until sewers were installed.

Following the Nassau County Department of Health investigation and the Town of Hempstead's steps to protect its water supply system, NYSDEC conducted site assessment activities within the NCIA from 1994 to 1999 to identify the sources of the groundwater contamination. Based on NYSDEC's findings, 17 individual facilities within the NCIA were listed on NYSDEC's Registry of Inactive Hazardous Waste Disposal Sites between May 1995 and September 1999. Investigations have been completed, and response actions have been selected by NYSDEC under state law for the 17 facilities. Of the 17 facilities, five require no further action, one requires further monitoring, and 11 have on-going response actions including continued operation of air sparging and soil vapor extraction systems.

NYSDEC determined that a variety of disposal activities within the NCIA had resulted in the disposal of hazardous wastes, including 1,1,1-trichloroethane (TCA), tetrachloroethene (PCE), and trichloroethene (TCE), which are chlorinated VOCs. Some of these hazardous wastes were released or have migrated from the NCIA to surrounding areas, including the area bordering the NCIA south of Old Country Road and Grand Boulevard. Individual facility descriptions, operational/disposal histories, and cleanup histories for facilities within the NCIA can be found in NYSDEC's 2003 ROD entitled, "New Cassel Industrial Area Sites, Town of North Hempstead, Nassau County, New York, Off-site Groundwater South of the New Cassel Industrial Area Operable Unit No. 3" (to avoid confusion, note that "OU3" in this instance is the geographical designation that NYSDEC assigned to a portion of the area that the EPA has designated as OU1.)

In October 2003, NYSDEC selected a remedy under its State authorities to address groundwater contamination downgradient of the NCIA. NYSDEC's remedy called for remediation of the upper and deep portion of the aquifer (to a depth of 225 feet below ground surface (bgs)) with in-well vapor stripping/localized vapor treatment. NYSDEC's remedy included a contingency plan to utilize ex-situ extraction and treatment (more commonly known as groundwater pump and treat) if pilot-testing caused NYSDEC to determine that the State's remedy was less practical because of engineering or economic reasons.

The State has not implemented the 2003 remedy it selected under its state authorities. Rather, it carried out pre-design activities and then requested that the EPA include the Site on the National Priorities List (NPL). In 2009, NYSDEC retained consultants to perform pre-design investigations, and based on that first investigation, NYSDEC determined that the Magothy aquifer is anisotropic,[3] and as a result, concluded that in-well vapor stripping may not be an effective technology for remediating all of the groundwater. Thereafter, NYSDEC decided that the contingency remedy of ex-situ extraction and treatment of the contaminated groundwater was more appropriate, and a subsequent pre-design investigation for the contingency remedy was

[3] In an anisotropic aquifer, the hydraulic conductivity (measurement of ease in which water can flow through the aquifer material) is different in the horizontal and vertical direction.

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completed in December 2011. However, as mentioned above, this remedy has not been implemented. No further actions were taken by NYSDEC related to what they referred to as the off-site groundwater south of the NCIA. On September 16, 2011, the EPA listed the Site on the NPL.

3. COMMUNITY PARTICIPATION

On July 26, 2013, the EPA released the Proposed Plan for cleanup of OU1 of the Site to the public for comment. The EPA assembled supporting documentation, which comprises the administrative record, and has made it available to the public at the information repositories maintained at the Westbury Public Library in Westbury, New York, and the EPA Region 2 Office in New York City.

Notice of the July 26, 2013 start of the public comment period and the availability of the above-referenced documents was published in *The Westbury Times* on July 31, 2013. The public comment period, originally scheduled to be 30 days, was extended to September 24, 2013, after EPA received a request for an extension of time. Notice of an extension to the public comment period to September 24, 2013 was published in *The Westbury Times* on August 23, 2013. Copies of both public notices published in *The Westbury Times* can be found in Appendix V.

On August 15, 2012, the EPA held a public meeting at the "Yes We Can" Community Center in North Hempstead to inform local officials and interested citizens about the Superfund process, to present the Proposed Plan for OU1 of the Site, including the preferred proposed remedial alternatives, and to respond to questions and comments from the attendees. Responses to the questions and comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (See Appendix V).

4. SCOPE AND ROLE OF RESPONSE ACTION AT OPERABLE UNIT ONE

Section 300.5 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Section 300.5, defines an OU as a discrete action that comprises an incremental step toward comprehensively addressing a site's problems. A discrete portion of a remedial response eliminates or mitigates a release, a threat of release, or pathway of exposure. Cleanup of a site can be divided into number of OUs, depending on the complexity of the problems associated with the site.

Cleanup of this Site will be addressed in discrete phases or components, and it is anticipated that there will be multiple OUs for the Site, and subsequent Proposed Plans and RODs will address groundwater contamination related to other OUs at the Site.

The primary objectives of the actions set forth in this ROD are to address the OU1 groundwater contamination, reduce the migration of contaminants, and minimize any potential future negative health impacts. This ROD addresses groundwater contamination in the area downgradient of the NCIA and is designated as OU1 for the Site. A map of OU1 is provided as Figure 1, which can be found in Appendix I.

The EPA anticipates conducting a separate investigation of a second OU to address groundwater

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contamination in the far-field area further downgradient of the portion of the plume addressed in this OU1. This would lead to a remedy selection process which may result in the selection of another remedy that would be consistent with the actions selected in this ROD. The remedy selected for OU1 is intended to, among other things, minimize further migration of contaminants while an investigation of the far-field area is being conducted (among other areas). Additional OUs for the Site would include, but may not be limited to, areas of groundwater contamination impacting the Hicksville water supply wells 5-2, 5-3, 4-2, 8-1, 8-3, 9-3 and Hempstead-Levittown 2A. It is anticipated that these other OUs will likewise proceed through the remedy selection process. Furthermore, a subsequent remedy for groundwater at the entire Site, including OU1, will be addressed in a future Proposed Plan and ROD.

Individual facilities within the NCIA are considered to be among the sources of groundwater contamination for OU1. Response actions which are addressing sources of contamination in the NCIA are being conducted at those upgradient facilities, and they continue to be overseen by NYSDEC under its state hazardous waste cleanup program. The on-going, State-authorized response actions at the NCIA facilities are not part of this OU1, although the successful completion (*i.e.*, source control or cleanup) of addressing the source area(s) at the upgradient individual NCIA facilities, under NYSDEC oversight are anticipated and was assumed in evaluating the potential for attaining the objectives of the selected remedial alternative in this ROD.

The effectiveness of the remedy selected in this ROD presumes that the actions currently being overseen by NYSDEC under agreements it has with individual NCIA facility owners/operators will prove to be effective in addressing contaminant sources at those facilities within the NCIA. In the event that contaminant source control is not successfully achieved pursuant to NYSDEC's on-going cleanup efforts, the EPA may elect to evaluate additional options at individual NCIA facilities in separate, subsequent OUs in the future pursuant to the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. §§ 9601-9675, to ensure the effectiveness of the remedy selected by the EPA for this OU1.

5. SUMMARY OF OPERABLE UNIT ONE CHARACTERISTICS

5.1 Overview

In 2011, after the Site was included on the NPL, the EPA commenced its Supplemental Remedial Investigation which resulted in the Supplemental Remedial Investigation Memorandum, dated July 2013. The Supplemental Remedial Investigation Memorandum summarizes historical groundwater data, outlines response activities conducted, characterizes the Site, and provides recommendations for future investigation and response activities at the Site. The evaluation of groundwater contamination downgradient of the NCIA, designated as OU1 by the EPA, included a review of NYSDEC's September 2000 study, October 2003 remedy, and the 2009 and 2011 Pre-Design Investigation Reports.

Section 5 of the Supplemental Remedial Investigation Memorandum includes summaries of these aforementioned investigations conducted under state law with NYSDEC oversight prior to the Site listing on the NPL. The document also provides a summary of Site Characteristics for

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OU1 from the EPA's Supplemental Remedial Investigation.

5.2 Site Geology/Hydrogeology

The principal hydrogeologic units underlying OU1 at the Site are the glacial outwash and morainal deposits known as the Upper Glacial Aquifer (UGA) and the underlying Magothy Formation and Matawan Group (Magothy). Beneath these two units are the clay member and the Lloyd Sand member of the Raritan Formation.

The UGA is estimated to be 40 to 65 feet thick and consists predominantly of coarse-grained sands and gravels. A distinct contact between the UGA and the Magothy units has not been observed in the area. The underlying Magothy formation sediments (estimated to be approximately 600 feet thick) are characterized by sand and silty sand with discontinuous clay and silt layers. Geologic studies in the area have revealed that sediments tend to become finer in size fraction downward in the Magothy formation, except within the basal portion where coarse-grained sands and gravels are prevalent.

Unconfined groundwater is generally found at the Site between 40 and 65 feet bgs, which is near the estimated boundary between the UGA and Magothy aquifers. Groundwater within the UGA and Magothy aquifers flows in a south-southwest direction in the area downgradient of the NCIA. Pumping of the Bowling Green water supply wells is likely to influence the groundwater flow direction above the depth of their production interval of approximately 470 to 580 feet bgs.

5.3 Summary of NYSDEC's 2000 Remedial Investigation Study

By 2000, NYSDEC had performed its remedial investigation activities that included the collection of three rounds of groundwater samples from a network of 50 solitary and clustered groundwater monitoring wells[4] in the vicinity of the NCIA. Groundwater monitoring wells were installed at various depths that targeted four depth ranges (*i.e.*, 0 to 64 feet, 65 to 99 feet, 100 to 124 feet and 125 to 200 feet bgs). Early warning monitoring well clusters located upgradient of the Bowling Green water supply wells, were also sampled at depths ranging from 132 to 164 and 504 to 516 feet bgs. These early-warning monitoring wells were installed to monitor contamination in the groundwater upgradient of the two Bowling Green water supply wells. The early-warning monitoring wells became part of a network of monitoring wells that were sampled in support of NYSDEC's investigation of the groundwater contamination downgradient of the NCIA.

Groundwater samples were analyzed for VOCs. During the third round of sampling, samples from a subset of the groundwater monitoring wells were also analyzed for physical and chemical parameters to assist in a monitored natural attenuation evaluation. Additionally, 39 groundwater samples were collected from four Hydropunch® borings (GWHP-01 through GWHP-04) in 2000. The location of the monitoring wells and Hydropunch® borings can be found in NYSDEC's September 2000 Remedial Investigation Report for the "New Cassel Industrial Area Off-site Groundwater."

[4] The term "clustered groundwater monitoring wells" refers to monitoring well locations where there are two or more wells at different depth intervals.

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5.3.1 Summary of NYSDEC's Remedial Investigation Results

NYSDEC concluded in its 2000 Remedial Investigation Report for the "New Cassel Industrial Area Off-site Groundwater," that the primary contaminants were PCE, TCE, and TCA. Breakdown products of PCE, TCE, TCA and other minor constituents within the VOC category were also present. Three groundwater plumes were identified within the NYSDEC's study area downgradient of the NCIA, and they were identified as having emanated from the NCIA. NYSDEC attributed the source of groundwater contamination within its study area to the individual NYSDEC Registry facilities located upgradient and within the NCIA. Potential sources of groundwater contamination from sources upgradient of the NCIA were not identified. Groundwater samples collected from upgradient wells as part of the State's investigation contained levels of PCE from nondetect to 14 µg/L and no detectable levels of TCE.

The distribution of contamination within NYSDEC's study area was determined to be influenced by local geology and hydrogeology. This included the effect from the pumping of the Bowling Green water supply wells which produces a significant downward vertical gradient (*i.e.* drawing the groundwater deeper and toward it) in the vicinity of the NCIA. Additionally, NYSDEC determined that the presence of some breakdown products suggests that biodegradation of VOCs has occurred; however, the degree of biodegradation is limited within the area downgradient of the NCIA.

5.4 NYSDEC's 2003 Remedy Selection

In October 2003, NYSDEC selected a remedy under its State authorities to address what it termed the "Off-site Groundwater South of the New Cassel Industrial Area." NYSDEC's remedy called for remediation of the upper and deep portion of the aquifer (to a depth of 225 feet bgs) with in-well vapor-stripping/localized vapor treatment. NYSDEC's remedy included a contingency plan to utilize ex-situ extraction and treatment (more commonly known as groundwater pump and treat) if it were determined during pilot testing that the in-well approach is less practical because of engineering or economic reasons.

5.5 NYSDEC's 2006 to 2009 Vapor Intrusion Investigations

From 2006 to 2009, NYSDEC conducted vapor intrusion investigations downgradient of the NCIA. Investigations were conducted in three phases to assess whether VOCs from the NCIA are volatilizing and entering structures in areas in the vicinity of the NCIA.

Phase 1 was conducted in September 2006 and included the collection of soil vapor samples at 38 locations throughout NYSDEC's study area downgradient of the NCIA. At each of 38 locations, one sample was collected approximately six to ten feet above the water table (generally 29 to 45 feet bgs), and one sample was collected at approximately eight feet bgs (the typical depth of a building's foundation).

As a screening evaluation, NYSDEC compared results from the Phase 1 soil vapor sampling to the New York State Department of Health's (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated September 2006, which includes guidelines for indoor air concentrations for PCE and TCE, which are 100 and 5 micrograms per cubic meter (µg/m^3),

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respectively. This comparison provided for the targeting of locations for subsequent phases of the vapor intrusion investigation. Phase 1 results identified PCE concentrations up to 1,086 $\mu g/m^3$. TCE was identified at concentrations up to 363 $\mu g/m^3$. Based on the results, NYSDEC determined that indoor air sampling should be conducted at W.T. Clarke High School as soil vapor samples within the vicinity identified TCE concentrations above NYSDOH air guidelines.

Phase 2 began in September 2007 and included the collection of six indoor air samples from the basement and first floor locations and one outdoor (ambient air) location at the W.T. Clarke High School. Phase 2 results were compared to NYSDOH air guidance values, and concentrations of the identified NYSDEC's contaminants of concern were below levels of concern. The ambient air sample, which serves as a measurement of background concentrations, had a concentration of TCE at 3.71 $\mu g/m^3$. The TCE ambient air result was higher than the indoor air concentrations and was, therefore, unlikely the result of volatilization of contaminants from contaminated groundwater. The maximum concentration of PCE 2.28 $\mu g/m^3$ from a first floor indoor air sample was below both NYSDOH and the EPA guidance values. Additionally, concentrations of carbon tetrachloride and benzene were identified up to 0.831 $\mu g/m^3$ and 1.95 $\mu g/m^3$, respectively. While NYSDOH did not have an indoor air guidance value for carbon tetrachloride and benzene, these values do not exceed the EPA's upper bound acceptable risk levels for those two substances.

Phase 3 was conducted in March 2009, and included collection of outdoor air, indoor air and/or subslab samples at the W.T. Clarke High School, seven residential properties, and a Town of Hempstead Water Department facility. Phase 3 results at the W.T. Clarke High School did not identify detections in indoor air or subslab samples above levels of concern. Both PCE and TCE were not detected in the indoor air above their reporting limits. TCA was detected in the indoor air up to 1.3 $\mu g/m^3$ and, while NYSDOH does not have an indoor air guidance value for this VOC[5], it does not exceed the EPA's current risk based screening level of 5,200 $\mu g/m^3$. Methylene chloride was detected at concentrations of up to 14 $\mu g/m^3$ in the indoor air, however, NYSDOH's air guidance value is 60 $\mu g/m^3$. Based on these results, NYSDEC determined that no further action was necessary, which was in accordance with NYSDOH's 2006 Guidance.

Results from Phase 3 sampling at the seven residential properties did not identify detections in the indoor air above levels of concern for NYSDEC's contaminants of concern. Subslab sampling at six residential properties indicated that the highest concentrations of PCE and TCE were 15 $\mu g/m^3$ and 14 $\mu g/m^3$, respectively. Based on comparison of these results to NYSDOH's 2006 Guidance, one residence, located approximately 500 feet downgradient from the NCIA was selected for future monitoring.

Phase 3 additionally included vapor intrusion sampling at a Town of Hempstead Water Department facility located at the Bowling Green water supply wells. Chloroform, a compound for which the NYSDOH does not have a respective air guidance value, was detected in the indoor air at concentrations of 150 $\mu g/m^3$ and in the subslab at concentrations of 81,000 $\mu g/m^3$. The EPA's current risk based industrial indoor air value for chloroform is 0.53 $\mu g/m^3$. Other

[5] NYSDOH's 2006 *Guidance for Evaluating Soil Vapor Intrusion in New York State* provides guidance on actions that should be taken to address current and potential exposures related to soil vapor intrusion and can be used to evaluate indoor air data for 1,1,1-TCA. Currently, there are no NYSDOH air guidance values for sub-slab data.

NYSDEC contaminants of concern were not detected above levels of concern in the indoor air. No further actions were taken by NYSDEC subsequent to the completion of the three phases of the vapor intrusion investigations.

5.6 NYSDEC's 2009 Pre-Design Investigation

After selection of its remedy in 2003, NYSDEC conducted a pre-design investigation, which was completed in 2009. The 2009 pre-design investigation included a groundwater quality assessment from existing monitoring wells, vertical profile groundwater sampling from temporary monitoring wells, geologic profiling, soil sampling, and gamma logging. Seven temporary monitoring wells were advanced to a depth of 285 feet bgs, which is comparable to the depth of the deepest permanent monitoring well locations. At two additional locations, temporary monitoring wells were installed in the western plume area and the central-eastern plume area to a depth of 502 feet bgs. Groundwater samples were collected at 20-foot intervals from the water table (approximately 45 feet bgs) down to 502 feet bgs. Results from these two temporary monitoring wells documented the presence of Site-related VOC contamination at depths up to 502 feet bgs.

5.6.1 Monitored Natural Attenuation Evaluation

The 2009 pre-design investigation evaluated available groundwater monitoring sampling results collected quarterly subsequent to the selection of the State's 2003 remedy, to determine whether the data corresponds with previous conclusions drawn in 2003. Review of the data indicated that the chlorinated VOCs comprise two general suites of parent and degradation or "daughter products," ethanes and ethenes. An evaluation of the occurrence and distribution of ethane compounds in the VOC plume suggested that degradation was occurring.

Historically, the parent compound TCA was the primary ethane species constituent detected in wells within the NCIA. However, in wells downgradient of the NCIA, the percentage of TCA decreased relative to the wells within the NCIA while the percentage of 1,1-dichloroethane (1,1-DCA) increased relative to the NCIA wells, indicating the degradation of TCA to 1,1-DCA.

However, evaluations were not able to determine whether breakdown of ethene constituents was occurring because of the varying occurrence and distribution of the ethene parent and breakdown compounds between the NCIA and downgradient wells. Historically, the distribution of ethene constituents in the wells located within the NCIA was comprised mainly of breakdown products 1,1-dichloroethene (1,1-DCE) and 1,2-dichloroethene (1,2-DCE), while wells downgradient of the NCIA contained relatively higher amounts of the parent products PCE and TCE. As part of the natural attenuation evaluation, some additional parameters that would be indicative of the biodegradation of chlorinated VOCs were collected from a limited set of monitoring wells. The data did not reveal the presence of ferrous iron, indicating that a reducing environment may not be present at those locations. Total organic carbon was also not detected. The presence of total organic carbon would have indicated a potential energy source for biodegradation. In addition, byproducts of biodegradation *(i.e.*, alkalinity, chlorides, carbon dioxide, and methane) were not detected at elevated concentrations. Parameters such as sulfide and hydrogen were not screened for during this evaluation.

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Based on these factors, significant biodegradation of the VOC contaminant plumes does not appear to be occurring within OU1. However, the presence of some breakdown products suggests that a limited degree of biodegradation is occurring within OU1.

5.6.2 Evaluation of Hydrogeologic Conditions

Results from NYSDEC's 2009 pre-design investigation indicated that, based on literature data for the Magothy in the vicinity of the area proposed for treatment, anisotropy ratios (*i.e.*, ratio of vertical to horizontal hydraulic conductivity) of approximately 100 are not uncommon. Vertical hydraulic conductivity sampling measurements based on discrete soil sampling of the Magothy revealed higher degrees of anisotropy (*i.e.*, average was 42,700). NYSDEC concluded in its 2009 pre-design investigation that in-well vapor stripping would not be an effective technology for remediating groundwater and recommended use of the contingency remedy of groundwater extraction and treatment.

5.7 NYSDEC's 2011 Pre-Design Investigation

In 2011, NYSDEC conducted a second pre-design investigation that included the installation of 11 new monitoring wells and two extraction (pumping) wells, a 72-hour aquifer pump test of an extraction well, and a pilot test/treatability study for ex-situ treatment of contaminated groundwater.

Results from NYSDEC's 2011 pre-design investigation, which included sampling from the recently expanded monitoring well network, indicated that the impacted area of groundwater had a larger horizontal and vertical extent than previously determined in NYSDEC's 2000 study. The water level monitoring conducted as part of the 72-hour aquifer pump test revealed that the Bowling Green water supply wells strongly influence the water levels in all of monitoring wells located in the Magothy that were monitored during the test. Results from this pump test indicated test extraction wells were relatively high yielding, and NYSDEC determined that a series of high yielding pumping wells would be required to capture known contamination.

Data from the 72-hour aquifer pump test was additionally used to calculate aquifer characteristics, including anisotropic ratios, which were determined to be significantly lower (27 to 100) than the original estimate from the 2009 pre-design investigation. Calculated results for anisotropy were within the published ranges from several United States Geologic Survey studies on Long Island. Based on this information collected, these results are consistent with NYSDEC's initial conclusion in its 2003 state remedy.

NYSDEC concluded, based on its 2011 pre-design investigation that the contaminant plumes were stable with localized areas where declining or increasing concentration trends are observed. Concentrations of PCE/TCE breakdown compounds are relatively low to nondetect compared to the concentrations of PCE and TCE, which indicates that their biodegradation is not progressing at a significant rate within OU1. Concentrations of Site related VOCs in the early warning monitoring wells were below their respective federal MCLs and State water quality standards.

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5.8 EPA's Supplemental Remedial Investigation Memorandum

In 2011, after the Site was added to the NPL, the EPA commenced its Supplemental Remedial Investigation which resulted in the Supplemental Remedial Investigation Memorandum, dated July 2013. The EPA's Supplemental Remedial Investigation Memorandum summarizes historical groundwater data, outlines response activities conducted, sets forth Site characteristics, and provides recommendations for future investigation and response activities at the Site. The evaluation of groundwater contamination downgradient of the NCIA, designated as OU1 by the EPA, included a review of the aforementioned NYSDEC's September 2000 study, October 2003 remedy, and the 2009 and 2011 Pre-Design Investigation Reports.

5.8.1 Summary of EPA's Supplemental Remedial Investigation Memorandum

Based on an evaluation of the groundwater data collected through 2011, three groundwater plumes exist at OU1 (the eastern, central, and western plumes). These plumes are characterized by chlorinated VOCs, primarily PCE and TCE, and are generally oriented in a south-southwest direction, consistent with regional groundwater flow. A downward hydraulic gradient appears to drive the three plumes to greater depths as groundwater moves through the area downgradient of the NCIA. The OU1 eastern and OU1 western plumes are more extensive laterally than the OU1 central plume. The nature and extent of the three contaminant plumes within OU1 are depicted on Figure 2 in Appendix I.

The OU1 eastern plume is characterized by a generally higher molar fraction[6] of PCE relative to TCE at depths less than approximately 205 feet. During the April 2011 pre-design investigation sampling, the highest concentrations of PCE and TCE 16,000 micrograms per liter (µg/L) and 1,800 µg/L, respectively, in the 119-129 feet bgs depth interval. The monitoring well location with the highest concentrations (FSMW-14A) is located approximately 500 feet south of Old Country Road in the northern portion of the OU1 eastern plume area. This monitoring well was installed by a NCIA party in 2004 and has revealed concentrations of PCE up to 75,000 µg/L in the past.

The OU1 central plume is characterized by the highest observed concentrations of TCA within OU1. The highest concentration of TCA (1,400 µg/L) was detected in 2008 at a depth of 105 to 125 feet bgs. The presence of TCA in the OU1 central plume can be used as a contaminant fingerprint to distinguish between the plumes within OU1.

The OU1 central plume is also characterized by a generally higher molar fraction of TCE and cis-1,2- dichloroethene (cis-1,2-DCE) compared to PCE. The highest concentrations of TCE, cis-1,2 DCE, and PCE were observed in 2008 during the first pre-design investigation. At 185 feet bgs, TCE was detected at a concentration of 900 µg/L. At 205 feet bgs, cis-1,2-DCE was detected at a concentration of a 150 µg/L. At 165 feet bgs, PCE was detected at a concentration of a 130 µg/L. At depths greater than approximately 150 feet bgs, PCE and TCE in the OU1 central plume appear to be commingled with the OU1 western plume.

[6] The molar fraction is the amount of a chlorinated VOC divided by the total amount of total chlorinated VOCs. This fraction has been adjusted for molecular weight.

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The OU1 western plume is characterized by a generally higher molar fraction of TCE compared to PCE. The highest concentration of TCE (5,100 µg/L) was detected in 2008 at a depth of 225 feet bgs. The highest concentration of PCE (3,700 µg/L) was also detected in 2008 at a depth of 225 feet bgs. The results of the TMW, which was extended down to 502 feet bgs, did not reveal concentrations of PCE and TCE deeper than 450 feet in the western plume downgradient of the NCIA.

5.9 Contaminant Fate and Transport

Discharge of liquid chlorinated VOCs can contaminate groundwater when released into the subsurface via disposal methods such as a dry well or leaching pools. Chlorinated VOCs, such as PCE and TCE, can migrate downward through the unsaturated zone in a relatively linear pattern with minimal dispersion from the discharge location if unimpeded by low-permeability layers of clays and silts in the subsurface. Natural processes such as percolation of rainfall through the soils to groundwater can facilitate the vertical migration of chlorinated VOCs in the subsurface. Once a liquid chlorinated VOC moves through the unsaturated subsurface and encounters the water table, it will typically dissolve into the groundwater to a degree depending on its solubility. Chlorinated VOCs in the dissolved phase are weakly adsorbed to the soil material and tend to move with groundwater flow, although generally not at the same rate because of the physical and chemical characteristics of the aquifer system. Over time, these dissolved chlorinated VOCs can continue to migrate extensively vertically and horizontally through the subsurface.

The presence and migration of dissolved phase chlorinated VOC contamination in OU1 is evident based on results from past sampling events taken from the monitoring well network within OU1. Three plumes have been observed within OU1: the OU1 eastern, OU1 central and OU1 western plumes. Previous investigations have revealed that dissolved chlorinated VOCs have migrated south of Old Country Road approximately 1,800 feet south in the OU1 western plume area, 800 feet south in the OU1 central plume area, and 1,200 feet in the OU1 eastern plume area. Contamination appears to migrate deeper as the distance along each plume axis increases in distance from the northern boundary (Old Country Road) of OU1. A natural downward gradient across OU1 is enhanced by the almost continuous pumping of the Bowling Green water supply wells. Past sampling results from permanent monitoring wells have revealed that dissolved chlorinated VOC levels at concentrations greater than 100 µg/L have migrated vertically to depths up to 285 feet bgs. A previous sampling investigation installed two temporary monitoring wells at a depth of 502 feet bgs, and it revealed the presence of dissolved chlorinated VOCs up to or close to the depth of the temporary monitoring well.

Depending on the quantity released into the subsurface, not all chlorinated VOCs will dissolve completely. Undissolved chlorinated VOCs will continue to move downward through the subsurface under the force of gravity as a Dense Nonaqueous Phase Liquid (DNAPL). DNAPLs are chemicals or mixtures of chemicals that are both heavier than water and only slightly soluble in water (*e.g.*, pure phase PCE and TCE). There is a potential for the presence of DNAPL in limited areas of OU1. Recent sampling results at a monitoring well in the northern portion of the OU1 eastern plume area revealed high concentrations of PCE up to a 16,000 µg/L, indicative of DNAPL. A review of past groundwater sampling events overseen by a NCIA party at this monitoring well location reveals that higher concentrations of PCE (up to a 75,000 µg/L) have been observed.

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6. CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

6.1 Land Use

The land use pattern within OU1 is one of high/dense land use and development, with large areas of impervious surfaces and little remaining natural areas. The OU1 area contains mostly residential parcels, two schools, and some commercial/retail space (banks, food and retail shops, office space). The Bowling Green water supply wells are located within OU1, south of Old County Road. Nassau County Basin 51, a storm water detention/recharge basin, is located adjacent to the Bowling Green treatment plant. Another smaller recharge basin operated by Nassau County Department of Public Works is located south of Old County Road and just north of the local middle and high school. W.T. Clarke Middle School and High School intercept the southwest boundary edge of the OU1 area. A few county facilities including the Nassau County Family Court and the Family Assistance Center are located on the northeastern portion of OU1 along Carman Avenue.

6.2 Groundwater Use

Water use on Long Island is dependent on the aquifers underlying the island. These aquifers, including the UGA, Magothy, and Lloyd, comprise a system of sole or principal source aquifers that are defined by the EPA as supplying at least 50% of drinking water consumed in the area overlying the aquifers[7]. The aquifers underlying Long Island, composed primarily of sand and gravel mixed with lesser amounts of silt and clay, are particularly susceptible to contamination through both the horizontal and vertical migration of contaminants.

Adjacent to the OU1 central plume area boundary, the Bowling Green Water Supply District maintains a water supply plant and well field (with the Bowling Green 1 and Bowling Green 2 production wells). The Bowling Green Water Supply District, as well as numerous other distribution systems, provides potable water to a portion of Nassau County. The Bowling Green water supply wells 1 and 2 are screened in the Magothy aquifer at approximately 470 to 530 and 520-580 feet bgs, respectively. An engineering control, which includes a GAC and an air stripping system, is in place at the Bowling Green treatment plant to treat extracted groundwater before distribution to the public. Within OU1, the area serviced by municipal water system(s), no private drinking water wells are known to exist.

7. SUMMARY OF SITE RISKS

As part of the CERCLA remedy selection process, the EPA conducted a baseline human health risk assessment (HHRA) for groundwater at OU1 to estimate current and future effects of contaminants on human health (New York state-law cleanup decisions do not require risk assessments of this type). A HHRA is an analysis of the potential adverse human health effects caused by hazardous-substance exposure in the absence of any actions to control or mitigate these exposures under current and future land uses. It can provide the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by a remedial action. Section 7 of the ROD summarizes the results of the HHRA for OU1. Tables 1 through 6

[7] http://www.epa.gov/Region2/water/aquifer/

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in Appendix II present the relevant subset of information from the HHRA. The HHRA for OU1 at the Site, entitled *Final Baseline Human Health Risk Assessment*, prepared by Henningson, Durham & Richardson, Inc. (HDR) for U.S. Army Corps of Engineers, May 2013, is available in the Administrative Record.

A screening level ecological risk assessment, which assesses the risk posed to ecological receptors, was not conducted because contaminated groundwater downgradient of NCIA does not discharge to surface water bodies within OU1. Because no groundwater discharges to surface water, exposure pathways are not compromised, and ecological receptors are not exposed to contaminants from OU1.

7.1 Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios. The four-step process is described below.

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

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

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

Risk Characterization: In this last step, outputs of the exposure and toxicity assessments are summarized and combined to provide a quantitative assessment of site-related risks. During this step, contaminants with concentrations that exceed federal Superfund guidelines for acceptable exposure are identified. These guidelines are 10^{-4} to 10^{-6}, or one-in-ten-thousand to one-in-a-million excess occurrences for cancer, and a hazard index (HI) of greater than 1.0 for noncancer health hazards. Chemicals with concentrations that exceed these guidelines are then considered chemical of concern (COCs) for the site and are typically those that will require remediation. The uncertainties associated with the risk calculations are also evaluated under this step.

The following subsections summarize the components of the HHRA with respect to the basic

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steps in the Superfund Risk Assessment process: 1) Hazard Identification; 2) Exposure Assessment; 3) Toxicity Assessment; and 4) Risk Characterization. These steps, as applied to OU1 of the Site, are described below.

7.1.1 Hazard Identification

The HHRA quantitatively assessed a groundwater dataset that included samples from 38 combined monitoring well locations collected in both April 2011 and February 2008 during pre-design investigations conducted on behalf of NYSDEC. The groundwater dataset consisted of VOC analysis from permanent monitoring wells within OU1 only. An evaluation of data usability concluded that the analytical groundwater data were suitable for use in the HHRA.

During the hazard identification process, the COPCs in OU1 groundwater were identified based on factors such as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations, mobility persistence, and bioaccumulation. Fifteen VOCs were identified as COPCs and included: TCA; 1,1,2,2-tetrachloroethane; 1,1,2-TCA; 1,1-DCA; 1,1-DCE; 1,2-DCA; benzene; bromodichloromethane; carbon tetrachloride; chloroform; cis-1,2-DCE; PCE; trans-1,2-DCE; TCE; and vinyl chloride.

The exposure point concentration (EPC) is the concentration of a constituent in a given environmental medium at the point of human contact. Estimates of the EPC represent the concentration term used in the exposure assessment component of the quantitative risk evaluation. Groundwater EPCs for COCs, or those chemicals requiring remediation at OU1 of the Site, are provided in Table 1.

7.1.2 Exposure Assessment

In this step of the HHRA, the different exposure scenarios and pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Consistent with Superfund policy and guidance, the HHRA is a baseline human health risk assessment, and, therefore, assumes no remediation or institutional controls to mitigate or remove hazardous substance releases. Cancer risks and noncancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the site. The RME is defined as the highest exposure that is reasonably expected to occur at a site.

The area encompassing OU1 mainly consists of residential parcels with some retail businesses along Old Country Road. Portions of the W.T. Clarke Middle School and High School are within the southwest corner of OU1. The Bowling Green water supply wells, Nassau County Storm Water Basin 51, and another smaller Nassau County Department of Public Works-operated recharge basin are located within the area. It is expected that the future land and groundwater use in this area will remain the same.

Based on current zoning and anticipated future use of OU1, the HHRA focused on two future receptors: residents and commercial/industrial workers exposed to groundwater. Current exposure to contaminated groundwater at OU1 of the Site is not a completed exposure pathway because all the receptors in the vicinity of OU1 are connected to the municipal water supply

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which is treated before distribution. As shown in Table 2, exposure pathways considered for the future commercial/industrial workers include ingestion and dermal contact with groundwater, while the exposure pathways for the future resident (child and adult) included ingestion, dermal contact, and inhalation of volatiles while bathing/showering.

Additionally, as part of the HHRA, a qualitative screening assessment was conducted to determine if the potential for vapor intrusion into indoor air exists. The groundwater to vapor exposure pathway was evaluated qualitatively by comparing the maximum detected VOC concentration in groundwater to chemical-specific, risk-based groundwater screening levels provided in the EPA's Vapor Intrusion Screening Level Calculator (VISL)[8]. These screening levels in the VISL are set at the target threshold values which correlate to an indoor air concentration representing a cancer risk of 1×10^{-6} or a noncancer hazard quotient of 1. Any chemical exceeding the groundwater screening value was identified as a potential vapor intrusion-related COPCs. The following twelve vapor intrusion-related COPCs were identified: 1,1,2,2-tetrachloroethane; 1,1,2-TCA; 1,1-DCA; 1,1-DCE; 1,2-DCA; benzene; bromodichloromethane; carbon tetrachloride; chloroform; PCE;TCE; and vinyl chloride.

The qualitative screening level evaluation indicated that the potential for vapor intrusion exists at OU1 of the Site. While the EPA has not conducted any vapor intrusion sampling at OU1 to date, the EPA's HHRA for OU1 did summarize the vapor intrusion sampling that was conducted by NYSDEC from 2006 to 2009. Results from NYSDEC's vapor intrusion investigation, which included sampling of seven residences, did not indicate the need for installation of vapor intrusion mitigation systems. Further discussion of NYSDEC's results and a comparison with the EPA's current vapor intrusion screening levels can be found in Section 5 of the *Final Baseline Human Health Risk Assessment*, prepared by HDR Inc. for U.S. Army Corps of Engineers, May 2013, available in the Administrative Record.

7.1.3 Toxicity Assessment

The toxicity assessment determines the types of adverse health effects associated with exposure to COPCs and the relationship between the magnitude of exposure (dose) and severity of adverse effect (response). Potential health effects are contaminant specific and may include the risk of developing cancer over a lifetime or other noncancer health effects, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some contaminants are capable of causing both cancer and noncancer health effects.

Under the EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards as a result of exposure to site chemicals are considered separately. Consistent with current the EPA policy, it was assumed that the toxic effects of the site-related chemicals would be additive.

Thus, cancer and noncancer risks associated with exposures to individual COPCs were added to indicate the potential risks and hazards associated with mixtures of potential carcinogens and noncarcinogens, respectively. Toxicity data for the HHRA were provided by the Integrated Risk

[8] EPA's Office of Solid Waste and Emergency Response's Vapor Intrusion Assessment Tool, the Vapor Intrusion Screening Level Calculator (Version 3.0, November 2012) was used to assess the potential for vapor intrusion at OU1.

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Information System database, the Provisional Peer Reviewed Toxicity Database, or another source that is identified as an appropriate reference for toxicity values consistent with the EPA's directive on toxicity values. This information is presented in Table 3 (noncancer toxicity data summary) and Table 4 (cancer toxicity data summary). Additional toxicity information for all COPCs is presented in the baseline HHRA.

7.1.4 Risk Characterization

The final step in the HHRA combines the exposure and toxicity information to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk for developing cancer and the potential for noncancer health hazards.

Noncancer Health Hazards

For noncancer health effects, a HI is calculated. The HI is determined based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (*e.g.*, the amount of chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as below. The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

HQ = Intake/RfD

where:
HQ = hazard quotient
Intake = estimated intake for a chemical (milligram (mg)/kilogram (kg)-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (*i.e.*, chronic, subchronic, or acute).

The key concept for a noncancer HI is that a "threshold level" (measured as an HI of less than 1) exists below which noncancer health effects are not expected to occur. The HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1.0, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1.0 to evaluate the potential for noncancer health effects on a specific target organ. The HI provides a useful reference point for ascertaining the potential significance of multiple contaminant

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exposures within a single medium or across media.

As summarized in Table 5, the HI for noncancer effects exceeded the EPA's threshold value of 1 for the future adult resident (HI of 300) and child resident (HI of 700). The primary contributors (*i.e.*, COCs) to this hazard level were TCE, PCE, cis-1,2-DCE, 1,1,2- trichloroethane, and 1,1-DCE. In addition, noncancer health effects exceeded the EPA's threshold value of 1 for the future commercial/industrial worker with a HI of 20. The primary contributors to this hazard level were TCE and PCE.

Cancer Risks

Cancer risk is expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposure is calculated from the following equation, while the equation for inhalation exposure uses the IUR, rather than the SF:

Risk = LADD x SF

where:

Risk	=	a unitless probability (*e.g.*, 1×10^{-6} of an individual developing cancer)
LADD	=	Lifetime Average Daily Dose averaged over 70 years (mg/kg-day)
SF	=	Cancer Slope Factor, expressed as $(mg/kg\text{-}day)^{-1}$

The likelihood of an individual developing cancer is expressed as a probability that is usually expressed in scientific notation (such as 1×10^{-4}). For example, a 10^{-4} cancer risk means a "one in 10,000 excess cancer risk," or an increased risk of an individual developing cancer of one in 10,000 as a result of exposure to site contaminants under the conditions used in the Exposure Assessment. Under the federal Superfund program, the EPA's goal of protection is an excess cancer risk of 10^{-6} (one in 1,000,000) or less for the RME individual. Acceptable cancer risks, established under the NCP, are an individual lifetime excess cancer risk at or below the range of 10^{-4} to 10^{-6}.

As summarized in Table 6, the estimated cancer risks for future residents (child and adult) and commercial/industrial workers in the OU1 area exceed the EPA's target risk range of 1×10^{-6} to 1×10^{-4}. The estimated cancer risk for a future resident exposed to groundwater is 3×10^{-3}, with the primary risk drivers (*i.e.*, COCs) identified as PCE, TCE, vinyl chloride, 1,1-DCA, chloroform, and 1,1,2,2-tetrachloroethane. The estimated cancer risk for a future site worker exposed to groundwater at OU1 of the site was 2×10^{-4}.

Uncertainties

The procedures and inputs used to assess risks in this evaluation are subject to a variety of uncertainties. In general, the main sources of uncertainty include the following: environmental chemistry sampling and analysis, risk characterization, fate and transport modeling, receptor exposure assessment, and toxicological data/assessment.

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Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals as to the actual levels present. Environmental chemistry-analysis error can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being analyzed. The data used in the risk assessment included only VOCs, and, therefore, did not account for other parameters which could potentially underestimate groundwater risks and hazards.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the COCs, the period over which such exposure would occur, and in the models used to estimate the concentrations of the COCs at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations at OU1, and it is highly unlikely to underestimate actual risks related to OU1 of the Site.

Additionally, there is uncertainty because of the lack of 1,4-dioxane data that was available in the 2008 to 2011 groundwater monitoring well data set. 1,4-dioxane is a VOC that is a potential human carcinogen, and its exclusion based on lack of data presents uncertainty as its exclusion could potentially underestimate the overall risk from exposure to OU1 groundwater.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways is presented in the risk assessment report.

7.2 Risk Characterization Conclusions

A quantitative assessment of receptors under the future scenario indicated unacceptable noncancer hazard and cancer risk to human health due to the presence of VOCs in groundwater at OU1 of the Site. The estimated cancer risks for future site workers of 2×10^{-4} and future residents of 3×10^{-3} at OU1 exceed the EPA's target risk range. Additionally, estimated noncancer HI for the future site workers (20), future child (700) and adult residents (300) at OU1 exceed the EPA's target threshold of 1. In sum, the COCs based on noncancer and cancer health effects are: TCE, PCE, cis-1,2-DCE, 1,1-DCE, vinyl chloride, 1,1,2- TCA, 1,1,2,2-tetrachloroethane, 1,1-DCA, and chloroform.

7.3 Basis for Taking Action

Based on the results of the quantitative HHRA, the EPA has determined that actual or threatened releases of hazardous substances from OU1 of the Site, if not addressed, may present a threat to human health. It is the EPA's current judgment that the response action identified in this ROD is necessary to protect public health or welfare from actual or threatened releases of hazardous substances into the environment.

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8. REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific risk-based levels established using the risk assessments.

The following RAOs have been established to address groundwater contamination for OU1 of the Site:

- Prevent or minimize current and potential future human exposure (via ingestion, dermal contact, and inhalation) to VOCs in groundwater at concentrations in excess of federal MCLs and state standards;

- Minimize the potential for further migration of groundwater with VOC contaminant concentrations greater than federal MCLs and state standards; and

- Restore the impacted aquifer to its most beneficial use as a source of drinking water by reducing contaminant levels to the federal MCLs and state standards.

The cleanup goals for the groundwater COCs and their basis are presented in Table 7.

9. DESCRIPTION OF ALTERNATIVES

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

Detailed descriptions of the remedial alternatives considered for addressing groundwater contamination at OU1 can be found in the EPA's OU1 Supplemental Feasibility Study (FS) Memorandum. The EPA's OU1 Supplemental FS Memorandum updates information previously presented in NYSDEC's study for "New Cassel Industrial Area Off-site Groundwater," dated September 2000, and it introduces three additional alternatives. Based on evaluations performed by the EPA in the development of the OU1 Supplemental FS Memorandum, remedial alternatives developed by NYSDEC in 2000 for its remedy that do not address the entire vertical extent of groundwater contamination were not considered satisfactory alternatives and are not included among the EPA's alternatives for this remedy.

The construction time for each alternative reflects only the time required to construct the remedy and does not include the time required to design the remedy, actually attain performance

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standards, negotiate the performance of the remedy with any potentially responsible parties, or procure contracts for design and construction.

9.1 Description of Common Elements among Remedial Alternatives

All of the alternatives, with the exception of Alternative 1 and the other exceptions noted, below, include certain common components. Alternatives 2 through 5 include long-term monitoring as part of operations and maintenance (O&M) activities to confirm that groundwater quality improves following implementation of the selected alternative until performance standards are achieved. The long-term monitoring program would include sampling from the two existing, early-warning monitoring well clusters and an evaluation of potential impacts on the Bowling Green water supply wells. Also, as additional groundwater data become available, the EPA would continue to investigate the soil vapor intrusion pathway for OU1 under alternatives 2 through 5. Vapor mitigation systems would be installed, if warranted.

Alternatives 2, 3, 4, and 5 include institutional controls for groundwater use restrictions until performance standards are achieved; a plan would be developed which would specify those institutional controls to ensure that the remedy is protective. Any existing local requirements that prevent installation of drinking water wells and informational devices to limit exposure to contaminated groundwater would be implemented.

Alternatives 3, 4, and 5, all of which include active remediation, would evaluate the use of in-situ chemical treatments such as in-situ chemical oxidation (ISCO) to target areas containing high concentrations (greater than a 10,000 μg/L) of total VOCs. ISCO is a process that involves the injection of reactive chemical oxidants into the subsurface for rapid contaminant destruction. Oxidation of organic compounds using ISCO converts contaminants to nontoxic by-products. During the remedial design, a treatability study would be performed to evaluate the use of in-situ chemical treatments, such as ISCO, as an element of the selected alternative, in a manner that complements and improves the effectiveness of the remedy. In-situ chemical treatment would only be utilized if a determination is made during the remedial design that the application would not adversely affect the water supply wells.

Additionally, because it will take longer than five years to achieve RAOs, in alternatives 2 through 5 include, a review of conditions at the Site to be conducted no less often than once every five years until cleanup levels are achieved. Alternative 1, No Further Action, would also necessitate a review of conditions no less often than once every five years as contaminants above the MCL would be present at OU1 of the Site.

9.2 Description of Remedial Alternatives

Alternative 1: No Further Action

Capital Cost:	$0
Annual O&M Costs (present-worth):	$0
Present-Worth Cost:	$0
Construction Time:	0 years

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The NCP requires that a "No Action" alternative be considered as a baseline for comparison with other remedial alternatives. Under this alternative, there would be no physical remedial actions taken to address contamination. Additionally, this alternative does not include monitoring or institutional controls.

Under this alternative, CERCLA requires that the Site would be reviewed at least once every five years as long as contaminants remain above the levels that allow for unrestricted use and unlimited exposure. If justified by the review, additional response actions may be implemented.

Alternative 2: Monitored Natural Attenuation

Capital Cost:	$614,000
Annual O&M Costs (present-worth):	$115,000
Present-Worth Cost:	$3,300,000
Construction Time:	6 to 9 months

This remedial alternative relies on monitored natural attenuation (MNA) to address the groundwater contamination. Natural attenuation is the process by which contaminant concentrations are reduced by various naturally occurring physical, chemical, and biological processes. The main processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction of contaminants. These processes occur naturally, in-situ, and act to decrease the mass or concentration of contaminants in the subsurface. Only non-augmented, natural processes are relied upon under this alternative.

Implementation of this alternative includes the installation of additional monitoring wells, periodic sample collection and analysis, data evaluation, and contaminant trend analysis. Under this alternative, a network of approximately 33 groundwater monitoring wells (21 existing and 12 to be installed) would be monitored for MNA parameters, which would include groundwater quality. The conceptual sampling schedule used for this alternative assumes 24 groundwater monitoring wells sampled quarterly for the first two years, semi-annually for the next three years, and annually thereafter.

An estimated remediation time frame of 30 years is used for estimating costs associated with O&M activities. The time frame to meet groundwater RAOs in OU1 is difficult to predict because the EPA's Supplemental FS Memorandum did not include modeling to estimate remediation time frames. However, under this alternative, it is anticipated that RAOs would not be achieved in a reasonable time frame based on Site-specific conditions.

This alternative includes long-term monitoring to confirm that groundwater quality improves following implementation of the selected remedy until performance standards are achieved. As additional groundwater data become available, the EPA would continue to investigate the soil vapor intrusion pathway for OU1 under Alternative 2. Additionally, in accordance with CERCLA, a review of conditions at the Site will be conducted no less often than once every five years until RAOs are achieved. As discussed earlier, this alternative would also include the common element of institutional controls.

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Alternative 3: In-well Vapor Stripping; In-Situ Chemical Treatment

Capital Cost:	$11,728,000
Annual O&M Costs (present-worth):	$652,000
Present-Worth Cost:	$24,000,000
Construction Time:	1 to 2 years

This remedial alternative includes the installation of in-well vapor-stripping systems in groundwater at various depths to provide contaminant mass removal and containment at OU1.

In-well vapor stripping is a technology that uses the principles of phase separation to transfer VOCs from the liquid to gas phase by aerating the contaminated water in the wellhead. Aeration can be accomplished by either injecting air into the water table or by using an air stripper mounted at the well head. Typically, extracted vapors are treated (as necessary) above-grade and discharged to the atmosphere. Vapor treatment, if required, generally consists of vapor-phase GAC.

The in-well vapor-stripping well is a closed system where the contaminated groundwater is never exposed at the ground surface or to the atmosphere. Typically impacted groundwater is pumped to the well head where it is treated and discharged or directly discharged back into the well. Once treated, the groundwater flows back into the aquifer through screens in the well that are typically located at the water table (unsaturated zone) but can also be located beneath the water table (saturated zone). In some in-well vapor-stripping well configurations, the extraction and re-injection of groundwater from the aquifer induces a hydraulic circulation pattern that allows continuous cycling of groundwater through the treatment well. As groundwater circulates through the treatment system in-situ and vapor is extracted, the contaminant concentrations in the groundwater are reduced.

In-well vapor stripping can be implemented in different system configurations. For the purposes of developing a conceptual design and cost estimate for comparison with other technologies in the OU1 Supplemental FS Memorandum, wells were configured centrally along the OU1 eastern, central and western plume areas to provide mass removal. Wells were additionally placed perpendicular to groundwater flow along each of the OU1 plumes at the 100 µg/L total VOC contour to provide containment, treatment, or both of the plume areas. This conceptual design would necessitate installation of 13 permanent in-well vapor-stripping wells in the OU1 eastern plume area, eight in the OU1 central plume area, and 51 in the OU1 western plume area. The conceptual layout of these 72 wells targets the shallow (< 175 feet bgs), intermediate (175 to 250 feet bgs) and deep (>250 feet bgs) intervals of the aquifer. A centralized treatment building was assumed in the conceptual design for vapor treatment.

In-well vapor stripping would target treatment of groundwater contaminated where the concentration of total VOCs is greater than 100 µg/L, but less than 10,000 µg/L. The remedial design would evaluate the use of in-situ chemical treatments such as ISCO to target areas containing high concentrations (concentrations that are greater than 10,000 µg/L) of VOCs.

An estimated remediation time frame of 30 years is used for developing costs associated with O&M activities. The time frame to meet groundwater RAOs in OU1 is difficult to predict

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because it is uncertain how quickly groundwater concentrations will decrease as a result of remedial technologies. Active remediation would be employed in the targeted treatment areas until the remediation goal for each of the COCs is attained within the targeted treatment area.

The conceptual design would require further evaluation during the remedial design phase if this alternative is selected. As discussed earlier, this alternative includes the common element of long-term monitoring to confirm that groundwater quality improves following implementation of this alternative until RAOs are achieved. Additional wells would also have to be installed to monitor the progress of the remediation. As additional groundwater data become available, the EPA would continue to investigate the soil vapor intrusion pathway for OU1 under Alternative 3. Additionally, in accordance with CERCLA, a review of conditions at the Site will be conducted no less often than once every five years until RAOs are achieved. This alternative would also include the common element of institutional controls.

Alternative 4: Groundwater Extraction and Treatment; In-Situ Chemical Treatment

Capital Cost:	$ 8,862,000
Annual O&M Costs (present-worth):	$ 834,000
Present-Worth Cost:	$ 24,200,000
Construction Time:	1 to 2 years

This remedial alternative consists of the extraction of groundwater via pumping wells and treatment on-Site prior to discharge. Groundwater would be pumped and treated to remove contaminant mass from areas of the aquifer with elevated concentrations of VOCs and to provide containment within OU1.

For this conceptual design, it is estimated that 11 extraction wells would be installed in the shallow (< 175 feet bgs), intermediate (175 to 250 feet bgs) and deep (>250 feet bgs) intervals of the contaminated portions of the aquifer. The conceptual design contains an estimate of three extraction wells in the OU1 eastern plume area, three in the OU1 central plume area, and five in the OU1 western plume area.

Extraction wells would target treatment of groundwater contaminated with concentrations of total VOCs in excess of 100 µg/L. The remedial design would evaluate the use of in-situ chemical treatments such as ISCO to target areas containing high concentrations (concentrations that are greater than 10,000 µg/L) of VOCs.

Extracted groundwater with VOC contamination is typically treated with either liquid phase GAC or air stripping, or both. Air stripper effluent may be treated with vapor phase GAC, if necessary. Extracted groundwater would be pumped from the network of extraction wells to one centralized treatment system facility with a treatment capacity of approximately 700 gallons per minute (gpm), where groundwater would be treated using both an air stripper and liquid phase GAC. Treated groundwater would then be re-injected back into the UGA using an estimated 20 infiltration wells which would be installed in the vicinity of the Nassau County Recharge Basin #51 parcel. However, during the remedial design phase, an evaluation and determination would be made whether to re-inject the treated water or to discharge it to a publicly owned treatment works (POTW), or some combination thereof. This conceptual design, including the number and

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placement of the extraction wells, would require further evaluation during the remedial design if this alternative is selected.

An estimated remediation time frame of 30 years is used for developing costs associated with O&M activities. The time frame to meet groundwater RAOs in OU1 is difficult to predict because it is uncertain how quickly groundwater concentrations will decrease as a result of remedial technologies. Active remediation would be employed in the targeted treatment areas until the remediation goal for each of the COCs is attained within the targeted treatment area.

The conceptual design would require further evaluation during the remedial design phase if this alternative is selected. As discussed earlier, this alternative includes the common element of long-term monitoring to confirm that groundwater quality improves following implementation of this alternative until RAOs are achieved. Additional wells would also have to be installed to monitor the progress of the remediation. As additional groundwater data become available, the EPA would continue to investigate the soil vapor intrusion pathway for OU1 under Alternative 4. Additionally, in accordance with CERCLA, a review of conditions at the Site will be conducted no less often than once every five years until RAOs are achieved. This alternative would also include the common element of institutional controls.

Alternative 5: Hybrid Alternative – In-well Vapor Stripping / Groundwater Extraction and Treatment; In-situ Chemical Treatment

Capital Cost:	$ 10,044,000
Annual O&M Costs (present-worth):	$ 680,000
Present-Worth Cost:	$ 22,900,000
Construction Time:	1 to 2 years

This remedial alternative consists of a hybrid, or combination, of Alternative 3 (in-well vapor stripping) and Alternative 4 (groundwater extraction and treatment). This hybrid alternative would provide contaminant mass removal and containment through the implementation of both in-well vapor stripping and groundwater extraction and treatment remedial technologies to address groundwater contamination in OU1.

Under the conceptual design, in-well vapor stripping would target treatment of groundwater in areas where concentrations of total VOCs are greater than 100 µg/L but less than 1,000 µg/L. Groundwater extraction and treatment would target groundwater in areas with concentrations of total VOCs greater than a 1,000 µg/L but less than a 10,000 µg/L. In plume areas where concentrations of total VOCs are greater than a 10,000 µg/L, use of in-situ chemical treatment such as ISCO would be evaluated for implementation.

For this conceptual design, it is estimated that three extraction wells would be installed in the OU1 eastern plume area as total VOC concentrations generally exceed 1,000 µg/L. In the OU1 central plume area where total VOC concentrations are generally less than 1,000 µg/L, eight in-well vapor-stripping wells would be installed. In the OU1 western plume area, a combination of 12 in-well vapor-stripping wells and three extraction wells would be used as the plume area covers a wider area and concentrations are generally less than 1,000 µg/L.

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Under this alternative, a centralized treatment plant would be constructed in the vicinity of Nassau County Recharge Basin #51 to treat extracted groundwater and vapors. Extracted groundwater would be pumped to a centralized treatment plant where groundwater would then be treated using both an air stripper and liquid phase GAC. Treated groundwater, after meeting groundwater standards, would then be re-injected back into the UGA using an estimated seven dry wells.

The centralized treatment plant would have the capacity to treat up to 350 gpm. However, during the remedial design, an evaluation and determination would be made whether to re-inject the treated groundwater or discharge it to a POTW, or some combination thereof. For the in-well vapor-stripping wells, extracted vapors are typically treated (if necessary) above grade and discharged to the atmosphere. Vapor treatment, if required, generally consists of vapor-phase GAC, which would be addressed at the centralized treatment plant.

An estimated remediation time frame of 30 years is used for developing costs associated with O&M activities. The time frame to meet groundwater RAOs in OU1 is difficult to predict because it is uncertain how quickly groundwater concentrations will decrease as a result of remedial technologies. Active remediation would be employed in the targeted treatment areas until the remediation goal for each of the COCs is attained within the targeted treatment area.

The conceptual design would require further evaluation during the remedial design phase if this alternative is selected. This alternative includes long-term monitoring to confirm that groundwater quality improves following implementation of this alternative until performance standards are achieved. Additional wells would also have to be installed to monitor the progress of the remediation. As additional groundwater data become available, the EPA would continue to investigate the soil vapor intrusion pathway for OU1 under Alternative 5. Additionally, in accordance with CERCLA, a review of conditions at the Site will be conducted no less often than once every five years until performance standards are achieved. This alternative would also include the common element of institutional controls.

10. COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy for a site, the EPA considers the factors set forth in CERCLA Section 121, 42 U.S.C. § 9621, by conducting a detailed analysis of the remedial alternatives introduced in the FS pursuant to the requirements of the NCP at 40 C.F.R. § 300.430(e)(9), the EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies*, OSWER Directive 9355.3-01, and the EPA's *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, OSWER 9200.1-23.P. The detailed analysis consists of an assessment of the individual alternatives against each of the nine evaluation criteria set forth at 40 C.F.R. § 300.430(e)(9)(iii) and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following **"threshold"** criteria are the most important and must be satisfied by any remedial alternative in order to be eligible for selection:

1. **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each

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exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. **Compliance with ARARs** addresses whether a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and regulations or provide grounds for invoking a waiver. Other federal or state advisories, criteria, or guidance are TBCs. While TBCs are not required to be adhered to by the NCP, the NCP recognizes that they may be very useful in determining what is protective of a site or how to carry out certain actions or requirements.

The following **"primary balancing"** criteria are used to make comparisons and to identify the major tradeoffs between alternatives:

3. **Long-term effectiveness and permanence** refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. **Reduction of toxicity, mobility, or volume through treatment** is the anticipated performance of the treatment technologies, with respect to these parameters, that a remedy may employ.

5. **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation of the remedy.

6. **Implementability** is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. **Cost** includes estimated capital, O&M, and present worth costs.

The following **"modifying"** criteria are used in the final evaluation of the remedial alternatives after the formal comment period, and they may prompt modification of the preferred remedy that was presented in the Proposed Plan:

8. **State acceptance** indicates whether, based on its review of the RI/FS report, HHRA, and Proposed Plan, the State concurs with, opposes, or has no comments on the proposed remedy.

9. **Community acceptance** refers to the public's general response to the alternatives described in the RI/FS report, HHRA, and Proposed Plan.

A comparative analysis of the alternatives considered in this ROD, based upon the evaluation criteria noted above, follows.

10.1 Overall Protection of Human Health and the Environment

Alternative 1 (no action) does not provide for adequate protection of human health because it does not mitigate potential future risk posed by contaminated groundwater within OU1.

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Protectiveness under Alternative 2 is achieved through a combination of monitoring naturally occurring processes and the implementation of institutional controls until cleanup levels are achieved. However, Alternative 2 does not prevent the migration of contaminants, and based on the natural attenuation evaluation, there is uncertainty that biodegradation would progress at a rate so that cleanup levels would be achieved in a reasonable timeframe.

Alternatives 3, 4, and 5 include active remedial components that would address groundwater contamination and are intended to restore groundwater quality over the long-term. Alternatives 3, 4, and 5 would also rely on certain natural processes to achieve the cleanup levels for areas not targeted for active remediation.

Protectiveness under Alternatives 3, 4, and 5 requires a combination of activities to reduce contaminant concentrations in groundwater and limit exposure to residual contaminants through maintenance of any existing institutional controls which restrict groundwater use. Institutional any are anticipated to include existing governmental controls, such as well permit requirements regarding groundwater use in the impacted area. A plan would be developed which would specify institutional controls to ensure that the remedy is protective.

10.2 Compliance with ARARs

The list of chemical-specific, location-specific, and action-specific ARARs can be found in Tables 8, 9, 10, respectively, in Appendix II of this ROD.

The EPA has promulgated health-based protective MCLs (40 CFR Part 141,), which are enforceable standards for various drinking water contaminants (and are chemical-specific ARARs). NYSDOH has promulgated health-based protective standards (10 NYCRR § 5-1.51 Chapter 1). If more than one such requirement applies to a contaminant, compliance with the more stringent ARAR, TBC or guidance is required. The aquifer at the Site is classified as Class GA (6 NYCRR 701.18), which means that the groundwater is designated as a potable drinking water supply. As groundwater within OU1 is a source of drinking water, the MCLs are ARARs and need to be achieved.

Alterative 1, no action, would comply with location- and action-specific ARARs as no work would be conducted. However, Alternative 1 inherently does not include the measures to determine if chemical-specific ARARs have been met. Under Alternative 2, it is not anticipated that chemical-specific ARARs would be achieved in a reasonable time frame as data collected to date has not indicated that complete biodegradation of PCE/TCE is progressing at a significant rate. Thus, degradation of the contaminants throughout the plume to levels which achieve ARARs is likely to exceed a reasonable time. While no single definition of a reasonable timeframe exists, the EPA, pursuant to CERCLA and the NCP, considers various factors when evaluating what is a reasonable time frame for achieving groundwater restoration cleanup levels. For example, when the contaminated groundwater is not currently used, is being treated for contamination, or is an alternate water source is readily available, it would likely be appropriate to consider a longer time-frame for achieving restoration cleanup levels.

An estimated remediation time frame of 30 years was used for developing costs associated with O&M activities for Alternatives 3, 4 and 5. The time frame to meet groundwater RAOs in OU1

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is however, difficult to predict because it is uncertain how quickly groundwater concentrations will decrease as a result of implementing the various remedial technologies. Given the successful application of the remedial technologies at other sites, and the response times seen at other Long Island Superfund sites within the same sandy aquifer, it is not unreasonable to expect that the RAOs would be achieved within a 30 year time frame. Active remediation under Alternatives 3, 4, and 5 would be employed in the targeted treatment areas until the remediation goal for each of the COCs is attained within the targeted treatment area. Alternatives 3, 4, and 5 would comply with location-and action-specific ARARs. Chemical-specific ARARs would also be attained for each of these alternatives through treatment.

10.3 Long-Term Effectiveness and Permanence

Alternative 1 does not provide long-term effectiveness or permanence because no active remedial measures are proposed. The EPA has determined that, due to the uncertainty surrounding the data for MNA within OU1, Alternative 2 would not provide long-term effectiveness or permanence at this portion of the Site. In-well vapor stripping under Alternative 3, extraction and treatment under Alternative 4, and a combination of those technologies under Alternative 5 are considered effective technologies for treatment and/or containment of contaminated groundwater under appropriate circumstances, if designed and constructed properly.

Alternatives 3, 4, and 5 rely on a combination of treatment and institutional controls. Institutional controls are anticipated to include any existing governmental controls, such as well permit requirements regarding groundwater use in the impacted area.

Alternative 3, in-well vapor stripping, is expected to be effective and reliable in significantly removing VOC contamination in groundwater. However, the effectiveness of this technology when applied to areas with high levels of VOC concentrations and at significant depth has been limited. The effectiveness of this alternative is limited by the radius of influence (ROI) or “reach” into the aquifer. The ROI will depend on pumping capacity of each stripping well and hydrogeologic characteristics of the groundwater in OU1 area. The ability to secure access to residential properties may impact the optimal placement of the in-well vapor stripping wells. Effectiveness could also be limited because it is possible that creation of a circulation cell may not be feasible. Treatment may not be accomplished in one pass, or additional measures may be needed to provide multiple passes through the treatment system. These additions may require not only vertical but horizontal space that may not be available because of the presence of existing subsurface utilities. A pilot study would be needed to determine pre-design parameters, such as the actual ROI, optimal well spacing, depth to the treatment zone, flow rates, and pumping capacity prior to full-scale implementation. In order to assess the effectiveness of Alternative 3 additional measurements of the aquifer’s anisotropy would also be needed.

Alternative 4 would be more reliable than Alternative 3 because there is uncertainty about whether in-well vapor stripping could effectively remove contamination in all of the targeted areas, particular those areas with high total VOC concentrations or in areas where the contamination is at significant depths. Alternative 4 is a proven and effective technology that has been utilized at other Superfund sites on Long Island, New York.

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Alternative 5 allows for a combination of both in-well vapor stripping and extraction/treatment technologies to treat the OU1 plume areas. In the OU1 central plume area, where the contaminant plume is generally less extensive laterally and vertically with lower concentrations of total VOCs, in-well vapor stripping is expected to be effective. In the OU1 eastern and a portion of the western plume, where the plume is present at deeper depths and higher concentrations, use of extraction and treatment is anticipated to be more effective, as it is a proven technology which is effective at reducing contaminant mass in such conditions. Alternative 5 provides the capability to effectively target use of either of these two technologies to treat and contain contamination throughout different horizontal and vertical hydraulic and contaminant gradients.

10.4 Reduction in Toxicity, Mobility, or Volume through Treatment

Alternative 1 does not address contamination through treatment as no action would be taken. Additionally, Alternative 1 does provide the means to asses a reduction in toxicity, mobility or volume through treatment (TMV). Alternative 2 would be similar to Alternative 1, in that naturally occurring processes to degrade contaminants would be the only means to reduce TMV. However, Alternative 2 does include monitoring requirements to evaluate the reduction, although evaluations to date suggest that conditions in the aquifer are not conducive to the timely degradation of the COCs through destructive mechanisms.

Alternative 2 relies on natural processes to degrade contaminants and, as such, the reduction in TMV of contaminants will vary with location. Under Alternative 2, the MNA biodegradation processes can transform PCE, TCE, and cis-1,2-DCE into the more toxic vinyl chloride under anaerobic conditions before transformation to the less toxic ethane. This transformation would need to be monitored and managed to prevent potential exposure to contaminated drinking water. Physical processes such as dispersion are working to reduce the toxicity by decreasing contaminant concentrations. The presence of cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride, which are ethene breakdown products of PCE and TCE, is evident. However, the limited MNA data set has revealed this breakdown is not occurring throughout the entire OU1 area. Total VOC groundwater concentrations greater than a 1,000 µg/L coupled with the absence of a significant rate of complete biodegradation indicate that Alternative 2 would not reduce the TMV of contaminants significantly.

Alternatives 3, 4, and 5 would reduce the toxicity and volume of contaminants through active remedial treatment of contaminated groundwater. Alternative 3 uses a system to remove the contaminants from groundwater in-situ and provides chemical treatment for the collected vapor-phase contamination on-Site. Alternative 4 removes contaminated groundwater via extraction and treats the contamination via a carbon-treatment process on-Site. Alternative 5 utilizes both those technologies and treats vapor phase-contamination and extracted groundwater on-Site at a central treatment plant.

Under Alternatives 3, 4, and 5, in-situ chemical treatment such as ISCO would be applied to areas where total VOC concentrations exceed a 10,000 µg/L so as to reduce the TMV of those contaminants. After treatment, Alternatives 3, 4, and 5 would generate residuals in the form of spent used GAC that would require regeneration, destruction or disposal.

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Alternative 5 would be the most effective at reducing the TMV of contaminants because each of the technologies would be applied to those areas best suited for its application, based on depth and concentrations of contaminants. For example, in-well vapor stripping would be utilized in more shallow areas and where concentrations of total VOCs are comparatively low to moderate (*e.g.*, less than a 1,000 µg/L). Extraction and treatment would be utilized where total VOC concentrations are comparatively higher (*e.g.*, greater than 1,000 µg/L) and at intermediate and deeper depths where in-well vapor stripping may not be as effective. If pilot testing indicates that in-well vapor stripping would not be an efficient technology at reducing the TMV of contaminants for portions of targeted treatment zones then extraction and treatment could be implemented in those areas under Alternative 5.

10.5 Short-Term Effectiveness

Alternative 1 would be the most effective in the short term as there would be no risks posed during the implementation of this alternative. Thereafter, Alternative 2 would be the second most effective in the short term as it would only require the installation of monitoring wells and sample collection.

Alternatives 3, 4, and 5 may have short-term impacts to remediation workers, the public, and the environment during implementation. Remedy-related construction (*e.g.*, trench excavation) under Alternatives 3, 4, and 5 would require disruptions in traffic, and street closures. In addition, Alternatives 3, 4, and 5 have above-ground treatment components and infrastructure that may create a minor noise nuisance and inconvenience for local residents during the construction.

Exposure of workers, the surrounding community, and the local environment to contaminants during the implementation of Alternatives 3, 4, and 5 would be minimal. Drilling activities, including the installation of monitoring, in-well vapor stripping, and extraction wells for Alternatives 3, 4, and 5 could produce contaminated liquids that present some risk to remediation workers at the Site. The potential for remediation workers to have direct contact with contaminants in groundwater could also occur when groundwater remediation systems are operating under Alternatives 4 and 5. Alternatives 4 and 5 could increase the risks of exposure, ingestion, and inhalation of contaminants for workers because contaminated groundwater would be extracted to the surface for treatment. However, measures could be implemented to mitigate exposure risks.

Alternatives 3, 4, and 5 include monitoring that would provide the data needed for proper management of the remedial processes and a mechanism to address any potential impacts to the community, remediation workers, and the environment. Risk from exposure to groundwater during any excavation work would require management via occupational health and safety controls, such as dust control measures.

Groundwater monitoring and discharge of treated groundwater would have minimal impact on workers responsible for periodic sampling. The time required for implementation of Alternatives 3, 4, and 5 is estimated to take one to two years.

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10.6 Implementability

Alternative 1 is no action and therefore is the easiest of all the alternatives to implement. Alternative 2, MNA, is a well-established remedial approach that is also easily implementable because no active remediation would be performed. Alternative 2 would include the installation of an expanded monitoring well network and sample collection and analysis.

In-well vapor stripping and groundwater extraction and treatment are well-established technologies that utilize commercially available equipment and are implementable. However, obtaining the necessary access to implement Alternatives 3, 4, and 5 may pose access challenges because they require multiple wells, below ground piping, and treatment buildings needed to be constructed on multiple owners' properties.

Of the three active remediation alternatives, Alternative 4 would be the easiest alternative to construct and would require the least amount of street closures, less land area, and less disruption in residential areas. Alternative 3 would be the most difficult to implement because construction activities would result in a significant disruption in residential areas. This alternative would require installation of a large number of wells and associated infrastructures. The ability to reconfigure in-well vapor-stripping well locations because of access constraints may be possible; however, doing so could potentially impact the effectiveness and schedule of Alternatives 3 and 5. Additionally, design challenges would increase with Alternatives 3 and 5 as the vapors captured from the in-well vapor-stripping wells would need to be transported via transmission lines and blowers to a centralized treatment plant.

Under Alternative 3, the depth of the deepest contamination (estimated between approximately 285 to 502 feet bgs) increases the design challenges of the in-well vapor system. There are practical limitations on the depth that compressed air can be injected into the aquifer which could impact the effectiveness in vapor-stripping over a portion of the treatment well. Additionally, anisotropic aquifer conditions potentially present in portions of the aquifer could potentially reduce the success of an in-well vapor-stripping well to establish a groundwater circulation cell across the treatment zone of the aquifer.

Use of in-situ chemical treatment such as ISCO, under Alternatives 3, 4, and 5, is a well-established treatment that is commercially available. A treatability study would be performed during the remedial design to evaluate the use of in-situ chemical treatments, such as ISCO, as an element of the selected alternative to complement and improve the effectiveness of the remedy. In-situ chemical treatment would only be utilized if a determination is made during the remedial design that its application would not adversely affect the water supply wells. Alternatives 2, 3, 4, and 5 would require routine groundwater quality, performance, and administrative monitoring, including five-year CERCLA reviews. Alternative 3, 4, and 5 would require periodic operation and maintenance (*e.g.*, substrate inspection, GAC replacement) for the life of the treatment. Reinjection of all or part of treated water under alternatives 4 and 5 could present implementability challenges if a suitable location is not agreed upon between the EPA and local and county officials. A final determination would be made on discharge location or method once additional design information has been generated.

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10.7 Cost

The estimated capital costs, O&M, and present worth cost are discussed in detail in the EPA's July 2013 OU1 Supplemental FS Memorandum. For estimating costs and for planning purposes, a 30 year time frame was used for O&M under Alternatives 2, 3, 4, and 5. Alternative 1 had no associated costs as no action would be taken. The costs estimates are based on the best available information and are provided in the table below. The highest present worth cost is Alternative 4 at $24.2 million. Of the three alternatives with active remedial components, Alternative 5 is slightly less expensive than Alternatives 3 and 4.

Alternative	Capital Cost	Annual O&M Cost	Present Worth
1	$0	$0	$0
2	$ 614,000	$115,000	$3,300,000
3	$11,727,000	$652,000	$24,000,000
4	$ 8,862,000	$834,000	$24,200,000
5	$10,044,000	$680,000	$22,900,000

10.8 State/Support Agency Acceptance

NYSDEC concurs with the selected remedy. A letter of concurrence is attached in Appendix IV.

10.9 Community Acceptance

The EPA solicited input from the community on the remedial alternatives proposed for OU1 at the Site. Verbal comments received from community members at the August 15, 2013 public meeting generally related to vapor intrusion and the Superfund process. During the comment period from July 26, 2013 through September 24, 2013, approximately seven comment letters were received via email and U.S. mail. Copies of the comment letters are provided as Attachment 6 to Appendix V. The majority of comments received were submitted from potentially responsible parties at the Site. The New Cassel Business Association also submitted comments which among other things questioned the effect construction activities would have on the residential and business communities. Additionally, the Hicksville Water District submitted questions and comments regarding components of the preferred remedy and future OUs at the Site. A summary of significant comments contained in the letters and the comments provided at the public meeting on August 15, 2013, as well as EPA's responses to those comments, are provided in the Responsiveness Summary (Appendix V).

11. PRINCIPAL THREAT WASTES

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a Site whenever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal

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threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment in the event exposure should occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria which are described above. The manner in which principal threat wastes are addressed provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

The contamination addressed in this ROD is in the groundwater. Contaminated groundwater is generally not considered to be source material; however, the potential for DNAPL in groundwater may be viewed as source material. Analytical results from previous investigations indicate that the eastern portion of the plume contains concentrations of PCE as high as 75,000 µg/L indicative of the presence of DNAPL. The selected remedy will actively address this portion of the plume.

12. SELECTED REMEDY

12.1 Summary of the Rationale for the Selected Remedy

Based upon the requirements of CERCLA, the results of OU1 investigations, the detailed analysis of the alternatives, and public comments, the EPA has determined that Alternative 5 best satisfies the requirements of CERCLA Section 121, 42 U.S.C. §9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, 40 CFR §300.430(e)(9).

While Alternative 3, in-well vapor stripping, and Alternative 4, extraction and treatment, are both proven technologies to remediate VOC contaminated groundwater actively, there are difficulties and uncertainties at this OU associated with relying solely on one of these remedial technologies to address OU1 groundwater contamination.

Relying exclusively on in-well vapor stripping as envisioned under Alternative 3 would be difficult in a densely populated and developed residential setting. Alternative 3 would require the installation of large numbers of wells and associated infrastructure and would result in a significant disruption in a largely residential area and an increased remedial costs. In addition, the depth of the deepest contamination (estimated between approximately 285 to 502 feet bgs) increases the design challenges of the in-well vapor-stripping system. Limits on the hydraulic depth to which the compressed air can be injected into the aquifer could result in air stripping being conducted over only a portion of the treatment well. Anisotropic aquifer conditions potentially present in portions of the aquifer could reduce the potential for an in-well stripping well to establish a groundwater circulation cell across the treatment zone of the aquifer.

Utilizing extraction and treatment as the primary remedial technology in Alternative 4 increases the volume of extracted groundwater that would require ex-situ treatment and handling, thereby increasing both the capital costs and annual operations and maintenance costs without providing

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a significant reduction of the TMV of contaminants relative to Alternative 5, the selected remedy.

The EPA's selected remedy incorporates a combination of in-well vapor stripping and extraction and treatment. The remedy will be designed to utilize the different technologies effectively to target groundwater contamination within OU1, based upon location-specific conditions (*i.e.*, depth to treatment and concentration levels). Utilizing both in-well vapor stripping and extraction and treatment will provide additional cost-saving measures, as outlined above in Section 10.7, by reducing either the capital or O&M costs that would have been associated with installing and operating independent remedial systems. Each of the treatment components will be optimized during the remedial design to improve treatment effectiveness or decrease the overall remedial time frame.

The approach of the selected remedy is expected to be effective because the contaminant plumes in the OU1 eastern plume and portions of the OU1 western plume are more extensive laterally and/or vertically (greater than 250 feet bgs). For the OU1 eastern and portions of the OU1 western plume, use of extraction and treatment is a proven technology that is effective at reducing contaminant mass and providing containment of the contaminant plume under these conditions. In-well vapor stripping is expected to be more effective in the OU1 central plume, where the contaminant plume is generally less extensive laterally and vertically and generally has lower concentrations of total VOCs, as well as in portions of the OU1 western plume. If, during the remedial design investigation activities, it is determined that in-well vapor stripping will not be an effective technology for addressing contamination at the OU1 central and portions of the OU1 western plume, then the existing extraction and treatment component of the selected remedy will be utilized as the active remedial technology in those areas as well.

Access to install the in-well vapor-stripping wells and the extraction wells as set forth in the selected remedy, Alternative 5, is more manageable although admittedly complicated. The treatment plant will be sited in an area that is not zoned residential. The conceptual design for the selected remedy is provided as Figure 3 in Appendix I.

In-situ chemical treatment, such as ISCO, will be used to target areas containing very high concentrations of total VOCs. It will, as appropriate, be utilized in combination with groundwater extraction or in-well vapor stripping in an effort to reduce the remediation time frames by more effectively reducing the contaminant mass of total VOCs and, therefore, the resulting costs of the selected remedy.

12.2 Description of the Selected Remedy

The response action selected in this ROD represents the first remedial phase for the Site. It actively addresses groundwater contamination in the area downgradient of Old Country Road, Grand Boulevard, and the NCIA and is considered an interim remedy for OU1 at the Site. The EPA anticipates conducting a separate investigation of one or more additional OUs to address groundwater contamination at the Site, including in the far-field area farther downgradient of the portion of the plume addressed in this OU1. Additional planned OUs for the Site include, but may not be limited to, areas of groundwater contamination impacting the Hicksville water supply wells 5-2, 5-3, 4-2, 8-1, 8-3, 9-3 and Hempstead-Levittown 2A.

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The major components of the selected remedy include the following:

- A combination of (a) in-situ treatment of groundwater via in-well vapor stripping and (b) extraction of groundwater via pumping and ex-situ treatment of extracted groundwater prior to discharge to a POTW or reinjection to groundwater (to be determined during design). The purpose is to establish containment and effectuate removal of contaminant mass where concentrations of total VOC concentrations are greater than 100 μg/L;

- In-situ chemical treatment, such as ISCO, to target high concentration contaminant areas, as appropriate;

- Implementation of long-term monitoring to track and monitor changes in groundwater contamination in OU1 to ensure the RAOs are attained;

- Development of a Site Management Plan to ensure proper management of the Site remedy post-construction. The Site Management Plan will include provisions for any O&M and long-term monitoring required for the remedy, as well as periodic certifications; and

- Institutional controls consisting of any existing local requirements that prevent installation of drinking water wells, and informational devices to limit exposure to contaminated groundwater.

Individual facilities within the NCIA are considered to be among the sources of groundwater contamination for OU1. Response actions which are addressing sources of contamination in the NCIA are being conducted at those upgradient facilities, and they continue to be overseen by NYSDEC under its state hazardous waste cleanup program. The on-going, State-authorized response actions at the NCIA facilities are not part of this OU1, although the successful completion (*i.e.*, source control or cleanup) of addressing the source area(s) at the upgradient individual NCIA facilities, under NYSDEC oversight are anticipated and was assumed in evaluating the potential for attaining the objectives of the selected remedial alternative in this ROD. In the event that theses sources are not successfully addressed, the EPA may elect to evaluate additional options at individual NCIA facilities pursuant to CERCLA in a future operable unit to ensure the effectiveness of the selected remedy.

The environmental benefits of this remedy may be enhanced by giving consideration, during the design phase, to technologies and practices that are sustainable in accordance with the EPA Region 2's Clean and Green Energy Policy[9]. This will include consideration of green remediation technologies and practices, including GAC regeneration.

12.3 Summary of the Estimated Remedy Costs

The estimated capital, annual O&M, and total present-worth costs for the selected remedy are $10,044,000, $680,000, and $22,900,000, respectively. The costs estimates are based on available information and are order-of-magnitude engineering cost estimates that are expected

[9] See http://epa.gov/region2/superfund/green_remediation.

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between +50 to -30 percent of the actual project cost. Changes to the cost estimate can occur as a result of new information and data collected during the design of the remedy. Individual cost estimates for each remedial alternative are provided in the EPA's OU1 Supplemental FS Memorandum dated July 2013.

12.4 Expected Outcomes of the Selected Remedy

The selected remedy addresses areas of VOC contamination at OU1 at the Site. The results of the HHRA indicate that the hypothetical future use of groundwater at OU1 of the Site will pose an unacceptable increased future cancer risk and unacceptable noncancer hazards to human health if no action is taken. Under the selected remedy, a combination of in-well vapor stripping, groundwater extraction and treatment technologies, and in-situ chemical treatment, as applicable, will be used to remediate contaminated groundwater and will restore the aquifer at OU1 as a potential source of drinking water in a reasonable timeframe by reducing contaminant levels to the federal MCLs and state standards. This interim action remedy selected for OU1 is an initial action intended to minimize further migration of contaminants while an RI of the far-field area can be conducted. The selected remedy does not constitute the final remedy for the Site. Additional data concerning Site-related contamination, to be generated during the far-field RI, may become available prior to implementation of the selected remedy. This data may be considered during the design of the selected remedy.

Cleanup levels for the COCs are presented in Appendix II, Table 7. Achieving the cleanup levels will restore the aquifer to its beneficial use.

13. STATUTORY DETERMINATIONS

The EPA and the State of New York believe that the selected remedy complies with the CERCLA and NCP provisions for remedy selection, meets the threshold criteria, and provides the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. These provisions require the selection of remedies that are protective of human health and the environment, comply with ARARs (or justify a waiver from such requirements), are cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the TMV of hazardous substances as a principal element (or justifies not satisfying the preference). The following sections discuss how the selected remedy meets these statutory requirements.

13.1 Protection of Human Health and the Environment

The selected remedy will protect human health and the environment because it will over the long-term restore groundwater quality at OU1 at the Site to drinking-water standards. Protection will also be achieved by eliminating all remaining direct-contact risks to human health associated with contaminated groundwater. Institutional controls will also assist in protecting human health over both the short- and long-term by helping to control and limit exposure to hazardous substances.

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13.2 Compliance with ARARs

The selected remedy is expected to achieve federal MCLs or more stringent state standards for the COCs in the groundwater. The COCs and the relevant MCLs are as provided in Table 7, which can be found in Appendix II.

A full list of the ARARs, TBCs, and other guidance related to implementation of the selected remedy is presented in Tables 8, 9, and 10, which can be found in Appendix II.

13.3 Cost Effectiveness

A cost-effective remedy is one in which costs are proportional to its overall effectiveness (NCP Section 300.430(f)(1)(ii)(D)). Overall, effectiveness is based on the evaluations of long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. The EPA evaluated the "overall effectiveness" of those alternatives that satisfied the threshold criteria (*i.e.*, those that were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume though treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness.

Each of the alternatives has undergone a detailed cost analysis. In that analysis, capital and annual O&M costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, annual O&M costs were calculated for the estimated life of each alternative. The total estimated present-worth cost for implementing the selected remedy is $22,900,000.

Based on the comparison of overall effectiveness to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost-effective (NCP Section 300.430(f) (1) (ii)(D)) and is the least-cost action which will achieve groundwater standards within a reasonable time frame. A 30 year timeframe was used for planning and estimating purposes to remediate groundwater, although remediation timeframes could exceed this estimate.

13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to Maximum Extent Practicable

The selected remedy provides the best balance of tradeoffs among the alternatives with respect to the balancing criteria set forth in NCP Section 300.430(f)(1)(i)(B), because it represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at OU1. The selected remedy satisfies the criteria for long-term effectiveness and permanence by removing contaminant mass from areas of OU1 with elevated levels of VOC concentrations. The combination of in-well vapor stripping and extraction and treatment with use of in-situ chemical treatment, as applicable, will permanently reduce the mass of contaminants in OU1 groundwater, thereby reducing the toxicity, mobility, and volume of contamination.

The selected remedy is implementable because it employs standard technologies that are readily available and allows flexibility through the combination of active remedial components. Additionally, the selected remedy allows flexibility to use in-situ chemical treatments to enhance

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the remediation of contaminated groundwater in conjunction with the active remedial components.

13.5 Preference for Treatment as a Principal Element

Through the use of a combination of an in-situ (in-well vapor-stripping and in-situ chemical treatment) and ex-situ (extraction and treatment) technologies, the selected remedy satisfies the statutory preference for remedies that employ treatment as a principal element.

13.6 Five-Year Review Requirements

This remedy will result in hazardous substances, pollutants, or contaminants remaining at this OU until performance standards are attained, and as such, use and exposure must be limited until such standards are met. Since it may take more than five years to attain the cleanup levels, policy reviews pursuant to Section 121(c) of CERCLA will be conducted no less often than once every five years after the completion of construction to ensure that remedy is, or will be, protective of human health and environment.

14. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for OU1 of the Site was released on July 26, 2013. The Proposed Plan identified Alternative 5 as the preferred alternative for remediating the contaminated groundwater. The EPA received a request to extend the public comment period and extended the comment period until September 24, 2013.

The EPA reviewed all written (including electronic formats such as e-mail) and oral comments during the public comment period. The EPA has determined that no significant changes to the remedy, as originally identified in the Proposed Plan, are necessary or appropriate.

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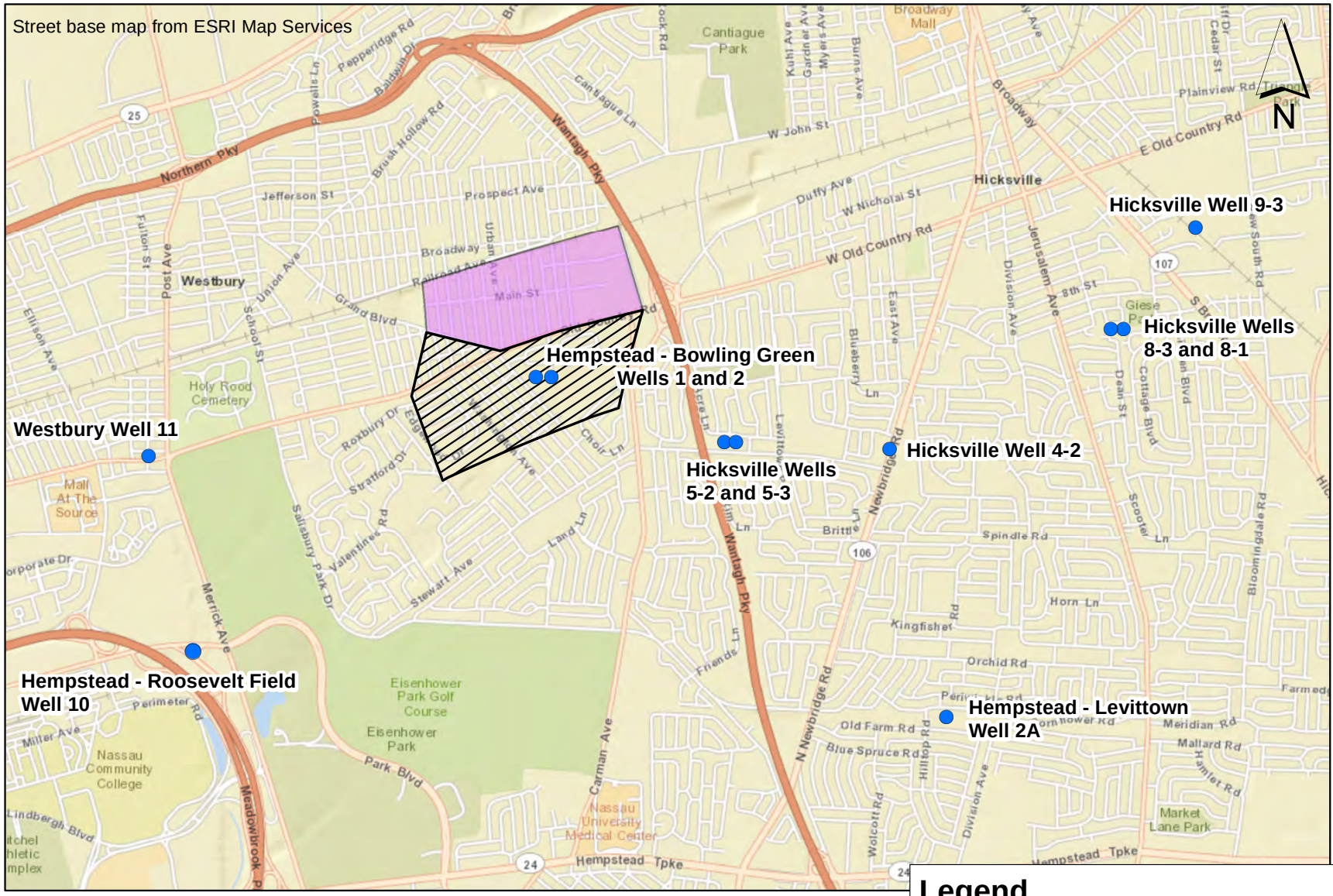
APPENDIX I

FIGURES



EPA

0 0.25 0.5 1 Mile

Legend

- Water District Public Supply Well
- Operable Unit 1
- New Cassel Industrial Area

Figure 1 - Site Location
New Cassel/Hicksville Ground Water Contamination Site

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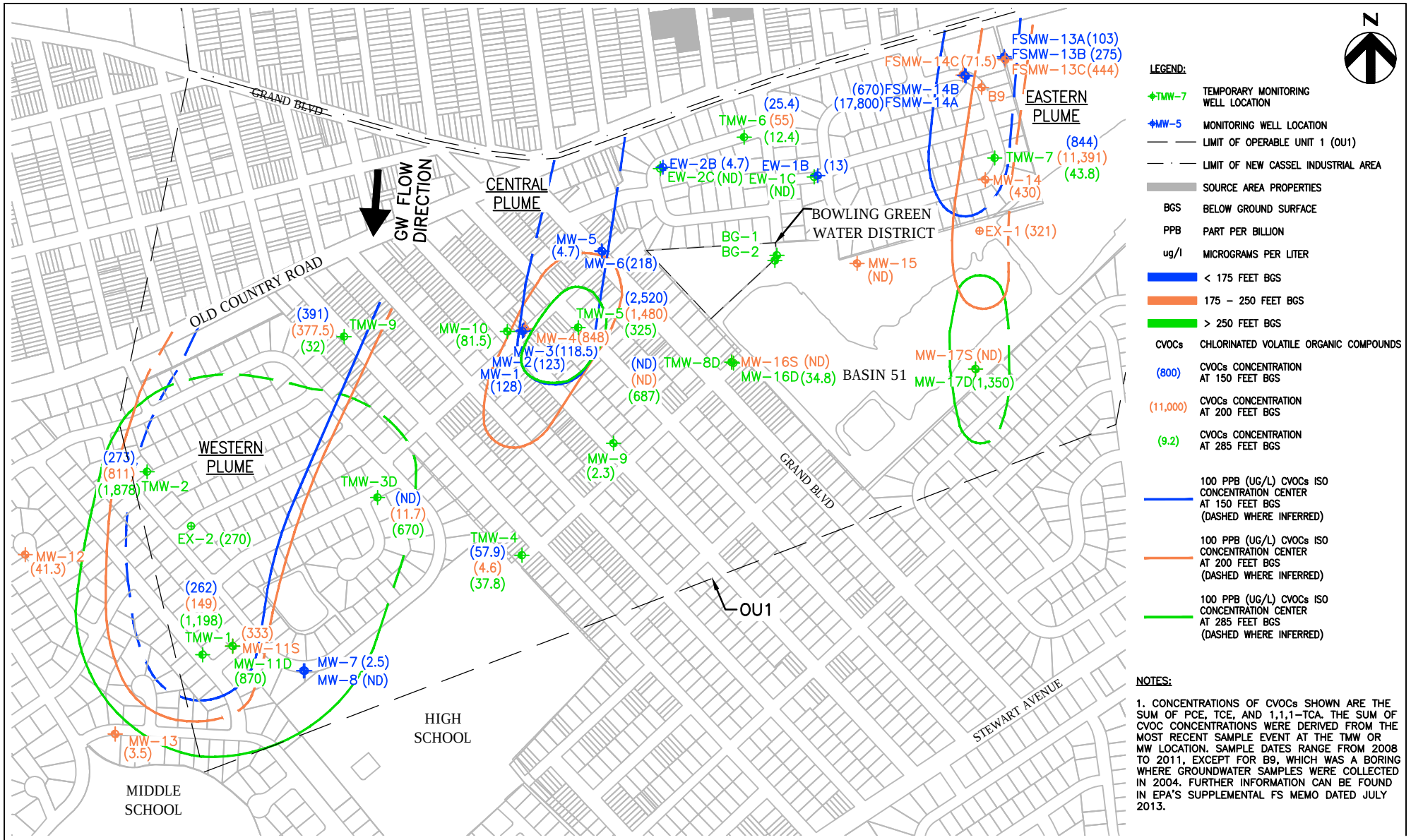

NOTES:

1. CONCENTRATIONS OF CVOCs SHOWN ARE THE SUM OF PCE, TCE, AND 1,1,1–TCA. THE SUM OF CVOC CONCENTRATIONS WERE DERIVED FROM THE MOST RECENT SAMPLE EVENT AT THE TMW OR MW LOCATION. SAMPLE DATES RANGE FROM 2008 TO 2011, EXCEPT FOR B9, WHICH WAS A BORING WHERE GROUNDWATER SAMPLES WERE COLLECTED IN 2004. FURTHER INFORMATION CAN BE FOUND IN EPA'S SUPPLEMENTAL FS MEMO DATED JULY 2013.

1 inch = 600 ft.

HDR

CVOCs ISO-CONCENTRATION MAP

NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE OU1

TOWNSHIP OF NORTH HEMPSTEAD AND HEMPSTEAD, NASSAU COUNTY, NY

DATE
JULY 2013

FIGURE
2

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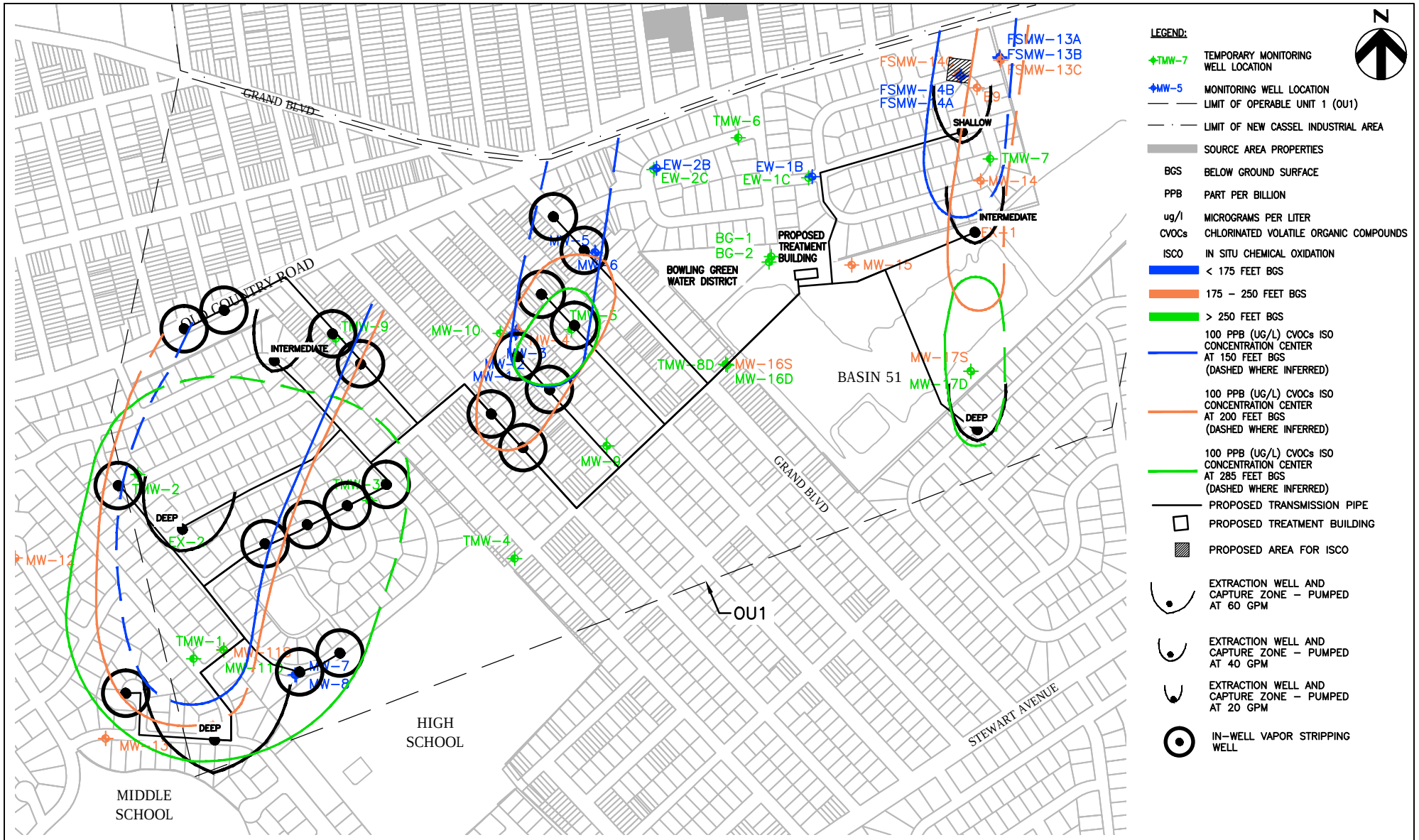

1 inch = 600 ft.

HDR

ALTERNATIVE 5
COMBINED IN SITU AND EX SITU GROUNDWATER TREATMENT

NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE OU1
TOWNSHIP OF NORTH HEMPSTEAD AND HEMPSTEAD, NASSAU COUNTY, NY

DATE
JULY 2013

FIGURE
3

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APPENDIX II

TABLES

Table 1
Summary of Chemicals of Concern and
Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Concern	Concentration Detected				Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)	EPC Units	Statistical Measure
		Min		Max						
Groundwater (Tapwater)	1,1,2,2-Tetrachloroethane	5.00E-01	U	2.30E+01		µg/L	1/38	2.30E+01	µg/L	Maximum Detected Concentration
	1,1,2-Trichloroethane	5.00E-01	U	5.40E+00		µg/L	5/38	1.38E+00	µg/L	95% KM (t) UCL
	1,1-Dichloroethane	3.30E-01	J	9.70E+02	D	µg/L	25/38	3.02E+02	µg/L	99% KM (Chebyshev) UCL
	1,1-Dichloroethene	3.40E-01	J	8.40E+02	D	µg/L	25/38	3.92E+02	µg/L	99% KM (Chebyshev) UCL
	Chloroform	2.50E-01	J	5.40E+01		µg/L	20/38	2.35E+01	µg/L	99% KM (Chebyshev) UCL
	cis-1,2-Dichloroethene	5.00E-01	U	6.30E+02	E	µg/L	30/38	2.47E+02	µg/L	99% KM (Chebyshev) UCL
	Tetrachloroethene	5.00E-01	U	1.20E+04	E	µg/L	30/38	3.54E+03	µg/L	99% KM (Chebyshev) UCL
	Trichloroethene	3.20E-01	J	1.80E+03	E	µg/L	32/38	3.88E+02	µg/L	95% KM (Chebyshev) UCL
	Vinyl Chloride	5.00E-01	U	1.10E+01		µg/L	3/38	1.10E+01	µg/L	Maximum Detected Concentration

Qualifier Definitions:
D = analysis at a secondary dilution factor
E = analytes whose concentrations exceed the calibration range of the instrument
J = compound was detected below the reporting limit in the sample
U = analyte was analyzed for, but no quantifiable concentration was found at or above the DL

Table 2
Selection of Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Groundwater	Groundwater (Tap Water)	Residential	Adult/Child	Dermal/Ingestion	none	Residents in the area are connected to the municipal water supply. The BG Well Field uses an aeration system to treat groundwater.
				Commercial/ Industrial Worker	Adult			Commercial/Industrial Workers in the area are connected to the municipal water supply. The BG Well Field uses an aeration system to treat groundwater.
		Bathroom Air	Water Vapor in Bathroom Air	Residential	Adult/Child	Inhalation	none	Residents in the area are connected to the municipal water supply. The BG Well Field uses an aeration system to treat groundwater.
		Indoor Air	Indoor Air	Residential	Adult/Child	Inhalation	Qual	Indoor air vapor intrusion is a potentially complete exposure pathway.
				Commercial/ Industrial Worker	Adult/Child	Inhalation		
		Groundwater	Groundwater (Excavation/ Trench)	Construction Worker	Adult	Dermal/Ingestion/Inhalation	none	Construction workers were not assessed because depth to groundwater > 10' bgs.
		Ambient Air	Ambient Air (Excavation/ Trench)	Construction Worker	Adult	Inhalation	none	Construction workers were not assessed because depth to groundwater > 10' bgs.
Future	Groundwater	Groundwater	Groundwater (Tap Water)	Residential	Adult/Child	Dermal/Ingestion	Quant	Future Residents in the area are connected to the municipal water supply. The BG Well Field uses an aeration system to treat groundwater. Future residents are being quantitatively evaluated based on the assumption that contaminated groundwater beneath the site is used as a potable water supply.
				Commercial/ Industrial Worker	Adult			Commercial/Industrial Workers in the area are connected to the municipal water supply. The BG Well Field uses an aeration system to treat groundwater. Future commercial/industrial workers are being quantitatively evaluated based on the assumption that contaminated groundwater beneath the site is used as a potable water supply.
		Bathroom Air	Water Vapor in Bathroom Air	Residential	Adult/Child	Inhalation	Quant	Residents in the area are connected to the municipal water supply. The BG Well Field uses an aeration system to treat groundwater. Future residents are being quantitatively evaluated based on the assumption that contaminated groundwater beneath the site is used as a potable water supply.
		Indoor Air	Indoor Air	Residential	Adult/Child	Inhalation	Qual	Indoor air vapor intrusion is a potentially complete exposure pathway.
				Commercial/ Industrial Worker	Adult			
		Groundwater	Groundwater (Excavation/ Trench)	Construction Worker	Adult	Dermal/Ingestion/Inhalation	none	Construction workers were not assessed because depth to groundwater > 10' bgs.
		Ambient Air	Ambient Air (Excavation/ Trench)	Construction Worker	Adult	Inhalation	none	Construction workers were not assessed because depth to groundwater > 10' bgs.

Definitions:
BG- Bowling Green Water Supply District
Quant- Quantitative
Qual- Qualitative

Table 3
Non-Cancer Toxicity Data Summary

Pathway: Oral/Dermal

Chemicals of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal	Adj. Dermal RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD Target Organ	Dates of RfD
1,1,2,2-Tetrachloroethane	Chronic	2.0E-02	mg/kg-day	> 50%	2.0E-02	mg/kg-day	Increased relative kidney weight in male rats	1000	IRIS	9/30/2010
1,1,2-Trichloroethane	Chronic	4.0E-03	mg/kg-day	> 50%	4.0E-03	mg/kg-day	Clinical serum chemistry	1000	IRIS	2/1/1995
1,1-Dichloroethane	Chronic	2.0E-01	mg/kg-day	> 50%	2.0E-01	mg/kg-day	Kidney	NA	PPRTV	
1,1-Dichloroethene	Chronic	5.0E-02	mg/kg-day	> 50%	5.0E-02	mg/kg-day	Liver	100	IRIS	8/13/2002
Chloroform	Chronic	1.0E-02	mg/kg-day	> 50%	1.0E-02	mg/kg-day	Liver	100	IRIS	10/19/2001
cis-1,2-Dichloroethene	Chronic	2.0E-03	mg/kg-day	> 50%	2.0E-03	mg/kg-day	Increased relative kidney weight in male rats	3,000	IRIS	9/30/2010
Tetrachloroethene	Chronic	6.0E-03	mg/kg-day	> 50%	6.0E-03	mg/kg-day	Neurotoxicity	1,000	IRIS	2/10/2012
Trichloroethene	Chronic	5.0E-04	mg/kg-day	> 50%	5.0E-04	mg/kg-day	Immunological; developmental immunotoxicity; heart malformations	1000/100/10	IRIS	9/28/2011
Vinyl Chloride	Chronic	3.0E-03	mg/kg-day	> 50%	3.0E-03	mg/kg-day	Liver	30	IRIS	8/7/2000

Pathway: Inhalation

Chemicals of Concern	Chronic/ Subchronic	Inhalation RfC	Inhalation RfC Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfC Target Organ	Dates of RfC
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	Chronic	2.0E-04	mg/m^3	vacuolation/microcysts in rats	300	PPRTV Appendix (screening value)	12/1/1992
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	Chronic	2.0E-01	mg/m^3	Liver	30	IRIS	8/13/2002
Chloroform	Chronic	9.8E-02	mg/m^3	Liver	NA	ATSDR	
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	Chronic	4.0E-02	mg/m^3	Neurotoxicity	1000	IRIS	2/10/2012
Trichloroethene	Chronic	2.0E-03	mg/m^3	CNS, liver, kidney, male reproductive system and embryo, fetuses, and neonates (development toxicity)	100/10	IRIS	9/28/2011
Vinyl Chloride	Chronic	1.0E-01	mg/m^3	Liver	30	IRIS	8/7/2000

Footnotes:
(1) Source: Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Section 4.2 and Exhibit 4-1. USEPA recommends that the oral RfD should not be adjusted to estimate the absorbed dose for compounds when the absorption efficiency is greater than 50%

Definitions:
ATSDR = Agency for Toxic Substances & Disease Registry Minimal Risk Levels
CNS = Central nervous system
IRIS = Integrated Risk Information System
NA = Not available
PPRTV = Provisional Peer Reviewed Toxicity Value

Table 4
Cancer Toxicity Data Summary

Pathway: Ingestion/ Dermal

Chemical of Concern	Oral Cancer Slope Factor	Units	Absorbed Cancer Slope Factor for Dermal	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1,2,2-Tetrachloroethane	2.0E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-01	$(mg/kg\text{-}day)^{-1}$	likely human carcinogen	IRIS	9/30/2010
1,1,2-Trichloroethane	5.7E-02	$(mg/kg\text{-}day)^{-1}$	5.7E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	2/1/1994
1,1-Dichloroethane	5.7E-03	$(mg/kg\text{-}day)^{-1}$	5.7E-03	$(mg/kg\text{-}day)^{-1}$	C	Cal/EPA	
1,1-Dichloroethene	NA	$(mg/kg\text{-}day)^{-1}$	NA	$(mg/kg\text{-}day)^{-1}$	C	IRIS	8/13/2002
Chloroform	3.1E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	Cal/EPA	
cis-1,2-Dichloroethene	NA	$(mg/kg\text{-}day)^{-1}$	NA	$(mg/kg\text{-}day)^{-1}$	NA	NA	NA
Tetrachloroethene	2.1E-03	$(mg/kg\text{-}day)^{-1}$	2.1E-03	$(mg/kg\text{-}day)^{-1}$	likely human carcinogen	IRIS	2/10/2012
Trichloroethene (1,2)	4.6E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	9/28/2012
Vinyl Chloride (adulthood) (1)	7.2E-01	$(mg/kg\text{-}day)^{-1}$	7.2E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	8/7/2000
Vinyl Chloride (from birth) (1)	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	8/7/2000

Pathway: Inhalation

Chemical of Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1,2,2-Tetrachloroethane	5.8E-05	$(ug/m^3)^{-1}$	NA	NA	NA	Cal/EPA	9/30/2010
1,1,2-Trichloroethane	1.6E-05	$(ug/m^3)^{-1}$	NA	NA	C	IRIS	2/1/1994
1,1-Dichloroethane	1.6E-06	$(ug/m^3)^{-1}$	NA	NA	C	Cal/EPA	10/1/1996
1,1-Dichloroethene	NA	$(ug/m^3)^{-1}$	NA	NA	C	IRIS	8/13/2002
Chloroform	2.3E-05	$(ug/m^3)^{-1}$	NA	NA	B2	IRIS	10/19/2001
cis-1,2-Dichloroethene	NA	$(ug/m^3)^{-1}$	NA	NA	NA	NA	NA
Tetrachloroethene	2.6E-07	$(ug/m^3)^{-1}$	NA	NA	likely human carcinogen	IRIS	2/10/2012
Trichloroethene (1,3)	4.1E-06	$(ug/m^3)^{-1}$	NA	NA	A	IRIS	9/28/2011
Vinyl Chloride (adulthood) (1)	4.4E-06	$(ug/m^3)^{-1}$	NA	NA	A	IRIS	8/7/2000
Vinyl Chloride (from birth) (1)	8.8E-06	$(ug/m^3)^{-1}$	NA	NA	A	IRIS	8/7/2000

Footnotes:
(1) This chemical operates with a mutagenic mode of action (USEPA 2005, 2011).
(2) The kidney lifetime oral slope factor for TCE is 9.3E-3 per mg/kg-day and 3.7E-02 per mg/kg-day for NHL and liver.
(3) The kidney lifetime unit risk for TCE is 1.0E-6 per $\mu g/m^3$ and 3.1E-6 per $\mu g/m^3$ for NHL and liver.

Weight of Evidence definitions:
Group A chemicals (known human carcinogens) are agents which there is sufficient evidence to support the casual association between exposure to the agents in humans and cancer.
Group B2 chemicals for which there is sufficient evidence of carcinogenicity in animals but no evidence in humans.
Group C chemicals (possible human carcinogens) are agents for which there is limited evidence of carcinogenicity in animals and inadequate or a lack of human data.

Definitions:
Cal/EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System
NA = Not available

$(\mu g/m^3)^{-1}$ = Per micrograms per cubic meter
(mg/kg-day)-1 = Per milligrams per kilogram per day

Table 5
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Future
Receptor Population: Residential
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Groundwater (Tapwater)	cis-1,2-Dichloroethene	Kidney	3.E+00	NA	4.E-01	4.E+00
			Tetrachloroethene	CNS	2.E+01	NA	1.E+01	3.E+01
			Trichloroethene	Immunological, Developmental, Heart	2.E+01	NA	4.E+00	2.E+01
							Exposure Medium Index Total	5.E+01
	Bathroom Air	Water Vapor in Bathroom Air	1,1,2-Trichloroethane	Vacuolation	NA	5.E+00	NA	5.E+00
			1,1-Dichloroethene	Liver	NA	1.E+00	NA	1.E+00
			Tetrachloroethene	CNS	NA	6.E+01	NA	6.E+01
			Trichloroethene	Liver, Kidney, Reproductive, Immunological, Heart, Developmental	NA	1.E+02	NA	1.E+02
							Exposure Medium Index Total	2.E+02
							Receptor Hazard Index Total	3.E+02
							Kidney HI	1.E+02
							CNS HI	2.E+02
							Liver HI	1.E+02
							Immunological HI	2.E+02
							Heart HI	2.E+02
							Developmental HI	2.E+02
							Vacuolation HI	5.E+00
							Reproductive HI	1.E+02

Table 5 Continued
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Future

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Groundwater (Tapwater)	cis-1,2-Dichloroethene	Kidney	8.E+00	NA	1.E+00	9.E+00
			Tetrachloroethene	CNS	4.E+01	NA	2.E+01	6.E+01
			Trichloroethene	Immunological, Developmental, Heart	5.E+01	NA	8.E+00	6.E+01
							Exposure Medium Index Total	1.E+02
	Bathroom Air	Water Vapor in Bathroom Air	1,1,2-Trichloroethane	Vacuolation	NA	1.E+01	NA	1.E+01
			1,1-Dichloroethene	Liver	NA	4.E+00	NA	4.E+00
			Tetrachloroethene	CNS	NA	2.E+02	NA	2.E+02
			Trichloroethene	Liver, Kidney, Reproductive, Immunological, Heart, Developmental	NA	4.E+02	NA	4.E+02
							Exposure Medium Index Total	6.E+02
							Receptor Hazard Index Total	7.E+02
							Kidney HI	4.E+02
							CNS HI	7.E+02
							Liver HI	4.E+02
							Immunological HI	5.E+02
							Heart HI	5.E+02
							Developmental HI	5.E+02
							Vacuolation HI	1.E+01
							Reproductive HI	4.E+02

Table 5 Continued
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Future

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Primary target Organ	Non-Carcinogenic Hazard Quotient			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Groundwater (Tapwater)	Tetrachloroethene	CNS	6.E+00	NA	1.E+00	7.E+00
			Trichloroethene	Immunological, Developmental, Heart	8.E+00	NA	5.E-01	8.E+00
	Exposure Medium Index Total							2.E+01
							Receptor Hazard Index	2.E+01
							CNS HI	7.E+00
							Immunological HI	8.E+00
							Heart HI	8.E+00
							Developmental HI	8.E+00

Defintions:
CNS = Central Nervous System
NA= Not applicable

Table 6
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Residential
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Groundwater (Tap Water)	Tetrachloroethene	1.E-04	NA	7.E-05	2.E-04
			Trichloroethene	5.E-04	NA	6.E-05	5.E-04
			Vinyl Chloride	2.E-04	NA	1.E-05	2.E-04
						Exposure Medium Total=	1.E-03
	Bathroom Air	Water Vapor in Bathroom Air	1,1,2,2-Tetrachloroethane	NA	6.E-04	NA	6.E-04
			1,1-Dichloroethane	NA	2.E-04	NA	2.E-04
			Chloroform	NA	2.E-04	NA	2.E-04
			Tetrachloroethene	NA	4.E-04	NA	4.E-04
			Trichloroethene	NA	6.E-04	NA	6.E-04
						Exposure Medium Total=	2.E-03
						Total Risk=	3.E-03

Scenario Timeframe: Future
Receptor Population: Commercial/Industrial Worker [(1)]
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Groundwater (Tap Water)	NA	NA	NA	NA	NA
		Exposure Point Total		1.E-04	NA	1.E-05	2.E-04
						Exposure Medium Total=	2.E-04
						Total Risk=	2.E-04

Footnotes:

(1) No Chemicals of Concern were tabulated for this receptor since no individual chemical exceed the 10^{-4} cancer risk range. For overall completeness and transparency, the cancer risk totals for each exposure route were listed.

Definitions:
NA- not applicable

Table 7
Cleanup Levels for Contaminants of Concern in OU1 Groundwater

Chemicals of Concern (COCs)	NYSDEC Water Quality Standard (µg/L)	Federal Maximum Contaminant Level (µg/L)	NYSDOH Drinking Water Quality Standards (µg/L)	Cleanup Level [A] (µg/L)
1,1,2,2- Tetrachloroethane	5	No Standard (NS)	5	5
1,1,2- Trichloroethane	1	5	5	1
1,1- Dichloroethane	5	NS	5	5
1,1-Dichloroethene	5	7	5	5
Chloroform	7	80	50	7
Cis-1,2-Dichloroethene	5	70	5	5
Tetrachloroethene	5	5	5	5
Trichloroethene	5	5	5	5
Vinyl chloride	2	2	2	2

Notes:

[A] The cleanup level represents the level to which each COC will be cleaned up to. The cleanup level is the more stringent of the federal or state value listed above. The table does not include all ARARs, TBCs and other guidance that applies to the remedy selected in this ROD.

Table 8
Chemical-Specific ARARs, TBCs, and Other Guidance

REGULATION/ AUTHORITY	CITATION	REQUIREMENT SYNOPSIS
National Primary Drinking Water Standards	42 U.S.C. § 300f et seq and 40 CFR Part 141, Subpart F	These federal standards establish maximum contaminant levels (MCLs) which are health-based standards for public water systems.
New York State Groundwater Quality Standards	ECL §§3-0301[2][m], 15-0313, 17-0301, 17-0809; 6 NYCRR Part 703	Provides numerical groundwater quality standards.
New York State Department of Health Drinking Water Standards	10 NYCRR Part 5	Sets standards for public drinking water supplies.

Table 9
Location-Specific ARARs, TBCs, and Other Guidance

REGULATION/ AUTHORITY	CITATION	REQUIREMENT SYNOPSIS
National Historic Preservation Act	16 U.S.C. §§470-470x-6; 36 C.F.R. Part 800	Establishes that response actions must take into account effect on properties currently listed or eligible for inclusion on the National Registry of Historic Places. Requires federal agencies to take into account the effects of their undertakings on historic properties and afford the council a reasonable opportunity to comment on such undertakings. This will include consultation with state and local governments, and private organizations as necessary.

Table 10
Action-Specific ARARs, TBCs, and Other Guidance

REGULATION/ AUTHORITY	CITATION	REQUIREMENT SYNOPSIS
General Requirement for Site Remediation		
Occupational Safety and Health Act (OSHA) - General Industry Standards	29 USC §553 and 42 USC§126; 29 CFR §1910.120	These regulations specify the 8-hour time-weighted average concentration for worker exposure to various compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR §1910.120.
OSHA – Safety and Health Standards	40 U.S.C. §333; 29 U.S.C. §§653, 655, 657; 29 CFR Part 1926	These regulations specify the type of safety equipment and procedures to be followed during site remediation.
OSHA – Recordkeeping, Reporting and Related Regulations	29 U.S.C. §§657, 658, 660, 669, 673; 29 CFR Part 1904	These regulations outline recordkeeping and reporting requirements for an employer under OSHA.
Resource Conservation and Recovery Act (RCRA) – General Standards	42 U.S.C. §§6905, 6912(a), 6924, and 6925; 40 CFR Part 264	General performance standards requiring minimization of need for further maintenance and control. Also requires decontamination or disposal of contaminated equipment, structures and soils. Outlines requirements for safety equipment and spill control when treating, handling and/or storing hazardous wastes. Provides emergency procedures to be used when following explosions, fires, etc. when storing hazardous wastes.
RCRA 90-Day Accumulation Rule for Hazardous Waste	42 U.S.C.§§ 6906, 6912, 6922-6925, 6937, and 6938; 40 CFR Part 262	Allows generators of hazardous waste to store and treat hazardous waste at the generation site for up to 90 days in tanks, containers and containment buildings without having to obtain a RCRA hazardous waste permit.
RCRA Hazardous Waste Permit Program	42 U.S.C. §6925; 40 CFR Part 270	Covers the basic permitting, application, monitoring and reporting requirements for off-site hazardous waste management facilities.

REGULATION/ AUTHORITY	CITATION	REQUIREMENT SYNOPSIS
General Requirement for Site Remediation (continued)		
Superfund Green Remediation Strategy	www.epa.gov/superfund/greenremediation/sf-gr-strategy.pdf	Provides the EPA's strategy to clean up hazardous waste sites in ways that use natural resources and energy efficiently and reduces negative impacts on human health and the environment.
Green Remediation	DER-31	Provides concepts and techniques of green remediation and guidance on how to apply them to remedial programs under DER.
New York Hazardous Waste Management System - General	ECL, Article 27; 6 NYCRR Part 370	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 371-376.
Identification and Listing of Hazardous Wastes	ECL, Article 27; 6 NYCRR Part 371	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 371-376.
New York Regulations for Hazardous Waste Management Facilities	ECL, Article 27; 6 NYCRR Part 373.1.1 - 373.1.8	Provides requirements and procedures for obtaining a permit to operate a hazardous waste treatment, storage and disposal facility. Also lists contents and conditions of permits.
Waste Transportation		
U.S. Department of Transportation (USDOT) Rules for Transportation of Hazardous Materials	49 CFR Parts 107 and 171.1-172.558	Outlines procedures for the packaging, labeling, manifesting and transporting of hazardous materials.
RCRA- Standards Applicable to Transporters of Applicable Hazardous Waste	42 U.S.C.§§ 6906, 6912, 6922-6925, 6937, and 6938; 40 CFR Part 263	Establishes the responsibility of off-site transporters of hazardous waste in the handling, transportation and management of the waste. Requires manifesting, recordkeeping and immediate action in the event of a discharge.

REGULATION/ AUTHORITY	CITATION	REQUIREMENT SYNOPSIS
Waste Transportation (continued)		
New York State Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities	ECL, Article 27; 6 NYCRR Part 372	Provides guidelines relating to the use of the manifest system and its recordkeeping requirements. It applies to generators, transporters and facilities in New York State.
Waste Transporter Permits	ECL, Article 27, Titles 3, 9, and 15; 6 NYCRR Part 364	Governs the collection, transport and delivery of regulated waste within New York State.
Disposal		
New York Standards for Universal Waste and Land Disposal Restrictions	ECL, Article 27; 6 NYCRR Part 374-3 6 NYCRR Part 376	These regulations establish standards for treatment and disposal of hazardous wastes.
Groundwater Discharge		
Clean Water Act	CWA [40 CFR 122, 125)	National Pollutant Discharge Elimination System (NPDES) permit requirements for point source discharges must be met, including the NPDES Best Management Practice (BMP) Program. These regulations include, but are not limited to, requirements for compliance with water quality standards, a discharge monitoring system, and records maintenance.
Safe Drinking Water Act – Underground Injection Control Program	40 CFR 144, 146	Establish performance standards, well requirements, and permitting requirements for groundwater re-injection wells.
New York Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations	6NYCRR Part 703	Establish numerical criteria for groundwater treatment before discharge.
New York State Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations	TOGS 1.1.1	Provides groundwater effluent limitations for use where there are no standards.

REGULATION/ AUTHORITY	CITATION	REQUIREMENT SYNOPSIS
Off-Gas Management		
Clean Air Act-National Ambient Air Quality Standards	42 U.S.C. §§7401-7671q; 40 CFR Parts 50-52 60 and 40	Establishes ambient air quality standards for protection of public health.
Federal Directive – Control of Air Emissions from Superfund Air Strippers	OSWER Directive 9355.0-28	These provide guidance on the use of controls for Superfund site air strippers as well as other vapor extraction techniques in attainment and non-attainment areas for ozone.
New York Air Quality Standards/	DER-10 6 NYCRR Part 257	This regulation requires that maximum 24-hour concentrations for particulate matter not be exceeded more than once per year. Fugitive dust emissions from site excavation activities must be maintained below 250 micrograms per cubic meter ($\mu g/m^3$).
NYSDEC Guidelines for the Control of Toxic Ambient Contaminants	DAR-1 Air Guide 1	This policy provides guidance for the control of toxic ambient air contaminants and outlines the procedures for evaluating sources.
New York Permits and Certificates	6 NYCRR Part 201	Permits may be exempted for listed trivial activities.
New York Emissions Verification	6 NYCRR Part 202	Specifies the sampling and documentation requirements for off-gas emissions.
New York General Prohibitions	6 NYCRR Part 211	Prohibition applies to any particulate, fume, gas, mist, odor, smoke, vapor, pollen, toxic or deleterious emissions.
New York General Process Emission Sources	6 NYCRR Part 212	Sets the treatment requirements for certain emission rates.

APPENDIX III

ADMINSTRATIVE RECORD INDEX

R2-0012388

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

DRAFT

07/24/2013 **REGION ID: 02**

Site Name: NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE
CERCLIS ID: NY0001095363
OUID: 01
SSID: A245
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
684499	07/24/2013	ADMINISTRATIVE RECORD INDEX FOR OU1 FOR THE NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE	3	[INDEX]			[]	[]	[,]	[US ENVIRONMENTAL PROTECTION AGENCY]
182594	06/01/1986	INVESTIGATION OF CONTAMINATED AQUIFER SEGMENTS NASSAU COUNTY, NY FOR THE NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE	111	[REPORT]			[]	[]	[,]	[DVIRKA & BARTILUCCI CONSULTING ENGINEERS, NASSAU COUNTY HEALTH DEPT]
182596	06/29/1987	ERRATA SHEET FOR REPORT INVESTIGATION OF CONTAMINATED AQUIFER SEGMENTS NASSAU COUNTY, NY FOR THE NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE	2	[LETTER]			[CONETTA, BEN]	[EPA]	[LOVEJOY, JOHN L]	[NASSAU COUNTY HEALTH DEPT]
182598	02/01/1995	PRELIMINARY ASSESSMENT SITE INVESTIGATION REPORT FOR THE NEW CASSEL/HICKSVILLE GROUNDWATER CONTAMINATION SITE	216	[REPORT]			[,]	[NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[,]	[LAWLER MATUSKY SKELLY ENGINEERS]
182599	09/15/1995	REMEDIAL SITE ASSESSMENT DECISION FOR FURTHER ASSESSMENT NEEDED UNDER CERCLA FOR THE NEW CASSEL/HICKSVILLE GROUNDWATER CONTAMINATION SITE	2	[FORM]			[]	[]	[PRUDER, ELGIN P]	[US ENVIRONMENTAL PROTECTION AGENCY]
152845	09/01/2000	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION REMEDIAL INVESTIGATION / FEASIBILITY STUDY REPORT - VOLUMES I - III OF III FOR THE NEW CASSEL / HICKSVILLE GROUND WATER CONTAMINATION SITE	920	[REPORT]			[,]	[NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[,]	[LAWLER, MATUSKY & SKELLY ENGINEERS LLP]
152846	11/07/2003	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION RECORD OF DECISION FOR OU3 FOR THE NEW CASSEL / HICKSVILLE GROUND WATER CONTAMINATION SITE	105	[REPORT]			[]	[]	[DESNOYERS, DALE]	[NY STATE DEPT OF ENVIRONMENTAL CONSERVATION]
123778	06/01/2009	PRE-DESIGN INVESTIGATION REPORT FOR OU 3 FOR THE NEW CASSEL INDUSTRIAL AREA SITE	1102	[REPORT]			[,]	[NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[,]	[DVIRKA & BARTILUCCI CONSULTING ENGINEERS]

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ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

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07/24/2013 **REGION ID: 02**

Site Name: NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE
CERCLIS ID: NY0001095363
OUID: 01
SSID: A245
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
123779	06/01/2009	PRE-DESIGN INVESTIGATION REPORT FOR OU3 - APPENDIX J FOR THE NEW CASSEL INDUSTRIAL AREA SITE	8500	[REPORT]			[,]	[NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[,]	[DVIRKA & BARTILUCCI CONSULTING ENGINEERS]
152844	12/27/2010	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION'S CONCURRENCE ON THE NOMINATION TO THE NATIONAL PRIORITIES LIST FOR THE NEW CASSEL / HICKSVILLE GROUND WATER CONTAMINATION SITE	3	[LETTER]			[MUGDAN, WALTER E]	[EPA, REGION 2]	[IWANOWICZ, PETER]	[NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION]
210401	05/01/2011	COMMUNITY UPDATE REGARDING THE PROPOSAL TO ADD SITE TO THE NATIONAL PRIORITIES LIST FOR NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE	2	[FACTSHEET]			[]	[]	[]	[]
210400	05/03/2011	PUBLIC FORUM MEETING AGENDA FOR NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE	1	[AGENDA]			[]	[]	[]	[]
210402	05/03/2011	INVITATION FROM LEGISLATOR NORMA L. GONSALVES TO ATTEND PUBLIC FORUM FOR NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE	2	[NOTICE]			[]	[]	[]	[]
210404	11/07/2011	US ENVIRONMENTAL PROTECTION AGENCY'S NATURAL RESOURCE TRUSTEE NOTIFICATION SENT TO ONEIDA INDIAN NATION COUNSEL FOR THE NEW CASSEL/ HICKSVILLE GROUND WATER CONTAMINATION SITE	3	[LETTER]			[BEAKMAN , MEGHAN]	[GENERAL COUNSEL - ONEIDA INDIAN NATION]	[ENCK, JUDITH A]	[EPA, REGION 2]
123777	12/15/2011	PRE-DESIGN INVESTIGATION REPORT FOR THE NEW CASSEL INDUSTRIAL AREA SITE	677	[REPORT]			[,]	[NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION]	[,]	[HDR, INC.]
210406	01/09/2012	DEPARTMENT ON NAVY'S RESPONSE TO US ENVIRONMENTAL PROTECTION AGENCY'S NATURAL RESOURCE TRUSTEE NOTIFICATION FOR THE NEW CASSEL/ HICKSVILLE GROUND WATER CONTAMINATION SITE	2	[LETTER]			[MITCHELL, JUDY-ANN]	[US ENVIRONMENTAL PROTECTION AGENCY REGION 2]	[BARNETT, CHERRYL F]	[US NAVY]

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

DRAFT

07/24/2013 **REGION ID: 02**

Site Name: NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE
CERCLIS ID: NY0001095363
OUID: 01
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Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Beginning Bates:	Ending Bates:	Addressee Name:	Addressee Organization:	Author Name:	Author Organization:
210405	01/27/2012	US DEPARTMENT OF INTERIOR'S RESPONSE TO US ENVIRONMENTAL PROTECTION AGENCY'S NATURAL RESOURCE TRUSTEE NOTIFICATION FOR THE NEW CASSEL/ HICKSVILLE GROUND WATER CONTAMINATION SITE	1	[LETTER]			[MITCHELL, JUDY-ANN]	[US ENVIRONMENTAL PROTECTION AGENCY REGION 2]	[RADDANT, ANDREW L]	[U. S. DEPARTMENT OF THE INTERIOR]
210403	03/22/2012	SUBMITTAL OF RESULTS OF NATURAL RESOURCE TRUSTEE NOTIFICATION FOR THE NEW CASSEL/ HICKSVILLE GROUND WATER CONTAMINATION SITE	2	[LETTER]			[LAPOMA, JENNIFER]	[US ENVIRONMENTAL PROTECTION AGENCY REGION 2]	[RAMAKRISHNAN, RAJINI]	[US ENVIRONMENTAL PROTECTION AGENCY]
123776	03/05/2013	CORRESPONDENCE REGARDING NATIONAL PRIORITIES LIST REMOVAL SITE EVALUATION FOR NEW CASSEL/HICKSVILLE GROUNDWATER CONTAMINATION SITE	6	[LETTER]			[ROTOLA, JOSEPH]	[EPA]	[MAGRIPLES , NICHOLAS]	[EPA, REGION 2]
123775	05/01/2013	STAGE 1A CULTURAL RESOURCES SURVEY FOR NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE	46	[REPORT]			[,]	[HDR, INC.]	[,]	[JOHN MILNER ASSOCIATES, INC.]
210407	05/01/2013	FINAL BASELINE HUMAN HEALTH RISK ASSESSMENT FOR OU1 FOR THE NEW CASSEL / HICKSVILLE GROUND WATER CONTAMINATION SITE	190	[REPORT]			[,]	[US ARMY CORPS OF ENGINEERS]	[,]	[HDR ARCHITECTURE AND ENGINEERING PC]
687590	07/23/2013	SUPPLEMENTAL FEASIBILITY STUDY TECHNICAL MEMORANDUM FOR OU1 FOR THE NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE	183	[REPORT]			[,]	[US ARMY CORPS OF ENGINEERS - KANSAS CITY DISTRICT]	[,]	[HDR / O'BRIEN & GERE JOINT VENTURE]

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APPENDIX IV

NEW YORK STATE CONCURRENCE LETTER

New York State Department of Environmental Conservation
Division of Environmental Remediation
Office of the Director, 12th Floor
625 Broadway, Albany, New York 12233-7011
Phone: (518) 402-9706 • **Fax:** (518) 402-9020
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Joe Martens
Commissioner

Sent Via Email Only

September 30, 2013

Mr. Walter Mugdan, Director (mugdan.walter@epa.gov)
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region 2
290 Broadway
New York, NY 10007-1866

RE: Record of Decision
New Cassel/Hicksville Ground Water Contamination – Operable Unit 1
NYSDEC Site No. 130215 / USEPA Site No. NY0001095363
Towns of North Hempstead, Hempstead and Oyster Bay, Nassau County

Dear Mr. Mugdan:

The New York State Department of Environmental Conservation (DEC) and the New York State Department of Health (DOH) have reviewed the September 2013 Record of Decision for Operable Unit 1 (OU1) of the New Cassel/Hicksville Ground Water Contamination Site, prepared by the United States Environmental Protection Agency (EPA). The site is located in the Towns of North Hempstead, Hempstead and Hicksville, Nassau County.

The EPA's Selected Remedy is Alternative 5: Hybrid Alternative – In-well Vapor Stripping/Groundwater Extraction and Treatment; In-Situ Chemical Treatment. The selected remedy will include the following major components:

- A combination of in-situ treatment of groundwater via in-well vapor stripping and extraction of groundwater via pumping and ex-situ treatment of extracted groundwater prior to discharge to a publicly owned treatment works or reinjection to groundwater (to be determined during design) to establish containment and effectuate removal of contaminant mass where concentrations of total volatile organic compound concentrations are greater than 100 micrograms per liter;
- In-situ chemical treatment, such as in-situ chemical oxidation, to target high concentration contaminant areas, as appropriate;
- Implementation of long-term monitoring to track and monitor changes in groundwater contamination in OU1 to ensure the Remedial Action Objectives are attained;
- Development of a Site Management Plan to ensure proper management of the Site remedy post-construction. The Site Management Plan will include provisions for any operation and maintenance and long-term monitoring required for the remedy, as well as periodic certifications; and
- Institutional controls consisting of existing local requirements that prevent installation of drinking water wells, and informational devices to limit exposure to contaminated groundwater.

It is my understanding that the EPA has agreed to prepare the Site Management Plan and Final Engineering Report consistent with DEC guidance. I also understand that EPA will continue to investigate the soil vapor intrusion pathway for OU1 and will install vapor mitigation systems, if warranted. Based on this information, DEC concurs with the selected remedy and believes it is protective of human health and the environment. If you have any questions, please contact Mr. Guy Bobersky or Mr. Jeffrey Dyber at (518) 402-9621.

Sincerely,

Robert W. Schick, P.E.
Director
Division of Environmental Remediation

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APPENDIX V

RESPONSIVENESS SUMMARY

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Appendix V - Attachment 6	Written Comments Submitted During Public Comment Period

INTRODUCTION

A responsiveness summary is required by the regulations promulgated under the Superfund statute. It provides a summary of comments and concerns received during the public comment period, as well as the responses of the EPA to those comments and concerns. All comments received were considered by the EPA in its final decision regarding the selection of the remedy for OU1 at the Site.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

The Proposed Plan for operable unit 1 (OU1) was released to the public on July 26, 2013, along with the Supplemental Remedial Investigation (RI) Memorandum, the OU1 Supplemental Feasibility Study (FS) Memorandum, and Baseline Human Health Risk Assessment (HHRA) Report for OU1. The EPA and New York State Department of Environmental Conservation's (NYSDEC) preferred remedy and the basis for that preference were identified in the Proposed Plan.

These documents, including the Proposed Plan, and others, were made available to the public in information repositories maintained at the EPA Superfund Records Center in the Region 2 offices at 290 Broadway, 18th Floor, New York, New York and the Westbury Public Library, 445 Jefferson Street, Westbury, New York.

A notice that announced the commencement of the public comment period, the public meeting date, a description of the preferred remedy, the EPA contact information, and the availability of the above-referenced documents was published in *The Westbury Times*, a local newspaper, on July 31, 2013. A notice of an extension to the public comment period until September 24, 2013 was published in *The Westbury Times* on August 23, 2013.

The EPA held a public meeting on August 15, 2013 at 7:00 P.M. at the "Yes We Can" Community Center to discuss the findings of the RI/FS and to answer questions from the public about the remedial alternatives and the proposed remedy. Responses to the comments and questions received at the public meeting, along with other written comments received during the public comment period, are included in this Responsiveness Summary.

SUMMARY OF COMMENTS AND EPA RESPONSES

Approximately seven comment letters were received via email and U.S. mail during the comment period from July 26, 2013 through September 24, 2013. Copies of the comment letters are provided in Attachment 6 of this Responsiveness Summary. A summary of significant comments contained in the letters, and the comments provided at the public meeting on August 15, 2013, as well as the EPA's responses to those comments, are provided below. Comments received and the EPA's responses have been categorized below by the following topics: Nature and Extent of Contamination, Human Health, Site Cleanup, and Other Comments/Questions.

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The majority of comments received were submitted from potentially responsible parties at the Site. A limited number of questions related to vapor intrusion and the Superfund process were received during the public meeting. Questions regarding components of the preferred remedy and future OUs at the Site were received from the Hicksville Water District.

NATURE AND EXTENT OF CONTAMINATION

Comment # 1: The EPA did not consider historical data, consisting of thousands of soil and groundwater samples, collected from within and surrounding the New Cassel Industrial Area (NCIA) when developing the Conceptual Site Model (CSM) for OU1. This data is crucial to accurately understanding the location and characteristics of the plumes that originate from the NCIA and upgradient parties, the chemical signature of plumes at the source areas, and the fate and transport characteristics of these plumes as they migrate into OU1.

Response Comment # 1: This OU addresses a discrete portion of the Site consisting of an area downgradient of the NCIA which has been designated as OU1. The EPA has coordinated with NYSDEC on the on-going remedial measures that are in place, or expected to be in place, to address source areas and contamination within the NCIA itself and it is the EPA's expectation that this contamination will continue to be addressed under the NYSDEC State cleanup program. The proposed plan anticipated and assumed the successful source control or cleanup of the source area(s) at those upgradient individual NCIA facilities under NYSDEC oversight in evaluating the potential for attainment of the objectives of this selected remedy. To ensure the effectiveness of the remedy at OU1, the EPA has outlined provisions whereby the EPA may elect to evaluate additional options in a future OU pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at individual sources if they are not successfully addressed.

Furthermore, the historical data had limited usefulness when conducting the RI/FS for this OU. For example, the HHRA only considered data collected from OU1 because the historical data collected from within the NCIA would not be reflective of current conditions and the remedial activities under NYSDEC authority are intended to mitigate the migration of contaminants to OU1. In addition, the purpose of the EPA's RI/FS for OU1 was not to attribute source contribution from the NCIA to contamination within OU1.

Comment # 2: The EPA inaccurately relied on data collected by NYSDEC from seven temporary monitoring wells. NYSDEC installed these temporary monitoring wells inappropriately using a hollow stem auger, and they were sampled contrary to the EPA recommended sampling protocols, resulting in the cross-contamination of the shallow groundwater with the deeper groundwater. At two locations where a mud rotary drill was utilized for installing monitoring wells, groundwater analytical results from hydropunch sampling did not indicate impacts to the top 150 feet (ft). below ground surface (bgs) and the top 250 ft. bgs. Groundwater quality results from these permanent monitoring wells, which were installed adjacent to temporary monitoring well locations, contained significantly lower concentrations of

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Site-related contaminants in the same depth intervals. Furthermore, data from these temporary monitoring wells is not reproducible.

Response Comment # 2: Sample results from the temporary monitoring wells were used in a qualitative capacity (*i.e.*, screening assessment). As qualified in the EPA's Supplemental FS, uncertainty associated with analytical data collected from the temporary monitoring wells was considered when developing OU1 contaminant plume maps. At locations where a permanent monitoring well was installed at a previous temporary monitoring well location, the data from the permanent monitoring well was used. Additionally, only data collected from permanent monitoring wells was used in the EPA's OU1 HHRA.

Comment # 3: The EPA incorrectly depicts groundwater flow direction and the OU1 plumes as migrating primarily south. The EPA's depiction is inconsistent with historical groundwater elevation data indicating groundwater flow direction to the southwest, as discussed in NYSDEC's 2000 RI/FS, 2003 Record of Decision (ROD), 2009 Pre-Design Investigation, and elevation data collected in 2011 under NYSDEC oversight. The conclusion regarding a southwest groundwater flow direction is further supported by OU1 groundwater quality data using the degradation of 1,1,1-trichloroethane (TCA) as a marker compound in the central plume. Based on the 2011 groundwater elevation data, a groundwater flow divide exists in the OU1 eastern plume areas because there is split with contaminant mass flowing both to the south and the southwest. Additionally, vertical gradients indicate that NCIA-related plumes migrate laterally, but also sink downward. The OU1 eastern plume descends more rapidly than the OU1 western plume due to the influence of the Bowling Green water supply wells. An accurate assessment of the spatial and vertical variability of the groundwater hydraulics is essential for properly designing any groundwater remediation system.

Response to Comment # 3: Based on the groundwater elevation data, groundwater flow is towards the south/southwest across the OU1 area. Regional groundwater flow correlates with a south/southwest groundwater flow direction. The isoconcentration maps were prepared using groundwater sample analytical results with consideration to the groundwater flow direction. The presence of TCA in the OU1 central plume in greater concentrations relative to the OU1 eastern and OU1 western plumes support the conclusion that there are three separate OU1 plumes. The lack of contamination detected in MW-15 also supports the conclusion that the OU1 eastern groundwater plume is separate from the OU1 central plume and that groundwater flow is towards the south/southwest across OU1.

Comment # 4: The EPA relied on data collected from monitoring wells that are too shallow to delineate the extent of the OU1 eastern, central, and western plumes. MW-16 is located adjacent to TMW-8D and screened at a shallow depth of 215 to 225 ft. bgs and a deeper depth of 275 to 286 ft. bgs. Analytical results from TMW-8D indicated the plume was present from 292 to 372 ft. bgs, which means MW-16 was installed at depth intervals where the temporary monitoring well concentrations at the adjacent location were nondetect or well below New York State standards, criteria and guidance (SCG). The EPA ignored the groundwater quality data at TMW-8D in the development of the CSM and delineation of the OU1 plumes. Also, MW-15 and

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GWHP-2 were also screened at depths too shallow to delineate the plume. As a result, the EPA incorrectly dismissed the southwest flow component of the OU1 eastern plume.

Response Comment # 4: MW-17D is located almost directly west of MW-16D and essentially the equivalent groundwater elevation measurement was recorded from both monitoring wells indicating little or no western flow component. Similar elevation data was collected between MW-15 and EX-1. The elevation data does not support a westerly flow direction in this area. In addition, TCA was not detected in EX-1 but was detected in MW-16D supporting the conclusion that MW-16D is not downgradient of EX-1 and that groundwater flows to the south/south west and not to the west.

Comment # 5: A commenter stated that the EPA's CSM relied on an incorrect approach to performing the chlorinated ethenes molar ratio analysis. The EPA mischaracterizes the breakdown pathway and does not allow for the differentiation between the degradation products in tetrachloroethene (PCE)/trichloroethene (TCE) and TCA plumes. The results of an alternative analysis performed by the commenter can be found in Appendix V, Attachment 6.

Response to Comment # 5: The molar fraction analysis conducted by the EPA, as part of the EPA's Supplemental RI Memorandum, was not intended to define solely the extent of individual plumes within OU1 or to define contributing source areas within the NCIA. The molar fraction analysis was done consistently for other areas of the Site, not only OU1. The intent of conducting a molar fraction analysis using ethenes was to provide a regional overview of the PCE/TCE degradation at portions of the Site, not just OU1. Based on commenter's alternative analysis, it appears that considering the TCA degradation pathway and eliminating 1,1-dichloroethene (1,1-DCE) from the PCE/TCE molar analysis could be helpful for differentiating the OU1 central and OU1 eastern plume.

The commenter's analysis considers a portion of the EPA's OU1 western plume to be an area downgradient of their alternatively delineated OU1 central plume. Wells in this area were described by the commenter as containing high TCE mole fractions. The EPA's analysis indicated that the OU1 western plume has a TCE signature. The commenter's alternative delineation of the OU1 western plume identified PCE as the primary ethene. Therefore, EPA does not agree with the commenter's alternative delineation.

Comment # 6: The CSM does not consider contamination that has originated from upgradient sites. The commenter identifies the Sylvania and General Instruments facilities as upgradient sources and states that the commingled chlorinated volatile organic compound (VOC) plumes have reached OU1.

Response to Comment # 6: The commenter indicates that 1,2-dichlorobenzene (1,2-DCB) is a contaminant marker of the Sylvania and General Instruments commingled plume. The EPA has evaluated the presence of 1,2-DCB within OU1 and has determined that it has not been detected frequently within OU1. The groundwater data set, used in the HHRA, indicates that the frequency of 1,2-DCB in OU1 was detected in 2 out 38 sample locations. The maximum

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detected concentration of 1,2-DCB was 1.1 micrograms per Liter (μg/L), which is lower than the state standard of 3 μg/L for 1,2-DCB. Additionally, 1,2-DCB was not detected in the raw water (pre-treated) samples from Bowling Green water supply wells 1 and 2, which were sampled by the EPA in August 2010 to evaluate eligibility of the Site for inclusion on the National Priorities List (NPL).

The commenter further states that groundwater data reveals a deeper upgradient plume with a distinctive contaminant ratio (low PCE to TCE molar ratio) from that of the shallow contamination from the Frost Street sites located within in the eastern portion of the NCIA. Although the commenter proposes one potential explanation for this difference in contaminant ratios, other potential explanations may exist. Factors such as potential differences in hydrogeologic conditions in different areas of the aquifer or the potential influence of the Bowling Green water supply wells that could affect degradation processes should also be taken into consideration.

The purpose of the RI/FS for OU1 is not to attribute contribution. During the course of the remedial design for OU1 and remedial investigations for other OUs, the EPA will continue to evaluate any potential contributing sources of contamination to OU1.

Comment # 7: The full extent of the upgradient plume has not been determined and the proposed plan for OU1 needs to address contributions from upgradient sources, including commingled plumes from the Sylvania and General Instruments facilities.

Response to Comment # 7: The EPA has sufficiently characterized the nature and extent of contamination for OU1. The EPA expects that additional data will be collected as part of the remedial design for OU1 and remedial investigations for other OUs. In addition, as indicated in the response to comment # 1 above, to ensure the effectiveness of the remedy at OU1, the EPA has outlined provisions whereby the EPA may elect to evaluate additional options in a future OU pursuant to CERCLA at individual sources if they are not successfully addressed.

Comment # 8: The EPA's CSM fails to acknowledge that the Bowling Green water supply wells are contaminated and explain the sources responsible, including the central and eastern plumes in OU1.

Response to Comment # 8: The CSM was not intended to identify responsible sources for OU1. Although, the CSM does not include analytical results from the Bowling Green water supply wells, analytical results from the early warning-wells have been discussed and evaluated as part of the OU1 Supplemental FS.

Comment # 9: A commenter stated that the western plume within the NCIA is limited in spatial extent and has attenuated to concentrations below NYS water quality standards before reaching Old Country Road. The commenter refers to a statement in NYSDEC's 2003 remedy stating that the western plume (within the NCIA) is not contributing to the concentrations measured in the western plume (downgradient of Old Country Road).

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Response to Comment # 9: As previously discussed, the EPA evaluated current and available groundwater contamination within OU1 in the proposed plan and did not consider data from within the NCIA.

As seen in Figure 2 of the proposed plan, the OU1 western plume has contaminant concentrations greater than 100 µg/L and is therefore targeted for active remediation. Figure 2 depicts the current nature and extent of contamination and its intent was not to attribute source contribution of the contamination present within OU1.

Comment # 10: The Hicksville Water District claims that the proposed plan does not address whether OU1 groundwater was analyzed for 1,4-dioxane and asks whether the EPA sampled for 1,4-dioxane?

Response to Comment # 10: Sampling activities related to the OU1 groundwater investigation have not been analyzed for 1,4-dioxane. During the remedial design, the EPA anticipates that 1,4-dioxane will be included in the sample analysis in order to properly design the treatment system.

HUMAN HEALTH

Comment # 11: The whole premise of the risk assessment for OU1, upon which the EPA based its remedy, will almost certainly not occur.

Response to Comment # 11: In accordance with the EPA guidance, the HHRA for OU1 was conducted to estimate current and future effects of contaminants on human health. The OU1 HHRA indicated that exposures to contaminated groundwater are currently incomplete because there is an engineering control at the Bowling Green water supply wells. Future effects were evaluated in the absence of any actions to control or mitigate exposures, (*i.e.*, no engineering control at Bowling Green water supply wells). The results of the HHRA indicated there is an unacceptable risk under the future exposure scenario due to exposure to contaminated groundwater at OU1. Therefore, remedial alternatives were evaluated to mitigate that risk, which is consistent with the EPA's policy.

Comment # 12: Commenters stated that Nassau County is fully developed, and there are no plans to add any new water districts or public water supplies. The commenter noted that if, under a highly unlikely scenario, a water district was formed south of the NCIA or if new water supply wells were developed, the VOC contamination, if present, could be addressed similarly with the same type of engineering controls currently used at the Bowling Green water supply wells.

Response to Comment # 12: In that scenario, if drinking water wells were developed within OU1, these wells would be addressed by the institutional controls component of the selected remedy. The purpose of institutional controls is to ensure the continued protection including the development of any new drinking water wells to limit exposure to contaminated groundwater.

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SITE CLEANUP

Comment # 13: Several commenters stated that the preferred remedial alternative is unnecessary and/or inconsistent with CERCLA or the NCP because the current and potential future human exposures related to OU1 contaminated groundwater are already being addressed by the existing engineering control (granular activated carbon (GAC) and air stripper) at the Bowling Green water supply wells. Commenters stated that the suspected source areas of contamination within the NCIA have been remediated, thereby eliminating the potential for these source areas to contribute to additional OU1 groundwater contamination. Some of the commenters have proposed that, as a result of these conditions, the EPA should have evaluated well head protection as a remedial alternative or as a component of the monitored natural attenuation (MNA) remedial alternative described in the proposed plan.

Response to Comment # 13: New York State considers the aquifer to be a Class GA (fresh) groundwater and the best usage is as a source of potable water supply. The NCP states that the EPA must remediate all groundwater to its most beneficial use. Since the groundwater within OU1 is designated as a potable drinking water supply it was evaluated as such in the HHRA. In accordance with the EPA guidance, the HHRA was conducted to estimate current and future effects of contaminants on human health in the absence of any actions to control or mitigate these exposures. Although exposures to OU1 contaminated groundwater are currently incomplete due to the engineering control at the Bowling Green water supply wells, consistent with the EPA guidance future exposure to OU1 groundwater in the absence of any treatment was also evaluated. The HHRA indicated there was unacceptable risk under the future exposure scenario due to exposure to contaminated groundwater at OU1. Therefore, remedial alternatives were evaluated to mitigate the risk identified in the HHRA.

The proposed plan addresses a discrete portion of the Site consisting of an area downgradient of the NCIA which has been designated as OU1. The EPA has coordinated with NYSDEC on the on-going remedial measures that are in place, or expected to be in place, to address source areas and contamination within the NCIA and it is the EPA's expectation that this contamination will continue to be addressed under the NYSDEC State cleanup program. The proposed plan anticipated and assumed the successful source control or cleanup of the source area(s) at those upgradient individual NCIA facilities under NYSDEC oversight in evaluating the potential for attainment of the objectives of this selected remedy. To ensure the effectiveness of the remedy at OU1, the EPA has outlined provisions whereby the EPA may elect to evaluate additional options in a future OU at individual sources if they are not successfully addressed under State law.

CERCLA establishes a preference for remedies which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at sites. Section 104(c)(6) of the NCP defines "remedial action" measures necessary to restore ground or surface water. The EPA recognizes that pumping at a water supply well and treating groundwater at the well head to primarily provide drinking water may, over time, result in some localized improvement in ground or surface water quality; however, the effect is at best tangential to, but not designed to address aquifer restoration. The EPA's

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selected remedy is an aggressive and effective approach to restoring the aquifer that is consistent with the NCP. As shown in Figure 3, the selected remedy targets active remediation where concentrations of total chlorinated VOCs exceed 100 µg/L. The Bowling Green water supply wells are outside the footprint of the sidegradient and downgradient total chlorinated VOC plumes.

Comment # 14: Several commenters expressed concerns about the cost of the preferred alternative, indicating that the preferred alternative is not a cost-effective remedy, because the fact that the treatment system at the Bowling Green water supply wells is effectively treating extracted groundwater; and therefore the preferred alternative is inconsistent with the NCP.

Response to Comment # 14: As outlined in the proposed plan, the EPA has established one of the RAOs for OU1 to be the restoration of the impacted aquifer to its most beneficial use as source of drinking water by reducing contaminant levels to the federal MCLs and state standards. Section 104(c)(6) of the NCP defines "remedial" action measures necessary to restore ground or surface water. While pumping via water supply well and treating groundwater at the well head primarily to provide drinking water may, over time, result in some localized improvement in ground or surface water quality, the effect is at best tangential to, but not designed to address aquifer restoration. As previously discussed in comment # 13, the EPA's selected remedy is an aggressive and effective approach to restoring the aquifer that is consistent with the NCP.

Based on the comparison of overall effectiveness to cost, the preferred remedy outlined in the proposed plan meets the statutory requirement that Superfund remedies be cost-effective (NCP Section 300.430(f)(1)(ii)(D)). A cost-effective remedy is one in which costs are proportional to its overall effectiveness (NCP Section 300.430(f)(1)(ii)(D)). Overall, effectiveness is based on the evaluations of long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. The EPA evaluated the "overall effectiveness" of those alternatives that satisfied the threshold criteria (*i.e.*, those that were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume though treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness.

The EPA's selected remedy will be designed to utilize the different technologies effectively to target groundwater contamination within OU1, based upon location-specific conditions (*i.e.*, depth to treatment and concentration levels). Utilizing both in-well vapor stripping and extraction and treatment is expected to provide cost-saving measures through a reduction in either the capital or O&M costs associated with installing and just one operating independent remedial system. Each of the treatment components will be optimized during the remedial design to improve treatment effectiveness or decrease the remedial time frame.

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Comment # 15: The GAC and air stripper tower at the Bowling Green water supply wells are appropriate actions as CERCLA contemplates remedial actions that are designed only to "minimize" – not eliminate – "the release of hazardous substances." CERCLA provides examples of remedial actions that would not "remediate the underlying source," including "confinement," "clay cover," "diversion," and "provision of alternative water supplies." By removing VOCs from the groundwater that have been drawn into the Bowling Green water supply wells, the GAC and air stripper would do more than the preferred remedy to address the OU1 groundwater contamination. The GAC and air stripper do in fact "clean [] contaminated water," and "rid [] the environment of contamination," and thereby minimize the release of hazardous substance "to protect the public health and welfare."

Response to Comment # 15: Refer to the response to comment #13 and comment # 14 above.

Comment # 16: All of the remedial alternatives considered by the EPA were developed to mitigate future risks that are unsubstantiated, and as a result, other viable and practical technologies were excluded from consideration.

Response to Comment # 16: Consistent with the NCP, a remedial action under CERCLA should seek to restore the aquifer to beneficial use wherever practicable. The aquifer underlying OU1 has been designated a Class GA (fresh) groundwater by the NYSDEC and the best usage of Class GA waters is as a source of potable water supply. Since the groundwater beneath the site is a potable drinking water supply, it was evaluated as such in the HHRA.

The HHRA was conducted in accordance with the EPA guidance to estimate the current and future effects of contaminants on human health in the absence of any actions to control or mitigate these exposures. Although exposures to contaminated groundwater are currently incomplete as a result of the engineering control at the Bowling Green water supply wells, future exposure to groundwater in the absence of any treatment was also evaluated. The results of the HHRA indicated there was unacceptable risk and hazards under the future exposure scenario from exposure to contaminated groundwater at OU1. Remedial alternatives were developed in the Supplemental FS to mitigate the unacceptable risk.

Comment # 17: The EPA's preferred Alternative 5 actually creates new exposure risks to human health and the environment compared to existing conditions.

Response to Comment # 17: As indicated in the short-term effectiveness section of the proposed plan, exposure of workers, the surrounding community, and the local environment to contaminants during the implementation of the preferred remedial alternatives would be minimal. However, measures will be implemented to mitigate potential exposure risks. In addition, the selected remedy will include monitoring that would provide the data needed for proper management of the remedial processes and a mechanism to address any potential impacts to the community, remediation workers, and the environment. Risk from exposure to groundwater during any excavation work would require management via occupational health and safety controls.

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Comment # 18: Since the exact number/placement of in-well vapor stripping wells and or extraction wells, and the location of the centralized treatment plant were not identified in the proposed plan and will not be determined until the remedial design, the cost effectiveness outlined in the proposed plan is called into question.

Response to Comment # 18: The Supplemental FS includes a conceptual design with estimates for the elements identified in the comment. During the remedial design, the number and placement of in-well vapor stripping and extraction and the location of a centralized treatment plant will be determined. Consistent with the EPA guidance, the Supplemental FS provided cost estimates for the conceptual design.

Comment # 19: The proposed remediation wells are not located in the appropriate locations since the EPA incorrectly depicted the groundwater and contaminant migration directions. The EPA's design for the preferred remedy results in the proposed installation of remedial wells in areas that have relatively low levels of contamination and a sub-optimal orientation of wells.

Response to Comment # 19: Figure 3 in the proposed plan depicts a conceptual design for Alternative 5, which is the preferred remedy. Placement of the remedial components of the preferred remedy in the conceptual design was based on estimated OU1 contaminant plumes that were developed based on the available groundwater samples and measurement results. Isoconcentration maps were prepared using measured groundwater elevations and regional groundwater flow. Groundwater sample results were used in conjunction with the groundwater flow direction across OU1 to develop the OU1 contaminant plume maps. The remedial systems including well locations were developed based on the estimated OU1 plume maps. Determinations, such as placement of extraction wells and/or in-well vapor stripping wells, will be finalized during the remedial design. As part of the remedial design, a pre-design investigation will be conducted and used to refine the layout of the remedial system.

Comment # 20: Due to low concentrations in the OU1 western plume, the combination of MNA and well head treatment at the Bowling Green water supply wells is a more appropriate and cost-effective remedy for the OU1 western and central plume**.**

Response to Comment # 20: The lack of daughter compounds present in the aquifer suggests that the degradation of chlorinated VOCs is not occurring at a significant rate. Additionally, groundwater sampling has confirmed that the presence of compounds related to biodegradation is limited within OU1 which indicates that physical processes such as dispersion and diffusion are the only means for degradation. Based on the comparison of overall effectiveness to cost, the preferred remedy outlined in the proposed plan meets the statutory requirement that Superfund remedies be cost-effective (NCP Section 300.430(f) (1) (ii)(D)). Also, see the response to comment # 13.

Comment # 21: In scenarios with no human health exposure pathway, MNA is the appropriate remedy for the dilute portion of the plume. The commenter noted that although there is not a

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uniform standard for defining a "dilute" or "concentrated" plume, the commenter formulated an argument that the EPA has set precedent for distinguishing the two because the Picillo Pig Farm Superfund Site in Rhode Island has distinguished "dilute" and "concentrated plume areas" as those areas of the plume with total VOC concentrations greater than a 1,000 μg/L. Furthermore, the EPA has set a precedent for the implementation of MNA in dilute, chlorinated VOC concentrations similar to those of the OU1 western plume, at other sites including: Peninsula Boulevard Groundwater Plume Superfund Site; Pohatcong Valley Groundwater Contamination Superfund Site; West Kingston Town Dump/University of Rhode Island Disposal Area Superfund Site; and the Dover Municipal Landfill Superfund Site.

Response to Comment # 21: The results of the EPA's HHRA indicated there was unacceptable risk under the future exposure scenario due to exposure to contaminated groundwater at OU1 and hence a remedial action is necessary to mitigate that risk. The EPA evaluated MNA as Alternative 2.

The EPA evaluates remedial alternatives based on site-specific conditions. It should be noted that the overall approach of the selected remedy is consistent with the work as outlined in some of the examples provided (*i.e.,* Peninsula Boulevard). For example, at the Peninsula Boulevard Groundwater Contamination site, which is also in Nassau County, the remedial approach is active remediation in areas with higher concentrations *(i.e.,* greater than 100 μg/L) and also natural processes to achieve the cleanup levels for areas not targeted for active remediation, consistent with the approach outlined for this OU1.

Comment # 22: The EPA's rejection of Alternative 2 (MNA) is unfounded. Since the EPA acknowledges that the timeframe to meet groundwater RAOs is difficult to predict and modeling has not been provided to estimate remediation time frames, the EPA has no technical basis to conclude that RAOs would not be achieved in a reasonable time frame, and the EPA was just speculating.

Response to Comment # 22: The EPA determined that chemical-specific ARARs would not be achieved in a reasonable time frame under Alternative 2. Data collected to date has not demonstrated that complete biodegradation is occurring or has occurred. The lack of daughter compounds present in OU1 data suggests that the degradation of chlorinated VOCs is not occurring at a significant rate.

Additionally, groundwater sampling has confirmed that the presence of compounds related to biodegradation is limited which indicates that physical processes, such as dispersion and diffusion, are a means for degradation. As a result, and as indicated in the proposed plan, it is not anticipated the MNA would occur in a reasonable time frame.

As summarized in the EPA's OU1 Supplemental FS, NYSDEC's 2009 MNA evaluation did not support the premise that significant biodegradation of chlorinated VOC plumes was occurring in the area downgradient of NCIA and Old Country Road. Furthermore, review of groundwater

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data quality collected subsequent to NYSDEC's 2009 investigation, further supports the EPA's conclusion about MNA.

Comment # 23: A sharp decline in groundwater concentrations observed at wells within the NCIA and OU1 at locations downgradient of remediated source areas indicates MNA is occurring at the Site. As such, the EPA's statements regarding the uncertainty in the biodegradation rates and its effect on meeting RAOs in a reasonable time frame is misguided.

Response to Comment # 23: The lack of daughter compounds present in OU1 suggests that the degradation of chlorinated VOCs is not occurring at a significant rate. Additionally, groundwater sampling has confirmed that the presence of compounds related to biodegradation is limited, which indicates that physical processes such as dispersion and diffusion are a means for degradation.

As previously discussed and as summarized in the EPA's Supplemental FS, NYSDEC's 2009 MNA evaluation did not support the premise that significant biodegradation of chlorinated VOC plumes was occurring in the area downgradient of NCIA and Old Country Road. The review of groundwater data quality collected subsequent to NYSDEC's 2009 investigation further supports the conclusion reached in the MNA evaluation.

The proposed plan anticipated and assumed the successful source control or cleanup of the source area(s) at those upgradient individual NCIA facilities under NYSDEC oversight in evaluating the potential for attainment of the objectives of this selected remedy. It is anticipated that source control measures within the NCIA will result in a decline in groundwater contaminant concentrations within the NCIA.

Comment # 24: Based on the low concentrations present at the downgradient OU1 boundary and given that these concentrations are expected to decline with time, the EPA has overstated the need for preventing contaminant migration.

Response to Comment # 24: As shown on Figure 2 of the proposed plan, in the eastern and western areas of OU1, the isoconcentration contours are in the downgradient boundaries of OU1. Therefore, those areas would require remediation. The isoconcentration contour depicts areas within OU1 greater than 100 μg/L of total chlorinated VOCs, as well as those areas where the EPA seeks to prevent the migration of the OU1 plumes.

Comment # 25: The EPA has failed to take into consideration the in-well vapor stripping literature guidance, the presence of high anisotropy rates and the presence of low permeability layers documented from prior investigations performed by NYSDEC, as well as performance issues encountered at the General Instruments/Vishay facility.

Response to Comment # 25: As part of the Supplemental FS, the EPA evaluated NYSDEC's 2009 investigation, which based on published data in literature for the Magothy in the vicinity of the area proposed for treatment, indicated that anisotropy ratios of approximately 100 are not

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uncommon. Vertical hydraulic conductivity sampling measurements based on discrete soil sampling of the Magothy revealed higher degrees of anisotropy with an average of 42,700.

The EPA also evaluated the results from the 72-hour aquifer pump test conducted as part of NYSDEC's 2011 investigation. Data from the aquifer pump test was used to calculate aquifer characteristics, including anisotropic ratios, which were determined to be significantly lower (27 to 100) than the original estimate from NYSDEC's prior 2009 investigation. These calculated results for anisotropy were within the published ranges from several United States Geologic Survey studies on Long Island. Review of the data generated from NYSDEC's 2011 aquifer pump test, indicates that the aquifer characteristics within OU1 appear to be generally favorable for use of in-well vapor stripping. Remedial activities at the General Instrument facility, including the operation of an in-well vapor stripping system, were reviewed and summarized in the EPA's Supplemental RI Memorandum. Lessons learned from General Instrument's use of the Unterdruck-Verdampfer-Brunnen (UVB) in-well vapor stripping system and operation and maintenance (O&M) of the UVB system will be taken into consideration during the remedial design. The EPA's Supplemental FS used the Accelerated Remediation Technologies (ART) in-well vapor stripping system for purposes of estimating costs. The Supplemental FS assumed ART in the conceptual design because of the thickness of the unsaturated zone within OU1 (38 to 50 ft.) and the spatial constraints of installing underground vaults in existing roadways, which would be necessary for other in-well vapor stripping systems such as the UVB.

As part of the remedial design, a pilot test will be conducted to verify the effectiveness of the in-well vapor stripping technology for OU1. In the event that data and evaluations conducted during the remedial design indicate that in-well vapor stripping is ineffective or cost prohibitive, the selected remedy allows for groundwater extraction and *ex-situ* treatment to alternatively be used in areas where the conceptual design had indicated use of in-well vapor stripping.

Comment # 26: Commenters raised a wide range of concerns regarding the application of in-well vapor stripping for OU1. Concerns included the appropriateness of its use in a densely populated setting, the depth of contamination, and the challenge of injecting compressed air into the aquifer thereby limiting the effectiveness of the in-well vapor stripping method to only a portion of the well, the ability to achieve state standards, the risk of upper aquifer contamination and the potential for the public to be impacted by air pollution from off-gas effluent.

Response to Comment # 26: The selected remedy provides for the use of in-well vapor stripping as a component of the remedy. If, during the remedial design investigation activities, it is determined that in-well vapor stripping will not be an effective technology for addressing contamination at OU1, then the remedy allows for the use of groundwater extraction and *ex-situ* treatment.

Comment # 27: In-well vapor stripping is a patented technology that is licensed to a limited number of vendors. A competitive bidding process will be compromised.

Response to Comment # 27: In-well vapor stripping is a component of the selected remedy, and the selected remedy envisions that other technologies will be employed in combination with in

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well vapor stripping. As a result, the bidding process would not have a limited number of contractors participating. As discussed in the EPA's OU1 Supplemental FS, there are different types of in-well vapor stripping systems provided by different vendors further enabling a competitive bidding process.

Comment # 28: While the Supplemental FS for OU1 addresses the risk of chemical iron fouling (concluding that the risk is low due to iron concentrations in area groundwater of generally less than 1 milligram per liter), the Supplemental FS does not address the risk of iron-related biofouling, which was the cause of the fouling realized at the recirculation well system for the former General Instruments facility.

Response to Comment # 28: Biofouling is a potential issue that can affect the performance of remedial systems. Preventative measures will be evaluated and considered during the remedial design and construction of the selected remedy to reduce operation and maintenance costs as much as possible. If during the pilot study it is determined that the operation and maintenance of the in-well vapor stripping wells is cost prohibitive then the technology could be replaced with groundwater extraction and *ex situ* treatment.

Comment # 29: The proposed plan significantly underestimated costs associated with maintenance of in-well vapor stripping systems (approximately $26,000 per well annually), as well as the logistics of maintaining numerous wells within residential areas.

Response to Comment # 29: The maintenance schedule would be dependent on the design and site specific subsurface conditions. Typical systems can run for two to three years before a well cleaning is needed, and many systems can run well beyond three years prior to needing well cleaning. It is expected that during the remedial design phase preventative measures would be evaluated and consideration given to ways in which operation and maintenance costs can be reduced. As part of the remedial design process, lessons learned from other nearby facilities, such as General Instruments, which has implemented this technology and have experience with O&M of the systems would be taken into consideration. Based on the results of a pilot study, if it is determined that the operation and maintenance of the in-well vapor stripping wells is cost prohibitive, then, the technology could be replaced with groundwater extraction and *ex-situ* treatment.

Comment # 30: Commenters noted that obtaining the necessary access in a residential area to install the infrastructure and treatment components required for the preferred remedial alternative would be complicated. The presence of underground utilities within public-right-of-ways further complicates matters. Therefore, construction in non-residential areas should be considered.

Response to Comment # 30: During the remedial design, consideration will be given to potential access-related challenges identified in the comment. Consideration will be given to reconfiguring well locations; however, modifications to well location configurations will need to be balanced with considerations regarding any potential impacts, such as effectiveness.

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Comment # 31: Commenters raised concerns that the construction of the preferred alternative in a largely residential area would result in a significant disruption, cause dust and noise, and would results in large areas that would be inaccessible. Additionally, areas where construction has taken place would require vigilant security measures to avoid becoming attractive locations for children, teenagers, and others.

Response to Comment # 31: The remedial design will take into consideration measures to minimize the short-term impacts identified in the comment. Additionally, measures to mitigate dust and noise, as well as other potential quality of life related concerns will be addressed during the remedial design. The remedial design will also provide a plan on how to restrict access and maintain security in construction areas.

Comment # 32: The EPA's proposed remedial alternative is not environmentally sustainable for the community because an enormous amount of electricity will be required. The proposed remedial techniques are not being designed in accordance with the EPA Region 2's Clean and Green Energy Policy.

Response to Comment # 32: The remedy will be designed consistent with the EPA Region's 2 Clean and Green Energy Policy. Pursuant to the EPA Region 2's Clean and Green Energy Policy, the EPA considers the factors set out in CERCLA Section 121, 42 U.S.C. Section 9621 in selecting a remedy, by conducting a detailed analysis of the viable remedial alternatives in accordance with the NCP, 40 CFR Section 300.430(e)(9)(iii) and the Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01. The environmental benefits of the selected remedy may be enhanced by giving consideration during the remedial design, to technologies and practices that are sustainable as discussed in the EPA Region 2's Clean and Green Energy Policy.

Comment # 33: The theoretical benefit of the treatment component of the preferred remedial alternative is outweighed by the disruption and risks to the public. The EPA must balance the factors of limited and uncertain value of reducing contaminant levels in the deeper groundwater against the factor that the contaminants have no exposure pathway to the public.

Response to Comment # 33: As previously discussed, the HHRA indicated an unacceptable risk based on the future exposure scenario. The HHRA, conducted in accordance with the EPA guidance, evaluated future exposure assuming that the contaminated aquifer was used as a source of drinking water in the absence of treatment. As an unacceptable risk to human health was identified in the HHRA, remedial measures to mitigate such risk were evaluated. Based on the comparison of overall effectiveness to cost, the preferred remedy outlined in the proposed plan meets the statutory requirement that Superfund remedies be cost-effective (NCP Section 300.430(f) (1) (ii)(D)).

Comment # 34: A suitable location for the centralized treatment plant has not been identified and no compatible locations were identified within a quarter mile radius. Since vapors from the in-well vapor stripping process would need to be conveyed over a long distance to a centralized

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treatment plant, several large vacuum blowers would be necessary, which would result in a noise disturbance and increased costs.

Response to Comment # 34: During the remedial design, efforts would be employed to mitigate or eliminate such disturbances through sound deadening enclosures and mufflers, as appropriate.

Comment # 35: The groundwater extraction system component of the preferred remedial alternative requires groundwater to be transferred under pressure to the centralized treatment plant, which results in a risk if contaminated groundwater is released.

Response to Comment # 35: The remedial design would include the development of plans to ensure that Site-related activities associated with the construction and operation phase of the selected remedy are conducted in a manner that are protective of human health and the environment.

Comment # 36: Placing compressors at the central treatment location that could consistently deliver enough pressure to overcome the requisite hydraulic head across 5,000 ft. of linear piping to the furthest well may not be technically practical.

Response to Comment # 36: During the remedial design phase, options for providing the required pressure for operating the in-well vapor stripping systems and conveying contaminated vapors to the treatment building will be identified and evaluated. A suitable location and any associated land acquisition actions necessary for the construction of the treatment building will be included as part of the pre-design investigation. At that time, the EPA may opt to find more than one suitable location, thereby reducing the length of transmission piping required.

Comment # 37: The reinjection of treated water back into the subsurface would result in mounding which could impact the temperature and characteristics of the groundwater.

Response to Comment # 37: During the remedial design, a final determination will be made regarding the discharge location and methods. The final determination will, among other things, take into consideration potential impacts that treated water may have if reinjected back into the groundwater.

Comment # 38: Commenters raised concerns about the use of in-situ chemical oxidation (ISCO) as part of the preferred alternative resulting from perceived public hazards posed from the mixing and injection process and adverse impact to the drinking water supply at the Bowling Green water supply wells, without having conducted a fate and transport study.

Response to Comment # 38: During the remedial design, a treatability study would be performed to evaluate the use of in-situ chemical treatments, as an element of the selected remedy, in a manner that complements and improves the effectiveness of selected remedy. In-situ chemical treatment would only be utilized if a determination is made during the remedial design that the application would not adversely affect the water supply wells. The treatability study will assess various in-situ chemical treatment products to determine which will be best suited for implementation based on site specific conditions. The EPA will coordinate with state

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and local officials prior to the commencement of any field studies. Any oxidizing compound precluded by the NYSDEC will not be used. The treatability study would include a health and safety plan to ensure the safety of workers and the community. Additionally, if application of in-situ chemical treatment were found to have no adverse impact upon the water supply wells, its use would have to comply with federal and state regulations (*See* Table 10 in the ROD).

Comment # 39: The Hicksville Water District raised several technical questions related to the in-situ chemical treatment (such as ISCO) component of the preferred remedial alternative outlined in the proposed plan: What chemicals will be used to oxidize the VOCs? Will the ISCO related chemicals introduce additional contamination into the aquifer (*i.e.*, heavy metal impurities in Potassium Permanganate)? What information does the EPA have to demonstrate that no other water quality issues will develop as a result of injecting chemical oxidant into the aquifer? Can the EPA confirm that the injection of chemical oxidants into the aquifer will not mobilize inorganic contamination into the aquifer? How will the EPA determine complete mineralization of the VOC contamination since the by-products of the parent products TCE, PCE, and TCA are more difficult for water suppliers to treat with conventional technology as they move down their degradation pathways?

Response to Comment # 39: During the remedial design, a treatability study will be conducted to evaluate the use of in-situ chemical treatments, such as ISCO. In-situ chemical treatment would only be utilized if it is determined that the application would not adversely affect the water supply wells. The EPA expects to coordinate with potentially impacted water districts during the remedial design to ensure that the concerns raised by the commenter are adequately addressed.

Comment # 40: The Hicksville Water District expressed its concern that any remedial measures taken at the Site do not adversely impact the water quality near the capture zones of its wells or any land within its service area where future supply wells may be constructed. The Hicksville Water District asked the following questions about OU1's long-term monitoring program: How often will each treatment system be sampled to confirm it is meeting performance standards? How often will these results be published for public review? Does the EPA have information that demonstrates the two existing monitoring well clusters are in the appropriate locations and depths to determine if the performance standards are being achieved? Will additional monitoring wells be installed to confirm that contamination is not migrating out of the remediation zone?

Response to Comment # 40: The EPA acknowledges the concerns presented in the comment and will seek to coordinate with potentially impacted water districts on these types of matters. The evaluation of existing monitoring wells, including the two existing early warning monitoring wells for the Bowling Green water supply wells, and the development of work plans for the installation of additional monitoring wells to monitor the progress of the selected remedy in achieving performance standards will be determined during the remedial design. The remedial design will also include information regarding the frequency of the sampling program and the schedule for data validation, which the EPA will take into consideration when developing a plan

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to disseminate information to the public. It is the EPA's intention to provide the public with information related to the Site in a timely manner.

Comment # 41: Commenter stated that the proposed plan is not cost-effective because it is not coordinated with proposed action by New York State. In addition, the proposed plan is inconsistent with and not effectively coordinated with remediation measures contemplated by NYSDEC.

Response to Comment # 41: The remedial work for OU1 would complement the work that has been conducted, and/or is being conducted under order with NYSDEC at facilities within the NCIA. Response actions which are addressing sources of contamination in the NCIA have not been designed to address the downgradient groundwater contamination within OU1. During the OU1 remedial design, the EPA will continue to work with NYSDEC to ensure that any response actions taken within the NCIA do not impede the actions taken within OU1. Effort would be made to minimize any disruptions between the two. The EPA expects that that those facilities within the NCIA that are under order or agreement with New York State will continue to meet their obligations under their orders or agreements. As discussed in the OU1 proposed plan, the on-going, State-authorized response actions to address source areas at the NCIA facilities are not the focus of OU1, although source control or cleanup of the source area(s) at the individual NCIA facilities, under NYSDEC oversight, are anticipated and was assumed in evaluating the potential for attaining the objectives of the selected remedy in the ROD.

OTHER COMMENTS/QUESTIONS

Comment # 42: The preferred alternative will place an unnecessary burden on the local community, including businesses and property owners who have already been saddled with clean up costs resulting from the past actions of NYSDEC. The proposed plan did not take into account remedial measures which have been paid for and performed by business and property owners. Property owners have already spent millions of dollars to satisfy the remedial measures and to start all over is counterproductive and unnecessary. Additionally, activities related to the construction of the preferred remedial alternative would undermine the designation of the NCIA as an Empire Zone and will disrupt the installation of any new infrastructure to support planned retail and commercial hubs. The EPA has an obligation to consider the significant impacts that the preferred remedial alternative outlined in the proposed plan will have on the community and balance these impacts against what the EPA feels are the perceived benefits of a remedial action at OU1.

Response to Comment # 42: The EPA will endeavor to minimize any disruption to the local community when undertaking activities related to the construction and implementation of the preferred remedial alternative.

The proposed plan addresses OU1 and outlines a preferred remedy for OU1. Response actions at NCIA facilities are not part of this OU1 remedy, although the successful source control or remediation at upgradient individual NCIA facilities, under NYSDEC oversight, is anticipated

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and was considered in evaluating the potential for attainment of the objectives of the selected remedy.

As previously discussed, the EPA used the available and current OU1 groundwater data when performing the HHRA because source control measures within the NCIA are intended to prevent the migration of contaminants to OU1. The EPA did not feel it was appropriate to use historic data from within the NCIA to evaluate the risks associated with contaminated groundwater in OU1. The data from within NCIA would then reflect contamination, but would not reflect current conditions (*i.e.*, source control measures) within OU1.

In accordance with EPA guidance, the HHRA was conducted to estimate current and future effects of contaminants on human health in the absence of any actions to control or mitigate these exposures. Although exposures to contaminated groundwater are currently incomplete due to the engineering control at the Bowling Green water supply wells, future exposure to groundwater in the absence of any treatment was also evaluated. The results of the HHRA indicated there was unacceptable risk and hazards under the future exposure scenario due to exposure to contaminated groundwater at OU1 and hence a remedial action is necessary to protect human health.

Based on the comparison of overall effectiveness to cost, the preferred remedy outlined in the proposed plan meets the statutory requirement that Superfund remedies be cost-effective (NCP Section 300.430(f) (1) (ii)(D)).

Comment # 43: At the August 15, 2013 meeting, the EPA only briefly discussed alternatives 1 through 4 that were not selected as the preferred remedial alternative.

Response to Comment # 43: The purpose of the August 15, 2013 public meeting was to present the conclusions of the documents supporting the proposed plan, to elaborate further on the reasons for recommending the preferred remedial alternative, and to receive public comments. The EPA believes that the purpose of the meeting was achieved through the combination of the presentation provided by the EPA, which included each of the alternatives evaluated in the proposed plan, and the questions received from those in attendance.

Comment # 44: The public comment period was not well-publicized, and the EPA performed limited outreach. As a result, the public will not be able to fully express its sentiments until implementation of a remedy is underway.

Response to Comment # 44: On July 26, 2013, the EPA issued a press release titled "EPA Encourages Public Comment on Plan for Ground Water Cleanup Near New Cassel Industrial Area." Notice of the July 26, 2013 start of the public comment period and the availability of the above-referenced documents was published in *The Westbury Times* on July 31, 2013. Individual mailings went out to over 200 recipients, including residents who had requested to join the EPA's Site mailing list, to announce the start of the public comment period and to provide details regarding the August 15, 2013 public meeting. The proposed plan and information regarding the

August 15, 2013 public meeting was additionally posted on the EPA's New Cassel/Hicksville Ground Water Contamination website:

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

Notice of an extension of time for the public comment period to September 24, 2013 was published in *The Westbury Times* on August 23, 2013. Notice on the extension to the public comment period was also provided on the EPA's New Cassel/Hicksville Ground Water Contamination website.

Comment # 45: Commenters stated that the EPA is barred from pursuing a CERCLA claim against parties who have prevailed in an action brought by the State under CERCLA for the same event.

Response to Comment # 45: This comment does not relate to the basis for the remedy decision that the EPA made in the ROD or to any of the evaluation criteria for a Superfund remedial alternative. The commenters' legal argument for enforcement and cost recovery is not something that is appropriate to address in the Responsiveness Summary.

Comment # 46: What is the schedule for the other OUs?

Response to Comment # 46: The EPA anticipates beginning RI/FS related activities associated with areas of groundwater contamination impacting the Hicksville water supply wells 5-2, 5-3, 4-2, 8-1, 8-3, 9-3 and Hempstead-Levittown water supply well 2A and the far-field area further downgradient of OU1 in the 2014 calendar year. A schedule for additional activities related to any other additional OUs to complete the nature and extent of contamination for the Site has not been developed yet.

Comment # 47: The District stated that the Hicksville water supply wells Nos. 9-1 and 9-2 should be identified in the proposed plan as they have also been impacted by VOC contamination.

Response to Comment # 47: The proposed plan only addresses OU1 of the Site. The EPA will address cleanup of this Site in discrete phases or components and anticipates that there will be multiple OUs for the Site. In the proposed plan, the EPA discusses that additional OUs for the Site would include, but may not be limited to, areas of groundwater contamination impacting the Hicksville water supply wells 5-2, 5-3, 4-2, 8-1, 8-3, 9-3 and Hempstead-Levittown water supply well 2A**.** The aforementioned water supply wells were specifically referenced because the EPA's Hazard Ranking System (HRS) sampling results indicated that VOCs in their raw (pre-treated) were present at observed level concentrations (*i.e.*, significantly above background).

In August 2010, the EPA sampled raw water from Hicksville water supply wells 9-1 and 9-2 as part of the HRS sampling. 1,1-Dichloroethane (1,1-DCA) was observed in Hicksville Wells 9-1 and 9-2 during that sampling, but the results, which ranged from 1.2 to 1.4 µg/L, were below both the state standard of 5 µg/L and the maximum background level observed during the HRS

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sampling. The EPA recognizes that Hicksville 9-3, which HRS sampling indicated had observed level concentrations, is in close proximity to 9-1 and 9-2. Therefore, the EPA will continue to evaluate Hicksville water supply wells 9-1 and 9-2 when conducting investigations near 9-3. The EPA will seek to coordinate with the water district regarding data they may have from the referenced wells.

Comment # 48: Several commenters asked if the EPA considered the potential for a change in more stringent federal MCLs or state standards when developing the proposed plan.

Response to Comment # 48: In the Preamble to the NCP, the EPA states its policy that it will not reopen remedy selection decisions contained in RODs (*i.e.,* ARARs are normally frozen at the time of ROD signature) unless a new or modified requirement calls into question the protectiveness of the selected remedy. The policy of freezing ARARs at the time of ROD signing will not sacrifice protection of human health and the environment because the remedy will be reviewed for protectiveness every five years, considering new or modified requirements at that point, or more frequently, if there is reason to believe that the remedy is no longer protective of health and environment.

Because under each of the alternatives evaluated, MCLs will take longer than five years to achieve at the Site, a policy review of conditions at the Site will be conducted no less often than once every five years until performance standards are achieved. As part of the five-year review, the EPA will determine the effect of a newly promulgated or modified standard on the protectiveness of the remedy originally selected in the ROD. Newly promulgated or modified requirements will be evaluated to determine if the cleanup levels established in the ROD remain protective. In the event that the evaluation indicates a change of a standard that was identified as an ARAR in the ROD establishes that the new requirement indicates that the remedy is no longer protective, the five-year review would recommend a follow-up action. However, a change in a standard may not necessarily result in a change in the resulting risk and therefore may not always impact protectiveness.

Comment # 49: What were the levels of site related indoor air contaminants detected during the vapor intrusion sampling at the residential properties during NYSDEC's investigation.

Response to Comment # 49: In 2009, NYSDEC conducted sampling at seven residential properties in an area downgradient of the NCIA. Indoor air concentrations ranged from nondetect to a maximum concentration of 1.1 micrograms per cubic meter ($\mu g/m^3$), 2.1 $\mu g/m^3$ and 16 $\mu g/m^3$ for PCE, TCE and TCA, respectively. None of these concentrations exceeded New York State Department of Health (NYSDOH) or EPA guidance values except for TCE which was equal to the EPA's guidance value. Sub-slab concentrations ranged from nondetect to a maximum concentration of 15 $\mu g/m^3$, 14 $\mu g/m^3$ and 2 $\mu g/m^3$ for PCE, TCE and TCA, respectively.

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The results of NYSDEC's soil vapor sampling are provided on Figure 4-1 in Appendix C of the EPA's Baseline Human Health Risk Assessment for OU1 and NYSDEC's Site Characterization Report Operable Unit 4 Phase 3 Off-Site Vapor Intrusion Evaluation, dated September 2009.

Comment # 50: A commenter asked when the EPA would consider evaluating the vapor intrusion pathway?

Response to Comment # 50: As part of the pre-remedial design investigation for OU1, the EPA anticipates collecting additional data that would be used to assess the soil vapor intrusion pathway. The EPA would evaluate the results of this effort and develop a schedule to perform any additional work, as appropriate.

Comment # 51: What are the names of the streets in New Cassel where the residental properties were sampled during NYSDEC's vapor intrusion investigation?

Response to Comment # 51: Figure 4-1 in Appendix C from the EPA's OU1 HHRA presents the approximate soil vapor sampling locations. As a matter of privacy, the residential addreses are not included in the figure. Of the residential properties sampled, one was located in New Cassel south of the NCIA and Grand Boulevard and the remaining properties were located in Salisbury.

Comment # 52: A commenter asked for the location of the highest indoor air concentration detected during NYSDEC's vapor intrusion investigation of residential properties.

Response to Comment # 52: The maximum indoor air concentration observed for an NCIA related contaminant of concern was TCE at a concentration of 2.1 $\mu g/m^3$. The maximum observed indoor air concentration is below NYSDOH guidance values and is equal to EPA's guidance value for indoor air concentrations for TCE. The location of this sample was located south of Grand Boulevard in New Cassel. Please refer to Figure 4-1 in Appendix C of the EPA's OU1 HHRA for map with the location of NYSDEC's vapor intrusion investigation of remedial properties.

Comment # 53: A commenter asked how the OU1 groundwater become contaminated, and additionally, how OU1 became part of the Superfund site.

Response to Comment # 53: In 1986, Nassau County Department of Health identified groundwater contamination throughout the NCIA. Thereafter, in the 1990s NYSDEC assessed individual facilities within the NCIA to identify the sources of groundwater contamination. NYSDEC investigated the groundwater downgradient of the NCIA and determined that a variety of disposal activities within the NCIA had resulted in the disposal of hazardous wastes including chlorinated VOCs. NYSDEC concluded that some of those wastes were released or have migrated from the NCIA to surrounding areas. In 2003, NYSDEC selected a remedy for the groundwater south of the NCIA and conducted pre-remedial activities until 2011.

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In 2010, the area downgradient of the NCIA and other areas of nearby groundwater contamination were referred to the EPA by NYSDEC for nomination onto the NPL. The EPA's OU1, the subject of this ROD, was among the areas referred to the EPA by NYSDEC.

In 2010, to assess eligibility for NPL nomination, the EPA conducted an investigation which included the collection of water samples from pre-treated groundwater from the Bowling Green, Hicksville, and other nearby water supply wells. The analytical sample results indicated that chlorinated VOCs in groundwater were present at concentrations significantly above background concentrations in some of the pre-treated groundwater samples collected. By March 2011, the EPA prepared a HRS package for the Site. The HRS package outlined the eligibility of the Site for proposed inclusion on the NPL based on a number of factors including, but not limited to observation of contaminant release based on the EPA's 2010 investigation, the toxicity and mobility of contaminants, and the potential for a population to be exposed to the contamination. In September 2011, the EPA listed the Site final on the NPL thus becoming a Superfund site.

Comment # 54: Are there any other areas in Nassau Country that may be desginated as a Superfund site?

Response to Comment # 54: There are currently 15 Superfund sites in Nassau County included on the NPL. No other sites in Nassau County are currently proposed for inclusion on the NPL. The EPA, in conjunction with the State of New York, will continue to evaluate whether there exist additional sites that should be evaluated for inclusion on the NPL.

Comment # 55: Is the New Cassel/Hicksville Ground Water Contamination Superfund Site the same site as the U.S. Army Corps of Engineers (USACE) Sylvania site? If it is not the same, what coordination has Region 2 and the USACE done for the two sites?

Response to Comment # 55: The New Cassel/Hicksville Ground Water Contamination Superfund Site is a widespread area of groundwater contamination within the Towns of North Hempstead, Hempstead and Oyster Bay. As a widespread area of groundwater contamination, the Site has multiple sources to the groundwater contamination. The Sylvania facility is believed to be among the sources that have contributed to the groundwater contamination at the Site.

Remediation of the Sylvania facility is managed under the Army Corps of Engineers Formerly Utilized Sites Remedial Program out of the New York District Office. The EPA is coordinating with the USACE New York District and information related to the contamination at the facility has been summarized and evaluated in EPA's Supplemental RI Memorandum for the Site.

Unrelated to the Sylvania facility and in support of the RI/FS for OU1, the EPA entered into an Interagency Agreement with the USACE Kansas City District to conduct certain RI/FS activities. As part of this effort, the USACE contracted with Henningson, Durham & Richardson, Inc. The work included development of the OU1 Supplemental FS, HHRA for OU1, and the Stage 1A Cultural Resource Report.

Comment # 56: A commenter asked where the repository for documents is located.

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Response to Comment # 56: The local information repository, which contains documents related to the development of the remedy for OU1, can be found at the Westbury Public Library, 445 Jefferson Street, Westbury, NY. The EPA additionally maintains an information repository at the EPA Region 2 Records Center located on the 18th floor of 290 Broadway New York, NY.

The proposed plan and ROD are available online at:
http://www.epa.gov/region02/superfund/npl/newcassel/docs.html

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Appendix V
Attachment 1

Proposed Plan

New Cassel/Hicksville Ground Water Contamination Superfund Site Nassau County, New York

July 2013

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for an interim remedy to address a portion of the contaminated groundwater downgradient of the New Cassel Industrial Area (NCIA), which comprises Operable Unit 1 (OU1) of the New Cassel/Hicksville Ground Water Contamination Superfund Site (the Site), and it identifies the preferred remedial alternative with the rationale for the preference. This OU1 pertains to only one portion of the Site, and the U.S. Environmental Protection Agency (EPA) anticipates additional remedies will be evaluated in the future for additional OUs at the Site.

This Proposed Plan was developed by EPA, the lead agency for the Site, in consultation with the New York State Department of Environmental Conservation (NYSDEC). EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, also known as Superfund), as amended, and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The nature and extent of the contamination for OU1 at the Site and the remedial alternatives summarized in this Proposed Plan are described in EPA's Supplemental Remedial Investigation (RI) Memorandum, dated July 2013, EPA's OU1 Supplemental Feasibility Study (FS) Memorandum, dated July 2013, NYSDEC's September 2000 RI/FS Report, as well as other documents contained in the Administrative Record for this Site. EPA encourages the public to review these documents to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted.

This Proposed Plan is being provided as a supplement to the above-referenced documents to inform the public of EPA's preferred remedy and to solicit public comments on the remedial alternatives evaluated, including the preferred alternative. The preferred remedial alternative for addressing contaminated groundwater includes a combination of in-well vapor stripping, extraction and on-Site treatment, and use of in-situ chemical treatment such as in-situ chemical oxidation (ISCO). The treated groundwater effluent would be disposed of by discharge to a waste-water treatment or by reinjection to groundwater.

The interim remedy described in this Proposed Plan is the preferred remedial alternative for OU1 at the Site. Changes to the preferred remedial alternative, or a change from the preferred remedial alternative to another remedial alternative may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected interim remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comment on all of the alternatives considered in the Proposed Plan and in the detailed analysis section of the EPA's OU1 Supplemental FS Memorandum because EPA may select a remedy other than the preferred alternative in this Proposed Plan.

MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD:
July 26, 2013 – August 26, 2013
EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING: August 15, 2013 at 7:00 pm
EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Supplemental FS Memorandum. Oral and written comments will also be accepted at the meeting. The meeting will be held on the second floor of the "Yes We Can" Community Center, 141 Garden Street, Westbury, NY 11590.

COMMUNITY ROLE IN SELECTION PROCESS

EPA relies on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, EPA's Supplemental RI Memorandum, OU1 Supplemental FS Memorandum, and this Proposed Plan have been made available to the public for a public comment period which begins on July 26, 2013 and concludes on August 26, 2013.

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A public meeting will be held during the public comment period at the "Yes We Can" Community Center at 141 Garden Street, Westbury, New York on August 15, 2013 at 7:00 p.m. to present the conclusions of the documents supporting this decision, to elaborate further on the reasons for recommending the preferred remedial alternative, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

Written comments on the Proposed Plan should be addressed to:

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Remedial Project Manager
Western New York Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866
telephone: (212) 637-4328
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INFORMATION REPOSITORIES

Copies of the Proposed Plan and supporting documentation are available at the following information repositories:

Westbury Public Library, Reference Section
445 Jefferson Street
Westbury, NY 11590
Telephone: (516) 333- 0176
Hours of operation:
Monday-Friday: 9:30 am to 9:00 pm
Saturday: 9:30 am to 5:00 pm
Sunday: 1:00 pm to 5:00 pm

USEPA – Region 2
Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007-1866
(212) 637-4308
Hours: Monday – Friday: 9:00 am to 5:00 pm

SCOPE AND ROLE OF ACTION

The primary objectives of this action are to address the groundwater contamination, reduce the migration of contaminants, and minimize any potential future negative health impacts. This Proposed Plan addresses groundwater contamination in the area immediately downgradient of the NCIA designated as OU1 for the Site. A Site location map is provided as Figure 1.

EPA will be addressing the Site in discrete phases or components known as OUs. An operable unit represents a portion of the site remedy that for technical or administrative purposes can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from Site contamination. EPA anticipates that there will be multiple OUs for the Site, and subsequent Proposed Plans and RODs will address groundwater contamination at other OUs at the Site.

EPA anticipates conducting a separate investigation of a second OU to address groundwater contamination in the far-field area further downgradient of the portion of the plume addressed in this OU1. This would result in a second Proposed Plan and ROD that complements the actions proposed in this Proposed Plan. This interim remedy selected for OU1 is an early action intended to minimize further migration of contaminants while the RI of the far-field area is being conducted. Additional OUs for the Site would include, but may not be limited to, areas of groundwater contamination impacting the Hicksville public supply wells 5-2, 5-3, 4-2, 8-1, 8-3, 9-3 and Hempstead-Levittown 2A. It is anticipated that additional Proposed Plans and RODs will be issued for these OUs. Furthermore, a subsequent remedy for groundwater at the entire Site, including OU1, will be addressed in a future Proposed Plan and ROD.

Individual facilities within the NCIA are considered to be among the sources of groundwater contamination for OU1. Those facilities continue to be addressed under NYSDEC's Superfund program. The on-going State authorized response actions to address source areas at the NCIA facilities are not the focus of this Proposed Plan, although successful completion (*i.e.*, source control or remediation) of the source area(s) at the individual NCIA facilities, under NYSDEC oversight, are essential to the full realization of the objectives of the preferred remedial alternative in this Proposed Plan.

The effectiveness of the remedy in this Proposed Plan requires coordination between actions currently being overseen by NYSDEC under agreements to address contaminant sources at individual facilities within the NCIA and EPA's preferred remedial alternative, as explained in this Proposed Plan. In the event that source control is not successfully implemented pursuant to NYSDEC's on-going enforcement efforts, EPA may elect to evaluate additional options at individual NCIA facilities pursuant to CERCLA to ensure the effectiveness of any remedy selected by EPA for this OU1.

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SITE BACKGROUND

Site Description

The Site comprises an area of widespread groundwater contamination within the Towns of Hempstead, North Hempstead, and Oyster Bay, Nassau County, New York. The Site currently is estimated to include approximately 6.5 square miles, characterized by contaminated groundwater that has impacted several public supply wells, including four Town of Hempstead wells (Bowling Green 1 and 2, Roosevelt Field 10 and Levittown 2A), six Hamlet of Hicksville wells (4-2, 5-2, 5-3, 8-1, 8-3 and 9-3), and one Village of Westbury well (11).

The area comprising OU1 includes approximately 211 acres and consists of residential properties, as well as some commercial/light industrial areas. Upgradient of OU1, the NCIA encompasses approximately 170 acres of land. It is bounded by the Long Island Railroad to the north, Frost Street to the east, Old Country Road to the south and Grand Boulevard to the southwest. The NCIA was developed for industrial use during the 1950s through the 1970s and remains densely populated with industrial and commercial properties. Review of Nassau County Department of Health and NYSDEC reports indicates that on-site leach pools and/or dry wells were generally used for disposal of wastewater until sewers were installed in the mid-1980s. Currently, there are an estimated 200 industrial and commercial businesses within the NCIA.

OU1 History

In 1986, as part of a county-wide groundwater investigation, Nassau County Department of Health identified extensive groundwater contamination throughout the NCIA. Groundwater data revealed that contaminants from the NCIA impacted the Bowling Green water supply, which is comprised of two public supply (extraction) wells and is approximately 1,000 feet downgradient of the NCIA[1].

In December of 1990, the Town of Hempstead completed construction of a granulated activated carbon treatment system at the Bowling Green water supply wells to address VOCs that were found in the drinking water. Five years later the treatment system was supplemented with an air stripper. This treatment system is still operating and effective in removing VOCs to below the drinking water standards prior to the distribution of this drinking water to the public. In 1997, NYSDEC installed four early warning wells located upgradient of the Bowling Green water supply wells to monitor contamination in the groundwater upgradient of the two water supply wells. Following the Nassau County Department of Health investigation and the Town of Hempstead's activities, NYSDEC conducted preliminary site assessment activities within the NCIA from 1994 to 1999 to identify the sources of the groundwater contamination. Based on NYSDEC's findings, 17 individual facilities within the NCIA were listed on NYSDEC's Registry of Inactive Hazardous Waste Disposal Sites (more commonly known as New York State Superfund) between May 1995 and September 1999. Investigations have been completed and remedial actions have been selected for the 17 facilities. Of the 17 facilities, five require no further action, one requires further monitoring, and 11 have on-going response actions including continued operation of air sparging and soil vapor extraction systems.

From 1999 to 2000, NYSDEC conducted a remedial investigation and feasibility study of the groundwater contamination downgradient of the NCIA. Based on the investigation, NYSDEC determined that a variety of disposal activities within the NCIA had resulted in the disposal of hazardous wastes, including 1,1,1-trichloroethane (TCA), tetrachloroethylene (PCE), and trichloroethylene (TCE), which are VOCs. Some of these hazardous wastes were released or have migrated from the NCIA to surrounding areas, including the area bordering the NCIA south of Old Country Road and Grand Boulevard. Individual facility descriptions, operational/disposal histories, and remedial histories for facilities within the NCIA can be found in NYSDEC's 2003 record of decision entitled, "New Cassel Industrial Area Sites, Town of North Hempstead, Nassau County, New York, Off-site Groundwater South of the New Cassel Industrial Area Operable Unit No. 3" (note that the term "OU3" is the geographical designation that NYSDEC assigned to a portion of the area that EPA has designated as OU1).

In October 2003, NYSDEC selected a remedy, under its State authorities to address groundwater contamination downgradient of the NCIA. NYSDEC's remedy called for remediation of the upper and deep portion of the aquifer (to a depth of 225 feet below ground surface (bgs)) with in-well vapor stripping/localized vapor treatment. NYSDEC's remedy included a contingency plan to utilize ex-situ extraction and treatment (more commonly known as groundwater pump and treat) if pilot testing determined the selected remedy to be less practical because of

[1] Both of the Bowling Green water supply wells were constructed in 1975 and have a permitted pumping capacity of 1,400 gallons per minute.

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engineering or economics reasons.

As part of the remedial design phase, in 2009 and 2011, NYSDEC retained consultants to perform pre-design investigations. The first pre-design investigation, conducted in 2009, determined the Magothy aquifer to be anisotropic[2] and, as a result, concluded that in-well vapor stripping may not be an effective technology for remediating the groundwater. Thereafter, NYSDEC decided that the contingency remedy of ex-situ extraction and treatment of the contaminated groundwater was more appropriate, and a subsequent pre-design investigation for the contingency remedy was completed in December 2011. However, this remedy was never implemented, and during the period when the 2011 pre-design investigation was being completed, NYSDEC requested that EPA list the Site on the National Priorities List (NPL). No further remedial actions were taken by NYSDEC related to what it referred to as the groundwater contamination downgradient of the NCIA. On September 16, 2011, EPA listed the Site on the NPL.

Site Geology

The principal hydrogeologic units underlying the Site are the glacial outwash and morainal deposits known as the Upper Glacial Aquifer (UGA) and the underlying Magothy Formation and Matawan Group (Magothy). Beneath these two units are the clay member and the Lloyd Sand member of the Raritan Formation.

The UGA is estimated to be 40 to 65 feet thick and consists predominantly of coarse-grained sands and gravels. A distinct contact between the UGA and the Magothy units has not been observed in the area. The underlying Magothy formation sediments (estimated to be approximately 600 feet thick) are characterized by sand and silty sand with discontinuous clay and silt layers. Geologic studies in the area have revealed that sediments tend to become finer in size fraction downward in the Magothy formation, except within the basal portion where coarse-grained sands and gravels are prevalent.

Unconfined groundwater is generally found at the Site between 40 and 65 feet bgs, which is near the estimated boundary between the UGA and Magothy aquifers. Groundwater within the UGA and Magothy aquifers flows in a south-southwest flow direction in the area downgradient of the NCIA. Pumping of the Bowling Green supply wells likely influences the groundwater flow direction above their production interval of 463 to 674 feet bgs.

[2] In an anisotropic aquifer, the hydraulic conductivity (measurement of ease in which water can flow through the aquifer material) is different in the horizontal and vertical direction.

NATURE AND EXTENT OF CONTAMINATION

Results of NYSDEC RI

As mentioned above, from 1999 to 2000, NYSDEC performed its remedial investigation activities' including the collection of three rounds of groundwater samples from a network of 50 solitary and clustered groundwater monitoring wells in the vicinity of the NCIA. Groundwater monitoring wells were installed at various depths that targeted four depth ranges (0 to 64 feet, 65 to 99 feet, 100 to 124 feet and 125 to 200 feet below ground surface). Early warning monitoring wells clusters, located upgradient of the Bowling Green supply wells, were also sampled at depths ranging from 132 to 164 and 504 to 516 feet bgs.

Groundwater samples were analyzed for VOCs by a NYSDEC contract laboratory. During the third round of sampling in January 2000, a subset of samples from 24 of the groundwater monitoring wells were also analyzed for physical and chemical parameters to assist in a monitored natural attenuation (MNA) evaluation. Additionally, 39 groundwater samples were collected from four Hydropunch® borings (GWHP-01 through GWHP-04) in 2000. The location of the monitoring wells and Hydropunch® borings can be found in NYSDEC's September 2000 RI Report for the "New Cassel Industrial Area Off-site Groundwater."

Summary of NYSDEC's RI Results

Major findings documented in NYSDEC's 2000 RI Report for groundwater contamination downgradient of the NCIA are summarized as follows:

- Contaminants of concern (COC) are PCE, TCE, and TCA. Breakdown products of PCE, TCE, TCA and other minor constituents within the VOC category were also present.
- Three groundwater plumes (eastern, central, and western) were identified emanating from the NCIA into the study area downgradient of the NCIA. NYSDEC attributed the source of groundwater contamination to the individual NYSDEC Registry facilities located within the NCIA.
- Contaminant distribution is influenced by local geology and hydrogeology. This includes the effect from the pumping of the Bowling Green supply wells

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which produces a significant downward vertical gradient (*i.e.* drawing the groundwater deeper and toward it) in the vicinity of the NCIA.
- The presence of some breakdown products suggests that the degree of biodegradation is limited within the area downgradient of the NCIA.
- Sources of groundwater contamination upgradient of the NCIA were not identified. Groundwater samples collected from upgradient well N-10459 did not contain any detectable PCE or TCE, and groundwater samples collected from upgradient well N-10462 contained low concentrations of PCE (8 J[3] and 14 micrograms per liter (µg/L)).

Vapor Intrusion

From 2006 to 2009, NYSDEC also conducted vapor intrusion investigations downgradient of the NCIA. Investigations were conducted in three phases to assess whether VOCs from the NCIA are volatilizing and entering structures in areas surrounding the NCIA.

Phase 1 was conducted in September 2006 and included the collection of soil vapor samples at 38 locations throughout NYSDEC's study area downgradient of the NCIA. At each of 38 locations, one sample was collected approximately six to ten feet above the water table (generally 29 to 45 feet bgs), and one sample was collected at approximately eight feet bgs (the typical depth of a building's foundation).

As a screening evaluation, NYSDEC compared results from the Phase 1 soil vapor sampling to the New York State Department of Health's (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated September 2006, which includes guidelines for indoor air concentrations for PCE and TCE, which are 100 µg/m^3 and 5 µg/m^3, respectively. This comparison provided for the targeting of locations for subsequent phases of the vapor intrusion investigation. Phase 1 results identified PCE concentrations up to 1,086 µg/m^3. TCE was identified at concentrations up to 363 µg/m^3. Based on the results, NYSDEC determined that indoor air sampling should be conducted at W.T. Clarke High School as soil vapor samples within the vicinity identified TCE concentrations above NYSDOH air guidelines.

Phase 2 began in September 2007 and included the collection of six indoor air samples from the basement, and first floor locations, and one outdoor (ambient air) location at the W.T. Clarke High School. Phase 2 results were compared to NYSDOH air guidance values, and concentrations of the identified COCs were below levels of concern. The ambient air sample, which serves as a measurement of background concentrations, had a concentration of TCE at 3.71 µg/m^3. The TCE ambient air result was higher than the indoor air concentrations and therefore, unlikely the result of volatilization of contaminants from contaminated groundwater. The maximum concentration of PCE was 2.28 µg/m^3 from a first floor indoor air sample. Additionally, concentrations of carbon tetrachloride and benzene were identified up to 0.831 µg/m^3 and 1.95 µg/m^3, respectively. While NYSDOH did not have an indoor air guidance value for carbon tetrachloride and benzene, these values do not exceed EPA's upper bound acceptable risk levels for those two substances.

Phase 3 was conducted in March 2009, and included collection of outdoor air, indoor air and/or subslab samples at the W.T. Clarke High School, seven residential properties, and a Town of Hempstead Water Department facility. Phase 3 results at the W.T. Clarke High School did not identify detections in indoor air or subslab samples above levels of concern. Both PCE and TCE were not detected in the indoor air above their reporting limits. TCA was detected in the indoor air up to 1.3 µg/m^3 and, while NYSDOH does not have an indoor air guidance value for this VOC[4], it does not exceed EPA's current risk based screening level of 5,200 µg/m^3. Methylene chloride was detected at concentrations of up to 14 µg/m^3 in the indoor air, however, NYSDOH's air guidance value is 60 µg/m^3. Based on these results, NYSDEC determined that no further action was necessary, which was in accordance with NYSDOH's 2006 Guidance.

Results from Phase 3 sampling at the seven residential properties did not identify detections in the indoor air above levels of concern for COCs. Subslab sampling at six residential properties indicated that the highest concentrations of PCE and TCE were 15 µg/m^3 and 14 µg/m^3, respectively. Based on comparison of these results to NYSDOH's 2006 Guidance, one residence, located approximately 500 feet downgradient from the NCIA was selected for future monitoring.

Phase 3 additionally included vapor intrusion sampling at a Town of Hempstead Water Department facility located at the Bowling Green water supply wells. Chloroform, a

[3] This sample result with a "J" qualifier represents an estimated value.

[4] NYSDOH's 2006 *Guidance for Evaluating Soil Vapor Intrusion in New York State* provides guidance on actions that should be taken to address current and potential exposures related to soil vapor intrusion and can be used to evaluate indoor air data for 1,1,1-TCA in Matrix 2. Currently, there are no NYSDOH air guidance values for sub slab data.

compound for which the NYSDOH does not have a respective air guidance value, was detected in the indoor air at concentrations of 150 $\mu g/m^3$ and in the subslab at concentrations of 81,000 $\mu g/m^3$. EPA's current risk based industrial indoor air value for chloroform is 0.53 $\mu g/m^3$. Other COCs were not detected above levels of concern in the indoor air.

No further actions were taken by NYSDEC subsequent to the completion of the three phases of the vapor intrusion investigations.

Summary of NYSDEC's Pre-Design Investigations

2009 Pre-Design Investigation

After selection of its remedy in 2003, NYSDEC conducted a pre-design investigation in 2009 that included a groundwater quality assessment from existing wells, vertical profile groundwater sampling including temporary monitoring wells (TMW), geologic profiling, soil sampling, and gamma logging. Seven TMWs were advanced to a depth of 285 feet bgs, which is comparable to the depth of the deepest permanent monitoring well locations. At two additional locations, TMWs were installed in the western plume and the central-eastern plume area to a depth of 502 feet bgs. Groundwater samples were collected at 20-foot intervals from the water table (approximately 45 feet bgs) down to 502 feet bgs. These results documented the presence of Site-related VOC contamination at depths up to 502 feet bgs.

Monitored Natural Attenuation Evaluation

The 2009 pre-design investigation evaluated available groundwater monitoring sampling results collected quarterly subsequent to the selection of the State's 2003 remedy, to determine whether the data corresponds with previous conclusions drawn in 2003. Review of the data revealed that the chlorinated VOCs comprise two general suites of parent and degradation or daughter products, ethanes and ethenes. An evaluation of the occurrence and distribution of ethane compounds in the VOC plume suggested that degradation was occurring.

Historically, the parent compound TCA was the primary ethane species constituent detected in wells within the NCIA. However, in wells downgradient of the NCIA, the percentage of TCA decreased relative to the wells within the NCIA while the percentage of 1,1-dichloroethane (DCA) increased relative to the NCIA wells, indicating the degradation of TCA to 1,1-DCA.

However, evaluations were not able to determine whether breakdown of ethene constituents was occurring due to the varying occurrence and distribution of the parent and breakdown ethene compounds between the NCIA and downgradient wells. Historically, the distribution of ethene constituents in the wells located within the NCIA was comprised mainly of breakdown products 1,1-DCE and 1,2-DCE, while wells downgradient of the NCIA contained relatively higher amounts of the parent products PCE and TCE. In addition, significant levels of vinyl chloride were not present, indicating that the ultimate breakdown of the ethene suite is not taking place.

As part of the natural attenuation evaluation, some additional parameters that would be indicative of the biodegradation of chlorinated VOCs were collected from a limited set of monitoring wells. The data did not reveal the presence of ferrous iron, indicating that a reducing environment may not be present at those locations, and total organic carbon was also not detected. The presence of total organic carbon would have indicated a potential energy source for biodegradation. In addition, byproducts of biodegradation (i.e. alkalinity, chlorides, carbon dioxide and methane) were not detected at elevated concentrations. Parameters such as sulfide and hydrogen were not collected during this evaluation.

Based on these factors, significant biodegradation of the VOC plumes does not appear to be occurring within OU1. However, the presence of some breakdown products suggests that the degree of biodegradation is limited within OU1.

Evaluation of Hydogeologic Conditions

Results from NYSDEC's 2009 pre-design investigation indicated that, based on literature data for the Magothy in the vicinity of the area proposed for treatment, anisotropy ratios (*i.e.*, ratio of vertical to horizontal hydraulic conductivity) of approximately 100 are not uncommon. Vertical hydraulic conductivity sampling measurements based on discrete soil sampling of the Magothy revealed higher degrees of anisotropy (*i.e.*, average was 42,700). NYSDEC concluded in its 2009 pre-design investigation that in-well vapor stripping would not be an effective technology for remediating groundwater and recommended use of the contingency remedy of groundwater extraction and treatment.

2011 Pre-Design Investigation

As a result, in 2011, NYSDEC conducted a second pre-design investigation that included the installation of 11 new monitoring wells and two extraction (pumping) wells, a 72-hour aquifer pump test of an extraction well, and a

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pilot test/treatability study for ex-situ treatment of contaminated groundwater.

Results from NYSDEC's 2011 pre-design investigation, which included sampling from the recently expanded monitoring well network, indicated that impacted area of groundwater had a larger horizontal and vertical extent than previously determined in NYSDEC's 2000 study. The water level monitoring conducted as part of the 72-hour aquifer pump test revealed that the Bowling Green water supply wells strongly influence the water levels in all of monitoring wells located in the Magothy that were monitored during the test. Results from the pump test indicated test extraction wells were relatively high yielding, and NYSDEC determined that a series of high yielding pumping wells would be required to capture known contamination.

Data from the 72-hour aquifer pump test was additionally used to calculate aquifer characteristics, including anisotropic ratios, which were determined to be significantly lower (27 to 100) than the original estimate from the 2009 pre-design investigation. Calculated results for anisotropy were within the published ranges from several United States Geologic Survey studies on Long Island. Based on this information collected, these results are consistent with NYSDEC's initial selection in the remedy selected in 2003.

NYSDEC concluded, based on its 2011 pre-design investigation that the contaminant plumes were stable with localized areas where declining or increasing concentrations trends are observed. Concentrations of PCE/TCE breakdown compounds are relatively low to nondetect compared to the concentrations of PCE and TCE, which indicates that their biodegradation is not progressing at a significant rate within OU1. Concentrations of Site related VOCs in the early warning monitoring wells were below their respective state and federal water quality standards.

EPA's Supplemental RI Memorandum

In 2011, after the Site was added to the NPL, EPA commenced its Supplemental RI which resulted in the Supplemental RI Memorandum, dated May 2013, which summarizes the historical groundwater data, outlines response activities conducted, and provides recommendations for future investigation and remedial activities at the Site. The evaluation of groundwater contamination downgradient of the NCIA, designated as OU1 by EPA, included a review of NYSDEC's September 2000 study, October 2003 remedy, and the 2009 and 2011 Pre-Design Investigation Reports.

Summary of EPA's Supplemental RI Memorandum

Based on an evaluation of groundwater data collected through 2011, EPA determined the current nature and extent of contamination in OU1, as is set forth in the Supplemental RI Memorandum, that three groundwater plumes exist at OU1 (the eastern, central, and western plumes). These plumes are characterized by chlorinated VOCs (CVOCs), primarily PCE and TCE, and are generally oriented in a south-southwest direction, consistent with regional groundwater flow. A downward hydraulic gradient appears to drive the three plumes to greater depths as groundwater moves through the area downgradient of the NCIA. The eastern and western plumes are more extensive laterally than the central plume. The three plumes are depicted on Figure 2 and described in more detail as follows:

- **OU1 Eastern Plume**: The eastern plume is characterized by a generally higher molar fraction[5] of PCE relative to TCE at depths less than approximately 205 feet. In depths greater than approximately 205 feet, a generally higher molar fraction of TCE compared to PCE was observed.

  April 2011 pre-design investigation sampling of monitoring well FSMW-14A revealed PCE and TCE at concentrations of 16,000 µg/L and 1,800 µg/L respectively. Monitoring well FSMW-14A is screened in the Magothy at 119 to 129 feet bgs and was installed in 2004 in association with investigations conducted at a facility located in the NCIA. Past sampling has indicated PCE concentrations up to 75,000 µg/L at FSMW-14A.

- **OU1 Central Plume**: The central plume contains a generally higher molar fraction of TCE and cis-1,2 DCE compared to PCE. Below a depth of approximately 150 feet bgs, PCE and TCE in the central plume appear to be commingled with the western plume.

  Relatively high concentrations of TCA (up to 1,400 µg/L at monitoring well TMW-5) were also detected in the central plume based on data collected in 2008. The presence of TCA in the central plume can be used as a contaminant fingerprint to distinguish between plumes.

[5] The molar fraction is the amount of a CVOC divided by the total amount of total CVOCs. This fraction has been adjusted for molecular weight.

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- **OU1 Western Plume**: The western plume has a generally higher molar fraction of TCE compared to PCE.

  The highest concentration of TCE (5,100 µg/L) was detected in 2008, along the western edge of OU1 at monitoring well TMW-2, located within the Magothy at 225 feet bgs. The highest concentration of PCE (3,700 µg/L) was also detected in 2008 and was along the southwestern edge of OU1 at monitoring well TMW-1, located within the Magothy at 225 feet bgs.

  Based on data collected from a TMW, both PCE and TCE do not appear to extend deeper than 450 feet in the western plume downgradient of the NCIA.

RISK SUMMARY

EPA conducted a baseline human health risk assessment (HHRA) for OU1 to estimate current and future effects of contaminants on human health. A baseline HHRA is an analysis of the potential adverse human health effects of releases of hazardous substances from a site in the absence of any actions or controls to mitigate such releases under current and future land and groundwater uses.

A four-step human health risk assessment process was used for assessing Site-related cancer risks and noncancer health hazards. The four-step process is comprised of: Hazard Identification of Chemicals of Potential Concern (COPCs), Exposure Assessment, Toxicity Assessment, and Risk Characterization (see adjoining text box, "What is Risk and How is it Calculated" for more details on the risk assessment process).

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

Cancer risks and noncancer health hazard indexes (HIs) are summarized below (please see the adjoining text box for an explanation of these terms).

A screening level ecological risk assessment was not conducted to assess the risk posed to ecological receptors because contaminated groundwater downgradient of the NCIA does not discharge to any

WHAT IS RISK AND HOW IS IT CALCULATED?

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

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

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

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

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

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surface water bodies within the area described as OU1. Since no groundwater discharges to surface water, exposure pathways are not complete, and ecological receptors are not exposed to contaminants from the Site.

Human Health Risk Assessment

The area encompassing OU1 mainly consists of residential parcels with some retail businesses along Old Country Road. Portions of the W.T. Clarke Middle School and High School are within the southwest corner of OU1. The Bowling Green supply wells, Nassau County Recharge Basin #51, and another smaller Nassau County Department of Public Works-operated recharge basin are located within the area. It is expected that the future land and groundwater use in this area will remain the same.

COPCs were selected by comparing maximum detected concentrations of each analyte in groundwater with available risk-based regional screening levels for tap water. All class A human carcinogens were also evaluated for the quantitative assessment. A total of fifteen VOCs were selected as COPCs for OU1, which are provided in Table 1.

The HHRA evaluated health effects that could result from direct exposure to contaminated groundwater though ingestion of and dermal contact with groundwater and inhalation of vapors during bathing/showering activities. Based on the current zoning and anticipated future use, the HHRA focused on a variety of possible receptors, including site workers and residents (children and adults). Although residents and businesses in the area are currently served by municipal water, groundwater at the Site is designated as a federally designated sole source aquifer, and the State considers it to be a potable water supply; therefore it could be used as such in the future. Consequently, hypothetical exposure to contaminated groundwater at the Site was evaluated quantitatively in the HHRA.

A more detailed discussion of the exposure pathways and estimates of risk can be found in the OU1 *Final Baseline Human Health Risk Assessment* in the information repositories.

Human Health Risk Assessment Summary

Table 1 provides the exposure concentration for COPCs found during EPA's statistical analysis of groundwater sampling data. Table 1 additionally provides the respective and current New York State Water Quality Standards for Class GA (potable drinking water aquifer) and EPA's Safe Drinking Water Act MCL values for comparison.

These exposure concentrations are associated with an excess lifetime cancer risk $3x10^{-3}$ for the future adult and child resident, and $2x10^{-4}$ for the commercial worker. PCE, TCE, vinyl chloride, 1,1-DCA, and 1,1,2,2-tetrachloroethane are the primary contributor to these cancer risk levels. The calculated noncarcinogenic hazard indices (HI) are as follows: future adult resident HI=300, future child resident HI=700, and future commercial worker HI= 20. Both TCE and PCE were the main drivers of noncancer hazards that yielded values greater than 1.

These cancer risks and noncancer hazards indicate that there is significant potential risk to potentially exposed populations from direct exposure to groundwater. For these receptors, exposure to groundwater results in either an excess lifetime cancer risk that exceeds EPA's target risk range of 10^{-4} to 10^{-6} or an HI above the acceptable level of 1, or both.

In 2013, as part of the HHRA, EPA conducted a qualitative vapor intrusion (VI) screening level desktop evaluation to assess potential risk using conservative assumptions. The evaluation indicated the potential for VI risk associated with groundwater contamination at OU1. However, NYSDEC's 2009 vapor intrusion investigation sampled 7 residences, and the results did not indicate the need for installation of vapor intrusion mitigation systems.

The results of the human health risk assessment indicate that the contaminated groundwater presents an unacceptable exposure risk. Based on the results of the RI and the risk assessment, EPA has determined that the actual or threatened releases of hazardous substances from the Site, if not addressed by the preferred remedy or one of the other active measures considered, may present a threat to human health or welfare or the environment. It is EPA's current judgment that the preferred remedial alternative identified in the Proposed Plan is necessary to protect public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment.

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Table 1: Exposure Point Concentrations and Respective NYS and EPA Drinking Water Standards for OU1 Groundwater

COPCs	Exposure Point Concentration (EPC)[6] (µg/L)	NYS Water Quality Standards (µg/L)	Federal Safe Drinking Water Act MCL (µg/L)
1,1,1-TCA	432	5	200
1,1,2,2-Tetrachloroethene	23	5	No Standard (NS)
1,1,2- TCA	1.38	1	5
1,1- DCA	302	5	NS
1,1-DCE	392	5	7
1,2-DCA	1.25	0.60	5
Benzene	10	1	5
Bromodichloro-methane	11	NS	NS
Carbon Tetrachloride	2.11	5	5
Chloroform	23.50	7	NS
Cis-1,2-DCE	247	5	70
PCE	3,540	5	5
Trans-1,2,-DCE	18.20	5	100
TCE	388	5	5
Vinyl chloride	11	2	2

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered guidance, and site-specific risk-based levels.

The following remedial action objectives have been established for OU1:

- Prevent or minimize current and potential future human exposure (via ingestion and dermal contact) to VOCs in groundwater at concentrations in excess of federal and State standards.
- Minimize the potential for further migration of groundwater with VOC contaminant concentrations greater than federal and State standards;
- Restore the impacted aquifer to its most beneficial use as a source of drinking water by reducing contaminant levels to the federal and State standards.

SUMMARY OF REMEDIAL ALTERNATIVES

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

Detailed descriptions of the remedial alternatives considered for addressing groundwater contamination at OU1 can be found in EPA's OU1 Supplemental FS Memorandum. EPA's OU1 Supplemental FS Memorandum updates information previously presented in NYSDEC's Feasibility Study Report for "New Cassel Industrial Area Off-site Groundwater", dated September 2000, and introduces three additional alternatives. Based on evaluations performed by EPA in the development of the OU1 Supplemental FS Memorandum, remedial alternatives developed by NYSDEC in 2000 for its remedy that do not address the entire vertical extent of groundwater contamination were thus not considered satisfactory alternatives and are not included among EPA's alternatives for this remedy.

The duration time for each alternative reflects only the time required to construct the remedy and does not include the time required to design the remedy, actually attain performance standards, negotiate the performance of the remedy with any potentially responsible parties, if possible, or procure contracts for design and construction.

[6] EPC is the concentration of a constituent in groundwater that is reasonably expected to be contacted by an individual over time and universally throughout OU1. The EPC value represents the 95% upper confidence limit of the mean concentration or the maximum detected concentration of the constituent.

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Common Elements

All of the alternatives, with the exception of the no action alternative, include common components. Alternatives 2 through 5 include long-term monitoring to ensure that groundwater quality improves following implementation of the selected remedy until performance standards are achieved. The long-term monitoring program would include sampling from the two existing, early warning monitoring well clusters and an evaluation of potential impacts to the Bowling Green supply wells. As additional groundwater data become available, EPA would continue to investigate the soil vapor intrusion pathway for OU1 under Alternatives 2 through 5. Vapor mitigation systems would be installed, if warranted.

Alternatives 2, 3, 4, and 5 include institutional controls for groundwater use restrictions until performance standards are achieved and as such a plan would be developed which would specify institutional controls to ensure that the remedy is protective. Existing local requirements that prevent installation of drinking water wells and informational devices to limit exposure to contaminated groundwater would be implemented.

Alternatives 3, 4, and 5, all of which include active remediation, would evaluate the use of in-situ chemical treatments such as ISCO to target areas containing high concentrations (greater than 10,000 µg/L) of total VOCs. ISCO is a process that involves the injection of reactive chemical oxidants into the subsurface for rapid contaminant destruction. Oxidation of organic compounds using ISCO converts contaminants to non-toxic by-products. During the remedial design, a treatability study would be performed to evaluate the use in-situ chemical treatments, such as ISCO, as an element of the selected alternative in a manner that complements and improves the effectiveness of the remedy. In-situ chemical treatment would only be utilized if a determination is made during the remedial design that the application would not adversely affect the public supply wells.

Additionally, because MCLs will take longer than five years to achieve in Alternatives 2 through 5, a review of conditions at the Site will be conducted no less often than once every five years until performance standards are achieved.

Alternative 1: No Action

Capital Cost:	$0
Annual O&M Costs:	$0
Present-Worth Cost:	$0
Duration Time:	Not Applicable

The NCP requires that a "No Action" alternative be developed as a baseline for comparing other remedial alternatives. Under this alternative, there would be no physical remedial actions taken to address contamination. Additionally, this alternative does not include monitoring or institutional controls.

Under this alternative, CERCLA requires that the Site would be reviewed at least once every five years as long as contaminants remain above the levels that allow for unrestricted use and unlimited exposure. If justified by the review, additional response actions may be implemented.

Alternative 2: Monitored Natural Attenuation

Capital Cost:	$ 614,000
Annual O&M Costs:	$ 115,000
Present-Worth Cost:	$ 3,300,000
Duration Time:	6 to 9 months

This remedial alternative relies on monitored natural attenuation to address the groundwater contamination. Natural attenuation is the process by which contaminant concentrations are reduced by various naturally occurring physical, chemical, and biological processes. The main processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction of contaminants. These processes occur naturally, in-situ, and act to decrease the mass or concentration of contaminants in the subsurface. Only non-augmented natural processes are relied upon under this alternative.

Implementation of this alternative includes the installation of additional monitoring wells, periodic sample collection and analysis, data evaluation, and contaminant trend analysis. Under this alternative, a network of approximately 33 groundwater monitoring wells (21 existing and 12 to be installed) would be monitored for MNA parameters, which would include groundwater quality. The conceptual sampling schedule used for this alternative assumes 24 groundwater monitoring wells sampled quarterly for the first two years, semi-annually for the next three years, and annually thereafter.

An estimated remediation time frame of 30 years is used for estimating costs associated with operation and maintenance (O&M) activities. The time frame to meet groundwater RAOs in OU1 is difficult to predict since EPA's Supplemental FS Memorandum did not include modeling to estimate remediation time frames. However, under this alternative, it is anticipated that RAOs would

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not be achieved in a reasonable time frame based on Site-specific conditions.

This alternative includes long-term monitoring to ensure that groundwater quality improves following implementation of the selected remedy until performance standards are achieved. As additional groundwater data become available, EPA would continue to investigate the soil vapor intrusion pathway for OU1 under Alternative 2. Additionally, in accordance with CERCLA, a review of conditions at the Site will be conducted no less often than once every five years until performance standards are achieved.

Alternative 3: In-Well Vapor Stripping; In-situ Chemical Treatment

Capital Cost:	$ 11,728,000
Annual O&M Costs:	$ 652,000
Present-Worth Cost:	$ 24,000,000
Duration Time:	1 to 2 years

This remedial alternative includes the installation of in-well vapor stripping systems in groundwater at various depths to provide contaminant mass removal and containment at OU1.

In-well vapor stripping is a technology that uses the principles of phase separation to transfer VOCs from the liquid to gas phase by aerating the contaminated water in the wellhead. Aeration can be accomplished by either injecting air into the water table or by using an air stripper mounted at the well head. Typically, extracted vapors are treated (if necessary) above grade and discharged to the atmosphere. Vapor treatment, if required, generally consists of vapor-phase granular activated carbon (GAC).

The in-well vapor stripping well is a closed system where the contaminated groundwater is never exposed at the ground surface or the atmosphere. Typically impacted groundwater is pumped to the well head where it is treated and discharged or directly discharged back into the well. Once treated, the groundwater flows back into the aquifer through screens in the well that are typically located at the water table (unsaturated zone) but can also be located beneath the water table (saturated zone). In some in-well vapor stripping well configurations, the extraction and re-injection of groundwater from the aquifer induces a hydraulic circulation pattern that allows continuous cycling of groundwater through the treatment well. As groundwater circulates through the treatment system in-situ and vapor is extracted the contaminant concentrations in the groundwater are reduced.

In-well vapor stripping can be implemented in different system configurations. For the purposes of developing a conceptual design and cost estimate for comparison with other technologies in the OU1 Supplemental FS Memorandum, wells were configured centrally along the OU1 eastern, central and western plume areas to provide mass removal. Wells were additionally placed perpendicular to groundwater flow along the OU1 plume 100 µg/L total VOC contour to provide containment, treatment, or both of the plume areas. This conceptual design would necessitate installation of 13 permanent in-well vapor stripping wells in the OU1 eastern plume area, eight in the OU1 central plume area, and 51 in the OU1 western plume area. The conceptual layout of these 72 wells targets the shallow (< 175 feet bgs), intermediate (175 -250 feet bgs) and deep (>250 feet bgs) depths. A centralized treatment building was assumed in the conceptual design for vapor treatment.

In-well vapor stripping would target treatment of groundwater contaminated with levels of total VOCs greater than 100 µg/L, but less than 10,000 µg/L. The remedial design would evaluate the use of in-situ chemical treatments such as ISCO to target areas containing high concentrations (greater than 10,000 µg/L) of VOCs.

An estimated remediation time frame of 30 years is used for developing costs associated with O&M activities. The time frame to meet groundwater RAOs in OU1 is difficult if not impossible to predict because it is uncertain how quickly groundwater concentrations will decrease as a result of remedial technologies. Active remediation would be employed in the targeted treatment areas until the MCL for each of the COPCs is attained within the targeted treatment area.

The conceptual design would require further evaluation during the remedial design phase if this alternative is selected. This alternative includes long-term monitoring to ensure that groundwater quality improves following implementation of the selected remedy until performance standards are achieved. Additional wells would also have to be installed to monitor the progress of the remediation. As additional groundwater data become available, EPA would continue to investigate the soil vapor intrusion pathway for OU1 under Alternative 3. Additionally, in accordance with CERCLA, a review of conditions at the Site will be conducted no less often than once every five years until performance standards are achieved.

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Alternative 4: Groundwater Extraction and Treatment; In-situ Chemical Treatment

Capital Cost:	$ 8,862,000
Annual O&M Costs:	$ 834,000
Present-Worth Cost:	$ 24,200,000
Duration Time:	1 to 2 years

This remedial alternative consists of the extraction of groundwater via pumping wells and treatment prior to discharge. Groundwater is pumped and treated to remove contaminant mass from areas of the aquifer with elevated concentrations of VOCs and to provide containment within OU1.

For this conceptual design, it is estimated that 11 extraction wells would be installed in the shallow (< 175 feet bgs), intermediate (175 -250 feet bgs) and deep (>250 feet bgs) intervals of the contaminated portions of the aquifer. The conceptual design estimates three extraction wells in the OU1 eastern plume area, three in the OU1 central plume area and five in the OU1 western plume area.

Extraction wells would target treatment of groundwater contaminated with levels of total VOCs in excess of 100 µg/L. The remedial design would evaluate the use of in-situ chemical treatments such as ISCO to target areas containing high concentrations (greater than 10,000 µg/L) of VOCs.

Extracted groundwater with VOC contamination is typically treated with either liquid phase GAC or air stripping, or both. Air stripper effluent air stream may be treated with vapor phase GAC, if necessary. Extracted groundwater would be pumped from the network of extraction wells to one centralized treatment system facility with a treatment capacity of approximately 700 gallons per minute (gpm), where groundwater would be treated using both an air stripper and liquid phase GAC. Treated groundwater would then be re-injected back into the UGA using an estimated 20 infiltration wells which would be installed in the vicinity of the Nassau County Recharge Basin #51 parcel. However during the remedial design phase, an evaluation and determination would be made whether to re-inject the treated water or to discharge it to a publicly owned treatment works (POTW). This conceptual design including the number and placement of the extraction wells would require further evaluation during the remedial design if this alternative is selected.

An estimated remediation time frame of 30 years is used for developing costs associated with O&M activities. The time frame to meet groundwater RAOs in OU1 is difficult if not impossible to predict because it is uncertain how quickly groundwater concentrations will decrease as a result of remedial technologies. Active remediation would be employed in the targeted treatment areas until the MCL for each of the COPCs is attained within the targeted treatment area.

The conceptual design would require further evaluation during the remedial design phase if this alternative is selected. This alternative includes long-term monitoring to ensure that groundwater quality improves following implementation of the selected remedy until performance standards are achieved. Additional wells would also have to be installed to monitor the progress of the remediation. As additional groundwater data become available, EPA would continue to investigate the soil vapor intrusion pathway for OU1 under Alternative 4. Additionally, in accordance with CERCLA, a review of conditions at the Site will be conducted no less often than once every five years until performance standards are achieved.

Alternative 5: Hybrid Alternative – In-well Vapor Stripping / Groundwater Extraction and Treatment; In-situ Chemical Treatment

Capital Cost:	$ 10,044,000
Annual O&M Costs:	$ 680,000
Present-Worth Cost:	$ 22,900,000
Duration Time:	1 to 2 years

This remedial alternative consists of a hybrid, or combination, of Alternative 3 (in-well vapor stripping) and Alternative 4 (groundwater extraction and treatment). This hybrid alternative would provide contaminant mass removal and containment through the implementation of both in-well vapor stripping and groundwater extraction and treatment remedial technologies to address groundwater contamination in OU1.

Under the conceptual design, in-well vapor stripping would target treatment of groundwater in areas where concentrations of total VOCs are greater than 100 µg/L but less than 1,000 µg/L. Groundwater extraction and treatment would target groundwater in areas with concentrations of total VOCs greater than 1,000 µg/L but less than 10,000 µg/L. In plume areas where concentrations of total VOCs are greater than 10,000 µg/L, use of in-situ chemical treatment such as ISCO would be evaluated for implementation.

For this conceptual design, it is estimated that three extraction wells would be installed in the OU1 eastern plume area as total VOC concentrations generally exceed 1,000 µg/L. In the OU1 central plume area where total VOC concentrations are generally less than 1,000 µg/L,

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eight in-well vapor stripping wells would be installed. In the OU1 western plume area, a combination of 12 in-well vapor stripping wells and three extraction wells would be used as the plume area covers a wider area and concentrations are generally less than 1,000 µg/L.

Under this alternative, a centralized treatment plant would be constructed in the vicinity of Nassau County Recharge Basin #51 to treat extracted groundwater and vapors. Extracted groundwater would be pumped to a centralized treatment plant where groundwater would then be treated using both an air stripper and liquid phase GAC. Treated groundwater, after meeting groundwater standards, would then be re-injected back into the UGA using an estimated seven dry wells.

The centralized treatment plant would have the capacity to treat up to 350 gpm. However, during the remedial design, an evaluation and determination would be made whether to re-inject the treated groundwater or discharge it to a POTW. For the in-well vapor stripping wells, extracted vapors are typically treated (if necessary) above grade and discharged to the atmosphere. Vapor treatment, if required, generally consists of vapor-phase GAC, which would be addressed at the centralized treatment plant.

An estimated remediation time frame of 30 years is used for developing costs associated with O&M activities. The time frame to meet groundwater RAOs in OU1 is difficult if not impossible to predict because it is uncertain how quickly groundwater concentrations will decrease as a result of remedial technologies. Active remediation would be employed in the targeted treatment areas until the MCL for each of the COPCs is attained within the targeted treatment area.

The conceptual design would require further evaluation during the remedial design phase if this alternative is selected. This alternative includes long-term monitoring to ensure that groundwater quality improves following implementation of the selected remedy until performance standards are achieved. Additional wells would also have to be installed to monitor the progress of the remediation. As additional groundwater data become available, EPA would continue to investigate the soil vapor intrusion pathway for OU1 under Alternative 5. Additionally, in accordance with CERCLA, a review of conditions at the Site will be conducted no less often than once every five years until performance standards are achieved.

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely, overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance.

Refer to the text box on the next page for a description of the evaluation criteria.

This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how each compares to the other options under consideration. A detailed analysis of alternatives can be found in EPA's OU1 Supplemental FS Memorandum, dated July 2013.

Overall Protection of Human Health and the Environment

All of the active alternatives provide protection for human health. Alternatives 3, 4, and 5 are the active remedies that address groundwater contamination and would restore groundwater quality over the long-term. Alternatives 3, 4, and 5 would also rely on certain natural processes to achieve the cleanup levels for areas not targeted for active remediation.

Alternative 2 relies entirely on natural attenuation processes to achieve cleanup levels. Protectiveness under Alternative 2 is achieved through reducing contaminant concentrations via naturally occurring processes. However, Alternative 2 does not prevent the migration of contaminants, and based on the natural attenuation evaluation conducted at the Site, there is uncertainty that biodegradation would progress at a rate such that cleanup levels would be achieved in a reasonable time.

The remaining alternatives presented would each address groundwater contamination through active remedial activities. Protectiveness under Alternatives 3, 4, and 5 requires a combination of actively reducing contaminant concentrations in groundwater and limiting exposure to residual contaminants through maintenance of existing institutional controls for groundwater use restrictions.

Institutional controls are anticipated to include existing governmental controls, such as well permit requirements regarding groundwater use in the impacted area. A plan would be developed which would specify institutional

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EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES

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

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

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

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

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

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

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

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

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

controls to ensure that remedy is protective.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

EPA and NYSDOH have promulgated health-based protective MCLs (40 CFR Part 141, 10 NYCRR § 5-1.51 Chapter 1), which are enforceable standards for various drinking water contaminants (and are chemical-specific ARARs). If more than one such requirement applies to a contaminant, compliance with the more stringent ARAR is required.

The aquifer at the Site is classified as Class GA (6NYCRR 701.18), meaning that it is designated as a potable drinking water supply. As groundwater within OU1 is a source of drinking water, achieving MCLs in the groundwater is an ARAR.

Alterative 1 would not comply with ARARs. Under Alternative 2, it is not anticipated that ARARs would be achieved in a reasonable time frame as data collected to date has not indicated that complete biodegradation of PCE/TCE is progressing at a significant rate. Thus, degradation of the contaminants throughout the plume to levels which achieve ARARs is likely to exceed a reasonable time. While no single definition of a reasonable timeframe exists, EPA, pursuant to CERCLA and the NCP, considers various factors when evaluating time frame for achieving groundwater restoration cleanup levels. For example, when the contaminated groundwater is not currently used, treated for contamination, or an alternate water source is readily available, it would likely be appropriate to consider a longer time-frame for achieving restoration cleanup levels.

An estimated remediation time frame of 30 years was used for developing costs associated with O&M activities for Alternatives 3, 4 and 5. The time frame to meet groundwater RAOs in OU1 is however, difficult, if not impossible, to predict because it is uncertain how quickly groundwater concentrations will decrease as a result of remedial technologies. Given the successful application of the remedial technologies at other sites, and the response times seen at other Long Island Superfund sites within the same sandy aquifer, it is likely that the RAOs would be achieved sooner than a 30 year time frame. Active remediation under Alternatives 3, 4 and 5 would be employed in the targeted treatment areas until the MCL for each of the COPCs is attained within the targeted treatment area. Alternatives 3, 4, and 5 would comply with location-and action-specific ARARs. Chemical-specific ARARs would also be attained for each of these alternatives through treatment.

Long-Term Effectiveness and Permanence

Alternatives 1 and 2 do not provide long-term effectiveness or permanence as no active remedial measures are proposed. In-well vapor stripping under Alternative 3, extraction and treatment under Alternative 4, and a combination of those technologies under Alternative 5 are considered effective technologies for treatment and/or containment of contaminated groundwater, if designed and constructed properly.

Alternatives 3, 4, and 5 rely on a combination of treatment and institutional controls. Institutional controls are

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anticipated to include existing governmental controls, such as well permit requirements regarding groundwater use in the impacted area.

Alternative 3, in-well vapor stripping, is expected to be effective and reliable in significantly removing VOC contamination in groundwater. However, the effectiveness of applying this technology to areas with high concentrations of VOC concentrations and at significant depth has been limited. The effectiveness of this alternative is limited by the radius of influence (ROI) or "reach" into the aquifer. The ROI will depend on pumping capacity of each stripping well and hydrogeologic characteristics of the groundwater in OU1 area. The ability to secure access to residential properties may impact the placement of the in-well vapor stripping wells. Effectiveness could also be limited due to the potential that creation of a circulation cell may not be possible and that treatment required in one pass or additional measures will be needed to provide multiple passes through the treatment system. These additions may require not only vertical but horizontal space that may or may not be available due to the presence of existing subsurface utilities. A pilot study would be necessary to determine pre-design parameters, such as the actual ROI, optimal well spacing, depth to the treatment zone, flow rates, and pumping capacity prior to full-scale implementation. The effectiveness of Alternative 3 would necessitate additional measurements of the aquifer's anisotropy.

Alternative 4 would be more reliable than Alternative 3 as there is uncertainty whether in-well vapor stripping could effectively remove contamination in areas with high total VOC concentrations or in areas where the contamination is at significant depths. Alternative 4 is an effective technology that has been utilized at other Superfund sites within Nassau County, New York.

Alternative 5 allows for a combination of both in-well vapor stripping and extraction/treatment technologies to treat for the OU1 plume areas. In the OU1 central plume area, where the contaminant plume is generally less extensive laterally and vertically with lower concentrations of total VOCs, in-well vapor stripping is expected to be effective. In the OU1 eastern and portion of the western plume, use of extraction and treatment is a proven technology which is effective at reducing contaminant mass. Alternative 5 provides the ability to effectively target use of either technology to treat and contain contamination throughout different horizontal and vertical hydraulic and contaminant gradients.

Reduction of Toxicity, Mobility, or Volume (TMV) Through Treatment

Alternative 1, No Action, does not address contamination and does not include the long-term monitoring of groundwater conditions.

Alternative 2 relies on natural processes to degrade contaminants and as such the reduction in toxicity, mobility and volume (TMV) will vary with location. Under Alternative 2, the MNA biodegradation processes can transform PCE, TCE, and cis-1,2-DCE into the more toxic vinyl chloride under anaerobic conditions before transformation to the less toxic ethane. This transformation would need to be monitored and managed to prevent potential exposure to contaminated drinking water. Physical processes such as dispersion are working to reduce the toxicity by decreasing contaminant concentrations. The presence of cis-1,2 DCE, trans-1,2-DCE and vinyl chloride, which are ethene breakdown products of PCE and TCE, is evident. However, the limited MNA data set has revealed this breakdown is not occurring throughout the entire OU1 area. Groundwater concentrations greater than 1,000 µg/L coupled with the absence of a significant rate of complete biodegradation indicate that Alternative 2 would not reduce the TMV of contaminants significantly.

Alternatives 3, 4, and 5 would reduce the toxicity and volume of contaminants through treatment of contaminated groundwater. Alternative 3 uses a system to remove the contaminants from groundwater in-situ, and provides chemical treatment for the collected vapor-phase contamination on-Site. Alternative 4 removes contaminated groundwater via extraction and treats the contamination via a carbon treatment process on-Site. Alternative 5 utilizes both those technologies and treats vapor phase-contamination and extracted groundwater on-Site at a central treatment plant.

Under Alternative 3, 4, and 5, in-situ chemical treatment such as ISCO would be applied to areas where total VOC concentrations exceed 10,000 µg/L to reduce TMV. After treatment, Alternatives 3, 4, and 5 would generate residuals in a form of used GAC that would require regeneration, destruction or disposal.

Alternative 5 would be the most effective at reducing TMV as each of the technologies would be applied to those areas best suited for its application, based on depth and concentrations of contaminants. For example, in-well vapor stripping would be utilized in more shallow areas and where concentrations of VOCs are comparatively low to moderate (e.g., less than 1,000 µg/L). Extraction and treatment would be utilized where VOC concentrations

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are comparatively higher (e.g., greater than 1,000 µg/L) and at intermediate and deeper depths where in-well vapor stripping may not be as effective. If pilot testing indicates that in-well vapor stripping would not be the most efficient technology at reducing TMV for certain areas of contamination, then extraction and treatment could be implemented in those areas under Alternative 5.

Short-Term Effectiveness

Alternative 1 would be the most effective in the short term as there would be no risks posed during the implementation of this alternative. Thereafter, Alternative 2 would be the second most effective in the short term as there would be minimal risks posed during the implementation of the alternative.

Alternatives 3, 4, and 5 may have short-term impacts to remediation workers, the public, and the environment during implementation. Remedy-related construction (e.g., trench excavation) under Alternatives 3, 4, and 5 would require disruptions in traffic and street closure permits. In addition, Alternatives 3, 4, and 5 have above-ground treatment components and infrastructure that may create a minor noise nuisance and inconvenience for local residents during construction.

Exposure of workers, the surrounding community, and the local environment to contaminants during the implementation of Alternatives 3, 4, and 5 is minimal. Drilling activities, including the installation of monitoring, in-well vapor stripping, and extraction wells for Alternatives 3, 4, and 5 could produce contaminated liquids that present some risk to remediation workers at the Site. The potential for remediation workers to have direct contact with contaminants in groundwater could also occur when groundwater remediation systems are operating under Alternatives 4 and 5. Alternatives 4 and 5 could increase the risks to exposure, ingestion, and inhalation of contaminants by workers because contaminated groundwater would be extracted to the surface for treatment. However, measures would be implemented to mitigate exposure risks.

Alternatives 3, 4, and 5 include monitoring that would provide the data needed for proper management of the remedial processes and a mechanism to address any potential impacts to the community, remediation workers, and the environment. Risk from exposure to groundwater during any excavation work would require management via occupational health and safety controls, such as dust control measures.

Groundwater monitoring and discharge of treated groundwater will have minimal impact on workers responsible for periodic sampling. The time required for implementation of Alternative 3, 4, and 5 is estimated to take one to two years.

Implementability

Alternative 1 is no action, and therefore is the easiest of all the alternatives implement. Alternative 2, MNA, is a well-established remedial approach that is also easily implementable as no active remediation would be performed. However, evaluations conducted to date suggest that the conditions in the aquifer are not conducive to the degradation of the COPCs through destructive mechanisms.

In-well vapor stripping and groundwater extraction and treatment are well-established technologies that have commercially available equipment and are implementable. However, obtaining the necessary access to implement Alternatives 3, 4, and 5 may pose access challenges because of multiple wells, below ground piping, and treatment buildings needing to be installed on multiple owners' properties.

Of the three active remediation alternatives, Alternative 4 would be the easiest alternative to construct and would require the least amount of street closure permits and would require less land area and disruption in residential areas. Alternative 3 would be the most difficult to implement as construction activities would result in a significant disruption in residential areas since this alternative would require installation of a large number of wells and associated infrastructures. The ability to reconfigure in-well vapor stripping well locations because of access constraints may be possible, however doing so could potentially impact the effectiveness and schedule of Alternatives 3 and 5. Additionally, there is an increase in the design challenges with Alternatives 3 and 5 as the vapors captured from the in-well vapor stripping wells would need to be transported via transmission lines and blowers to a centralized treatment plant.

Under Alternative 3, the depth of the deepest contamination (estimated between approximately 285 to 502 feet bgs) increases the design challenges of the in-well vapor system. There are practical limitations on the depth that the compressed air can be injected into the aquifer which could result in vapor stripping being conducted effectively over only a portion of the treatment well. Additionally, anisotropic aquifer conditions potentially present in portions of the aquifer could reduce the potential for success of an in-well vapor stripping well to establish a groundwater circulation cell across the treatment zone of the aquifer.

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Use of in-situ chemical treatment such as ISCO, under Alternatives 3, 4, and 5, is a well-established treatment that is commercially available. A treatability study would be performed during the remedial design to evaluate the use in-situ chemical treatments, such as ISCO as an element of the selected alternative in a manner that complements and improves the effectiveness of the remedy. In-situ chemical treatment would only be utilized if a determination is made during the remedial design that the application would not adversely affect the public supply wells.

Alternatives 2, 3, 4, and 5 would require routine groundwater quality, performance and administrative monitoring including five-year CERCLA reviews. Alternative 3, 4, and 5 would require periodic operation and maintenance (e.g., substrate inspection, GAC replacement) for the life of the treatment. Reinjection of all or part of treated water under Alternatives 4 and 5 could present implementability challenges if a suitable location is not agreed upon between the EPA and local and county officials. A final determination would be made on discharge location or method once additional design information has been generated.

Cost

The estimated capital costs, O&M, and present worth cost are discussed in detail in EPA's July 2013 OU1 Supplemental FS Memorandum. For estimating costs and for planning purposes, a 30 year time frame was used for O&M under Alternatives 2, 3, 4, and 5. The costs estimates are based on the best available information. The highest present worth cost is Alternative 4 at $24.2 million. Of the three alternatives with active remedial components, Alternative 5 is slightly less expensive than the Alternative 3 and 4.

Alternative	Capital Cost	Annual O&M Cost	Present Worth
1	$0	$0	$0
2	$ 614,000	$115,000	$3,300,000
3	$11,727,000	$652,000	$24,000,000
4	$ 8,862,000	$834,000	$24,200,000
5	$10,044,000	$680,000	$22,900,000

State/Support Agency Acceptance

NYSDEC concurs with the preferred remedial alternative.

Community Acceptance

Community acceptance of the preferred remedial alternative will be evaluated after the public comment period ends and will be described in the ROD for OU1 of the Site. The ROD is the document that formalizes the selection of the remedy for a site.

PREFERRED REMEDY

Based upon an evaluation of the remedial alternatives, EPA, and with the concurrence of NYSDEC, proposes Alternative 5, Hybrid Alternative – In-well Vapor Stripping / Groundwater Extraction and Treatment; In-situ Chemical Treatment as the Preferred Remedial Alternative. Alternative 5 has the following key components: in-situ treatment of groundwater via in-well vapor stripping and treatment of vapor-phase contamination at an on-Site central treatment plant; extraction of groundwater via pumping and ex-situ treatment of extracted groundwater prior to discharge to a POTW or reinjection to groundwater; use of in-situ chemical treatment such as ISCO to target high concentration contaminant areas, as appropriate; and long-term monitoring in conjunction with implementation of institutional controls.

Active remediation elements would be designed to establish containment and effectuate removal of contaminant mass where concentrations of total VOCs are greater than 100 µg/L. Under this flexible approach, Site-specific conditions would be taken into consideration in the design and development of the in-well vapor stripping and groundwater extraction well network. Figure 3 provides the conceptual locations of both the in-well vapor stripping and extraction wells. The exact numbers of in-well vapor stripping and extraction wells and their placement would be determined in the remedial design. An aquifer pump test would be conducted as part of the pre-remedial design to collect aquifer data that would be necessary to complete the design of the extraction and treatment component of the remedy.

The use of in-situ chemical treatment, such as ISCO to target areas containing high concentrations of total VOCs would be utilized, as appropriate, in combination with the other components of this remedy in an effort to reduce the remediation time-frames and the cost of this proposed alternative. The implementation of in-situ chemical treatment such as ISCO would be designed to enhance the remediation of the contaminated groundwater in conjunction with the in-well vapor stripping and extraction/treatment systems. During the remedial design it would be determined if and if so, how best to execute in-situ chemical treatment with the other remedial technology components of this preferred remedial alternative. In-situ chemical treatment would only be utilized if a determination is made during the remedial design that the application would not adversely affect the public supply wells.

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A centralized treatment plant with the capacity to achieve contaminant mass removal and containment objectives of the remedy would be constructed. EPA estimates that a capacity of 350 gpm would be required. The extracted groundwater would be treated for total VOC removal with either liquid phase GAC, air stripping, or both. Treated groundwater effluent would be discharged to a POTW or reinjected to groundwater. The method of discharge and discharge location would be determined once additional design information has been generated in the remedial design phase. The design of the treatment plant would take discharge requirements into account. Once additional design information has been generated, the location of the treatment plant and reinjection points would be further discussed with local and county officials.

Both the extraction and treatment system and the in-well vapor stripping system will operate until performance standards are attained at OU1, which EPA's July 2013 OU1 Supplemental FS Memorandum estimated to take 30 years. A more detailed process design to determine the actual number of extraction and in-well vapor stripping wells required to reach RAOs would be determined during the pre-remedial design phase.

The environmental benefits of the preferred remedial alternative may be enhanced by giving consideration, during the design to technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy[7]. This would include consideration of green remediation technologies and practices, including GAC regeneration.

A long-term groundwater monitoring program would be implemented to track and monitor changes in the groundwater contamination in OU1 to ensure the RAOs are attained. The results from the long-term monitoring program would be used to evaluate the migration and changes in VOC contaminants over time. The long-term monitoring program would include sampling from two existing, early warning monitoring well clusters and an evaluation of potential impacts to the Bowling Green supply wells. The long-term monitoring program may be optimized accordingly. As additional groundwater data become available, EPA would continue to consider the soil vapor intrusion pathway for OU1. Vapor mitigation systems would be installed, if warranted.

Institutional controls to restrict groundwater extraction and/or consumption are incorporated into this remedy for protection of human health and the environment over the long term. A plan would be developed which would specify institutional controls to ensure that the remedy is protective. Existing local requirements that prevent installation of drinking water wells and informational devices to limit exposure to contaminated groundwater would be implemented

Individual facilities within the NCIA are considered to be among the sources of groundwater contamination for OU1 and continue to be addressed under NYSDEC State Superfund program. Response actions at NCIA facilities are not the focus of this OU1 remedy, although successful completion (*i.e.*, source control or remediation) of the source area(s) at the individual NCIA facilities, under NYSDEC oversight, are essential to the full realization of the objectives of the preferred remedial alternative in this Proposed Plan. In the event that source control is not successfully implemented, EPA may elect to evaluate additional options at individual NCIA facilities pursuant to CERCLA to ensure the effectiveness of the preferred alternative.

While this alternative would ultimately result in reduction of contaminant levels in groundwater such that levels would allow for unlimited use and unrestricted exposure, it is anticipated that it would take longer than five years to achieve these levels. As a result, in accordance with CERCLA, the Site is to be reviewed at least once every five years until performance standards are achieved and unrestricted use is permissible.

Basis for the Remedy Preference

While Alternative 3, in-well vapor stripping and Alternative 4, extraction and treatment, are both proven technologies to actively remediate VOC-contaminated groundwater, there are difficulties at this Site associated with each of these remedial technologies in addressing the groundwater contamination.

Relying exclusively on in-well vapor stripping as envisioned under Alternative 3 would be difficult in a densely populated and developed residential setting. Alternative 3 would require the installation of large numbers of wells and associated infrastructure which would result in a significant disruption in the largely residential area. In addition, the depth of the deepest contamination (estimated between approximately 285 to 502 feet bgs) increases the design challenges of the in-well vapor stripping system. Limits on the hydraulic depth to which the compressed air can be injected into the aquifer could result in air stripping being conducted over only a portion of the treatment well. Anisotropic aquifer conditions potentially present in portions of the aquifer could reduce the potential for an in-well stripping well to establish a groundwater circulation cell across the

[7] See http://epa.gov/region2/superfund/green_remediation.

R2-0012439

treatment zone of the aquifer.

Utilizing extraction and treatment as the primary remedial technology in Alternative 4 increases the volume of extracted groundwater that would require ex-situ treatment and handling, thereby increasing both the capital costs and annual operations and maintenance costs without providing a significant reduction of TMV of contaminants relative to Alternative 5.

EPA is proposing Alternative 5, a hybrid of in-well vapor stripping and extraction and treatment as the preferred remedial alternative because a combination of these two active remedial technologies could be designed to utilize the different technologies effectively across a large area of groundwater contamination, based upon location-specific conditions (*i.e.*, depth to treatment, concentration levels). Utilizing both in-well vapor stripping and extraction and treatment would additionally provide cost saving measures by reducing capital costs associated with installing independent remedial systems. Each of the treatment components would be optimized during the remedial design to improve treatment effectiveness or decrease the remedial time frame.

This approach in Alternative 5 is expected to be particularly effective as the total VOC contaminant plumes in the OU1 eastern plume and portions of the western plume are more extensive laterally and/or vertically (greater than 250 feet bgs). For the OU1 eastern and portions of the western plume, use of extraction and treatment is a proven technology which is effective at reducing contaminant mass and providing containment of the contaminant plume under these conditions. In the OU1 central plume, where the contaminant plume is generally less extensive laterally and vertically and generally has lower concentrations of total VOCs, and in portions of the western plume, in-well vapor stripping is expected to be more effective. If during the remedial design investigation activities it is determined that in-well vapor stripping would not be an effective technology at addressing contamination at the OU1 central and portions of the western plume, then the existing extraction and treatment system under Alternative 5 would provide the opportunity to utilize that active remedial technology in those areas as well.
Access to install the in-well vapor stripping wells and the extraction wells under the preferred remedy, Alternative 5, though still complicated, is more manageable. Construction of the treatment plant would be sited in an area that is not zoned residential.

Under the proposed alternative, in-situ chemical treatment, such as ISCO, would be used to target areas containing high concentrations of total VOCs (greater than 10,000 µg/L). It would, as appropriate, be utilized in combination with groundwater extraction or in-well vapor stripping in an effort to reduce the remediation time frames by more effectively reducing the contaminant mass of total VOCs and, therefore, the costs of this alternative.

EPA, with the concurrence of NYSDEC, has concluded that Alternative 5, Hybrid Alternative – In-well Vapor Stripping / Groundwater Extraction and on-Site Treatment, and in-situ chemical treatment such as ISCO provides adequate protection of human health until a final remedy is selected by effectively reducing the toxicity, mobility and volume of contaminated groundwater in OU1 while providing the best balance of tradeoffs among the alternatives with respect to the evaluation criteria. The Preferred Alternative for OU1 does not constitute the final remedy for the Site. Additional data concerning Site-related contamination, to be generated during the far-field RI, may become available prior to the implementation of the Preferred Alternative. This data may be considered during the design of the Preferred Alternative.

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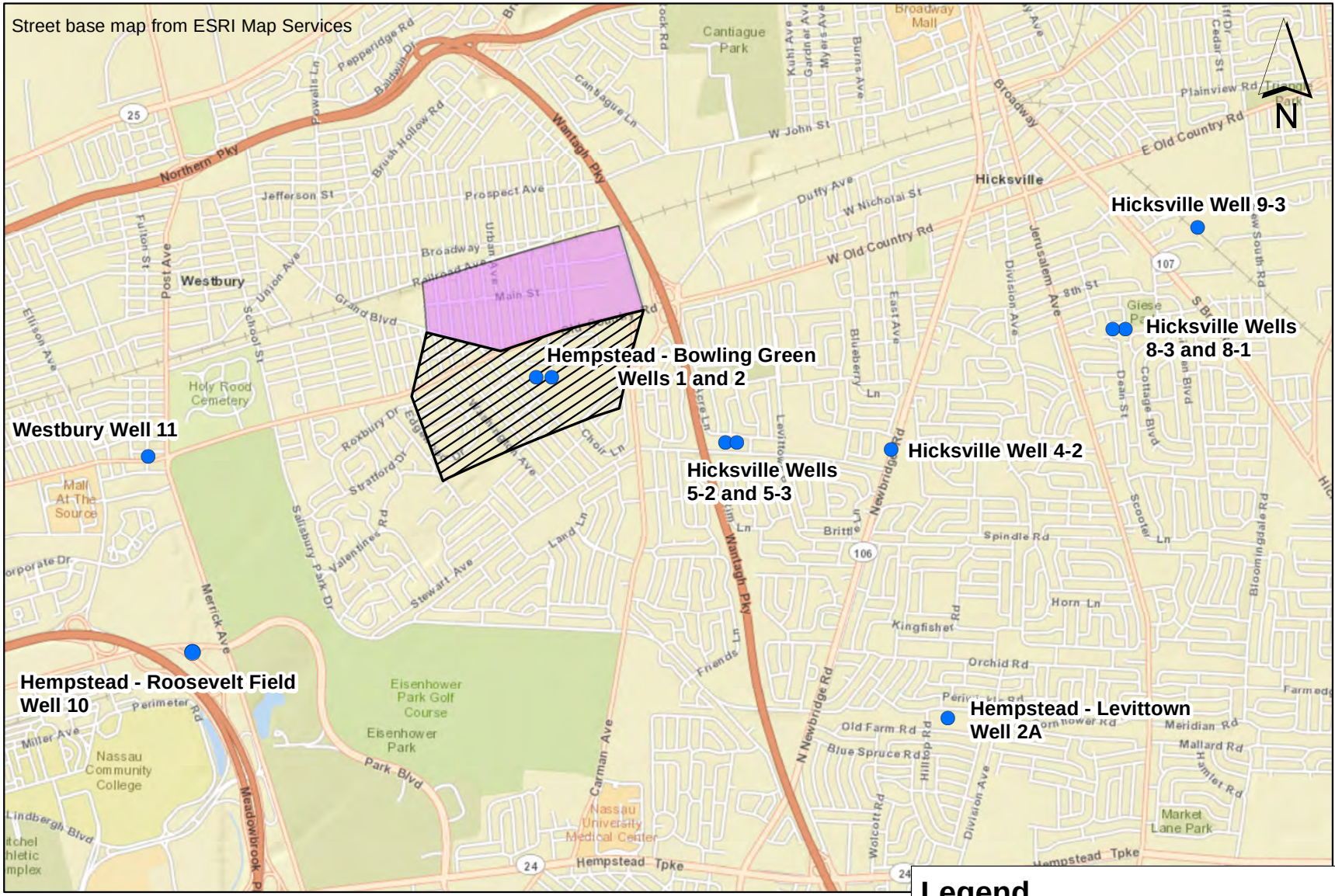

Figure 1 - Site Location
New Cassel/Hicksville Ground Water Contamination Site

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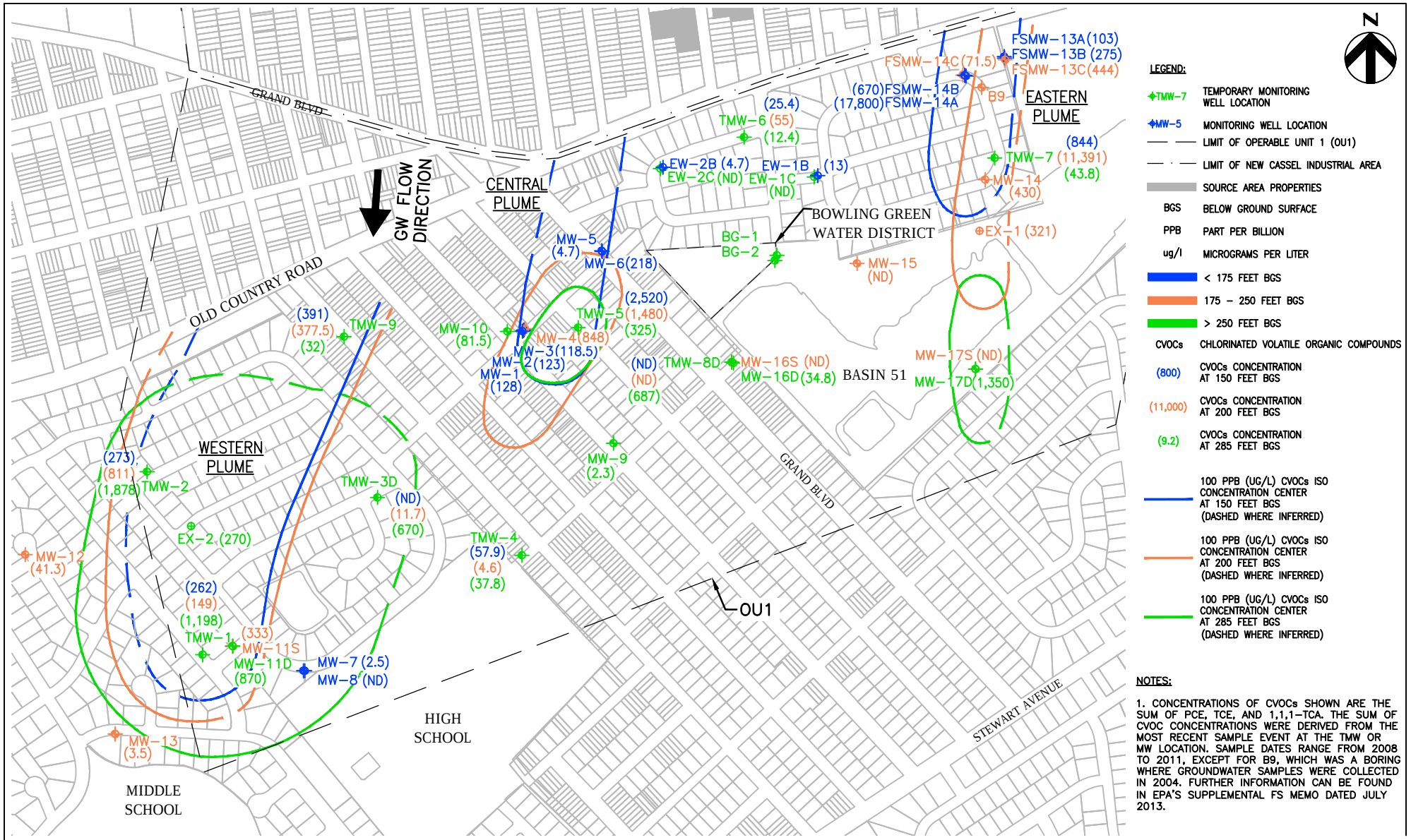

1 inch = 600 ft.

HDR

CVOCs ISO-CONCENTRATION MAP

NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE OU1

TOWNSHIP OF NORTH HEMPSTEAD AND HEMPSTEAD, NASSAU COUNTY, NY

DATE
JULY 2013

FIGURE
2

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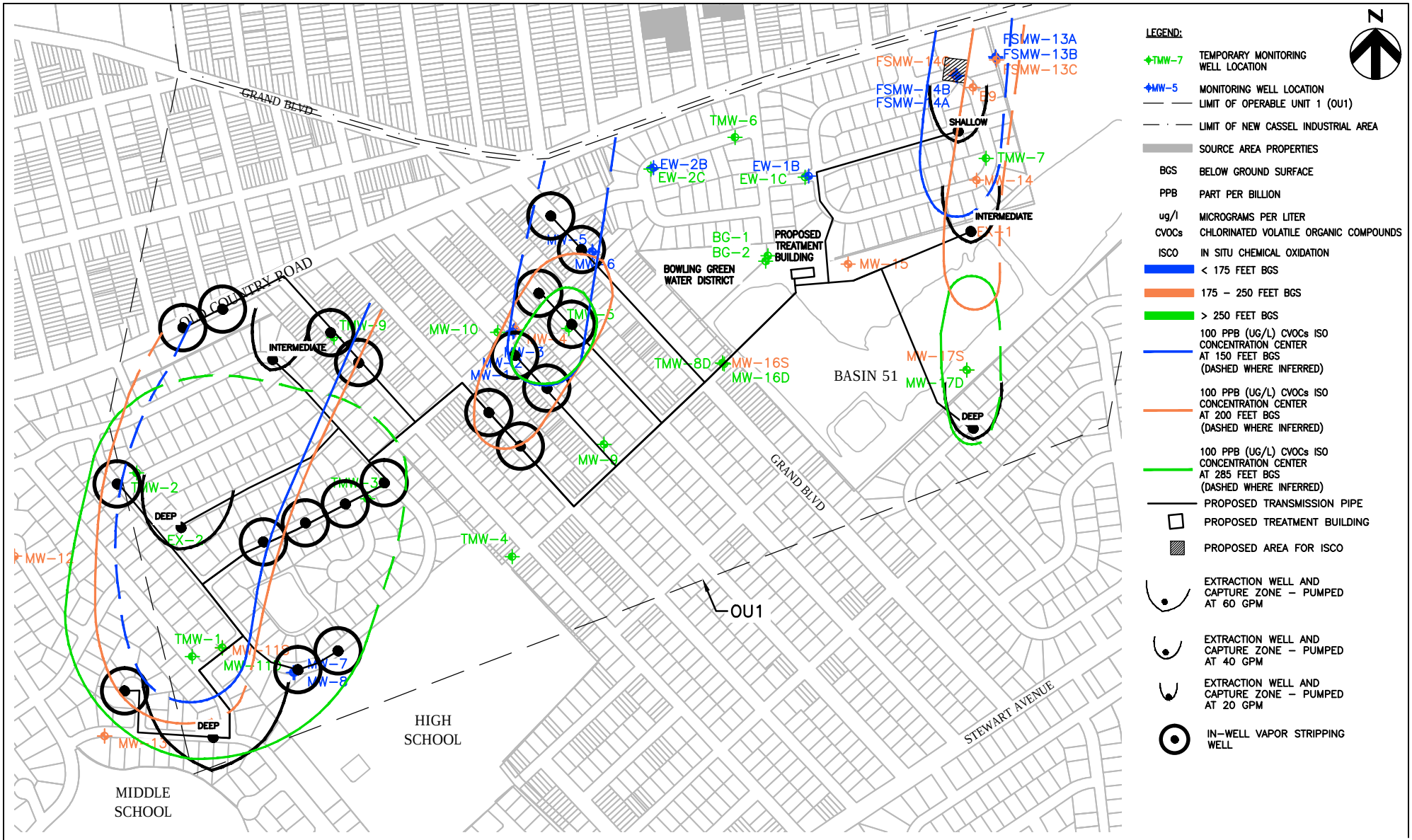

1 inch = 600 ft.

HDR

ALTERNATIVE 5

COMBINED IN SITU AND EX SITU GROUNDWATER TREATMENT

NEW CASSEL/HICKSVILLE GROUND WATER CONTAMINATION SITE OU1

TOWNSHIP OF NORTH HEMPSTEAD AND HEMPSTEAD, NASSAU COUNTY, NY

DATE

JULY 2013

FIGURE

3

R2-0012443

Appendix V
Attachment 2

Public Notice – Commencement of Public Comment Period

Local Gamer Goes to EVO2013

By BETSY ABRAHAM
BABRAHAM@ANTONNEWS.COM

Gordon Connell would scoff at the idea that video games are bad for you.

"It gives you that feeling of being a hero," the 24 year old says. "The purpose of gaming is to give you that vicarious feeling of something that is really cool in real life, but that you're not physically doing."

And living a vicarious lifestyle of saving princesses, throwing people off cliffs and roundhouse kicking, is something Connell knows well. For the past seven years the Westbury resident has been competing in video game tournaments all over North America, and he recently traveled to Las Vegas for Evolution 2013 (EVO2013), the biggest fight game tournament of the year.

Players traveled from all over the world for the video game tournament that featured games like Street Fighter, Mortal Kombat and Tekken Tag. There were seven games chosen for the tournament lineup, and gamers also competed to get their choice in the eighth slot by raising money for cancer. Connell, along with other members of the "smash" community were able to raise $92,000 for the Breast Cancer Foundation and get Super Smash Brothers Melee entered in EVO2013. Connell says that the gaming community is one of the best parts about being a gamer. He says that by going to competitions and tournaments, he has made friends from almost every country. He keeps in touch and networks with other "smash" lovers through the website smashboards.com, an online community which keeps people up-to-date on the latest game updates, events, livestreams and more.

"The smash community is really cool," Connell says. "We all personally know each other and get to spend time at each other's houses and get a lot of time to bond. And you get a lot of people rooting for their friends and they genuinely want you to win."

The object of Super Smash Brothers Melee is simple: beat up the other players (characters

include Mario, Donkey Kong and Kirby) or knock them off the ledge before the time runs out. With his characters Marth and Falco, Connel was able to place in the top 30 out of 1000 "smash" players at EVO2013. And while many may think that playing video games is just fun, Connell says it involves a lot of strategy.

"It's interesting to play and watch other people play because you see how they think. It's something that may look simple, but there's five or six reasons behind why they do it," Connell says.

Connell began playing Super Smash Brothers in high school, and says a childhood of watching kung fu moves and playing other video games, got him addicted.

"I have an attraction to well choreographed fight scenes so I was able to get that vicarious feeling through video games," Connell said. In 2006, he started competing and for two and a half years would spend every weekend traveling to tournaments. Now, as a computer science major at SUNY Old Westbury, he doesn't play video games for six hours a day or compete as much as he used to.

"The most important thing is to have fun with it and not take it like a job. You don't want to stress yourself with competing. You win some and you lose some," he said with a smile.

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101166

U. S. Environmental Protection Agency to Hold Public Meeting for Cleanup of the Area Downgradient of the New Cassel Industrial Area at the New Cassel/ Hicksville Ground Water Contamination Superfund Site, within the Towns of North Hempstead and Hempstead, Nassau County, New York

The United States Environmental Protection Agency (EPA) announces the opening of a 30-day public comment period on the Proposed Plan and other supporting documentation, which address the cleanup of contaminated groundwater in the area downgradient of the New Cassel Industrial Area in the Towns of North Hempstead and Hempstead, NY, at the New Cassel/Hicksville Ground Water Superfund site in Nassau County, New York. As part of the public comment period, EPA will hold a public meeting on **Thursday, August 15, 2013 from 7pm until 9pm on the second floor of the "Yes We Can" Community Center located at 141 Garden Street, Westbury, NY 11590.**

The meeting, which will address the proposed cleanup plan, will allow community members to comment on the Proposed Plan to EPA officials.

Based on the results of the Supplemental Feasibility Study and other supporting documentation, EPA recommends a combination of in-well vapor stripping, extraction and on-site treatment and use of in-situ chemical treatments to address contaminated groundwater, as the Proposed Plan's Preferred Alternative.

Documents supporting the preferred alternative are in the administrative record at the Westbury Public Library located at 445 Jefferson Street, Westbury, NY 11590 and at the EPA Records Center, 290 Broadway, 18th floor, New York, NY 10007. The Proposed Plan can also be found on the web at www.epa.gov/region2/superfund/npl/newcassel.

Comments regarding EPA's preferred remedy or documents in the administrative record must be submitted by August 26, 2013, to Jennifer LaPoma, Remedial Project Manager, U.S. EPA, 290 Broadway, 20th Floor, New York, NY 10007-1866, email - lapoma.jennifer@epa.gov.

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R2-0012445

Appendix V
Attachment 3

Public Notice - Public Comment Period Extension

TRAFFIC from page 1

fatality rates — according to the Tri-State Transportation Campaign, 84 pedestrians were killed on roads in Nassau between 2009 and 2011— County Executive Edward Mangano recently announced his Complete Streets program in a bid to make Nassau's streets among the safest in the nation.

throughout New York State.

"This policy has been passed on the state level, as well as our neighboring counties of Suffolk, Westchester, New York City, and the Towns of Hempstead and North Hempstead," she said. "Complete Streets is a recognition that there are multiple users of our roadways and to further advance safety and the health advantages of walking and bicy-

mostly due to an increase in pedestrian and vehicle traffic," said Gloria Monitto, long-time chairperson of the group. "One area that could use some attention is along Post Avenue."

Westbury has between 15 and 25 vehicle accidents a month throughout the entire village; a low number, given its high traffic level. However, certain issues still present a hazard and need to be [illegible] Monitto said. The Safe-

plain clothes units and increasing police presence in affected areas. Police will typically canvasses the area, interviewing local businesses

said. "We're also working hard to spread the message about the danger of texting and driving, which is actually more dangerous than drunk driving."

Monitto also said that a rising problem in the Westbury area and across Long Island is pedestrians crossing busy roadways without proper caution. Some of them are senior citizens, while others are intoxicated.

"It's gone up all over the island whether it's a vehicle or persons."

Though the problem has slowed, it still occurs sporadically. No arrests have yet been made.

U.S. Environmental Protection Agency Announces an Extension of the Public Comment Period on the Proposed Plan for the Cleanup of the Area Downgradient of the New Cassel Industrial Area at the New Cassel/Hicksville Ground Water Contamination Superfund Site, Nassau County, New York

The United States Environmental Protection Agency (EPA) announces an extension of the 30-day comment period on the Proposed Plan to address groundwater contamination in an area downgradient of the New Cassel Industrial Area in the Towns of North Hempstead and Hempstead, New York. In order to present the public with an opportunity to participate in the selection of a final remedial action plan, EPA announced a 30-day public comment period beginning on July 26, 2013 and ending August 26, 2013. The comment period has been extended until September 24, 2013.

Documents supporting the preferred remedy are in the administrative record at the Westbury Public Library, 445 Jefferson Street, Westbury, New York, or at the EPA Region II Records Center located at 290 Broadway, 18th Floor in New York City. The Proposed Plan can also be found on the web at: www.epa.gov/region2/superfund/npl/newcassel

EPA relies on public input to ensure that the selected remedy for each Superfund site meets the needs and concerns of the local community. It is important to note that although EPA has identified a preferred remedy for a portion of the site, no final decision will be made until EPA has considered all public comments received during the public comment period. EPA will summarize these comments along with EPA's responses in a Responsiveness Summary, which will be included in the Administrative Record file as part of the Record of Decisions. Written comments regarding the New Cassel/Hicksville Ground Water Contamination site, postmarked no later than September 24, 2013, may be sent to: Jennifer LaPoma, Remedial Project Manager, U.S. EPA, 290 Broadway, 20th Floor, New York, NY 10007-1866, lapoma.jennifer@epa.gov

RESIDENT RUNNING from page 1

Schaefer is a lifelong resident of Westbury. She grew up in Wheatley Hills riding bikes, playing kickball and going to the movies.

"It was a nice neighborhood and there were a lot of kids. I have fond memories of it," Schaefer said.

Now, she feels that growing up and currently living in Westbury has given her a better sense of the community's needs.

"I know the community really well. I know the people there and have a sense of the community," Schaefer said. "It's getting tougher to raise a family there, but it's still a nice place to raise a family."

She graduated from Our Lady of Mercy Academy High School in Syosset and received her Bachelor of Arts degree in Communications from Adelphi University. She later went on to earn her Juris Doctorate from Hofstra University School of Law in 2009. Prior to entering the legal field, Schaefer worked for the Marriott Marquis Hotel in Times

by working at Sullivan Papain Block McGrath & Cannavo, P.C., a law firm in Garden City, while attending Hofstra School of Law at night. After she was admitted she worked as an associate at Sullivan Papain prior to working at Pena & Kahn, PLLC, in the Bronx where she currently practices personal injury law. Entering the political arena is something she's been wanting to do for a while.

"I've always been interested in politics. It's something I've had in the back of my head that I wanted to do at one point. Once I got established as an attorney, and (got) to know the people, I wanted to help the community more," she said.

In November she will face off against Democratic candidate Jeffrey Griffin, who is from Carle Place. If elected, her focus will be lowering taxes and bringing new businesses to the area.

"I'm excited about the election," Schaefer said. "I'm excited to be

R2-0012447

Appendix V
Attachment 4

August 15, 2013 Public Meeting Sign-In Sheets

New Cassel/Hicksville Groundwater Contamination Superfund Site
Public Meeting – Thursday, August 15, 2013 @ 7pm
"Yes We Can" Community Center
141 Garden Street, Westbury, New York 11590

PLEASE PRINT CLEARLY

NAME	ADDRESS (with Zip Code)	E-mail	Organization
[illegible] Henry	[illegible]	[illegible]	[illegible]
Nathaniel Goodhue			
[illegible] Reid	[illegible] Westbury	[illegible]	

New Cassel/Hicksville Groundwater Contamination Superfund Site
Public Meeting – Thursday, August 15, 2013 @ 7pm
"Yes We Can" Community Center
141 Garden Street, Westbury, New York 11590

PLEASE PRINT CLEARLY

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New Cassel/Hicksville Groundwater Contamination Superfund Site
Public Meeting – Thursday, August 15, 2013 @ 7pm
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R2-0012451

New Cassel/Hicksville Groundwater Contamination Superfund Site
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R2-0012452

Appendix V
Attachment 5

August 15, 2013 Public Meeting Transcript

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
- -x

NEW CASSEL/HICKSVILLE

GROUNDWATER CONTAMINATION SUPERFUND SITE

PUBLIC MEETING

- -x

Yes We Can Community Center
141 Garden Street
Westbury, New York 11590

August 15, 2013
7:09 p.m.

P R E S E N T:

CECILIA ECHOLS,
EPA Community Involvement Coordinator

ULA FILIPOWICZ,
EPA Human Health Risk Assessor

JENNIFER LaPOMA,
EPA Remedial Project Manager

PETE MANNINO,
EPA Section Chief,
Western New York Remediation

MIKE SCORCA,
EPA Hydrogeologist

THOMAS CONNORS,
HDR, Contractor to EPA

JEFF DYBER,
New York State Department of Environmental Conservation Project Manager

JACQUELINE NEALON,
New York State Department of Health

New Cassel/Hicksville

MS. ECHOLS: Good evening. We're ready to begin.

Hello. My name is Cecilia Echols and I'm the Community Involvement Coordinator for the New Cassel/Hicksville Groundwater Contamination Superfund Site, which encompasses North Hempstead and the Town of Hempstead.

The purpose of tonight's meeting is to discuss and receive public comment on the site's proposed cleanup plan. The plan addresses contaminated groundwater in the areas downgradient of the site.

Community Involvement is a program that brings each one of you to come together so we can come up with the best informed way of cleaning up this site.

On the agenda tonight -- excuse me.

MR. MANNINO: We're having

New Cassel/Hicksville some problems here.

(Pause in proceedings)

MS. ECHOLS: All right. I'm back. And that's Pete Mannino. He's with the EPA. He is the Western New York Remediation Section Chief.

Then we also have Jennifer LaPoma -- just raise your hand -- she's a project manager.

Supporting will be Ula Filipowicz.

Did I say that right?

MS. FILIPOWICZ: Close.

MS. ECHOLS: She is the EPA Human Health Risk Assessor.

Michael Scorca, EPA Hydrologist.

Tom Connors, HDR, contractor to EPA.

Jeff Dyber, New York State DEC is here.

And Jacqueline Nealon, she's also here with. She's with New

New Cassel/Hicksville
York State Department of Health.

The public comment period ends on the 26th; however, a request was made for an extension.

Do you have that date?

What's the date?

MS. LaPOMA: September 24.

MS. ECHOLS: Until September 24.

Someone called in to the office?

MR. MANNINO: It was a written request.

MS. ECHOLS: There was a written request to the office for extension, so the public comment period has been extended to September 24.

Over two hundred residents or businesses should have received a postcard about the meeting. A public notice was placed in the Westbury Times on August 2.

We have the Powerpoint

New Cassel/Hicksville presentation for you here. I gave out a couple of copies. We're trying to save trees, as they say. So, you can see this presentation on the New Cassel web page.

The information repository that has all the documents related to this site are at the Westbury Public Library on Jefferson Street and at the EPA offices in New York.

I hope that everyone has signed in and wrote their name legibly, along with their e-mail, so when we update the mailing list, we'll be able to send you out new postcards whenever we're having another meeting.

And all of the questions will be taken at the end of the presentation.

And now we'll have Pete.

MR. MANNINO: Thank you, Cecilia.

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Just an overview of tonight's agenda. I'm going to start with some background slides on the Superfund process. That will be followed with some background information regarding the Superfund site.

Jennifer is going to talk about the Remedial Investigation process, which includes a Human Health Risk Assessment. And then she'll talk about the various alternatives that were evaluated to clean up the contaminated groundwater at this portion of the site that we're here to talk about tonight.

And then Jennifer is going to talk about the EPA's preferred alternative on how to clean up that portion of the contaminated groundwater.

We ask that you hold all of your questions or comments until

New Cassel/Hicksville after Jennifer has completed her presentation.

We have a stenographer here tonight. So, when you come up, please state your name and spell your last name out. That will help the stenographer a great deal.

And, so, if at any time if you can't hear me -- I usually talk loud to begin with -- just let me know. Thanks.

So, what is Superfund?

Congress in 1980 passed the Superfund Law to address toxic waste disposal disasters, and what it does is it provides federal funds for the cleanup of hazardous waste sites. It also allows EPA to respond to emergencies involving hazardous substances. It also empowers EPA to compel potentially responsible parties to pay for or conduct a cleanup.

New Cassel/Hicksville

Now, essentially, the Superfund cleanup process starts with the site discovery and a ranking system called the Hazard Ranking System, or HRS. It's followed by a preliminary assessment or a site inspection to determine whether or not the site is eligible for a listing on the National Priorities List.

Only sites listed on the National Priorities List are eligible for federal funds to conduct investigations or cleanup.

Before any cleanup can be done, there's a thorough investigation that is conducted. The Remedial Investigation, the purpose of that is to define the nature and extent of the contamination. And then the Feasibility Study evaluates alternatives on how to clean up that contamination.

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As we are here tonight, the proposed plan identifies EPA's and New York State's preferred alternative to clean up that contamination, we solicit public comment on the preferred alternative, and we then follow up with what's called the Record of Decision.

The Record of Decision identifies EPA's selected remedy and it addresses each of the written or verbal comments that are received during the public comment period.

Once EPA issues the Record of Decision, we enter the next phase, which is called the Remedial Design phase. It is during that phase that all the specs on how the cleanup will be performed are detailed.

Once that is done, the actual cleanup or construction-

New Cassel/Hicksville related activities or what's known as the Remedial Action Phase can begin.

Depending on the type of cleanup, there can be long-term monitoring. For example, with groundwater contamination, we'll have a plan that will involve some initial construction activities, and then there will be a long-term monitoring program to evaluate the effectiveness of that cleanup.

For sites where we're leaving contamination behind or where contamination is not being cleaned up to unrestricted residential use criteria, we conduct five-year reviews of our actions to insure that the objectives of the ROD are being met and the ultimate goal of the ROD is being achieved. Once that is done, the site can be deleted from the National Priorities List.

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So, now Jennifer LaPoma, the Remedial Project Manager for the site.

Thank you.

MS. LaPOMA: I'm Jennifer LaPoma. I'm project manager for New Cassel/Hicksville site. Thank you for joining us tonight and having us in your community.

I'm going to give an overview tonight of the site background and a discussion of the Remedial Investigation, the assessment to human health, discussion of our remedial alternatives, and I'll end with discussion on our preferred alternative before opening up to questions and answers.

The New Cassel/Hicksville Groundwater Contamination Site is a site that comprises an area of widespread groundwater contamination in the towns of

New Cassel/Hicksville Hempstead, North Hempstead, and Oyster Bay. So, within those towns, we have Village of Westbury, the Hamlet of Hicksville, Salsbury. And the site includes approximately six and a half square miles.

In 2010, EPA did sampling to list the site on the NPL, National Priorities List. Our sampling of pretreated water from public supply wells -- that's water that hasn't been treated, just extracted right out of the ground -- indicated elevated levels of contaminants.

And those blue dots right here represent eleven public supply wells that indicated elevated levels of contaminants. And after that sampling, we listed the site on the NPL.

So, tonight's meeting is to discuss a cleanup plan for a

New Cassel/Hicksville portion of the New Cassel/Hicksville site, and that portion is what we call Operable Unite 1, this gray/black hatched area.

EPA will often address sites for technical or administrative purposes separately or as operable units, as we call them, to eliminate or mitigate a release or eliminate exposure pathway from site contaminants.

So, while tonight's meeting is to only discuss this one portion in our cleanup plan for this one portion of the site, we do anticipate that we'll be handling the site as multiple operable units.

We don't have those operable units named just yet, but just to give you a sense of some of those other areas, we have this area that -- this is our Operable Unit

New Cassel/Hicksville 1 that we're discussing tonight.

This area down here, over here, we anticipate will be another operable unit.

The area upgradient of Hicksville Wells 5-2 and 5-3 will be another operable unit.

And these areas over here will be other operable units, if not one operable unit.

We hope to be in the community again soon to discuss these other areas.

So, this is a closeup and aerial image of our Operable Unit 1 outlined in white. Operable Unit 1 consists of approximately 211 acres. That's immediately downgradient of Old Country Road and Grand Boulevard.

OU1 consists of mostly residential properties, but it also has properties that are zoned for commercial and light

New Cassel/Hicksville industrial use.

And there's also local government property. We have a family court or a juvenile area over here; we have the Nassau County Recharge Basin 51; and we also have the Bowling Green Water District Supplies 1 and 2, that blue dot right there.

Immediately upgradient of the Operable Unit 1 is the New Cassel Industrial Area. So, our meeting is right about here tonight.

So, directly below us is the New Cassel Industrial Area; directly below that is Operable Unit 1.

The New Cassel Industrial Areas was developed in the 1950s through 1970s time period. And over the years, the New Cassel Industrial Area has had multiple industrial facilities operating

New Cassel/Hicksville

there, and those facilities have used chlorinated solvents, which are chemicals that are really good at cleaning things. They're really good at cleaning machinery, electronic components, and especially clothes.

So, waste generated from some of these industrial facilities within the New Cassel Industrial Area was generally disposed of in leach pools or dry wells located on the facility property.

So, a bit about the history. In the mid eighties, Nassau County Department of Health conducted a countywide groundwater investigation. And in that investigation, they identified extensive groundwater contamination throughout the New Cassel Industrial Area.

In 1990, the Bowling Green

New Cassel/Hicksville Water District Supply Wells 1 and 2, a treatment system was installed, and that treatment system was upgraded and supplemented in 1995.

In the mid 1990s to late '90s, New York State DEC, Department of Environmental Conservation, DEC, conducted assessments of facilities within the New Cassel Industrial Area. And thereafter, New York State DEC listed about seventeen facilities on the Registry of Inactive Hazardous Waste Sites.

So, to date, those seventeen facilities, out of those, five required no further action; one required future monitoring, or further monitoring; and eleven have ongoing response actions, which include a continuation of work to address soil contamination.

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So, concurrently, as the State was conducting investigation into the New Cassel Industrial Area, they started to investigate the groundwater that they called offsite groundwater south of the New Cassel Industrial Area. So, this is downgradient of the New Cassel Industrial Area.

And what they did was they conducted a Remedial Investigation and Feasibility Study. And this was done to define the nature and extent of groundwater contamination in that area and, also, to identify the cleanup options.

The State documented those findings in 2000 in their Remedial Investigation and Feasibility Study.

Thereafter, in 2003, New York State issued a remedial plan, a Record of Decision, and they

New Cassel/Hicksville selected a remedy to address the groundwater contamination.

DEC selected in-well vapor stripping with localized vapor treatment to 225 feet below ground surface. And an element of that remedy that they selected was the contingency to use extraction and treatment, commonly known as groundwater pump and treat, if in-well vapor stripping proved to be less practical for engineering or economic reasons, and I'll talk about those two technologies a little bit later on.

So, after the 2003 Record of Decision was released by the State, from that time period until about 2009, work was conducted in association with the first predesign investigation.

So, sampling was conducted, valuations were conducted, and, ultimately, what they determined

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was that based on some of their sampling efforts and based on some of the literature research that had been studied, they ultimately determined that in-well vapor stripping may be less practical, and they ultimately decided to utilize the contingency remedy of extraction and treatment.

So, DEC thereafter started to conduct the second predesign investigation, and that was for extraction and treatment.

So, in that second predesign investigation, they expanded their monitoring well network, they took water quality sampling, they installed extraction wells, they did a pilot study.

This photograph here shows the drilling of Extraction Well 1 in 2010.

And they conducted different pilot tests to help support it and

New Cassel/Hicksville move on to the next phase of design.

So, during the course of that second predesign investigation, New York State requested that EPA list the New Cassel/Hicksville site on to the National Priorities List, and EPA listed the site on September 16, 2011.

So from here on, I'm going to be discussing the work that EPA has conducted for Operable Unit 1 since the site was listed on the NPL.

So, once the site was listed, EPA recognized that the State had overseen many years of work, and we sought to review and summarize all of the available data that was out there; that was out there in association with the sites that are in the -- facilities in the vicinity of our

New Cassel/Hicksville Superfund site.

So, that work was summarized in EPA's Supplemental Remedial Investigation. And Remedial Investigation, the purpose of it is to determine the nature and extent of contamination.

So, as part of the Supplemental Remedial Investigation, EPA outlined the currently known nature and extent of groundwater contamination at Operable Unit 1 and we also outlined recommendations for future activities.

So, EPA conducted this Remedial Investigation for the entire site, New Cassel/Hicksville site. That included looking at other facilities; not just Operable Unit 1, but different areas. Operable Unit 1 was included with them.

So, before discussing the

New Cassel/Hicksville

nature and extent of contamination, I'll give a brief overview of the geology and hydrogeology of the site as it relates to the aquifer.

There are two geologic units underlying the site. We have the Upper Glacial Aquifer directly below us. And the Upper Glacial Aquifer is approximated to be 40 to 65 feet thick. It consists of course-grained sands and gravel.

And underlying the Upper Glacial Aquifer, we have the Magothy Aquifer. That's approximately six hundred feet thick, and it consists of sand, silty sand, and discontinuous clay silt layers.

It might be a little bit too bright in here to see, but I have a photograph of a soil sample that was taken from the Magothy Aquifer at about a depth of 219 to 221

New Cassel/Hicksville feet, and it just shows you how gritty this material is.

Groundwater in this area primarily flows in the south-southwestern direction and depth to the groundwater is typically encountered between thirty to fifty, sometimes sixty feet.

And, also, the Bowling Green Supply Wells, their production interval, the intervals that they extract groundwater from, is taken from the Magothy Aquifer. They're typically drawing water from about 450- to 550-foot depth intervals.

So, the current nature and extent of contamination, the results of our Supplemental Remedial Investigation.

This figure is showing the three contaminant plumes. And Operable Unit 1 is characterized by having three contaminant plumes.

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So, this figure depicts the concentrations of three primary chemicals: Tetrachloroethene, PCE; trichloroethene, TCE; and 1,1,1-trichloroethane, TCA. These three chemicals are the good cleaners, the solvents that I mentioned before.

They're volatile organic compounds. They are ones that have the ability to evaporate easily. They can transfer to the gas phase from the liquid phase very easily. And they are among the most common groundwater contaminants we see in Long Island.

So, these plumes here, they depict the hundred parts per billion micrograms per liter concentration contours, one part per billion. You can think of that as you have a billion people in a stadium, one hundred of those

New Cassel/Hicksville people are contaminant molecules, one hundred ppb.

So, the Operable Unit 1 Eastern Plume, right over here, this plume is characterized as having very high concentrations of tetrachloroethene, PCE.

We see concentration in this Northern Eastern Plume Area up to 16,000 parts per billion in recent sampling events. In the past, in 2004, somewhere mid 2000 timeframe, we've seen concentrations up to 75,000 parts per billion.

The Central Plume, this location here within Operable Unit 1, is characterized as having the highest concentrations of 1,1,1-trichloroethane. We've had concentrations of that contaminant up to 1,400 parts per billion.

The Western OU1 plume, this has the largest lateral or

New Cassel/Hicksville horizontal extent observed and it has the highest concentrations of trichloroethene, and that's up to concentrations of 5,100 parts per billion.

So, on to the Human Health Risk Assessment that EPA conducted. I'm going to be discussing the Human Health Risk Assessment, which is essentially an assessment of the risk to people.

So, EPA conducted a Human Health Risk Assessment to estimate current and future effects of contaminants on human health. And that was conducted -- that was evaluated in the absence of any control -- of any action to control or mitigate these exposures. And that means without any remedial measures to clean up the groundwater.

The Human Health Risk

Assessment assessed carcinogenic and noncarcinogenic health effects that can result from exposure to contaminated groundwater through ingestion of contaminated groundwater, through dermal contact with contaminated groundwater, and through inhalation of vapors while showering or bathing. And these were quantified for Operable Unit 1.

So, at the first step in the Human Health Risk Assessment process, the hazards are identified. We identified the hazards in groundwater contamination within Operable Unit 1.

And, essentially, what that gave us is a list of fifteen chemicals of potential concern. I haven't provided all fifteen here. All fifteen can be found in either

New Cassel/Hicksville

Table 1 of the Proposed Plan or in the Human Health Risk Assessment for Operable Unit 1.

What I did provide are the three chemicals that we talked about before; tetrachloroethene, trichloroethene, and 1,1,1-trichloroethane. I provided the maximum concentrations that I discussed in the early slide.

And for context, I've provided the New York Water Quality Standard, which is five; and the Federal Safe Drinking Water Act Standard, commonly known as our maximum contaminant level.

So, for context, you see in the Eastern Plume Area we have concentrations of PCE up to 16,000 parts per billion. Both New York State and Federal Safe Water Standard is five.

In the instance of 1,1,1-trichloroethane, TCA, you see the

New Cassel/Hicksville
Federal Safe Drinking Water Act Standard is 200 parts per billion and the New York Water Quality Standard is five parts per billion.

Just to be certain, EPA takes the most conservative value. So for 1,1,1-TCA, our drinking water standard is five.

So, the results of EPA's OU1 Human Health Risk Assessment.

The results indicated that for current exposure, there is no unacceptable risk or hazard. Current, today, there's no unacceptable risk or hazard. The reason for that is residents in the area are connected to municipal water supply.

That municipal water supply treats that water to drinking water standards. So, when the residents turn on their faucets, they are drinking water that has

New Cassel/Hicksville been treated. So, there's no unacceptable risk or hazard.

For the future potential scenario -- that's a hypothetical scenario where there's not a control or a treatment on the drinking water prior to public distribution.

So, EPA evaluates that hypothetical scenario to say that if the water is not being treated, would the public -- is there a risk that exceeds our target level for the public?

And the results of our future potential scenario indicate that the risks do exceed the EPA target risk range and our noncarcinogenic hazard threshold.

We looked at those for the following receptors: Those were the future residents -- and the way that we do our risk assessment, that's combined

New Cassel/Hicksville lifetime of a child and adult -- and, also, for a future site worker, a construction worker.

So, next we're going to be discussing the remedial alternatives for the site. That's the cleanup options for the site.

So, in the fall of 2002, EPA started to conduct a Supplemental Feasibility Study. And a Feasibility Study identifies remedial alternatives, cleanup options, based on site-specific conditions and sampling results that were determined during the Remedial Investigation.

And as part of the study, EPA updated the information that was contained within New York State DEC's Feasibility Study from the 2000 timeframe for the same area, for this Operable Unit 1 area.

In addition to updating some

of the information from DEC's 2000 FS, we also developed our own remedial alternatives that are included in that Supplemental Feasibility Study.

So, just to kind of give you a sense of some of that information that was updated in the study, since that was over ten years old we had to do some work to update the cost, we also had to do some work to update the assumptions that were made because we had evidence that the contamination had a wider aerial extent than in 2000.

And that was based on the investigations from the second predesign investigation where the monitoring well network was expanded.

As part of the Feasibility Study, remedial action objectives were developed for OU1, for the

New Cassel/Hicksville groundwater within OU1. And these objectives outline what we want the outcome to be within OU1 after the cleanup has occurred.

So, the first is to prevent or minimize the current and potential future human exposure via inhalation and dermal contact to volatile organic compounds in groundwater at concentrations in excess of federal and state standards.

Second, minimize potential for further migration of groundwater with volatile organic compound contaminant concentrations greater than federal and state standards.

And restore the impacted aquifer to its most beneficial use as a source of drinking water by reducing contaminant levels to federal and state standards.

New York State and the

New Cassel/Hicksville federal government designate the aquifer to be a sole source aquifer. And in addition to that, New York State designates the aquifer as a potable water source, so its beneficial use is as a drinking water source.

So, we have five remedial alternatives, cleanup options, that we evaluated for the site. And these five alternatives are outlined in our proposed plan that was released on July 26.

I'm going to walk through each of the cleanup options next.

Alternative 1 is no further action. This alternative includes just that; there's no action taken, there's no remedial work, there's no monitoring there's no monitoring and sampling of existing wells, there's no installation of any new wells, there's no money spent.

New Cassel/Hicksville

This alternative is important beyond it being required by our National Contingency Plan because it helps provide a baseline to compare the other alternatives to.

The only thing that would be included in this alternative is the five-year review because we're leaving contamination at the site. So, we would be required no less than every five years to review the site.

Alternative 2 is Monitored Natural Attenuation. Monitored Natural Attenuation is a process by which contaminant concentrations are reduced by various naturally-occurring processes. Those processes can be physical, biological, or chemical.

When certain parameters are present in the aquifer, these naturally-occurring processes can

New Cassel/Hicksville break down contaminated concentrations and sometimes reduce levels until they reach drinking water standards.

As this remedial method relies on the presence of certain parameters to reduce contamination via natural processes. Monitoring is a large component of this remedy.

So, this remedy would include installation and expand the monitoring well network, which would include installation of additional monitoring wells and sampling of those monitoring wells and sampling for parameters and groundwater quality.

So, the remaining three alternatives, Alternatives 3, 4, and 5, they all have some common elements to them, so I'm just going to talk about them upfront.

The common elements are

long-term monitoring, institutional controls, and a five-year review. And in addition to that, we have -- we include use of in-situ chemical treatment.

In-situ chemical treatment is a broad term, and it includes treatments such as in-situ chemical oxidation. What that is is a process whereby a reactive chemical is injected into the subsurface and it can rapidly break down that contaminant into a nontoxic byproduct.

So, an important component of use of in-situ chemical treatment as part of our remedy will be a treatability test; that if a remedy is selected in our Record of Decision that includes in-situ chemical treatment, we would thereafter, as part of the Remedial Design Phase, conduct a study where we assessed how best

New Cassel/Hicksville

to apply in-situ chemical treatment and to ensure there would be no adverse impact to the community or the public water drinking supply.

Alternative 3 is in-well vapor stripping with use of in-situ chemical treatment. In-well vapor stripping is a technology that uses the principles of base separation, the transfer of volatile organic compounds. Those are the type of contaminants in Operable Unit 1 from the liquid phase -- that's contaminants in the groundwater -- to the gas phase by aerating the contaminated water in a well that's underground.

This is a depiction of the well. This is contaminated groundwater. It would be aerated, and those contaminated -- the contaminated groundwater would be

phased out, it would go into the gas phase. Those vapors would be extracted and they would be piped through an underground system in the community. There would be a system of blowers, and they would be blown to a central location where those contaminated vapors would then be treated or processed located within a facility.

That treatment process would involve either granulated activated carbon or an air stripper, and those treatments are similar to what you're seeing on your public supply wells.

So, once the vapors are treated at the central facility, they would be treated to meet standards. And thereafter, once they've reached standards, they would be discharged to the atmosphere.

So, this is just a depiction

of our conceptual design from our supplemental feasibility study. And we target the in-well vapor stripping wells in three different plumes at different depth intervals. You can see that there's a lot of wells that will be involved; over seventy.

And then this area in the northern portion of Operable Unit 1, that little crosshatched box right there, that's the area in our conceptual design that we're targeting for in-situ chemical treatment. And that's because that plume has a really high concentration, up to 16,000, of tetrachloroethene.

Alternative 4 is extraction and treatment with in-situ chemical treatment. For this alternative, extraction wells will be installed that pump water aboveground to a treatment

New Cassel/Hicksville facility located on site. The extracted groundwater is then treated at the facility to remove the contaminant mass.

So, the top left photograph shows from a community perspective what this extraction well looks like. It's flush with the road. This was the extraction well that was installed by New York State in 2010.

And on the bottom left, I have a picture of a treatment facility. This treatment facility is located in Long Island in Port Jefferson. It's at the Lawrence Aviation Superfund Site.

So, this is our conceptual design for extraction and treatment. This is one that's commonly known as groundwater pump and treat.

In this conceptual design, we place the wells to target the

New Cassel/Hicksville three contaminant plumes. We have a total of eleven extraction wells; five in the western, three in the central, and three in the eastern.

Our conceptual design pipes. Once the groundwater has been extracted from the wells, it's pumped to a central treatment plant which has been proposed to be in the location -- for conceptual design, it's proposed location is the Nassau County Recharge Basin 51.

That's just our design, so that would require further discussions, the location of that plant.

And once water has been treated to standards through the treatment process at the facility, once it has reached drinking water standards, that water in our conceptual design is proposed to

be reinjected to the Upper Glacial Aquifer through a series of infiltration wells that will be located in Basin 51. Infiltration wells are wells that simply put water back in the ground.

And that's our proposal. Our plan does allow for if we do not install injection wells or reinjection wells that we could discharge to a publicly-owned treatment. We have in-situ chemical treatment in the same location. And we estimate that this remedy would take thirty years to complete.

So, our last alternative, Alternative 5, is a hybrid or combination of the last two alternatives, in-well vapor stripping, extraction and treatment, and in-situ chemical treatment. This alternative was designed because we think in-well

New Cassel/Hicksville stripping may be effective in some areas of Operable Unit 1 and that extraction and treatment may be more effective in others. A combination of the two allows for targeting of either technology to location-specific conditions within Operable Unit 1.

And then similar to the previous two alternatives, both extracted vapors and extracted groundwater would be treated at a centralized treatment plant.

This is our conceptual design for the alternative. So, we have a combination of the two. In the Eastern Plume, our conceptual design calls for three extraction wells. In the Central Plume, our design calls for eight in-well vapor stripping wells. And in the Western Plume, we have three extraction wells and I believe twelve vapor stripping

New Cassel/Hicksville wells.

And we estimate that this cleanup with this conceptual design will also take thirty years to achieve.

So, this table is an estimated -- is of the estimated cost for each remedial alternative.

Column two represents Capital Cost, those costs that are associated with the installation and the construction of the remedial action for each alternative.

The third column, Annual Operation & Maintenance, represents how much is cost to operate and maintain that remedy on a per year basis.

And the Present Worth Cost represents the sum of Capital Cost and Annual Operation & Maintenance over a thirty-year time period.

New Cassel/Hicksville

So, out of all the three alternatives that include an active remedial component, that's actually installing a remedial system, of these three alternatives you can see that Alternative 5 is slightly less expensive.

So, once we have all the remedial alternatives, the cleanup options, EPA evaluates each alternative against these nine criteria to ultimately select a preferred remedial alternative. That's our preferred cleanup plan.

So, this evaluation addresses our Superfund Law requirements and it also addresses any technical and policy considerations that may be important when selecting among the remedial alternatives.

So, the first two criteria are very important. These are the

New Cassel/Hicksville minimum requirements that a response measure must meet in order to be eligible for selection as a remedy; overall protection of human health, and compliance with applicable or relevant and appropriate requirements.

Our next set, these are primary balancing criteria. These five criteria are factors with which tradeoffs between the remedial alternatives are assessed. So, ultimately, the best cleanup option will be chosen given site-specific data and conditions.

Long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost.

The modifying criteria, the final two -- they're called

New Cassel/Hicksville modifying criteria because new information or comments from the State or the community could modify the proposed -- the preferred response measure, as outlined in our Proposed Plan, or cause other remedial measures to be considered.

So, our preferred remedy is Alternative 5. That's the combination, the hybrid, of in-well vapor stripping, extraction, and treatment.

So, in addition to in-well vapor stripping and treatment of the vapor-phase contamination and extraction of groundwater via pumping wells and treatment at an on-site treatment plant, our preferred remedial alternative also includes in-situ chemical treatment to target high levels of concentrations. So, that's concentration potentially above

New Cassel/Hicksville
10,000 parts per billion of
volatile organic compounds.

It also includes long-term monitoring. So, that would be a continuation of the water quality investigation to monitor the nature and extent of contamination. And long-term monitoring would also include a continuation of the soil vapor intrusion pathway investigation that the State previously conducted in the 2006 to 2009 timeframe.

It also includes institutional controls. Essentially, what that would include is a plan that we would develop that specifies what the laws are that we're going to comply with, what the standards are, so that it's all spelled out.

An institutional control would be something that -- in

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Nassau County, you're not allowed to install a drinking water well at your property unless there's a permit.

So, that is the presentation. We're going to open it up to question and answers now, and I'm going to give my contact information.

Cecilia mentioned earlier that our public comment period was recently extended. So, I'm going to provide you with the slide with...

So, the public comment period, we received a request yesterday, and we spoke about it, and we've granted an extension based on this request until September 24, 2013.

So, we ask that comments are submitted -- we won't accept comments later than September 24, 2013, so it must be postmarked by

New Cassel/Hicksville

that date.

And this is my information. It has my mailing address or my e-mail. So, you can provide comments to me either tonight through the question-and-answer process -- these comments will be documented in our transcript -- or you could provide written comments to me via mail or e-mail.

MS. ECHOLS: Do you have any questions?

There's a mic.

Is there anything you want to see from our presentation?

Are you all satisfied?

I also wanted to let everyone know we have an elected representative here.

Would you state your name, please, for us?

MR. MONTESANO: Assemblyman Mike Montesano.

MS. ECHOLS: Thank you.

New Cassel/Hicksville

Is there anyone else?

UNIDENTIFIED: Congresswoman Carolyn McCarthy's office.

MS. ECHOLS: Thank you.

MS. BRINN: And I'm from Legislator Bosworth's office, Nassau County Legislator Judi Bosworth.

UNIDENTIFIED: Town Supervisor John King's office.

MS. ECHOLS: Thank you.

MS. GLISCI: My name is Anita Glisci. I'm a citizen, private citizen. I do have a background in environmental science. I do work in the water district, not in this area.

My main question is if the MCLs change over the years -- you're saying that we're proposing this over a thirty-year period.

If MCLs change over the years, is there a provision in this proposal that we can have --

if the MCLs go down, instead of it's five parts per billion, if it goes down to two parts per billion or one part per billion or one part per trillion, is there something in these different alternative treatments that will, you know, make up for that to have that groundwater standard changed?

MS. LaPOMA: It's not in the alternatives itself. Where it is, is once the remedial action has started, five years from the date that that remedial action has started, a five-year review must be conducted.

So, in an instance like that, a change in drinking water standard would be captured by the five-year review.

And what that review would do is look at things to pick up on that. Has there been change in the water quality standards such

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that the remedy is no longer protective?

So, it assesses all those changes at minimum every five years and accounts for that. And then from there, it would also make recommendations.

So, in that instance, if the drinking water standard became lower and we determine that our remedial alternative was no longer protective, we would then recommend and outline how to address that in that five-year review.

MS. GLISCI: I have a question about vapor intrusion also into homes. Right now, you say that seven homes were tested in the New Cassel area.

What were the levels that were found?

And I see in each of the alternatives, you have the ability

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to start testing additional homes for that. My main concern is I live in that area and I'm worried about vapor intrusion into my basement.

And you do have a monitoring well right next door to me, in the property next door to me. So, I'm concerned about that.

At what point do you say, you know, let's start looking again?

MS. LaPOMA: So, it's a good point.

We envision continuing the soil vapor intrusion pathway investigation. So, the State -- we have not conducted any sampling of soil vapor intrusion on our own. What we've done is we've taken a look at the work that the State's done from 2006 to 2009. And in that, they sampled seven residences.

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The samples that -- the results from their sampling event did not indicate that the levels were high enough that they would need to install mitigation systems.

For one of those properties, the levels were high enough -- were at that level where they would continue monitoring.

So, EPA has not conducted any sampling, but what we're recommending is that we continue that program, we pick up where DEC left off and evaluate that intrusion pathway in the Operable Unit 1 area.

MS. GLISCI: Thanks.

MS. ECHOLS: Would you please come up?

Let me see how far this can stretch.

MS. GRAY: Carol Bright. I'm a resident of New Cassel.

New Cassel/Hicksville

I believe I spoke with Jennifer two years ago about the Superfund project, and I had told you what my address was. I just want to clarify that what my address is isn't part of the problem that exists.

But by hearing the lady just speak about her address in New Cassel, you said seven houses were tested.

On which streets in New Cassel were these seven houses that were tested?

MS. LaPOMA: Let me bring up a map.

The homes that were tested as part of the DEC study were within the Operable Unit 1 area. Those homes that were tested were within the boundaries of this Operable Unit 1 area.

It may have been a little over here. I'm not positive. DEC

New Cassel/Hicksville may be able to clarify that.

But all that sampling that south of Old Country Road and south of Grand Boulevard.

MS. GRAY: Okay. Thank you.

MS. GLISCI: Could you on that map in any way indicate where the location is of the highest vapor intrusion?

MS. LaPOMA: I cannot do that off the top of my head.

What I could do is I could provide you with a really great map from the DEC vapor intrusion report from 2009. And it's a really good map. It's basically this aerial photograph, and it highlights the general location of the property and the concentrations.

MS. GLISCI: I'd be interested in that.

MS. LaPOMA: Okay. See me after the meeting, and I'll get

New Cassel/Hicksville your information.

MS. GLISCI: Thank you.

MS. ECHOLS: Any more from this side of the room? No?

MS. REID: My name is Julia Reid. I'm a resident of New Cassel.

My question is -- I understand what a Superfund site is. I want to know why, how, we became a Superfund site.

I know it took years and years. I moved out here in 1962, and at that time I know the industrial park was over there, but I want to know how we had the honor of becoming a Superfund site.

And are there any other areas in Nassau that are endangered today?

MS. LaPOMA: I'm sorry, that last part of the question?

MS. REID: Are there any

New Cassel/Hicksville other areas in Nassau County that are in danger of being designated a Superfund site?

MS. LaPOMA: I'm not aware of any sites that are currently proposed to National Priorities List to Superfund right now that are in Nassau County. I'm not aware of those.

There are several other Superfund sites in Nassau County just -- let me try to orient myself -- just west of us. We have old Roosevelt Field, another groundwater contamination site in Garden City; we have Peninsula Boulevard, which is located south of us in Lynbrook, I believe, New York.

MS. GLISCI: That's Hewlett.

MS. LaPOMA: Hewlett.

And Fulton Avenue, located west of us.

And there's -- I forget

New Cassel/Hicksville exactly. I believe there's about twenty Superfund sites in Nassau County.

MS. REID: How did our groundwater become contaminated?

MS. LaPOMA: How did it become contaminated?

MS. REID: Yes.

MS. LaPOMA: North of the Operable Unit 1 area -- the area we're talking about tonight, this white outline right here -- we believe that the New Cassel Industrial Area is among the sources that contributed to groundwater contamination.

So, through the 1950s through 1970s, you know, this industrial area was being developed. And before sewer systems were installed, it was typical that facilities -- not just in Long Island, in a lot of places -- that they would dump the

New Cassel/Hicksville wastewater associated with their industrial processes at their facilities, they'd often dump that on their properties in either leach pools on their properties or into dry wells. And that has contaminated the groundwater over the years.

The DEC has done a lot of work to address the individual facilities within this area and they've done a lot of work on the soils, they've done a lot of work on the local groundwater that's located at the facility that over the years has migrated off and contaminated this area right here.

MS. ECHOLS: Any more questions?

This table?

Anyone back there?

To the right of me?

No?

Okay. I guess the meeting

New Cassel/Hicksville is going to close. My name, again, is Cecilia Echols, I'm your Community Involvement Coordinator for this site.

The public comment period closes September 24. If you have any questions or concerns, you can reach Jennifer. And if you ever want to talk to me, you can come to me. We're here for a little while longer tonight.

And I thank everyone for coming. Everyone have a good night. Thank you.

(Time noted: 8:05 p.m.)

C E R T I F I C A T E

STATE OF NEW YORK)
) ss.
COUNTY OF NEW YORK)

I, LINDA A. MARINO, RPR, CCR, a Shorthand (Stenotype) Reporter and Notary Public of the State of New York, do hereby certify that the foregoing transcription of the public meeting held at the time and place aforesaid is a true and correct transcription of my shorthand notes.

I further certify that I am neither counsel for nor related to any party to said action, nor in any way interested in the result or outcome thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this 20th day of August, 2013.

LINDA A. MARINO, RPR, CCR

Appendix V
Attachment 6

Written Comments Submitted During Public Comment Period

SHEEHAN
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GREEN

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September 23, 2013

Jennifer L. LaPoma
Remedial Project Manager
Western New York Remediation Section
United States Environmental Protection Agency
290 Broadway, 17th Floor,
New York, New York 10007-1866

Re: New Cassel/Hicksville Ground Water Contamination Superfund Site Proposed Plan

Dear Ms. LaPoma:

This firm represents IMC Eastern Corp. f/k/a IMC Magnetics Corp. with regard to the referenced matter. We attach hereto the Joint Comment to Proposed Remedial Plan of the New Cassel/Hicksville Groundwater Contamination Site submitted by the following:

(1) Garfunkel Wild, P.C., representing Arkwin Industries, Inc.;
(2) Bond, Schoeneck & King, PLLC, representing Barouh Eaton Allen Corp.;
(3) Farrell Fritz, P.C., representing Grand Machinery Exchange, Inc. and 2632 Realty Development Corp.;
(4) Sheehan Phinney Bass + Green, P.A., representing IMC Eastern Corp. (f/k/a IMC Magnetics Corp.);
(5) Epstein Becker & Green, P.C., representing Island Transportation Corporation;
(6) Kevin Maldonado & Partners, LLC, representing Next Millenium Realty, LLC and 101 Frost Street Associates;
(7) McNamee, Lochner, Titus & Williams, P.C., representing Next Millenium Realty, LLC and 101 Frost Street Associates;
(8) McCarthy Fingar, LLP, representing Tishcon Corp.;
(9) Sahn Ward Coschignano & Baker, PLLC, representing Utility Manufacturing Co., Inc. and Nest Equities, Inc.

Respectfully submitted,

Robert R. Lucic

Enc.
Cc: Beverly Kolenberg, Esquire

JOINT COMMENT TO PROPOSED REMEDIAL PLAN OF THE NEW CASSEL/HICKSVILLE GROUNDWATER CONTAMINATION SITE

This Comment is submitted by the following entities, through and by their respective legal counsel:

(1) Garfunkel Wild, P.C., representing Arkwin Industries, Inc.;
(2) Bond, Schoeneck & King, PLLC, representing Barouh Eaton Allen Corp.;
(3) Farrell Fritz, P.C., representing Grand Machinery Exchange, Inc. and 2632 Realty Development Corp.;
(4) Sheehan Phinney Bass + Green, P.A., representing IMC Eastern Corp. (f/k/a IMC Magnetics Corp.);
(5) Epstein Becker & Green, P.C., representing Island Transportation Corporation;
(6) Kevin Maldonado & Partners, LLC, representing Next Millenium Realty, LLC and 101 Frost Street Associates;
(7) McNamee, Lochner, Titus & Williams, P.C., representing Next Millenium Realty, LLC and 101 Frost Street Associates;
(8) McCarthy Fingar, LLP, representing Tishcon Corp.;
(9) Sahn Ward Coschignano & Baker, PLLC, representing Utility Manufacturing Co., Inc. and Nest Equities, Inc.

INTRODUCTION

The United States Environmental Protection Agency ("USEPA") has proposed a Remediation Plan for the New Cassel/Hicksville Groundwater Contamination Site ("Proposed Plan") that is flawed and inconsistent with the law. First, USEPA's Conceptual Site Model is fundamentally flawed. It fails to consider a substantial amount of relevant data related to the New Cassel Industrial Area ("NCIA"), and in addition relies on data collected from temporary monitoring wells using inappropriate methods and that have unreproducible results. Thus, the Proposed Plan is not based on a correct understanding of the contamination at the NCIA. Second, the Proposed Plan will greatly disrupt the NCIA community without conferring a concomitant benefit. Third, the Proposed Plan ignores that there is currently a remedy in place — granulated activated carbon and air stripping -- which has adequately addressed the contamination for decades without the exorbitant cost and extreme disruption that the Proposed Plan necessarily entails. Fourth, the immense cost of the Proposed Plan prevents it from being consistent with the National Contingency Plan. As a matter of law, any remedy must be cost effective, and the Proposed Plan is not. Finally, because it is likely that any action to recover the costs of the

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Proposed Plan would be time-barred, the USEPA should reject the Proposed Plan in favor of a cost-effective and achievable plan — continued well-head treatment at the Bowling Green wells combined with monitored natural attenuation.

I. USEPA'S CONCEPTUAL SITE MODEL – THE BASIS FOR THE PROPOSED PLAN – IS FUNDAMENTALLY FLAWED AND DOES NOT CHARACTERIZE GROUNDWATER CONTAMINATION CORRECTLY.

USEPA's Conceptual Site Model ("CSM"), which serves as the basis for its Proposed Plan, relies on incomplete data collected from within OU-1 and fails to take into account the massive amounts of environmental and investigation-related data upgradient of OU-1 collected over the past 3 decades. In addition, the plume chemical signature definition approach used by USEPA (chlorinated ethenes molar ratio analysis) is inappropriately implemented, leading to incorrect conclusions regarding the sources of the groundwater contamination observed in OU-1. Critical data relied upon by USEPA was collected using inappropriate methods. Furthermore, USEPA's decision to ignore the so-called "Upgradient Plume" from Sylvania and General Instruments (GI)/Vishay in selecting the proposed remedy for OU-1 is a critical error as the "Upgradient Plume" has both historically contributed and continues to contribute contaminated mass to the groundwater found at OU-1. As discussed in detail below, USEPA's failure to consider all available data from the NCIA, OU-1, and the "Upgradient Plume" from Sylvania and General Instruments (GI)/Vishay, and its failure to use actual groundwater flow directions that were determined by the New York State Department of Environmental Conservation ("NYSDEC") have resulted in a CSM that is inaccurate and unreliable and that Proposed Plan based upon that CSM is thus unsupportable.

A. A significant amount of critical data collected from within the NCIA, upgradient of the NCIA, and in OU-1 were not considered by USEPA in the Proposed Plan

Groundwater and soil data have been collected for more than three decades in areas both within and upgradient of OU-1. More than 7,400 soil and groundwater samples have been collected from over 1,100 locations within and adjacent to the NCIA, OU-1, the Upgradient Plume (Figure 2.1). Consideration of this data is crucial to an understanding of the source of the current OU-1 groundwater plumes and the fate of the plumes over time. A summary of the key investigations that have been performed are:

- *Bowling Green Estates Water District ("BGEWD") Sampling:* Groundwater samples have been collected from the BGEWD drinking water supply wells by the Nassau County Department of Health ("NCDH") beginning at least as early as 1977 and have been sampled routinely since then. (NYSDEC, 2000) These samples provide a fuller understanding of the timing and nature of the contamination reaching the BGEWD supply wells, as well as the evolution of the groundwater plumes observed in OU-1 than the data used by the USEPA. The USEPA failed to take into account these data.

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- *USGS/NCDH Investigations:* Between 1983 and 1985, NCDH installed 30 wells within the NCIA, primarily in the central and western portions, 6 wells north (upgradient) of the NCIA, 5 wells within OU-1, and 3 wells south or west of OU-1 (NCDH, 1986). In total during this time, 128 groundwater samples were collected and analyzed (NYSDEC, 2000 213-6905). Between 1986 and 1991, USGS installed 22 additional wells both *within and downgradient* of the NCIA; during this time, more than 350 groundwater samples were collected and analyzed (USGS, 1996. NYSDEC, 2000). The USEPA failed to take into account these data.
- *NYSDEC Preliminary Site Assessments (PSAs):* Due to the detection of chlorinated organics at the BGEWD supply wells, although at levels that were below the Maximum Contamination Levels ("MCLs"), NYSDEC performed a series of investigations to determine the source(s) these chemicals. As part of these Preliminary Site Assessments (PSAs), which were conducted between 1992 and 1997, more than 900 groundwater and 250 soil samples were collected from sites within the NCIA (LMS, 1994; LMS; 1995 , LMS, 1996 ; LMS, 1997). The USEPA failed to take into account these data.
- *Supplemental NCIA Investigations and Remedial Actions:* As a result of the PSAs, NYSDEC identified 17 sites within the NCIA, which the agency contended were inactive hazardous waste sites (NYSDEC, 2003). Soil and groundwater samples were collected at each site and were used to design, implement, and monitor remedial actions. In total, more than 1700 groundwater samples and 300 soil samples were collected and analyzed between 1997 and 2010 during these remedial activities (Appendix A).. The USEPA failed to take into account these data.
- *Upgradient Plume Investigations:* Between 1981 and 2010, over 2,300 soil and groundwater samples were also collected both on the Sylvania and GI/Vishay properties and downgradient of the properties. The USEPA failed to take into account these data.
- *NCIA and Off-Site Groundwater Investigations:* Additional investigations were performed by NYSDEC within the NCIA and OU1 between 1999 and 2000 (LMS, 2000). Four shallow groundwater monitoring wells were installed and vertical profile data were collected from four hydropunch locations. In total, over 140 groundwater samples were collected and analyzed (LMS, 2000).
- *Off–Site Groundwater Investigations:* Between 2008 and 2011, three different Pre-Design Investigations (PDIs) were performed on behalf of NYSDEC in the area downgradient of the NCIA. The first was performed by Dvirka & Bartilucci ("D&B") in 2009 (209-3163), the other two were performed by HDR in 2010 (210-7279) and 2011 (213-6532). In total, D&B and HDR installed 30 monitoring wells and collected and analyzed more than 150 groundwater samples during this time period. The USEPA failed to account for all the data collected and failed to account for the unreliability of these data and the inappropriate sampling techniques used in collecting these data.

Appendix A lists all the studies that USEPA should have but failed to consider in the development of the CSM and the Proposed Plan. These studies are not referenced or identified in the RI Memorandum or CSM.

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Despite the presence of a significant amount of data from inside, near and upgradient of OU-1, USEPA has relied on a limited and unrespresentative dataset in the development of its CSM for OU-1 and its selection of the remedial actions specified in the Proposed Plan.[1] In summary, the data not considered by USEPA include, but are not limited to the following (Figure 2.1):

- Over 2,500 groundwater samples collected from locations within the NCIA;
- Over 150 groundwater samples collected from locations within OU-1; and
- Over 2,500 groundwater samples collected from locations associated with the Upgradient Plume – including samples from within OU-1.

These data are critical for understanding the location, characteristics and source(s) of the plumes that originate from the NCIA and the upgradient parties, as well as the chemical signature of the plumes at the source areas, and the fate and transport characteristics of these plumes as they migrate into OU-1. A CSM which is based upon an incomplete and incorrect understanding of the nature, extent and fate of contamination cannot adequately support decisions regarding a remedy. One of the critical flaws in the USEPA analysis, the incorrect assumption that the OU-1 plumes originate only from NCIA-located sources, stems from USEPA's inadequate examination of groundwater quality at the NCIA source areas, since USEPA did not review and utilize for its analysis environmental data collected within the NCIA over the past three decades.

B. Flawed data from temporary monitoring wells, relied on by USEPA, were collected using inappropriate methods and are not reproducible

Flawed data, relied on by USEPA, were collected using inappropriate methods. Nine temporary monitoring wells ("TMWs") were installed in 2008 as part of the PDI conducted by D&B (2009; Figure 2.2) for the NYSDEC. Seven of the nine temporary wells were installed and sampled inappropriately, resulting in cross-contamination between the shallow and deep groundwater samples. Furthermore, groundwater quality data from the TMWs are not reproducible. For these reasons, USEPA erred in relying on the sampling data from these seven wells without qualification and far greater care.

1. Use of Hollow Stem Augers May Have Caused Cross-Contamination.

Seven of the nine TMWs installed in 2008 were each drilled to 285 ft-below ground surface (ft-bgs) with a Hollow Stem Auger ("HSA"). The use of HSAs for this type of well installation is inappropriate because soil and groundwater are transported up the auger flights; these drill cuttings contact the sides of the borehole as they are raised and cause cross-contamination between different depth intervals. The following reference sampling manuals warn about cross-contamination that is associated with the drilling methods used by D&B.

[1] Figure 2 of its Proposed Plan (USEPA Region II, 2013a) presents the data that USEPA used to generate the depictions of the OU-1 plumes, which forms the basis of their CSM.

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- *Guidance Manual for Groundwater Investigations (CalEPA, 1995, p. 17):* "Because drill cuttings are in contact with the entire length of the borehole as they are transported up the auger flights, hollow-stem augers may cause cross-contamination of sub-surface materials."
- *Handbook of Environmental Site Characterization and Ground-Water Monitoring (Einarson, 2006. pg. 834):* When using HSAs, "contaminants can be smeared against the borehole wall. This can impart a long-lived positive bias to groundwater samples collected from a multi-level well."
- *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers* (USEPA, 2002, p.11): "The effects of cross-contamination can be minimized by sampling the last contaminated (zone) first and progressing to the more contaminated (zones).

2. USEPA Sampling Protocols Were Not Observed in 7 Out of 9 Wells.

Furthermore, the sampling protocols used at these seven TMWs by D&B were inconsistent with proper sampling protocol. D&B collected samples first from the deeper sampling horizons that have higher levels of contamination, and then as each temporary well was raised, samples were collected from shallow, relatively clean groundwater. The USEPA itself recommends collecting samplings from the most impacted zones last in order to minimize cross-contamination (USEPA, 2002). The exact opposite technique was used here. Despite this obvious error, the USEPA utilized the flawed TMW data in its remedy selection procedure.

3. The Deficiencies Resulted in Flawed Data.

Groundwater quality data at each of the seven TMWs demonstrates that shallow groundwater was cross-contaminated due to the inappropriate sampling technique utilized (*i.e.*, sampling deeper horizons first, and then moving up within the borehole). The downward flow gradient in the Magothy Aquifer carries plumes vertically downward with the groundwater, as they migrate laterally away from source area(s). Because the TMWs were installed generally at least several thousand feet from the NCIA source areas, we would expect that most groundwater impacts would be at depth and that the shallow groundwater would be relatively clean. However, at all seven of these TMW locations, shallow groundwater quality impacts were observed, contrary to normal plume behavior in an aquifer with a downward vertical hydraulic gradient. Groundwater quality impacts observed in shallow groundwater, defined as the 50 to 150 ft-bgs depth interval (roughly, the top 100 feet of the water column), are summarized below (Table 2.1; Figure 2.3 and 2.4):

Table 2.1. Impacts Reported For Shallow Groundwater at select TMW Wells.

Temporary Well ID	Maximum Detected Concentration in Shallow Groundwater (µg/L)	
	PCE	TCE
TMW-1	270	61
TMW-2	250	310
TMW-4	57	17
TMW-5	330	870

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TMW-6	14	63
TMW-7	870	45
TMW-9	280	120

Significantly two other TMWs were installed during this investigation using a more appropriate method (TMW-3D and TMW-8D – both to 500 ft-bgs). At these locations, samples were collected starting in the shallow groundwater and working downward as the drilling progressed (from the least-impacted zone to the most-impacted). Groundwater concentrations at these two locations contradict the data from the other seven TMWs: they are consistent with what one would expect in a downward-trending plume; no groundwater contamination was detected to a depth of 150 ft-bgs (approximately 100 ft below the water table) at TMW-3D and until 250 ft-bgs (approximately 200 ft below the water table) at TMW-8D (Figures 2.3 and 2.4). At the two TMWs where USEPA recommended protocols were observed, contamination was only noted in the deeper groundwater.

Groundwater samples collected using permanent monitoring wells confirm that the data from temporary wells TMW-1, TMW-2, TMW-4, TMW-5, TMW-6, TMW-7and TMW-9 are unreliable. During the PDI performed in 2011 (HDR), permanent monitoring wells and extraction wells were installed adjacent to several of the prior temporary well locations. Monitoring wells MW-11S and MW-11D were installed adjacent to TMW-1; extraction well EX-2 was installed south of TMW-2 (Figure 2.2). Samples collected at the new permanent well locations from the same depth intervals contained significantly lower concentrations of key compounds (PCE, TCE, and TCA), some dramatically lower, than were detected in the nearby TMWs sampled using flawed techniques in 2008 (Table 2.2).

Table 2.2 Comparison of Data Collected at 2008 Temporary Wells and 2011 Permanent Wells

Well ID	TMW-2	EX-2
Date	8/18/2008	4/12/2011
Sample Depth (ft-bgs)	285	285
PCE (µg/L)	390	130
TCA (µg/L)	3.4	ND
TCE (µg/L)	1,400	140

Well ID	TMW-1	MW-11S	TMW-1	MW-11D
Date	8/27/2008	4/4/2011	8/26/2008	4/4/2011
Sample Depth (ft-bgs)	225	225	285	285
PCE (µg/L)	3,700	140	530	460
TCA (µg/L)	21	3.8	18	10
TCE (µg/L)	230	190	650	400

ND = Not Detected.

USEPA acknowledged in the Supplemental Feasibility Study (USEPA, 2013) that "there is greater uncertainty with the groundwater sampling data collected from the temporary well locations relative to the permanent monitoring locations." This uncertainty is exacerbated by the

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inability to reproduce the sample results collected from the TMWs and the likely cross-contamination that has impacted the shallow groundwater data at seven of the TMW locations. Despite its own misgivings about the data, USEPA used it in its remedy selection process.

II. THE PROPOSED PLAN WILL BE DISRUPTIVE TO THE COMMUNITY AND WILL PROVIDE LIMITED BENEFIT

A. The August 13, 2013 Meeting was Inadequately Promoted and Poorly Attended.

The adverse impacts to the New Cassel and Hicksville communities that will result from the construction of the remedy proposed by USEPA in its recently released Proposed Remedial Action Plan ("PRAP") for this newly enlarged federal Superfund site are numerous and have not been adequately evaluated. In fact, in USEPA's own words, one of the explicit purposes of this public comment period is for the Agency to inform itself of public concerns through public comment to the "detailed analysis section of the OU-1 Feasibility Study." Unfortunately, the August 15, 2013 public meeting ("Meeting") regarding the proposed remedy (held during the summer vacation season) was not well-publicized and attendance was sparse. This limited outreach shows that the USEPA has failed to make the public aware of and understand the proposed remedy and public sentiment will likely not be fully expressed until implementation is underway. Nevertheless, USEPA has an obligation to consider the significant impacts that the proposed remedy will impose on the communities, and to balance these impacts against the perceived benefits of the remedial action.

B. The Real Burdens on the Community Far Outweigh Any Theoretical Benefit From the Proposed Plan.

At the Meeting, after describing the types of chemicals and the levels of contamination, USEPA assured those in attendance that there currently is no exposure pathway and no risk of harm to humans from the detected plumes. Interestingly, USEPA's assurances are powerful support for proposed Remedial Alternative 1, which is taking no further action because of the absence of any exposure pathway. The four other Remedial Alternatives evaluated by USEPA were given short shrift at the Meeting and were only briefly explained. Despite this public admission, and despite the lack of an exposure pathway, USEPA rejected the no further action remedy.

Instead, USEPA proposed a multi-million dollar hybrid Remedial Alternative which includes in-well vapor stripping and treatment of vapor-phase contamination at an on-site central treatment plant; extraction of groundwater via pumping and ex-situ chemical treatment such as in-situ chemical oxidation ("ISCO") to target high concentration contaminant areas, and long-term monitoring in conjunction with the implementation of institutional controls. The exact numbers of in-well vapor stripping and extraction wells and their placement is not known and will not be determined until the remedial design. Similarly, the location for the centralized treatment plant with the capacity to achieve contaminant mass removal and containment objectives of the remedy has not been identified in the PRAP. These factors call into question the cost effectiveness of the Proposed Plan.

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The overarching sentiment expressed by those members of the public that attended the Meeting as well as those that attended prior public meetings held by USEPA in 2011 was that the public was not pleased about being "honored" as a federal Superfund site (their words). The concern expressed by business owners and residential homeowners alike was that this high profile listing will devalue homes and commercial real estate and, instead of encouraging development and growth of this already economically stressed community, USEPA's NPL listing of the area as a federal superfund site and the proposed remedial action create an adverse stigma to the area. Furthermore, since USEPA admits there are no exposure pathways, and no danger to the population, the extraordinary costs to implement the selected remedy, (estimated to be in excess of $23 million) will be an unnecessary burden to the local communities.

For the purpose of preparing this commentary, members of the New Cassel Business Association were contacted. In addition to the concerns expressed above, they also are concerned that construction of the magnitude required for the implementation of the USEPA proposed remedy will present an intolerable and long term disruption to commercial and retail operations in the area and will chill any efforts to attract new employers to the aging neighborhood. New York State has designated New Cassel as an Empire Zone to promote development. However, construction of the proposed remedy with its drilling of multiple wells and installation of miles of piping, construction of the centralized treatment facility and other associated activities will undermine this designation and will disrupt installation of any new infrastructure to support planned retail and commercial hubs.

The physical construction and ongoing operation of the components of the remedy is a matter of much public impact and distress. The remedies of in-well vapor stripping and ex-situ groundwater extraction and re-injection will require multiple sites for wells to be drilled and installed. Access to install these wells is complicated and would have to be considered only in non-residential areas. Local business owners and residents believe that their property values will plummet from having all these wells, pipes, a 4,000 square-foot centralized treatment building and associated apparatus installed throughout the area. The remedy requires chemical treatment which creates other ongoing safety hazards to the public. The construction of these systems is disruptive to traffic, will cause dust and noise and inaccessibility to large areas at a time and will require vigilant security to avoid ultimately becoming sites of "attractive nuisance" to children, teenagers and others.

During the 2009 Pre-Design Investigation, the NYSDEC found that local town and county officials were concerned that the installation and operation of in-well vapor stripping units within public rights-of-way will be logistically difficult given the presence of many utilities, including water, gas, electric, sanitary sewer, and storm sewers.

Relying on in-well vapor stripping in a densely populated setting is unwise. It will require the installation of large numbers of wells and associated infrastructure which will result in a significant disruption in a largely residential area. Furthermore, USEPA does not yet even know if the in-well vapor stripping process will be able to achieve Class GA drinking water standards. The depth of the deepest contamination which is estimated to extend to 502 feet below ground surface increases the design challenges. Limits on the hydraulic depth to which the compressed air can be injected into the aquifer limits the effectiveness of the stripping

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method to only a portion of the well. Yet, the Agency insisted on imposing this proposal and costly remedy on the public.

Moreover, utilizing extraction and treatment increases both capital costs and annual operations and maintenance costs without providing a significant reduction of contaminants. Potential air pollution from off-gas effluent is also a public impact. In essence, the proposed remedy will create an exposure pathway to these pollutants, where none presently exists. Furthermore, with this remedy, in addition to the extraction wells, four infiltration wells would be necessary to effectively infiltrate every 100 gallons per minute of treated groundwater. Each infiltration well would have a diameter of eight feet and depth of fifteen feet and would need to be spaced a minimum of fifty feet apart from each other and ten feet from any structure. Thus, a huge parcel of land would be necessary for location of these infiltration wells. The location was assumed by USEPA to be adjacent to the BGEWD supply wells, in the vicinity of the Basin #51 parcel, but it is not certain that this plan is feasible.

ISCO treatment, which is planned in areas of the eastern plume which USEPA contends contain the highest concentrations of contamination, includes the injection of chemical agents, such as ozone, hydrogen peroxide, pursulfate or potassium permanganate. This mixing and injection process has to occur on the surface prior to injection. Thus, this methodology is fraught with potential hazards to public health and safety. There is an opportunity for spills, leaks or regurgitation of injections – again creating an exposure pathway endangering humans. During the implementation, the area would have to be sectioned off to prevent unauthorized access and at the end of each day of application, the chemical reagents would have to be removed or properly secured to prevent contact with residents in the area. Furthermore, as mentioned in the PRAP, since the application of the chemicals to treat the contamination will occur only 330 feet below the screen zone of the BGEWD supply wells, a real possibility exists that the very chemicals used to treat the contamination could end up adversely impacting the drinking water itself! A fate and transport study has yet to be conducted to see if the application of chemicals through the ISCO process will impact the very drinking water sought to be protected. Despite this lack of crucial information, USEPA chose to include this remedial procedure as part of its proposed remedy.

Moreover, since the radius of influence of the ISCO chemicals is only 10-15 feet, numerous injection points will be needed. Accordingly, in an area 100' by 100' -- the size of an average back yard -- it will be necessary to have over 32 permanent injection points. The USEPA estimates that two injection events will occur, but the Agency readily admits that more may be necessary to be effective. Plus, these multiple injection points can possibly affect public subsurface utilities. What's more, if subsurface confining layers are discovered, USEPA will have to pressurize the injections, which can create a variety of health and safety problems for the workers and the public and will increase the probability of re-surfacing of the caustic reagent from pre-existing preferred conduits, such as sewer drains or improperly abandoned wells.

Lastly, the USEPA proposed remedial techniques are environmentally unsustainable for the community because they require an enormous use of electricity and they are not being designed in accordance with USEPA Region 2's Clean and Green Energy Policy, which would necessitate consideration of green remediation technologies and practices. The reinjection of the

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treated water back into the ground creates a mounding at the subsurface and can potentially impact the temperature and characteristics of the groundwater into which it is re-injected, the very public resource sought to be protected.

Against these many risks and community concerns, USEPA must balance the limited and uncertain value of reducing contaminant levels in deep ground water when those contaminants have no exposure pathway to the public. The theoretical benefit of such treatment is outweighed by the disruption and risks to the public, and the severely negative impact on needed economic development in the area that would be caused by the remediation activities.

III. CONTINUED WELL-HEAD TREATMENT AT THE BOWLING GREEN WELLS PLUS MONITORED NATURAL ATTENUATION IS THE APPROPRIATE REMEDY FOR OU-1

The USEPA's proposed remedy for OU-1 fails to accord sufficient weight to the fact that the potential exposure pathway for the groundwater contamination has been eliminated. The only remotely conceivable exposure pathway is through drinking the deep groundwater containing the chemicals of concern. The data developed over almost 30 years shows that this exposure pathway has already been eliminated by the installation of treatment systems that have been in operation for several decades. In addition, the suspected sources of the contamination have undergone on-site remediation, thereby eliminating the potential sources of additional off-site groundwater contamination. Accordingly, USEPA's proposed remedy is unnecessary and is inconsistent with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. §§ 9601 *et seq.*, ("CERCLA") or the National Contingency Plan ("NCP").

The investigation of contaminated groundwater in and around the area of concern began in the mid-1980s by the NCDH and the NYSDEC. Volatile organic compounds ("VOCs") were first detected in the local groundwater in 1986. The NCDH thereafter conducted a county-wide investigation that identified the NCIA as an area of groundwater contamination.

In 1988, the NYSDEC listed the entire 170-acre NCIA as a Class 2 site on the New York State Registry of Inactive Hazardous Waste Disposal Sites. Upon listing the NCIA, the NYSDEC hired an outside firm to conduct PSAs of the entire NCIA to locate sources of groundwater contamination. Among other things, the firm investigated off-site groundwater contamination migrating from the NCIA toward water supply wells. The NYSDEC identified the BGEWD supply wells as the down-gradient recipient of groundwater migrating from the NCIA.

VOCs were detected in the BGEWD supply wells beginning in 1989, but at concentrations that did not exceed the MCLs used by the NYSDEC, which are more stringent than the MCLs used by the USEPA. Although VOCs have been detected in the BGEWD supply wells from time to time thereafter, they have not exceeded the MCLs.

In 1989, a year after the NCIA was listed as a Class 2 site on the Registry, the Town of Hempstead Water Department ("Water Department") hired an environmental firm, D&B, to

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recommend a "long-term treatment option" for remediating the groundwater contamination migrating from the NCIA into the BGEWD supply wells. In November 1989, D&B reported that the contamination migrating from the NCIA to the BGEWD supply wells remained below New York's MCLs, but it recommended the installation of a granulated activated carbon treatment system, (the "GAC System"), to ensure these levels remained below the MCLs.

The GAC System was fully constructed by mid-December 1990. Tests following completion of construction showed that VOC concentrations in the BGEWD supply wells remained below state MCLs even without treatment through the system. Between 1990 and spring 1995, the GAC System was the exclusive remedy to treat the groundwater for the BGEWD supply wells. The GAC System remains in use today, more than twenty-two years after its construction and the drinking water continues to meet the state MCLs.

In May 1995, the NYSDEC and New York State Department of Health jointly held a public meeting concerning the groundwater contamination. After the public meeting, D&B was hired to identify further remedial options. In late May 1995, D&B recommended supplementing the GAC System with a thirty-foot air stripper tower. Physical on-site construction of the air stripper tower commenced on June 12 and 13, 1995. The air stripper tower was not designed to respond to an imminent threat to the BGEWD supply wells; rather, the Water Department installed it to keep the water within quality standards. In public comments, the Water Department emphasized that the water supply remained "safe to drink" and that the air stripper tower was being installed as a "precautionary measure." For eighteen years, the air stripper tower has been used in conjunction with the GAC System and the drinking water continues to meet the state MCLs.

The air stripper tower is designed to augment the GAC System. Specifically, in a May 23, 1995 letter to the NYSDEC's Director of the Division of Hazardous Waste Remediation, the Town of Hempstead's Presiding Supervisor noted that "***the carbon treatment system has kept the water within quality standards***." And in response to questions from local residents, the Water Department emphasized that "***the water is safe to drink*** and has been up to the present time and will continue to [be]," that it was unnecessary for residents "to buy bottled water," and that the air stripper tower was "being installed at this point in time ***as a precautionary measure***."

In 1995, the NYSDEC began an area-wide Remedial Investigation/Feasibility Study relating to the off-site groundwater contamination migrating south from the NCIA. The NYSDEC adopted a Record of Decision ("ROD") in 2003 for this off-site groundwater, which included the GAC System and air stripper tower as part of the selected permanent remedy. To date, the GAC System and air stripper tower remain the only part of the permanent remedy that has been implemented and the VOCs detected in the BGEWD supply wells have remained below the state MCLs.

The installation of the GAC System and air stripper tower are appropriate actions as CERCLA explicitly contemplates remedial actions that are designed only to "minimize"—not eliminate—"the release of hazardous substances." 42 U.S.C. § 9601(23). Indeed, the statute lists a number of examples of remedial action that would not "remediate the underlying source"

of contamination, including "confinement," "clay cover," "diversion," and "provision of alternative water supplies." *Id.* By removing VOCs from the groundwater drawn into the BGEWD supply wells, the GAC System and air stripper tower in fact do *more* to address the underlying contamination than these statutory examples. The GAC System and air stripper tower *do* in fact "clean[] contaminated water" and "rid[] the environment of contamination," and thereby minimize the release of hazardous substances "to protect the public health and welfare." *Id.*

USEPA and the New York State Department of Health have both acknowledged that there currently is no exposure pathway that would create a public health risk so long as the engineering controls are in place at the Bowling Green wells. Moreover, the Final Baseline Human Health Risk Assessment (HDR, May 2013) for OU-1 is expressly based on a purely hypothetical scenario that "the engineering control in place at the Bowling Green Water District is discontinued in the future." (p. 38; see also pp. 9, 43). Therefore, the whole premise of the risk assessment upon which USEPA's remedy selection is based is a completely imaginary scenario that almost certainly will never occur. USEPA can assure that the hypothetical scenario does not occur, consistent with the NCP, by requiring the continuation of the existing engineering controls, coupled with institutional controls on the use of ground water. See 40 CFR 300.400(a)(1)(iii)(D).

In addition, the sites within the NCIA have all undertaken remedial efforts so that the sources of groundwater contamination migrating from these sites have been removed. As a result, the levels of groundwater contamination migrating from the NCIA will decrease and the residual levels can be monitored to assure that they are being further reduced by natural attenuation.

One other point, Nassau County is fully developed and there are no plans to add any new water districts or public water supply wells. The NCDH and each of the approximately 50 separate public water suppliers in Nassau County routinely monitor and test both treated and untreated water from the supply wells to assure that the drinking water meets the MCLs. In the remote hypothetical chance that a new water district is formed south of the NCIA or new supply wells are drilled in areas that could intersect with groundwater plumes migrating south of the NCIA, and if VOCs are detected in these wells, they can be handled in the same successful fashion as is being done at the BGEWD supply wells by a GAC System and air stripper tower. This would fully eliminate the potential exposure pathway. As noted above, no such plans to form a new water district or install new supply wells have been announced, proposed or even hinted about.

Thus, the USEPA's proposed remedy is unnecessary as the existing systems already in place have eliminated the exposure pathway and the sources.

IV. THE PROPOSED PLAN IS INCONSISTENT WITH THE NCP BECAUSE THE PLAN IS NOT COST-EFFECTIVE

The Proposed Plan for the New Cassel/Hicksville Groundwater Contamination Superfund Site (the "Site") is inconsistent with the NCP because it is not cost effective. 40 C.F.R.

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§300.430(c)(9)(iii). "Each remedial action selected shall be cost-effective..." §300.430(f)(1)(ii)(D). "The NCP is designed to make the party seeking response costs choose a cost-effective course of action to protect the public health and the environment." *United States v. Chapman*, 146 F.3d 1166, 1170 (9th Cir. 1998).

"A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." §300.430(f)(1)(ii)(D). Overall effectiveness is determined by balancing the following primary balancing criteria: (1) long term effectiveness and performance; (2) reduction in toxicity, mobility and volume through treatment; and (3) short-term effectiveness. *Id.* Overall effectiveness is then compared to the cost. *Id.* The Proposed Plan does not meet this legal requirement.

A. Long-term Effectiveness and Permanence

Long term effectiveness and performance is assessed using the following factors: (1) magnitude of the residual risk remaining from untreated waste or treatment residuals remaining at the conclusion of the remedial activities; and (2) the adequacy and reliability of controls such as containment systems and institutional controls that are necessary to manage treatment residuals and untreated waste. §300.430(e)(9)(iii)(C).

There is no residual risk remaining from untreated water at the Site, because the MCLs have never been exceeded and since 1990 the drinking water has been treated to remove the low levels of VOCs in the drinking water. Even after the installation of USEPA's Proposed Plan, the town's water supply will still require the current well-head treatment.[2] Put simply, the proposed remedy does not make the drinking water any safer than it already is. Additionally, there is a risk that the Proposed Plan could result in the contamination of the upper aquifer. Putting aside the lack of any exposure pathway and the fact that that drinking water has not exceeded the MCLs, the proposed in-well vapor stripping may not be efficient enough to achieve Class GA drinking water in areas of the plumes. A pilot study is necessary to determine if Class GA water quality standards could even be achieved by the proposed remediation.[3] If the stripping process does not achieve Class GA standards, the upper aquifer is at risk of contamination by the groundwater treated by in-well vapor stripping.[4]

There is nothing effective in treating contamination, where treatment is already being provided to eliminate public risk, and the proposed additional treatment, undertaken at enormous expense, will not change or substantially enhance those effective risk controls already in place.

B. Reduction of Toxicity, Mobility or Volume through Treatment

[2] USEPA, Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site, at 6-4 (July 2013)
[3] USEPA, Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site, at 5-14 (July 2013)
[4] USEPA, Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site, at 6-7 (July 2013)

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The reduction of toxicity, mobility or volume concerns the degree to which the alternatives employ recycling or treatment that reduces toxicity, mobility or volume. §300.430(e)(9)(iii)(D). The following factors are considered: (1) the treatment or recycling processes the alternatives employ and the materials they will treat; (2) the amount of hazardous substances, pollutants, or contaminants that will be destroyed, treated or recycled; (3) the degree of expected reduction in toxicity, mobility or volume of the waste; (4) the degree to which the treatment is irreversible; (5) the type and quantity of residuals that will remain following treatment; and (6) the degree to which the treatment reduces the inherent hazards posed by the principal threats at the site. *Id.*

Although the Proposed Plan could result in the reduction of chlorinated VOCs, such reduction is not necessary for public health because there is already a water treatment system in place that capably removes VOCs to below safe drinking water standards. The proposed additional treatment will not "reduce[ ] the inherent hazards posed by the principal threats at the site." Therefore, the Proposed Plan is essentially treatment for its own sake, not to achieve a meaningful reduction in hazard.

C. Short-Term Effectiveness

The short-term impacts are evaluated using the following factors: (1) short-term risks that might be posed to the community during implementation of an alternative; (2) potential impacts on workers during remedial action and the effectiveness and reliability of protective measures; (3) potential environmental impacts of the remedial action and the effectiveness and reliability of mitigation measures; and (4) the time until protection is achieved. §300.430(c)(9)(iii)(E).

The Proposed Plan requires on-site mixing of chemical reagents, which presents an unnecessary risk of exposure to workers and residents of the community.[5] Additionally, the chemical reagents will likely be injected into the ground under high pressure.[6] When chemical reagents are injected under pressure, the chemicals may find their way to the surface through preferential pathways and present additional exposure hazards for the community.[7]

There is also an unnecessary risk to workers from the proposed groundwater extraction system.[8] Since the Proposed Plan requires the groundwater to be transferred under pressure to the centralized treatment plant, there is a risk of release of contaminated groundwater.[9]

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[5] USEPA, Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site, at 6-10 (July 2013)
[6] USEPA, Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site, at 6-10 (July 2013)
[7] USEPA, Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site, at 6-10 (July 2013)
[8] USEPA, Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site, at 6-7 (July 2013)
[9] USEPA, Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site, at 6-10 (July 2013)

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The in-well vapor stripping system will be susceptible to clogging from the precipitation of iron once the groundwater has been oxygenated.[10] This will compromise the effectiveness of the Proposed Plan. Overall, the Proposed Plan introduces short-term risks without achieving any reduction of long term risks.

D. The Costs of the Proposed Plan are Unnecessarily High Compared to Overall Effectiveness

It is not cost effective to have two systems in place to bring VOC concentrations to below safe drinking water standards. Since 1990, the GAC System is in place at the BGEWD supply wells. In 1995, an air stripper tower was installed as a precautionary measure. Additionally, there are four early warning wells located upgradient of the BGEWD supply wells to monitor groundwater contamination. This treatment system is still in operation and is effective at keeping VOCs concentrations to below safe drinking water standards. A $22.9 million remedial measure on top of that is unreasonable when there is already a safe and effective drinking water treatment system in place.

The Proposed Plan contains high costs that cannot be justified by the protection of public health. In-well vapor stripping is a patented technology that is only licensed to a limited number of vendors. Thus, a competitive bidding process will be compromised from the beginning. Furthermore, a suitable location for the centralized treatment plant has not been identified, despite efforts to find one. No compatible sites were identified within a quarter mile radius. Since the vapor from the in-well systems would need to be conveyed a long distance to the central treatment plant, several large vacuum blowers will be necessary, resulting in both a noise disturbance and increased costs.

For all of these reasons, the Proposed Plan is not consistent with the NCP and should not be implemented.

E. The Proposed Plan is not Cost-Effective because it is Not Coordinated with Proposed Action by New York State

The Proposed Plan is inconsistent with and not effectively coordinated with remediation measures contemplated by the NYSDEC at the Site. Attached is a recent letter from NYSDEC that contemplates two significant remedial expenses without any administrative or technical discussion in the Proposed Plan as to the cost-effectiveness or technical impact of these proposed expenditures.

NYSDEC proposes installation of a series of groundwater circulation wells at the Site down to 150 feet below grade north of Old Country Road. NYSDEC also proposes, at public expense, some as yet unpublicized remedial action plan for groundwater down to 250 feet in the same location. The Proposed Plan does not discuss the feasibility, impact or cost effectiveness of these proposals.

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[10] USEPA, Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site, at 6-12 (July 2013)

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The NYSDEC proposed groundwater circulation well system in the upper 150 feet would remediate and influence the groundwater at least 150 feet south of Old County Road into the geographical area covered by USEPA OU-1 and the Proposed Plan. NYSDEC's action must be technically analyzed and publicly discussed by USEPA so that cost-effectiveness and technical feasibility is achieved. NYSDEC's proposed expenses are redundant, not complementary, with the remedial measures contemplated in the Proposed Plan. It is imperative that USEPA generate detailed technical analysis, and present it in the public record, of the existing and contemplated remedial measures at the Site. Without this remedial and feasibility analysis and coordinated technical review, USEPA cannot achieve cost-effectiveness and thus compliance with the NCP.

V. USEPA IS BARRED FROM PURSUING A CERCLA CLAIM AGAINST PARTIES WHO HAVE PREVAILED IN AN ACTION BROUGHT BY THE STATE UNDER CERCLA FOR THE SAME EVENT

Before selecting a remedial action that involves substantial expense and only limited practical benefit, USEPA should also consider the likelihood that it will not be able to recover response costs from responsible parties. Here, because any claim for recovery of response costs is likely to be time-barred, USEPA should be hesitant to embrace the expansive remedial program described in the proposed plan. As the State's claim for cost recovery under CERCLA already has been held to be untimely, a claim by USEPA will likely be foreclosed by principles of claim or issue preclusion.

In 2003, the NYSDEC brought an action under CERCLA "seeking to recover past and future response costs incurred by the State in responding to the alleged release and threatened release of hazardous substances at nine facilities that form the New Cassel Industrial Area Superfund Site, located in Westbury, New York," and to "redress harm to the public health and environment of the State resulting from defendants' alleged acts and omissions at the NCIA Site." *New York v. Next Millennium Realty, LLC*, CV-06-1133 SJF MLO, 2008 WL 1958002 (E.D.N.Y. May 2, 2008) (the "State Action"). The State plaintiffs' federal claims against the defendants were dismissed in their entirety with prejudice as being time-barred. *Next Millenium Realty, LLC v. Adchem Corp.*, CV-06-1133 SJF ARL, 2011 WL 6012042 (E.D.N.Y. Nov. 29, 2011).

USEPA would be barred under the principles of *res judicata* and collateral estoppel from naming the State Action defendants as potentially responsible parties ("PRPs") in any action it might bring to recover CERCLA response costs for cleanup of OU-1 because it is the same relief that was sought in the State Action in which summary judgment was granted against the State.

"Under res judicata, a final judgment on the merits bars further claims by parties or their privies based on the same cause of action." *Montana v. U. S.*, 440 U.S. 147 (1979). To prove *res judicata*, also known as claim preclusion, "a party must show that 1) the previous action involved an adjudication on the merits; 2) the previous action involved the plaintiffs or those in privity with them; and 3) the claims asserted in the subsequent action were, or could have been, raised in the prior action." *Monahan v. New York City Dept. of Corrections,* 214 F.3d 275, 285 (2d Cir. 2000) (citing *Allen v. McCurry*, 449 U.S. 90, 94, 101 S. Ct. 411 (1980).

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With respect to the first requirement, courts have held that "a dismissal on statute of limitations grounds operates as a dismissal on the merits for res judicata purposes." *Quadrozzi Concrete Corp. v. New York,* 03 Civ. 1905 (LAP), 2004 U.S. Dist. LEXIS 19880 (S.D.N.Y. Sept. 30, 2004) (quoting *Karamoko v. New York City Hous. Auth.,* 170 F. Supp. 2d 372, 377 (S.D.N.Y. 2001), *aff'd* 2005 U.S. App. LEXIS 18212 (2d Cir. Aug. 23, 2005). Assuming the other elements of *res judicata* have been met, the federal district court's finding that the state's action was barred by the statute of limitations has a preclusive effect on any subsequent CERCLA claim that may be brought by USEPA.

With respect to the second element necessary to establish *res judicata*, the relationship between the federal government and governments of the states in the CERCLA context has been considered to be one of privity by the United States. *See State of New York v. Gen Elec. Co.,* No. 83-CV-1615, 592 F. Supp. 291, 294 n. 7 (N.D.N.Y. 1984) (where, in its *amicus curiae* brief, the United States described its interest in the case as follows: "First, the United States relies to a great extent on the response of states to the widespread problems generated by the disposal of hazardous wastes. Second, the United States is vitally interested in the outcome of actions brought under CERCLA to the extent that its own CERCLA actions may be affected by any adverse rulings.").

As to the third element, a cost recovery action brought by USEPA would be deemed sufficiently identical to the State Action for purposes of *res judicata*. The transaction or series of transactions at issue is the remediation of a single hazardous waste site, and USEPA's claim would require the same evidence as that presented in the State Action to prove liability. *See New York State Elec. & Gas Corp. v. FirstEnergy Corp.,* No. 3:03-CV-0438 (DEP), 2011 U.S. Dist. LEXIS 74216, *220 (N.D.N.Y. Jul. 11, 2011).

Under the doctrine of collateral estoppel, or issue preclusion, "once an issue is actually and necessarily determined by a court of competent jurisdiction, that determination is conclusive in subsequent suits based on a different cause of action involving a party to the prior litigation." *Montana v. U.S., 440 U.S. 147 (1979)*; *Parklane Hosiery Co. v. Shore*, 439 U.S. 322, 326 n. 5 (1979). In addition, collateral estoppel does not require the parties to the second action, or their privies, to have been bound by the original judgment. *Sathianathan v. Smith Barney, Inc.,* No. 04 Civ. 7122 (DAB) (FM), 2006 U.S. Dist. LEXIS 9828 (S.D.N.Y. Feb. 24, 2006).

The doctrine of collateral estoppel will preclude the relitigation of an issue decided in a previous proceeding even if the parties to the second action are not the same as those appearing in the earlier suit as long as: the issues in the proceedings are identical; the issue was actually litigated and decided in the prior proceeding; there was full and fair opportunity to litigate in the prior proceeding; and the issue previously litigated was necessary to support a valid and final judgment on the merits. *Sathianathan,* 2006 U.S. Dist. LEXIS 9828, at *51; *Liona Corp. v. PCH Assocs. (in re PCH Assocs.),* 949 F.2d 585, 593 (2d Cir. 1991). Here EPA would be barred from relitigating the issue of the classification of the response actions taken at the Site since that issue satisfies the elements of a collateral estoppel defense. In addition, USEPA would be collaterally estopped from relitigating the statute of limitations issue because all the elements are satisfied and, as courts have held, there can be only one remedial action for any given facility for statute of limitations purposes, and all cost recovery claims associated with a site are time barred when

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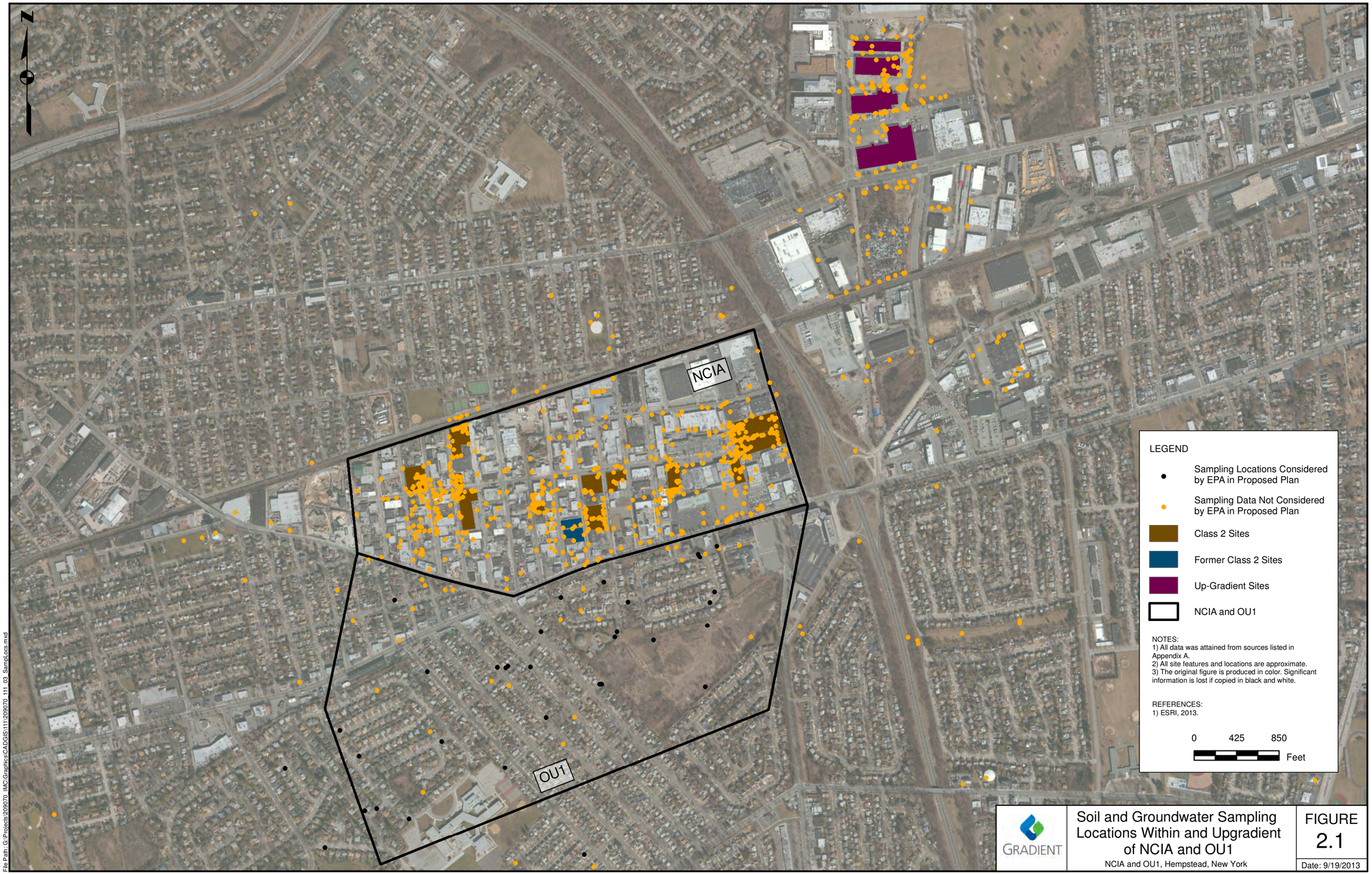
remedial activity has been initiated more than six years before the commencement of a case. *See New York State Elec. & Gas Corp. v FirstEnergy Corp.*, 2011 U.S. Dist. LEXIS 74216, at *236-237.

In certain situations, a nonparty may be bound by a final judgment when there is a certain relationship between a party and a nonparty. *Taylor v. Sturgell*, 553 U.S. 880, 892 (2008). The issue of res judicata/collateral estoppel in the context of concurrent environmental enforcement action was addressed by the court in *United States v. ITT Rayonier, Inc.*, 627 F.2d 996 (9th Cir. 1980). In *ITT Rayonier*, the court held that the USEPA was collaterally estopped from asserting a position contrary to the state court action on the same issue against the same defendant. The court determined that the interests of the State of Washington Department of Ecology and USEPA were "identical and their involvement sufficiently similar," and shared "more than an abstract interest in enforcement." *ITT Rayonier, Inc.*, 627 F.2d at 1003. The court held that the sufficiently close relationship precluded relitigation of the issue already resolved in the state court. *Id.*

Further, in *Harmon Indus., Inc. v. Browner*, 191 F.3d 894 (8th Cir. 1999), both the State of Missouri and USEPA initiated actions naming the same defendant, and both actions involved the enforcement of regulations based upon identical facts and legal principles. 191 F.3d at 903. The *Harmon Indus., Inc.* court determined that because the State of Missouri advanced the exact same legal right under the statute as did USEPA in its administrative action, the identity of the parties requirement was satisfied for purposes of *res judicata*. The court also rejected USEPA's sovereign immunity defense based on the United States Supreme Court's decision in *Montana v. United States*, 440 U.S. 147 (1979), and dismissed USEPA's enforcement action on principles of *res judicata* although the United States was not a party to the state's suit.

For these reasons, USEPA would be barred from pursuing a cost recovery claim against the defendants named in the State Action because it has already been determined by the court that the claims are untimely and barred by the statute of limitations, and because any claim by USEPA for recovery of remedial costs for the Site arises out of the same event, transaction, and occurrence that was the subject matter of the State Action, which has been resolved and is final on the merits.



File Path: G:\Projects\209070_IM\C\Graphics\CADGIS\111\209070_111_03_SampLocs.mxd

GRADIENT

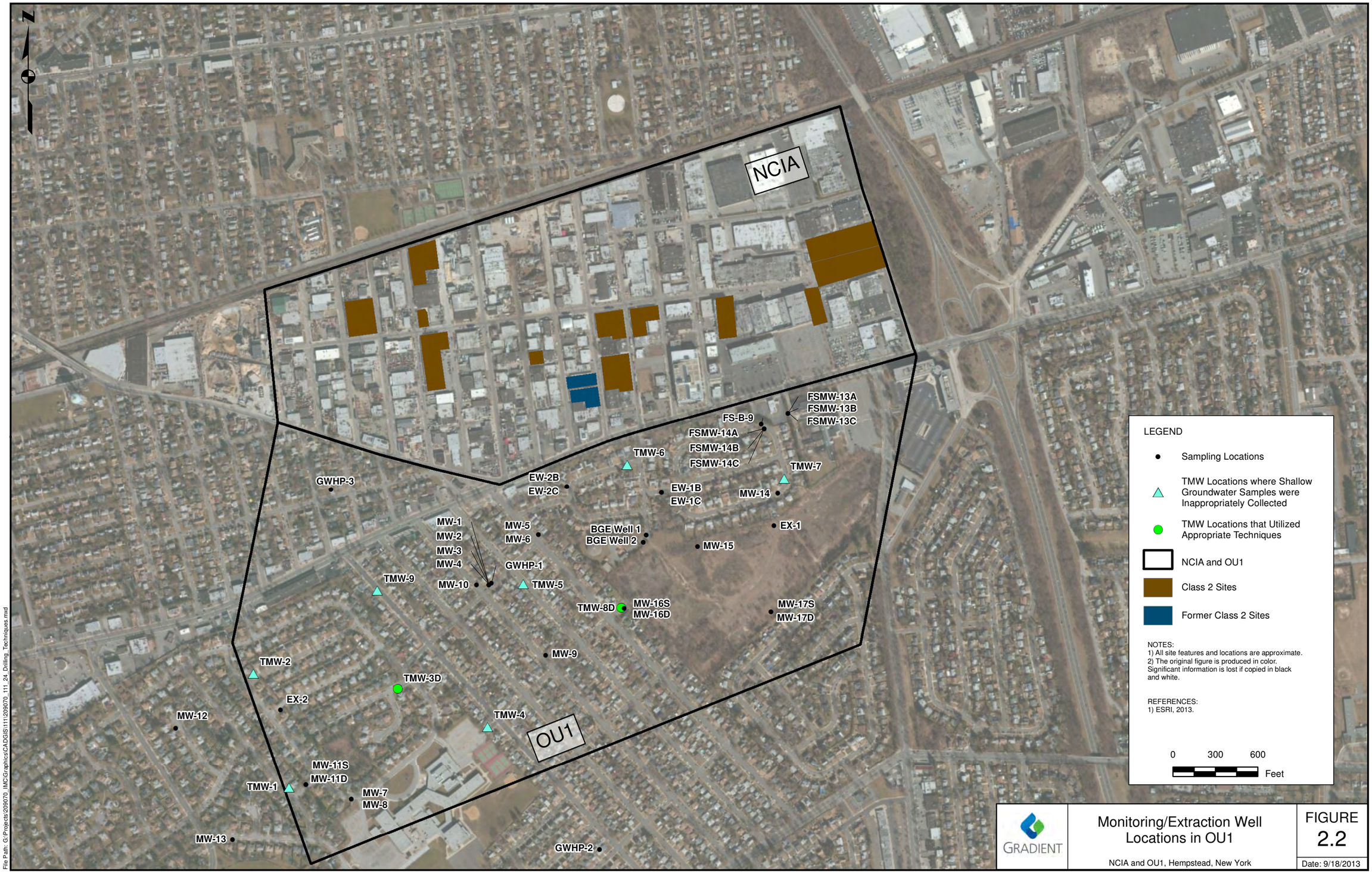
Soil and Groundwater Sampling Locations Within and Upgradient of NCIA and OU1

NCIA and OU1, Hempstead, New York

FIGURE 2.1

Date: 9/19/2013

R2-0012539



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GRADIENT

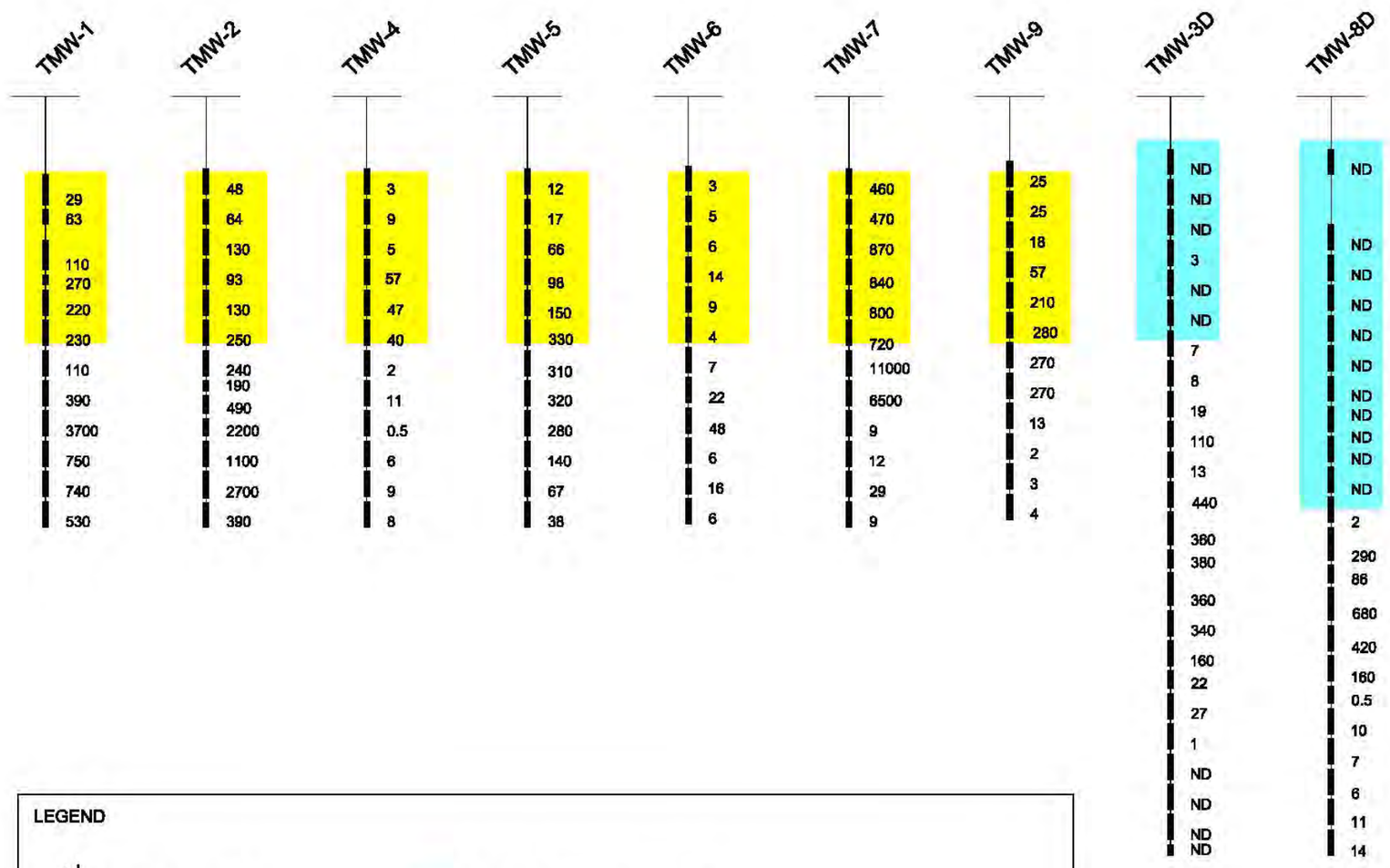
Monitoring/Extraction Well Locations in OU1

NCIA and OU1, Hempstead, New York

FIGURE 2.2

Date: 9/18/2013

R2-0012540



LEGEND

TMW-1 — Sample ID

Boring Depth

Sample Interval

42 — PCE Concentration (µg/L)

Shallow Groundwater Impacts Caused by Cross-Contamination due to Inappropriate Sampling Technique

Lack of Cross-Contamination at Properly Sampled Locations

NOTES:
1) Drawing is not to scale.
2) Drawing does not imply spatial order of well locations.

REFERENCE:
1) Dvirka and Bartilucci, 2009.

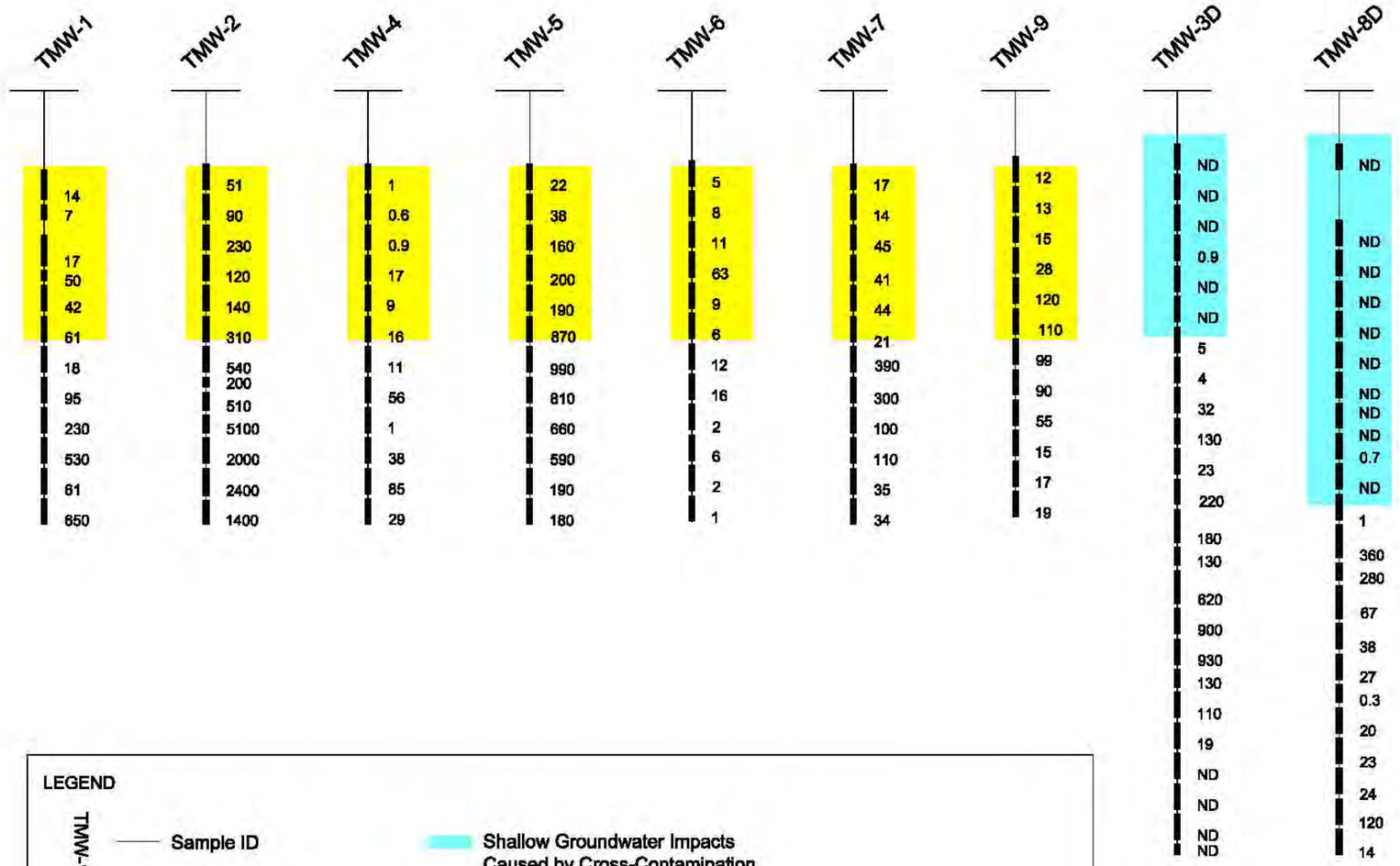
GRADIENT

PCE Groundwater Sampling Results
Temporary Monitoring Wells
OU1, Hempstead, New York

FIGURE
2.3
Date: 9/18/2013

File Path: G:\Projects\2060070_IMC\Graphics\Won\CAD\XsectionNottoScale.dwg

R2-0012541



LEGEND

TMW-1 — Sample ID

Boring Depth

Sample Interval

42 — TCE Concentration (µg/L)

Shallow Groundwater Impacts Caused by Cross-Contamination due to Inappropriate Sampling Technique

Lack of Cross-Contamination at Properly Sampled Locations

NOTES:
1) Drawing is not to scale.
2) Drawing does not imply spatial order of well locations.

REFERENCE:
1) Dvirka and Bartilucci, 2009.

GRADIENT

TCE Groundwater Sampling Results
Temporary Monitoring Wells
OU1, Hempstead, New York

FIGURE
2.4

Date: 9/18/2013

File Path: G:\Projects\206070_IMC\Graphics\NonCADXsectionNottoScale.dwg

R2-0012542

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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1	Black, JP ; Sobieraj, JA. [ESC Engineering of New York, P.C.]. February 14, 200e. "Letter to K. Carpenter (NYSDEC) re: Clarifications on Revision No. 1 to the Groundwater IRM Pilot Test Design Report, Former General Instruments Corporation Site, Hicksville, New York." 3p. ALBED00132681 - ALBED00132683.
2	New York State Dept. of Environmental Conservation (NYSDEC). 2000. "New Cassel Industrial Area (NCIA) Environmental Investigations and Sampling Database."
3	Holzmacher, McLendon & Murrell Consulting Engineers (Melville, NY). January 1971. "Engineering Study and Report, Industrial Waste Water Collection, Treatment and Disposal, General Instrument Corporation, Hicksville, Nassau County, New York." Report to General Instrument Corporation (Newark, NJ). 164p. SAD 099801 - SAD 099968.
4	Chemtech Consulting Group, Inc. (New York, NY). June 30, 1980. "Preliminary Engineers Report, Industrial Wastewater Generation Treatment and Disposal at General Instrument Corporation, 600 West John Street, Hicksville, New York 11802 (Draft)." 163p. SAD 100093 - SAD 100255
5	Ecological Analysts, Inc.. 1983. "Draft Preliminary Investigation of the General Instruments Corporation Site, Hicksville, Nassau County, New York. Phase I. Summary Report." 7p. SSB235296 - SSB 235302.
6	Baummer, JC Jr.. [Ecological Analysts, Inc.]. May 12, 1983. "Memorandum to File DEC 31 A re: General Instruments Site." 1p. SAD 104675.
7	Ecological Analysts, Inc. (Middletown, NY). November 1983. "Preliminary Investigation of the General Instruments Corporation Site, Hicksville, Nassau County, New York. Phase I. Summary Report." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 136p. SSB 206552 - SSB 206687.
8	Fred C. Hart Associates, Inc. (New York, NY). May 1985. "Removal of Contamination from the General Instrument Microelectronics Division Wastewater Lagoon." 87p. SAD 111195 - SAD 111287.
9	Fred C. Hart Associates, Inc.. May 2, 1985. "Letter to H. Schaefer (Nassau County Dept. of Health) re: Summary of the results of the volatile organics analysis." 2p. SAD 111196; SAD 232522.
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14	Nassau County Dept. of Health (NY) ; Dvirka and Bartilucci Consulting Engineers (Syosset, NY). June 1986. "Investigation of Contaminated Aquifer Segments, Nassau County, NY." 113p. SAD 347597 - SAD 347709.
15	New York State, Dept. of Environmental Conservation (NYSDEC). December 17, 1986. "Order on consent [In the Matter of a Field Investigation to Identify Any Threat to the Environment Caused by the Disposal of Hazardous Wastes and the Implementation of a Remedial Program, by General Instrument Corporation]." Index No. 1-1528, 11p. SSB 235857 - SSB 235867.
16	ERM Northeast, Inc. (Plainview, NY). June 1987. "Proposed Work Plan for a Subsurface Investigation, Air Techniques, Inc., Hicksville, New York." Report to Air Techniques, Inc.. 18p. SSB 206384 - SSB 206401.
17	ERM-Northeast, Inc. (Plainview, NY). August 1987. "Remedial Excavation and Subsurface Investigation, Air Techniques, Inc., Hicksville, New York." Report to Air Techniques, Inc. (Hicksville, NY). 141p. SSB 240026 - SSB 240166.
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23	Stearns & Wheler (Cazenovia, NY).. August 1, 1989. "Remedial Investigation/Feasibility Study Work Plan for General Instrument Corporation, Hicksville, New York - Addendum." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 17p. SDOH 242260 - SDOH 242279.
24	Whallon, CC. [OHM Corp.]. September 12, 1989. "Report on Remedial Activities at General Instrument Corporation, Hicksville, New York." Report to General Instrument Corp.. 107p. SAD 111696 - SAD 111803.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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26	Stearns & Wheler (Cazenovia, NY). December 1989. "Quality Assurance Project Plan, General Instrument Corp., Hicksville, New York." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 92p. SSB 228796 - SSB 228887.
27	New York State, Dept. of Environmental Conservation (NYSDEC). December 4, 1989. "Order on consent [In the matter of Air Techniques]." RCRA # CI-0020-89-09 ; EPA # NYD 043835081, 7p. SSB246722 - SSB246728.
28	Leong, SY. [Holzmacher, McLendon & Murrell, P.C. (H2M Group)]. January 2, 1990. "Letter to A. Pettinelli (Nassau County Department of Health) re: Utility Manufacturing Co., Inc. - Sanitary and stormwater drywell remediation." 3p. SW 132564 - SW 132566.
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34	Haimson, JS. [Holzmacher, McLendon & Murrell, P.C. (H2M Group)]. July 25, 1990. "Letter to A. Pettinelli (Nassau County Department of Health) re: Utility Manufacturing Co., Inc., Westbury, New York, developing data on groundwater quality upgradient of Westbury, New York facility." 3p. OAG007413 - OAG007415.
35	Anson Environmental Ltd. (Northport, NY). August 1990. "Phase II Investigation Report for Nassau County Section 11, Block 328, Lots 144, 157, 169, 174 and 175, New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York. Volume One." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 972p. SSB 008252 - SSB 009223SSB 000739.
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37	Haimson, JS. [Holzmacher, McLendon & Murrell, P.C. (H2M Group)]. January 23, 1991. "Letter to T. Kinsley (Nassau County Department of Health) re: Utility Manufacturing Co., Inc., Westbury, New York Facility, groundwater sampling and analysis of upgradient monitoring well." 10p. SAD 349248 - SAD 349257.
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40	Holzmacher, McLendon & Murrell, P.C.. April 1991. "Preliminary Site Investigation Report, Permafuse Corporation, 675 Main Street, Westbury, New York." Report to Permafuse Corporation (Westbury, NY). 60p. SAA 181891 - SAA 181950.
41	New York State, Dept. of Environmental Conservation (NYSDEC). April 4, 1991. "Order on consent [In the Matter of Dionics, Incorporated]." Case Number CI-5262-91-02, 5p. SSB243625 - SSB243629.
42	Impact Environmental (Kings Park, NY). May 28, 1991. "Environmental Assessment, Property Located at 95 Hopper Avenue, New Cassel, New York, Nassau County Tax Map Number 011-071-9, 10, 11, 12, 13, 54, 55, 56, 57 & 58." 24p. SW 117448 - SW 117471.
43	Impact Environmental (Kings Park, NY). May 28, 1991. "Appendix: Environmental Assessment, Property Located at 95 Hopper Avenue, New Cassel, New York, Nassau County Tax Map Number 011-071-53, 54, 55, 56, 57 & 58." 63p. SW 126183 - SW 126245.
44	ERM-Northeast. December 1991. "Phase II Investigation Work Plan, Air Techniques Site, Hicksville, Nassau County, New York, Site #1-30-040 (Second Revision)." Report to GTE Products Corporation. 137p. SSB 204500 - SSB 204636.
45	Fanning, Phillips & Molnar (Ronkonkoma, NY). December 1991. "Potentially Responsible Party Petition to Delist, The Metpar Corp., 95, 97, and 99 State Street, New Cassel, New York (Registry Number 1-30-043)." Report to Metpar Corp. (New Cassel, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 180p. SSB 034033 - SSB 034250.

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No.	Reference
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47	ERM-Northeast. 1992. "Data Validation Review of Groundwater Sample Analyses, GTE Air Techniques, Hicksville, New York, ERM-Northeast Project Number 342.003, Adirondack Environmental Services Case No. E10000, SDG No.GIW-3-72." Submitted to NYSDEC Region 1. 15p. SSB 204328 - SSB 204342.
48	Stearns & Wheler (Cazenovia, NY). 1992. "Remedial Investigation, General Instrument Corporation, Hicksville, New York. Volume II: Appendices A through I." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 249p. SAA 190079 - SAA 190327.
49	Stearns & Wheler (Cazenovia, NY). 1992. "Remedial Investigation, General Instrument Corporation, Hicksville, New York. Volume III: Appendices J-1 and J-2." Submitted to NYSDEC Region 1.. 224p. SAA 190329 - SAA 190552.
50	Stearns & Wheler (Cazenovia, NY). 1992."Remedial Investigation, General Instrument Corporation, Hicksville, New York. Volume IV: Appendices K-1 through N." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 235p. SAA 190554 - SAA 190788.
51	General Instrument Corp.. 1992 - 1995. "Log Book #1. General Instrument Field Book." 88p. SSB 237810 - SSB 237897.
52	Stearns & Wheler (Cazenovia, NY). January 1992. "Remedial Investigation, General Instrument Corporation, Hicksville, New York (Draft Report)." Report to General Instrument Corp... 169p. SAA 189909 - SAA 190077.
53	Anson Environmental Ltd. (Northport, NY). March 1992. "Phase II Investigation Report for Nassau County Section 11, Block 328, Lots 159, 170, 171, 164, 166, 23-26, 29-45, 63-67, 117, 58-61, 118, 162, 186, 142, 154, 178, 179, 185, 183, 173; Block 160, Lots 129-133, 173-177 New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York. Volume Two: Summary Data Package." 153p. SSB 011382 - SSB 011534.
54	Anson Environmental Ltd. (Northport, NY). March 1992. "Phase II Investigation Report for Nassau County Section 11, Block 328, Lots 159, 170, 171, 164, 166, 23-26, 29-45, 63-67, 117, 58-61, 118, 162, 186, 142, 154, 178, 179, 185, 183, 173; Block 160, Lots 129-133, 173-177 New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York. Volume Three: Analytical Data Report, Volatiles Data." 319p. SSB 019307 - SSB 019624.
55	Anson Environmental Ltd. (Northport, NY). March 1992. "Phase II Investigation Report for Nassau County Section 11, Block 328, Lots 159, 170, 171, 164, 166, 23-26, 29-45, 63-67, 117, 58-61, 118, 162, 186, 142, 154, 178, 179, 185, 183, 173; Block 160, Lots 129-133, 173-177 New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York. Volume Four: Analytical Data Report, Semivolatiles and Pesticide Data." 456p. SSB 011684 - SSB 012139.
56	Anson Environmental Ltd. (Northport, NY). March 1992. "Phase II Investigation Report for Nassau County Section 11, Block 328, Lots 159, 170, 171, 164, 166, 23-26, 29-45, 63-67, 117, 58-61, 118, 162, 186, 142, 154, 178, 179, 185, 183, 173; Block 160, Lots 129-133, 173-177 New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York. Volume Five: Analytical Data Report, Inorganic Data." 149p. SSB 011535 - SSB 011683.
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61	Anson Environmental Ltd. (Northport, NY). August 1992. "Phase II Investigation Report for Nassau County Section 11, Block 328, Lots 46 and 176 [694 and 770 Main Street], New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York." 822p. SSB 012272 - SSB 013094.
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63	Lawler, Matusky & Skelly Engineers (Pearl River, NY). September 1992. "PSA Work Plans for New Cassel Industrial Area Site." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 47p. SSB 015738 - SSB 015784.
64	Anson Environmental Ltd. (Northport, NY). October 21, 1992. "Closure Plan, IMC Magnetics Corp., 570 Main Street, Westbury, NY 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Region 1 (Stony Brook, NY). EPA Identification Number: NY002041895, 20p.
65	ERM-Northeast (Woodbury, NY). October 28, 1992. "Phase II Investigation Report, Air Techniques Site, Hicksville, Nassau County, New York, Site No. 1-30-040 (Draft)." Report to GTE Products Corp. (Stamford, CT). 55p. SSB 192298 - SSB 192352.
66	Anson Environmental Ltd. (Huntington, NY). November 21, 1992. "Closure Plan, IMC Magnetics Corp., 570 Main Street, Westbury, NY 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Region 1 (Stony Brook, NY). EPA Identification Number: NY002041895, 13p.

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67	Anson Environmental Ltd. (Northport, NY). December 17, 1992. "Closure Plan, IMC Magnetics Corp., 570 Main Street, Westbury, NY 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Region 1 (Stony Brook, NY). EPA Identification Number: NY002041895, 13p.
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73	Smith, DJ. [Holzmacher, McLendon & Murrell, P.C. (H2M Group)]. January 25, 1993. "Letter to A. Gara (NYSDEC) re: Uniflex, Inc. - Response to NYSDEC's letter dated December 24, 1992 regarding a NYSDEC hazardous waste compliance inspection." 66p. SSB249512 - SSB249577.
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78	Anson Environmental Ltd. (Huntington, NY). March 1993. "Phase II Investigation Report for Nassau County Section 11, Block 74, Lots 1-16, 75-82 New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York. Volume Four: Pesticide/PCB Data." 173p. SSB 009719 - SSB 009891.
79	Anson Environmental Ltd. (Huntington, NY). March 1993. "Phase II Investigation Report for Nassau County Section 11, Block 74, Lots 1-16, 75-82 New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York. Volume Five: Inorganic Data." 234p. SSB 010286 - SSB 010519.
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83	Anson Environmental Ltd. (Huntington, NY) ; Anson, D. July 21, 1993. "Letter Report to R. Eichenwald (IMC Magnetics) re: Closure Plan, 570 Main Street, Westbury, NY [Soil sampling and laboratory results]." EPA ID # NYD002041895, 79p.
84	Terra Vac (West Trenton, NJ). July 28, 1993. "Site Health and Safety Plan for Conducting a Soil Vapor Extraction Pilot Test and an Interim Remedial Measure at the General Instrument Site in Hicksville, New York, Terra Vac Project #: 40-4156." Report to Stearns & Wheler (Cazenovia, NY). 72p. SAA 185195 - SAA 185266.
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86	Lawler, Matusky & Skelly Engineers (Pearl River, NY). August 1993. "PSA Tasks 3 and 4 Work Plans for New Cassel Industrial Area Site." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 71p. SSB 015785 - SSB 015855.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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91	Anson Environmental Ltd. (Huntington, NY). December 3, 1993. "Closure Plan, IMC Magnetics Corp., 570 Main Street, Westbury, New York." 21p.
92	Anson Environmental Ltd. (Huntington, NY). December 3, 1993. "Closure Plan, History, IMC Magnetics Corp., 570 Main Street, Westbury, NY, 11590." Report to IMC Magnetics Corp. (Hauppauge, NY). EPA Identification Number: NY002041895, 10p.
93	Terra Vac (West Trenton, NJ). December 22, 1993. "Soil Vapor Extraction Pilot Test Report, General Instrument Site, Hicksville, New York, Terra Vac Project No. 40-4156." Report to General Instrument Corp. (Hicksville, New York).. 58p. SAA 190790 - SAA 190847.
94	H2M Labs, Inc. (Melville, NY). 1994. "Analytical Data Package, Contract No.: C003180, Case No.: SH194, SDG No. 0428-00." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 23p. SSB 033372 - SSB 033394.
95	H2M Labs, Inc. (Melville, NY). 1994. "Analytical Data Package for New York State Department of Environmental Conservation, Contract No.: C003180, Case No.: SH194, SDG No.: 0922-0, ASP A Protocol, Received September 22, 1994: Volatile Organics, ASP A Deliverables." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 25p. SSB 225139 - SSB 255163.
96	Anson Environmental Ltd. (Huntington, NY). January 1994. "Phase II Investigation Report for Nassau County Section 11, Block 181, Lots 26-29 [84 New York Avenue] New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York. Consolidated Volume One." 151p. SSB 010958 - SSB 011108.
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100	Anson Environmental Ltd. (Huntington, NY). March 1994. "Phase II Investigation Report for Nassau County Section 11, Block 7, Lots 13-15, 69-72, 67 Sylvester Street, Westbury, NewYork [Doak Pharmacal], New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York." 154p. SSB 011228 - SSB 011381.
101	Fanning, Phillips & Molnar (Ronkonkoma, NY). March 1994. "New York State Site Registry Delisting Petition for Uniflex, Inc., 474 Grand Blvd., Westbury, New York, New Cassel Inactive Hazardous Waste Disposal Site (Registry Number 1-30-043)." Report to Uniflex, Inc.. 145p. SSB 033227 - SSB 033371.
102	Lawler, Matusky & Skelly Engineers. May 1994. "PSA Tasks 5 and 6 Work Plans for New Cassel Industrial Area Site." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 43p. SSB 015858 - SSB 015900.
103	Fanning, Phillips & Molnar (Ronkonkoma, NY). June 1994. "Interim Remedial Measures Report for the Uniflex, Inc., Site, 474 Grand Blvd., Westbury, New York." Report to Uniflex, Inc. ; Rivkin, Radler and Kremer. 50p. SSB 033473 - SSB 033524.
104	Roth, RJ ; Peterson, RM. [Terra Vac]. July 13, 1994. "Letter to C. Gorsch (General Instrument Corp.) re: IRM monthly report-Month #2, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4156." 17p. SSB 226456 - SSB 226472.
105	Roth, RJ ; Peterson, RM. [Terra Vac]. July 13, 1994. "Letter to C. Gorsch (General Instrument Corp.) re: IRM startup report, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4156." 24p. SSB 226473 - SSB226496.
106	Welkin Environmental Engineering Management Co. (Massapequa, NY).. August 1994. "Decontamination Closure Report of Wafer 'A,' General Instrument Corp., Hicksville Facility, 600 West John Street, Hicksville, NY 11802." Report to General Instrument Corp. (Melville, NY).. 35p. SSB 235200 - SSB 235234.
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108	ERM-Northeast (Woodbury, NY). August 19, 1994. "Supplemental Phase II Investigation Report, Air Techniques Site, Hicksville, Nassau County, New York, Site Number 1-30-040." Report to GTE Operations Support Inc. (Stamford, CT). 40p. SSB 206415 - SSB 206454.
109	Anson Environmental Ltd. (Huntington, NY). September 1994. "Phase I Investigation Report for Nassau County Section 11, Block 77, Sections 66-69, 59 New York Avenue, New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York." 97p. SSB 011131 - SSB 011227.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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111	CA Rich Consultants, Inc. (Sea Cliff, NY). October 1994. "Work Plan, Leaching Pool Contamination, Investigation and Clean-Up, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 17p. SAA 184496 - SAA 184512.
112	Lawler, Matusky & Skelly Engineers (Pearl River, NY). October 1994. "Preliminary Site Assessment Report, New Cassel Industrial Area Site, North Hempstead, Nassau County, Appendices A-C, Report in 5 Volumes. Volume I (Revised Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC) (Albany, NY). 196p.
113	Welkin Environmental Engineering Management Co. (Massapequa, NY).. October 1994. "Remedial Investigation Report of Wafer 'A,' General Instrument Corp., Hicksville Facility, 600 West John Street, Hicksville, NY 11802." Report to General Instrument Corp. (Melville, NY).. 17p. SSB 235155 - SSB 235170.
114	Roth, RJ ; Peterson, RM. [Terra Vac]. October 17, 1994. "Letter to C. Gorsch (General Instrument Corp.) re: IRM monthly report, operating period: September 1 - October 6, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4156." 8p. SSB 226414 - SSB 226421.
115	Macri, J. [Sulzer Metco, Inc.]. October 24, 1994. "Letter to A. Gara (NYSDEC) re: Transfer of ownership." 1p. SSB246062.
116	Anson, D. [Anson Environmental Ltd.]. November 8, 1994. "Letter to R. Eichenwald (IMC Magnetics) re: Status report, 570 Main Street, Westbury, NY." 3p.
117	H2M Labs, Inc. (Melville, NY). December 1994. "Analytical Data Package for New York State Department of Environmental Conservation, Contract No.: C003180, Case No.: SH194, SDG No.: 1213, ASP A Protocol. Volatile Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 17p. SSB 233490 - SSB 233523.
118	Roth, RJ ; Malmanis, E. [Terra Vac]. December 8, 1994. "Letter to C. Gorsch (General Instrument Corp.) re: IRM monthly report, operating period: October 7 - November 9, 1994, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4156." 7p. SSB 226449 - SSB 226455.
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120	General Consolidated Industries, Inc. (East Farmingdale, NY). February 14, 1995. "Phase I Environmental Site Assessment and Phase II Subsurface Investigation, One Stop Auto & Truck Center, 299 Main Street, Westbury, New York 11590.
121	Roth, R ; Malmanis, E. [Terra Vac]. February 16, 1995. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period: November 9, 1994 - January 31, 1995, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4156." 7p. SSB 234010 - SSB 234016.
122	Roth, R ; Malmanis, E. [Terra Vac]. April 3, 1995. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period: February 1, 1995 - February 14, 1995, General Instrument Site, Hicksville Site, Terra Vac Project #40-41569-7." 7p. SSB 225639 - SSB 225645.
123	Roth, R ; Malmanis, E. [Terra Vac]. May 5, 1995. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period: March 9, 1995 - April 27, 1995, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4225." 15p. SSB 225 - 669 - SSB 225683.
124	CA Rich Consultants, Inc. (Sea Cliff, NY). June 1995. "Hazardous Waste Reduction Plan." Report to Tishcon Corp. (Westbury, NY). 22p. SAA 185897 - SAA 186102.
125	Dvirka and Bartilucci Consulting Engineers (Syosset, NY). June 1995. "Packed Tower Aeration System at Bowling Green Estates Water District, Wells 1 and 2, Pre-Engineered Metal Building and Mechanical Construction Contract, P.W. No. 41-95, Town of Hempstead, Department of Water, Nassau County, New York." 13p. TOHDOW001442 - TOHDOW001454.
126	Dvirka and Bartilucci Consulting Engineers (Syosset, NY). June 1995. "Packed Tower Aeration System at Bowling Green Estates Water District, Wells 1 and 2, General Construction Contract, P.W. No. 35-95, Town of Hempstead, Department of Water, Nassau County, New York." 156p. TOHDOW001149 - TOHDOW001304.
127	Vinci, A ; Roth, R. [Terra Vac]. June 14, 1995. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period: April 28, 1995 - May 31, 1995, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4225." 12p. SSB 234216 - SSB 234227.
128	Dvirka and Bartilucci Consulting Engineers (Syosset, NY). July 1995. "Packed Tower Aeration System at Bowling Green Estates Water District, Wells 1 and 2, Electrical Construction Contract, P.W. No. 42-95, Town of Hempstead, Department of Water, Nassau County, New York." 213p. NCDOH000569 - NCDOH000781.
129	Fanning, Phillips and Molnar (Ronkonkoma, NY). July 1995. "Draft Focussed Source Area Remedial Investigation Work Plan for Metpar Corporation, 95, 97, and 99 State Street, New Cassel, New York." Report to Metpar Corporation. Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 89p. SAA 158312 - SAA 158400.
130	Stearns & Wheler (Cazenovia, NY). August 1995. "IRM Work Plan, Excavation of Former Sump Area, General Instrument Corporation, Hicksville, New York." Report to General Instrument Corp.. 43p. SAA 185268 - SAA 185310.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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133	H2M Labs, Inc. (Melville, NY). September 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: SH095, SDG#: 0927, Water Samples Received September 28 & 29, 1995. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 100p. SAD 063538 - AD 063637.
134	H2M Labs, Inc. (Melville, NY). September 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: SH095, SDG#: 0927, Water Samples Received September 28 & 29, 1995: Volatile Data. Volume 1 of 2." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 308p. SAD 053115 - SAD 053422.
135	H2M Labs, Inc. (Melville, NY). September 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: SH095, SDG#: 0927, Water Samples Received September 28 & 29, 1995: Volatile Data. Volume 2 of 2." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 104p. SAD 063812 - SAD 063915.
136	H2M Labs, Inc. (Melville, NY). September 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Contract #: C003180, Case #: SH095, SDG#: 0928, Water Samples Received 9/29/95: Sample Data Dummary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 119p. SAD 063418 - SAD 063536.
137	Lawler, Matusky & Skelly Engineers (Pearl River, NY). September 1995. "PSA Tasks 1 to 3 Work Plans for New Cassel Industrial Area Multisite PSA." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 48p. BPM 317293 - BPM 317340.
138	Anson Environmental Ltd. (Huntington, NY). September 7, 1995. "Work Plan, Utility Manufacturing aka Wonder King Manufacturing Site, Site ID# 130043H, 700-712 Main Street, Westbury, New York 11590." 14p. SAD 090954 - SAD 090967.
139	Anson Environmental Ltd. (Huntington, NY). October 1995. "Phase II Investigation, Utility Manufacturing/Former Wonder King, 700-712 Main Street, Westbury, New York 11590 [New York State Departtment of Environmental Conservation New Cassel Industrial Area "P" Site Investigation]." 71p. SAD 072244 - SAD 072314.
140	Anson Environmental Ltd. (Huntington, NY). October 1995. "Phase II Investigation Report for Nassau County Section 11, Block 328, Lots 142, 154, 160, 162, 178, 179, and 181; 750 Main Street/1099 Old Country Road, 770 Main Street/1111 Old Country Road [New Cassel Industrial Area ("P" Site No.130043I) Block 328 Properties, Inactive Hazardous Waste Disposal Site]." 41p. SAD 348557 - SAD 348597.
141	Fanning, Phillips and Molnar (Ronkonkoma, NY). October 1995. "Focussed Source Area Remedial Investigation Work Plan for Metpar Corporation, 95, 97, and 99 State Street, New Cassel, New York." Report to Metpar Corporation (New Cassel, NY). Submitted to New York State Department of Environmental Conservation. 92p. SSB 034340 - SSB 034431.
142	H2M Labs, Inc. (Melville, NY). October 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: CE095, SDG#: 0927, Water Samples Received October 26, 1995: Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 174p. SAD 063638 - SAD 063811.
143	H2M Labs, Inc. (Melville, NY). October 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: CD095, SDG#: 0927, Water Samples Received October 26, 1995: Volatile Data." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 137p. SAD 063675 - SAD 063511.
144	Vinci, A ; Callaghan, JF. [Terra Vac]. October 30, 1995. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period August 4, 1995 to October 12, 1995, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4225." 7p. SSB 225596 - SSB 225602.
145	CA Rich Consultants, Inc. (Sea Cliff, NY). November 1995. "Focused Remedial Investigation Work Plan, Sampling & Analysis Plan and Health & Safety Plan, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 45p. SW 129914SW 131304 - SW 131347.
146	Anson Environmental Ltd.. November 2, 1995. "Work Plan, Atlas Graphics, Inc., 567 Main Street, Westbury, NY, Site No. 130043D." 16p. SW 123879 - SW 123894.
147	ABB Environmental Services (Portland, ME). December 1995. "Focused Remedial Investigation/Feasibility Study Work Plan - Task 1, Phase B Deliverable: 68 Kinkel Street - Former Tishcon Site, New Cassell Industrial Area, North Hempstead, New York, Site No. 1-30-43F." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 37p. SSB 002992 - SSB 003028.
148	CA Rich Consultants, Inc. (Sea Cliff, NY). December 1995. "Focused Remedial Investigation Work Plan, Sampling & Analysis Plan and Health & Safety Plan, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 79p. SAD 064098 - SAD 064181.
149	New York State, Dept. of Environmental Conservation (NYSDEC). December 5, 1995. "Order on consent [In the Matter of the Development and Implementation of a Focussed Remedial Investigation/Feasibility Study for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Raylene Holding Corporation and Metpar Corp.]." INDEX # W1-0739-95-11, 17p. SAA 185174 - SAA 185190.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
150	Fanning, Phillips and Molnar (Ronkonkoma, NY). 1996 ?"Focussed Source Area Remedial Investigation Report, Metpar Corp. Site, New Cassel Industrial Area (Revised)." Report to Metpar Corporation. Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 123p. SSB 034679 - SSB 034801.
151	Fanning, Phillips and Molnar (Ronkonkoma, NY). 1996 ?"Focussed Source Area Remedial Investigation Report, Metpar Corp. Site, New Cassel Industrial Area." Report to Metpar Corporation (New Cassel, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 121p. SSB 034434 - SSB 034554.
152	H2M Labs, Inc. (Melville, NY). January 1996. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Contract #: C003180, Case #: RS195, SDG#: 0118, Soil Samples Received January 18, 1996: Sample Data Summary." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 82p. SSB 233524 - SSB 233605.
153	H2M Labs, Inc. (Melville, NY). January 1996. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Contract #: C003180, Case #: RS195, SDG#: 0118, Soil Samples Received January 18, 1996: Volatile Data." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 417p. SSB 232671 - SSB 233087.
154	H2M Labs, Inc. (Melville, NY). January 1996. "Analytical Data Package for New York State Department of Environmental Conservation, Contract No.: C003180, Case No.: SH195, SDG No.: 0117, ASP CLP Package. Received January 17, 1996: Volatile Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 236p. SAA 188855 - SAA 189090.
155	Vinci, A ; Callaghan, JF. [Terra Vac]. January 12, 1996. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period October 13, 1995 to December 17, 1995, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4225." 5p. SDOH 242187 - SDOH 242191.
156	Lawler, Matusky & Skelly Engineers LLP. February 1996. "Multi-site PSA Report, New Cassel Industrial Area Site, North Hempstead, Nassau County. Volume IV: Appendix E (Continued)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 422p. OAG005713 - OAG006134.
157	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). February 1996. "Multi-site PSA Report, New Cassel Industrial Area Site, North Hempstead, Nassau County. Volume I (Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 161p. OAG004959 - OAG005119.
158	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). February 1996. "Multi-site PSA Report, New Cassel Industrial Area Site, North Hempstead, Nassau County. Volume II: Appendices A-D (Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 169p. OAG005120 - OAG005288.
159	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). February 1996. "Multi-site PSA Report, New Cassel Industrial Area Site, North Hempstead, Nassau County. Volume III: Appendix E (Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 424p. OAG005289 - OAG005712.
160	Stearns & Wheler, LLC (Cazenovia, NY). February 1996. "Supplemental Remedial Investigation Scope of Work, General Instrument Corporation, Hicksville Facility, Operable Unit 2 (Groundwater)." Report to General Instrument Corp.. 14p. SAD 112062 - SAD 112075.
161	YEC, Inc. (Valley Cottage, NY). February 1996. "Multi-Site Preliminary Site Assessment, Detailed Site History, New Cassel Industrial Area Site, North Hempstead, Nassau County (Draft)." Report to Lawler, Matusky & Skelly Engineers (Pearl River, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 49p. SAA 158644 - SAA 158691.
162	Weinstock, EA. [CA Rich Consultants, Inc.]. February 29, 1996. "Letter to J. Trad (NYSDEC) re: Remedial Investigation Work Plan Addendum, Tishcon Corp., 125 State Street, Westbury, New York, NYSDEC Site No.: 130043C." 2p. SW 124835 - SW 124836.
163	ABB Environmental Services (Portland, ME). March 1996. "Focused Remedial Investigation/Feasibility Study Work Plan: 68 Kinkel Street - Former Tishcon Site, New Cassell Industrial Area, North Hempstead, New York, Site No. 1-30-43F." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 167p. SSB 032522 - SSB 032688.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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177	Stearns & Wheler, LLC (Cazenovia, NY). April 1996. "Remediation Work Plan, Operable Unit 1, Area of Concern C, General Instrument Corporation, Hicksville, New York." Report to General Instrument Corp.. 77p. SAA 185312 - SAA 185388.
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180	Bonifas, MJ. [Hull & Associates, Inc.]. May 9, 1996. "Letter to C. Vasudevan (NYSDEC) re: Monthly Progress Report #1 for March 26, 1996 through May 9, 1996 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.026." 3p. SSB 003401 - SSB 003403.
181	Roth, RJ ; Callghan, JF. [Terra Vac]. June 4, 1996. "Letter to B. Curtis (General Instrument Corp.) re: Response to letter of May 29, 1996 regarding IRM, General Instrument Corporation, Hicksville, NY, Terra Vac Project 40-4225." 3p. SDOH 241433 - SDOH 241435.
182	New York State, Dept. of Environmental Conservation (NYSDEC). June 5, 1996. "Order on consent [In the Matter of the Development and Implementation of a Focussed Remedial Investigation/Feasibility Study for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Tishcon Corporation]." INDEX # W1-0758-95-05, 18p. BPM 298667 - BPM 298684.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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203	Bonifas, MJ. [Hull & Associates, Inc.]. November 11, 1996. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #6 for September 10, 1996 through November 9, 1996 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.039." 2p. SAD 043685 - SAD 043686.
204	CA RICH Consultants, Inc. (Sea Cliff, NY). December 1996. "Focused Remedial Investigation Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corporation. 256p. SAD 064183 - SAD 064438.
205	CA Rich Consultants, Inc. (Sea Cliff, NY). December 1996. "Focused Remedial Investigation Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 256p. SAD 064183 - SAD 064438.
206	YEC, Inc. (Valley Cottage, NY). December 1996. "Draft Preliminary Site Assessment, Detailed Site History, New Cassel Industrial Area Site, North Hempstead, Nassau County." Report to Lawler, Matusky & Skelly Engineers (Pearl River, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 30p. SAD 350110 - SAD 350139.
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208	Bonifas, MJ. [Hull & Associates, Inc.]. December 10, 1996. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #7 for November 10, 1996 through December 9, 1996 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.045." 2p. SAD 043644 - SAD 043645.
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215	H2M Labs, Inc. (Melville, NY). January 1997. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: RA096, SDG #: 0124, Water and Soil Samples Received January 24, 1997: Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 70p. SAA 175694 - SAA 175769.
216	H2M Labs, Inc. (Melville, NY). January 1997. "Analytical Data Package for New York State Department of Environmental Conservation, Contract No.: C003180, Case No.: RA096, SDG No.: 0123, ASP CLP Package. Received January 24, 1997: Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 63p. SAA 177362 - SAA 177424.
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219	H2M Labs, Inc. (Melville, NY). January 1997. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: RA096, SDG #: 0127. Soil Samples Received January 27, 1997. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 32p. SAA 179932 - SAA 179963.
220	H2M Labs, Inc. (Melville, NY). January 1997. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: RA096, SDG #: 0127. Soil Samples Received January 27, 1997. Volatile Data." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 98p. SAA 177792 - SAA 177889.
221	H2M Labs, Inc. (Melville, NY). January 1997. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: RA096, SDG #: 0122. Water and Soil Samples Received January 23, 1997. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 119p. SAA 176223 - SAA 176347.
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224	Stearns & Wheler, LLC (Cazenovia, NY). January 1997. "Operation, Maintenance, and Monitoring Manual, Soil Vapor Extraction System, General Instrument Corporation, Hicksville, New York (Draft). Volume 1 - General Manual." Report to General Instrument Corp.. 90p. SAA 189440 - SAA 189529.
225	YEC, Inc. (Valley Cottage, NY). January 1997. "Draft Preliminary Site Assessment, Detailed Site History, New Cassel Industrial Area Site, North Hempstead, Nassau County." Report to Lawler, Matusky & Skelly Engineers (Pearl River, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 30p. SAD 350064 - SAD 350093.
226	Bonifas, MJ. [Hull & Associates, Inc.]. January 10, 1997. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #8 for December 10, 1996 through January 9, 1997 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.048." 2p. SAD 043616 - SAD 043617.
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230	Hull & Associates, Inc. (Dublin, OH) ; Land Tech Remedial, Inc. (Farmingdale, NY). February 1997. "Final Investigation Report for the Investigation and Design of the Interim Remedial Measure for the Vadose Zone at the 570 Main Street, Manufacturing Facility, Westbury, New York, NYSDEC Site Code #130043A. Volume I." Report to IMC Eastern Corp.. HAI Document #NMB004D.032. 61p.
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232	Bonifas, MJ. [Hull & Associates, Inc.]. February 10, 1997. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #9 for January 10 through February 9, 1997 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.050." 2p. SAD 043610 - SAD 043611.
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236	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). March 1997. "Multisite PSA Task 4 Report, Supporting Documentation - Volume I: GPR Data Summary and SVOC Analytical Data." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 202p. Albem-Review0003485 - Albem-Review0003686.
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239	O'Brien & Gere Engineers, Inc.. April 1997. "Work Plan: Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York." Report to GTE Operations Support Inc.. 307p. SAD 106369 - SAD 106678.
240	Bonifas, MJ. [Hull & Associates, Inc.]. April 10, 1997. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #11 for March 10 through April 9, 1997 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.056." 2p. SAD 043602 - SAD 043603.
241	New York State, Dept. of Environmental Conservation (NYSDEC). April 22, 1997. "New York State Department of Environmental Conservation, SARA Title III, Toxic Release Inventory Data, Facility Report." 7p.
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245	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). May 1997. "Work Plan Appendix A: Subcontractor Quotation and Other Cost Backup, Former Laka Site, Westbury, Nassau County." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 124p. SAD 374168 - SAD 347291.
246	Merklin, WD. [Dvirka and Bartilucci Consulting Engineers]. May 8, 1997. "Letter to D. Davis (Town of Hempstead, Dept. of Water) re: Bowling Green Estates Water District, Expansion of Packed Tower Aeration System, D&B No. 1243-Q." 7p. TOHDOW002319 - TOHDOW002325.
247	Bonifas, MJ. [Hull & Associates, Inc.]. May 12, 1997. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #12 for April 10 through May 9, 1997 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.057." 2p. SW 121606 - SW 121607.
248	New York State, Dept. of Environmental Conservation (NYSDEC). May 21, 1997. "Order on consent [In the Matter of the Development and Implementation of a Focussed Remedial Investigation/Focussed Feasibility Study for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by 2632 Realty Development Corp.]." Index # Wl-0843-98506, 14p. BPM 295524 - BPM 295537.

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No.	Reference
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259	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). August 1997. "Field Activities Plan, Former LAKA Site and Bowling Green Early Warning Wells, Remedial Investigation/Feasibility Study." Report to New York State, Dept. of Environmental Conservation (NYSDEC) Division of Environmental Remediation (Albany, NY). 60p. SAD 074516 - SAD 074575.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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273	Hull & Associates, Inc. (Dublin, OH) ; Land Tech Remedial, Inc. (Farmingdale, NY). October 1997. "Work Plan for the Focused Ground-Water Investigation at the 570 Main Street Property, Westbury, New York." Report to IMC Magnetics Corp.. HAI Document #NMB004D.063, 253p.
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279	Anson Environmental Ltd. (Huntington, NY). November 1997 (Revised)"Work Plan, Utility Manufacturing/Wonder King Site, Site ID # 1-30-043H, 700-712 Main Street, Westbury, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation. 65p. SW 132221 - SW 132285.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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292	CA Rich Consultants, Inc. (Sea Cliff, NY). March 1998. "Interim Remedial Measures Final Report, Tishcon Corporation, 30-36 New York Avenue and 31-33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 95p. SAA 186589 - SAA 186683.
293	CA Rich Consultants, Inc. (Sea Cliff, NY). March 1998. "Interim Remedial Measures Final Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 58p. SAD 063968 - SAD 064025.
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295	O'Brien & Gere Engineers, Inc.. March 1998. "Investigation Work Plan, Exhibit B: Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York." Report to GTE Operations Support Inc.. 476p. SSB 214312 - SSB 214787.
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303	O'Brien & Gere Engineers, Inc.. May 1998 (Revised July 2, 1998)"Investigation Work Plan, Exhibit B: Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York (Revised May 1998) , including Revised Attachment dated July 2, 1998." Report to GTE Operations Support Inc.. 495p. SSB 214807 - SSB 215301.
304	New York State, Dept. of Environmental Conservation (NYSDEC). May 8, 1998. "Order on consent [In the Matter of the Development and Implementation of a Remedial Program for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Tishcon Corporation]." INDEX # I-WI-0757-98-02, 15p. BPM 297926 - BPM 297940.
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306	Bonifas, MJ. [Hull & Associates, Inc.]. May 11, 1998. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #24 for April 11, 1998 through May 11, 1998 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York, NMB004D.300.0078.DOC." 2p. SW 121730 - SW 121731.
307	Lawler, Matusky & Skelly Engineers (Pearl River, NY). June 1998. "Updated Health & Safety Plan (HASP) and Quality Assurance Plan (QAPjP) for the New Cassel Industrial Area Site, Frost Street Sites." Report to New York State, Dept. of Environmental Conservation (NYSDEC) (Albany, NY). 33p. SAD 348428 - SAD 348460.

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312	CA Rich Consultants, Inc. (Sea Cliff, NY). July 1998. "Hazardous Waste Reduction Plan, Tishcon Corporation, Westbury, New York (Revised)." Report to Tishcon Corp. (Westbury, NY). 4p. SSB246405 - SSB246408.
313	CA Rich Consultants, Inc. (Sea Cliff, NY). July 1998. "Post-Remediation Groundwater Quarterly Monitoring Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 10p. SAA 184872 - SAA 184881.
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315	LAB Validation Corp. (Northport, NY). July 1998. "Data Validation Report, Organic/Inorganic Analysis, Volatiles, RCRA Metals, For Samples Collected on May 11, 1998 at Tishcon - State Street, Westbury, NY." Report to C.A. Rich Consultants, Inc. (Sea Cliff, NY). 50p. SAD 062793 - SAD 062842.
316	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). July 1998. "Work Plan, Remedial Investigation Feasibility Study." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 141p. BPM 328733 - BPM 328873.
317	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). July 1998. "Field Activities Plan, Remedial Investigation Feasibility Study." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 54p. SAD 076433 - SAD 076486.
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322	Bonifas, MJ. [Hull & Associates, Inc.]. August 7, 1998. "Letter to J. Hussey (NYSDEC) re: Progress Report #1 for June 18 through August 6, 1998 for the Focused Ground-Water Investigation at the NYSDEC Site Code #1-W1-0750-96-02 in Westbury, New York. NMB007.200.0002." 3p. SW 121548 - SW 121550.
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324	Bonifas, MJ. [Hull & Associates, Inc.]. August 10, 1998. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #27 for July 11 through August 10, 1998 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0082.DOC." 2p. SW 122890 - SW 122891.
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No.	Reference
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333	Hull & Associates, Inc. (Mason, OH). September 1998. "Focused Ground-Water Investigation Report at the 570 Main Street Manufacturing Facility, Westbury, New York, NYSDEC Site Code #130043A. Volume III." Report to IMC Eastern Corp.. 206.
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335	Bonifas, MJ. [Hull & Associates, Inc.]. September 10, 1998. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #28 for August 11, 1998 through September 10, 1998 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.083.DOC." 2p. SW 120803 - SW 120804.
336	Walter, A ; Holzmacher, JR. [P.W. Grosser Consulting Engineer & Hydrogeologist, P.C.Kalogeras & Grosser Consulting Engineers, P.C.]. September 11, 1998. "Letter to B. MacKay (Nassau County Department of Health) re: Final closure report for: Sulzer Metco (US), Inc., 1101 Prospect Avenue, Westbury, NY." 5p. SAD356697 - SAD356701.
337	Impact Environmental (Kings Park, NY). September 18, 1998. "Focused Remedial Investigation Work Plan: Site Code # 1-30-043S, 299 Main Street, Westbury, New York. Appendices." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 249p. SAD 079465 - SAD 079713.
338	Impact Environmental (Kings Park, NY). September 18, 1998. "Focused Remedial Investigation Work Plan: 98-335, Site Code # 1-30-043S, 299 Main Street, Westbury, New York." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 297p. SSB 017393 - SSB 017689.
339	Anson Environmental Ltd. (Huntington, NY). October 1998. "Laboratory Analysis, Utility Manufacturing/Wonder King Site, Site ID No. 1-30-043H, 700-712 Main Street, Westbury, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation. 125p. SAD 072322 - SAD 072446.
340	CA Rich Consultants, Inc. (Sea Cliff, NY). October 1998. "Post-Remediation Groundwater Quarterly Monitoring Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 15p. SAD 062902 - SAD 062915.
341	Dvirka and Bartilucci Consulting Engineers. October 1998. "Blydenburgh Road Landfill Complex Groundwater Remediation Program, NYSDEC Site Number 152002. Certification Report Addendum." Report to Islip Resource Recovery Agency. 14p. SW141423 - SW 141436.
342	Fanning, Phillips & Molnar (Ronkonkoma, NY). October 1998. "Focussed Remedial Investigation Work Plan for 118-130 Swalm Avenue, New Cassel, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 99p. SSB 017875 - SSB 017973.
343	Anson Environmental Ltd. (Huntington, NY). October 2, 1998, January 21, 1999 (Revised)"Phase One Field Investigation Report, Focused Remedial Investigation to Comply with Work Plan for Utility Manufacturing/Wonder King Site dated November 1997, Site ID No. 1-30-043H, 700-712 Main Street, Westbury, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation. 246p. SSB 018076 - SSB 018321.
344	Bonifas, MJ. [Hull & Associates, Inc.]. October 12, 1998. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #30 for October 13, 1998 through November 11, 1998 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0085.DOC." 2p. SW 122730 - SW 122731.
345	Bonifas, MJ. [Hull & Associates, Inc.]. October 12, 1998. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #29 for September 11, 1998 through October 12, 1998 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0084.DOC." 2p. SW 121648 - SW 121649.
346	General Consolidated Industries, Inc. (Melville, NY). October 16, 1998. "Focused Remedial Investigation Work Plan, Tishcon Corp., New Cassel Industrial Area, 29 New York Avenue, North Hempstead, New York." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 285p. OAG006915 - OAG007199.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
347	New York State, Dept. of Environmental Conservation (NYSDEC). October 27, 1998. "Order on consent [In the Matter of the Development and Implementation of a Focussed Remedial Investigation/Focussed Feasibility Study for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Barouh Eaton Allen Corp.]." INDEX #WI-0816-97-09, 18p. BPM 295144 - BPM 295161.
348	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). November 1998. "Focused Remedial Investigation Report, Former LAKA Industries Site. Volume I: Report and Appendices A-B." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 141p. SSB 016121 - SSB 016261.
349	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). November 1998. "Focused Remedial Investigation Report, Former LAKA Industries Site. Volume II: Appendices C-G." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 193p. SAA 159782 - SAA 159974.
350	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). November 1998. "Focused Remedial Investigation Report, Former LAKA Industries Site. Volume III: Appendix H." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 522p. SAA 159975 - SAA 160496.
351	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). November 1998. "Focused Remedial Investigation Report, Former LAKA Industries Site. Volume III: Appendix H (Continued)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 412p. SAA 160497 - SAA 160908.
352	Turley, WL. [Hull & Associates, Inc.]. November 6, 1998. "Letter to J. Jones (NYSDEC) re: Progress Report #3 for October 8 through November 6, 1998 for the Focused Water Investigation at the NYSDEC Site Code-W1-0750-96-02 in Westbury, New York, NMB007.200.0009." 2p. SW 121728 - SW 121729.
353	Buck, L. [Fanning, Phillips and Molnar]. November 11, 1998. "Letter to J. Lovejoy (Nassau County Department of Health) re: Permafuse Site, Westbury, New York, FPM File No. 459-97-01." 13p. SAA 182559 - SAA 182571.
354	Impact Environmental ?. November 23, 1998. "Focused Remedial Investigation Final Work Plan 98-335, Site Code # 1-30-043S, 299 Main Street, Westbury, New York." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 54p. SSB 017337 - SSB 017390.
355	Turley, WL. [Hull & Associates, Inc.]. December 6, 1998. "Letter to J. Jones (NYSDEC) re: Progress Report #4 for November 6 through December 6, 1998 for the Focused Ground-Water Investigation at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0011." 2p. SAD 036767 - SAD 036768.
356	Bonifas, MJ. [Hull & Associates, Inc.]. December 10, 1998. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #31 for November 12, 1988 through December 10, 1998 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York, NMB004.300.0086." 2p. SW 122726 - SW 122727.
357	Phillips, KJ. [Fanning, Phillips and Molnar]. December 22, 1998. "Letter to R. Lilley, Jr. (NYSDEC) re: Permafuse Site, Westbury, New York, FPM File No. 459-97-01." 1p. SAA 182541.
358	Holzmacher, JR. [P.W. Grosser Consulting Engineer & Hydrogeologist, P.C.Kalogeras & Grosser Consulting Engineers, P.C.]. December 23, 1998. "Letter to B. Mackay (Nassau County Department of Health) re: Sulzer Metco (US) Inc., 1101 Prospect Avenue, floor drain and discharge point documentation." 3p. SAD356704 - SAD356706.
359	Phillips, KJ. [Fanning, Phillips and Molnar]. December 29, 1998. "Letter to J. Lilley, Jr. (NYSDEC) re: Permafuse Site, Westbury, New York, FPM File No. 459-97-01." 1p. SAA 182540.
360	CA Rich Consultants, Inc. (Sea Cliff, NY). January 1999. "Post-Remediation Groundwater Quarterly Monitoring Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 14p. SW 125785 - SW 125798.
361	H2M Labs, Inc. (Melville, NY). January 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Case No.: RA098, SDG No.: X0118. Soil & Water Samples Received 1/19-1/29/99. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 9p. SAD 037200 - SAD 037208.
362	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY) ; Lehtinen, M. January 5, 1999. "Letter Report to R. Lilley (NYSDEC) re: Upgradient Soil Sampling & Additional Monitoring Well Sampling." 199p. SAA 077229 - SAA 077427.
363	Lilley, RJ Jr.. [New York State, Dept. of Environmental Conservation (NYSDEC)]. January 6, 1999. "Letter to P. Dermody (Fanning, Phillips & Molnar) re: Permafuse Site, 675 Main Street Westbury, New York." 1p. SAD 037199.
364	Turley, WL. [Hull & Associates, Inc.]. January 8, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #5 for December 6, 1998 through January 8, 1999 for the Focused Ground-Water Investigation at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0012." 2p. SW 122347 - SW 122348.
365	Lancaster Laboratories (Lancaster, PA). January 11, 1999. "Data Package - IMC Magnetics, 507 Main St., Westbury, NJ. Water Samples Collected on 11/24/1998. Sample No. 3047375-3047376." Report to Hull & Associates, Inc.. 192p. SSB 020519 - SSB 020710.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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367	H2M Group ; Lawler, Matusky & Skelly Engineers, LLP. February 1999. "Engineering Investigations, Inactive Hazardous Waste Sites: Remedial Investigation/Feasibility Study, National Heatset Printing, Town of Babylon, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 368p.
368	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). February 1999. "Field Activities Plan, Remedial Investigation/Feasibility Study, New Cassel Industrial Area Offsite Groundwater (Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 40p. BPM 313651 - BPM 313690.
369	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). February 1999. "Work Plan, Remedial Investigation/Feasibility Study, New Cassel Industrial Area Offsite Groundwater." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 66p. SAD 088845 - SAD 088910.
370	Turley, WL. [Hull & Associates, Inc.]. February 8, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #6 for January 8, 1999 through February 8, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0015." 2p. SAD 043509 - SAD 043510.
371	Bonifas, MJ. [Hull & Associates, Inc.]. February 10, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #33 for January 12, 1999 through February 10, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0088." 2p. SW 122862 - SW 122863.
372	H2M Labs, Inc. (Melville, NY). March 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127C. Soil Samples Received March 16 & 21, 1999. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 62p. SAA 175132 - SAA 175193.
373	H2M Labs, Inc. (Melville, NY). March 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127C. Soil Samples Received March 16 & 21, 1999. Volatile Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 225p. SAA 175468 - SAA 175692.
374	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). March 1999. "Focused Remedial Investigation Report, Arkwin Industries. Volume II: Appendices G." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 537p. SAA 155013 - SAA 155549.
375	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). March 1999. "Focused Remedial Investigation Report, Arkwin Industries Volume I: Report and Appendices A-F." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 182p. SAD 064981 - SAD 065162.
376	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). March 1999. "Focused Remedial Investigation Report, Arkwin Industries. Volume III: Appendix G (Continued)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 559p. SAA 155550 - SAA 156108.
377	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). March 1999. "Immediate Investigation Work Assignment, Atlas Graphics. Volume I: Report and Appendices A-B." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 60p. SSB 003247 - SSB 003306.
378	Impact Environmental (Kings Park, NY). March 1, 1999. "Focused Remedial Investigation Final Work Plan: 98-335, Site Code # 1-30-043S, 299 Main Street, Westbury, New York." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State Department of Environmental Conservation (Albany, NY). 59p. SAD 085363 - SAD 085421.
379	Turley, WL. [Hull & Associates, Inc.]. March 8, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #7 for February 8, 1999 through March 8, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0016." 2p. SAD 036743 - SAD 036744.
380	Bonifas, MJ. [Hull & Associates, Inc.]. March 10, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #34 for February 11, 1999 through March 10, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0091." 2p. SW 122869 - SW 122870.
381	Impact Environmental (Kings Park). March 17, 1999. "Final Work Plan: Focused Remedial Investigation to be Conducted at: Site Code # 1-30-043S, 299 Main Street, Westbury, New York." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State Department of Environmental Conservation (Albany, NY). 57p. SAD 079354 - SAD 079410.

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No.	Reference
382	Impact Environmental (Kings Park, NY). March 17, 1999. "Work Plan: Focused Remedial Investigation to be Conducted at: Site Code # 1-30-043S, 299 Main Street, Westbury, New York. Appendices." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State Department of Environmental Conservation (Albany, NY). 252p. SAD 079101 - SAD 079352.
383	New York State, Dept. of Environmental Conservation (NYSDEC). March 26, 1999. "Order on consent [In the Matter of Development and Implementation of a Focussed Remedial Investigation/Focussed Feasibility Study for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Equity Share I Associates]." INDEX # WI-0828-98-05, 16p. BPM 296384 - BPM 296399.
384	CA Rich Consultants, Inc. (Sea Cliff, NY). April 1999. "Post-Remediation Groundwater Quarterly Monitoring Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 14p. SSB 004390 - SSB 004403.
385	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.:0127B. Soil Samples Received April 15, 1999. TCLP Wet Chemistry Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 13p. SAA 172747 - SAA 172759.
386	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA098, SDG No.: 0127A. Water Samples Received 4/15 & 4/16/99. Volatile Data." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 322p. SAA 179238 - SAA 179559.
387	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127B. Soil Samples Received April 15, 1999. PCB (total) Data Package." 119p. SAA 173314 - SAA 173432.
388	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA-098, SDG No.: 0127. Water Samples Received April 13 & 15, 1999. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 86p. SAA 178737 - SAA 178822.
389	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127B. Soil Samples Received April 15, 1999. TCLP Herbicides Data Package." 87p. SAA 174207 - SAA 174293.
390	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127B. Soil Samples Received April 15, 1999. TCLP Metals Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 167p. SAA 175300 - SAA 175466.
391	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127B. Soil Samples Received April 15, 1999. TCLP Pesticides Data Package." 171p. SAA 173820 - SAA 173990.
392	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA-098, SDG No.: 0127. Water Samples Received April 13 & 15, 1999. Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 387p. SAA 173433 - SAA 173819.
393	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA098, SDG No.: 0127A. Water Samples Received 4/15 & 4/16/99. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 80p. SAA 174127 - SAA 174206.
394	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA-098, SDG No.: 0127. Water Samples Received April 13 & 15, 1999. Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 387p. SAA 173433 - SAA 173819.
395	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127B. Soil Samples Received April 15, 1999. TCLP Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 106p. SAA 175194 - SAA 175299.
396	Bonifas, MJ. [Hull & Associates, Inc.]. April 9, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #35 for March 11, 1999 through April 9, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0093." 2p. SW 122849 - SW 122850.
397	Fanning, Phillips & Molnar (Ronkonkoma, NY). May 1999. "Focussed Remedial Investigation Report for 118-130 Swalm Street, New Cassel, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 65p. SAD 085452 - SAD 085515.
398	Fanning, Phillips & Molnar (Ronkonkoma, NY). May 1999. "Focussed Remedial Investigation Report for 118-130 Swalm Street, New Cassel, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 65p. SAD 085452 - SAD 085515.
399	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). May 1999. "Focused Feasibility Study Report, Former LAKA Industries Site." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 22p. SSB 016263 - SSB 016284.
400	Bonifas, MJ. [Hull & Associates, Inc.]. May 11, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #36 for April 10, 1999 through May 11, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0094." 2p. SAD 043193 - SAD 043194.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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402	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). June 1999. "Feasibility Study Report, Arkwin Industries Site." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 139p. SAA 156110 - SAA 156248.
403	New York State, Dept. of Environmental Conservation (NYSDEC). June 1999. "Record of Decision, National Heatset Printing Site, Town of Babylon, Suffolk County, New York." 73p.
404	Bonifas, MJ. [Hull & Associates, Inc.]. June 10, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #37 for May 12, 1999 through June 10, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0095." 2p. SW 122740 - SW 12741.
405	Turley, WL. [Hull & Associates, Inc.]. June 10, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #10 for May 10, 1999 through June 10, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0020." 2p. SW 122742 - SW 122743.
406	Chemtech (Englewood, NJ). June 30, 1999. "Data Package for Volatile Organics, 29 New York Avenue." Report to GCI, Inc.. 194p. SAA 172029 - SAA 172287.
407	CA RICH Consultants, Inc. (Sea Cliff, NY). July 1999. "Remedial Investigation for On-Site Ground Water, Tishcon Corporation, 30-36 New York Avenue and 31-33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corporation (Westbury, NY). 154p. SSB 031785 - SSB 031938.
408	CA Rich Consultants, Inc. (Sea Cliff, NY). July 1999. "Remedial Investigation for On-Site Ground Water, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 179p. SSB 031785 - SSB 031963.
409	Fanning, Phillips & Molnar (Ronkonkoma, NY). July 1999. "Closure Plan for Uniflex, Inc., 474 Grand Boulevard, Westbury, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 24p. SSB249348 - SSB249371.
410	Chemtech (Englewood, NJ). July 9, 1999. "Data Package for Volatile Organics, Part I, 29 New York Avenue." Report to GCI, Inc.. 456p. SAA 172288 - SAA 172745.
411	Chemtech (Englewood, NJ). July 10, 1999. "Data package for PP metals & TPH, Part III, 29 New York Avenue." Report to GCI, Inc.. 202p. SAA 171786 - SAA 171987.
412	Chemtech (Englewood, NJ). July 10, 1999. "Data Package for PP Metals & TPH, Part III, 29 New York Avenue." Report to GCI, Inc.. 202p. SAA 171786 - SAA 171987.
413	Bonifas, MJ. [Hull & Associates, Inc.]. July 12, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #38 for June 11, 1999 through July 12, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0096." 2p. SAD 043191 - SAD 043192.
414	Dermody, P. [Fanning, Phillips and Molnar]. July 12, 1999. "Letter to R. Gaborow (NYS Department of Environmental Conservation) re: 118-130 Swalm Street, New Cassel, New York, FPM File No. 486-98-03." 9p. SAD 050609 - SAD 050617.
415	Turley, WL. [Hull & Associates, Inc.]. July 13, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #11 for June 10, 1999 through July 13, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0022." 2p. SAD 036719 - SAD 036720.
416	Impact Environmental (Kings Park, NY). July 15, 1999. "Remote Survey: Focussed Remedial Investigation/Feasibility Study Conducted at: Site No. 1-30-043S, 299 Main Street, Westbury, New York." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State Department of Environmental Conservation (Albany, NY). 61p. SSB 016826 - SSB 016886.
417	CA Rich Consultants, Inc. (Sea Cliff, NY). August 1999. "On-Site Remedial Design Report, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 94p. SAD068463 - SAD068556.
418	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). August 1999. "Remedial Investigation/Feasibility Study (RI/FS), Frost Street Sites. Volume I." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 566p. SAD 075826 - SAD 076391.
419	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). August 1999. "Remedial Investigation/Feasibility Study (RI/FS), Frost Street Sites. Volume II: Appendices A-F." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 142p. OAG000882 - OAG001023.
420	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). August 1999. "Remedial Investigation/Feasibility Study (RI/FS), Frost Street Sites. Volume III: Appendix G." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 529p. OAG001259 - OAG001787.
421	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). August 1999. "Remedial Investigation/Feasibility Study (RI/FS), Frost Street Sites. Volume IV: Appendix H." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 511p. OAG001788 - OAG002298.
422	Turley, WL. [Hull & Associates, Inc.]. August 8, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #8 for March 8, 1999 through April 8, 1999 for the Focused Ground-Water Investigation at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0017." 2p. SAD 036734 - SAD 036735.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
423	Bonifas, MJ. [Hull & Associates, Inc.]. August 10, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #39 for July 13, 1999 through August 10, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0097." 2p. SAD 043189 - SAD 043190.
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425	Parrish, R. [Impact Environmental Consulting, Inc.]. August 31, 1999. "Letter to A. Ruepp (New York State Department of Environmental Conservation) re: 299 Main Street Site No. 1-30-043S, Notice of Completion/Work Schedule." 3p. SAD 051484 - SAD 051486.
426	H2M Labs, Inc. (Melville, NY). September 1999. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: TI99, SDG No.: 09281. Water Samples Received September 30, 1999. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 27p. SAD 062378 - SAD 062404.
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428	Hull & Associates, Inc. (Mason, OH). September 1999. "Focused Ground-Water Feasibility Study for the 570 Main Street Manufacturing Facility, Westbury, New York, NYSDEC Site Code #130043A." Report to IMC Eastern Corp.. HAI Document #NMB007.200.0019, 91p.
429	Hull & Associates, Inc. (Mason, OH). September 1999, November 1999 (Revised)"Focused Ground-Water Feasibility Study for the 570 Main Street Manufacturing Facility, Westbury, New York, NYSDEC Site Code #130043A." Report to IMC Eastern Corp.. HAI Document #NMB007.200.0019, 93p.
430	Hull & Associates, Inc. (Mason, OH). September 1999. "Focused Ground-Water Feasibility Study for the 570 Main Street Manufacturing Facility, Westbury, New York, NYSDEC Site Code #130043A." Report to IMC Eastern Corporation. 91p.
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432	Turley, WL. [Hull & Associates, Inc.]. September 9, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #13 for August 12, 1999 through September 9, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0024." 2p. SAD 036717 - SAD 036718.
433	Bonifas, MJ. [Hull & Associates, Inc.]. September 10, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #40 for August 11, 1999 through September 11, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0098." 2p. SAD 043187 - SAD 043188.
434	Parrish, R. [Impact Environmental Consulting, Inc.]. September 27, 1999. "Letter to A. Ruepp (New York State Department of Environmental Conservation) re: 299 Main Street Site No. 1-30-043S, Notice of Completion/Work Schedule." 5p. SSB 007478 - SSB 007482.
435	CA Rich Consultants, Inc. (Sea Cliff, NY). October 1999. "Post-Remediation Groundwater Monitoring Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 20p. SAD 045069 - SAD 045088.
436	Chemtech. October 1999. "IE Volatile Organics Analysis Data Sheet, Tentatively Identified Compounds, Sample Group 335-GP-021." Report to Impact Environmental. 19p. SAD 051425 - SAD 051443.
437	H2M Labs, Inc. (Melville, NY). October 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Case No.: RA098, SDG No.: 1004A. Water Samples Received 10/8/99. Volatile Data." 122p. SAA 179560 - SAA 179681.
438	H2M Labs, Inc. (Melville, NY). October 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Case No.: RA098, SDG No.: 1004A. Soil & Water Samples Received 10/8/99. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 148p. SAA 172760 - SAA 172907.
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441	H2M Labs, Inc. (Melville, NY). October 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Case No.: RA098, SDG No.: X1018A. Water Samples Received 10/19/99. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 101p. SAA 178823 - SAA 178923.

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No.	Reference
442	H2M Labs, Inc. (Melville, NY). October 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Case No.: RA098, SDG No.: X1018A. Water Samples Received 10/19/99. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 101p. SAA 178823 - SAA 178923.
443	Lawler, Matusky & Skelly Engineers LLP. October 1999. "New Cassel Industrial Area Offsite Groundwater RI/FS, Workplan Amendment #1." 56p. SAD 036954 - SAD 037009.
444	Kleaka, K. [Impact Environmental Consulting, Inc.]. October 4, 1999. "Letter to A. Ruepp (New York State Department of Environmental Conservation) re: 299 Main Street Site No. 1-30-043S, Sample Acquisition Plan." 1p. SAD 051465.
445	Kleaka, K. [Impact Environmental Consulting, Inc.]. October 7, 1999. "Letter to A. Ruepp (New York State Department of Environmental Conservation) re: 299 Main Street Site No. 1-30-043S, Work Plan Modification." 3p. SSB 007474 - SSB 007476.
446	Bonifas, MJ. [Hull & Associates, Inc.]. October 11, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #41 for September 11, 1999 through October 11, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0099." 2p. SAD 043184 - SAD 043185.
447	Turley, WL. [Hull & Associates, Inc.]. October 11, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #14 for September 9, 1999 through October 11, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0024." 2p. SAD 036715 - SAD 036716.
448	Harry, J. [Data Validation Services (North Creek, NY)]. October 19, 1999. "Letter to M. Heincz (Lawler, Matusky) re: Validation of New Castle Site Data Packages, Mitkem SDG Nos. 61519 and 61593." 16p. SAA 164481 - SAA 164496.
449	Lawler, Matusky & Skelly Engineers LLP. October 28, 1999. "New Cassel Industrial Area Offsite Groundwater RI/FS, Workplan Amendment #1." 73p. BPM 313577 - BPM 313649.
450	Hull & Associates, Inc. (Mason, OH). November 1999. "Focused Ground-Water Feasibility Study for the 570 Main Street Manufacturing Facility, Westbury, New York, NYSDEC Site Code #130043A (Revised)." Report to IMC Eastern Corporation. 93p.
451	Bonifas, MJ. [Hull & Associates, Inc.]. November 10, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #42 for October 12, 1999 through November 10, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0100." 2p. SW 121652 - SW 121653.
452	Turley, WL. [Hull & Associates, Inc.]. November 11, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #15 for October 11, 1999 through November 11, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0027." 2p. SW 117493 - SW 117494.
453	CA Rich Consultants, Inc. (Sea Cliff, NY). December 1999. "Feasibility Study Report for Off-Site Groundwater Operable Unit (OU) - 2, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 14p. SW 129544 - SW 129556.
454	Bonifas, MJ. [Hull & Associates, Inc.]. December 10, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #43 for November 11, 1999 through December 10, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0101." 2p. SW 121661 - SW 121662.
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456	Turley, WL. [Hull & Associates, Inc.]. December 13, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #16 for November 11, 1999 through December 13, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0028." 2p. SAD 043175 - SAD 043176.
457	General Consolidated Industries, Inc. (Hauppauge, NY). January 2000. "Focused Remedial Investigation Report, Tishcon Corporation, New Cassel Industrial Area, 29 New York Avenue, New Cassel, New York 11590, NYS DEC IHWDS I.D. No. 1-30-43V." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 116p. SAD 081878 - SAD 081993.
458	General Consolidated Industries, Inc. (Hauppauge, NY). January 2000. "Focused Remedial Investigation Report, Tishcon Corporation, New Cassel Industrial Area, 29 New York Avenue, New Cassel, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 115p. SAD 347921 - SAD 348035.
459	H2M Labs, Inc. (Melville, NY). January 2000. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA000, SDG No.: 0120. Water Samples, Samples Received 1/21 &1/25/00. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 68p. SAA 177294 - SAA 177361.
460	H2M Labs, Inc. (Melville, NY). January 2000. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA000, SDG No.: 0120. Water Samples, Samples Received 1/21 & 1/25/00. Volatile Data." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 319p. SAA 176890 - SAA 177208.

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462	H2M Labs, Inc. (Melville, NY). January 2000. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA000, SDG No.: 0110. Water Samples, Samples Received 1/11, 1/13, 1/14 & 1/18/00. Metals Data." 150p. SAA 177890 - SAA 178039.
463	H2M Labs, Inc. (Melville, NY). January 2000. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA000, SDG No.: 0110. Water Samples, Samples Received 1/11, 1/13, 1/14 & 1/18/00. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 246p. SAA 179682 - SAA 179927.
464	H2M Labs, Inc. (Melville, NY). January 2000. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA000, SDG No.: 0110. Water Samples, Samples Received 1/11, 1/13, 1/14 & 1/18/00. Wet Chemistry Data." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 145p. SAA 178040 - SAA 178184.
465	O'Brien & Gere Engineers, Inc.. January 2000. "Investigative Report: Former Sylvania Electric Products Inc., Facility, Hicksville, New York (Excerpt)." 24p. SAD 102273 - SAD 102296.
466	Stearns & Wheler, LLC (Cazenovia, NY). January 2000. "Groundwater Sampling Results, November 1999 Event, General Semiconductor, Inc., Hicksville, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 32p. SSB 197005 - SSB 197036.
467	Turley, WL. [Hull & Associates, Inc.]. January 10, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #17 for December 13, 1999 through January 10, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0030." 2p. SW 118069 - SW 118070.
468	Bonifas, MJ. [Hull & Associates, Inc.]. January 11, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #44 for December 11, 1999 through January 11, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0102.DOC." 2p. SW 121664 - SW 121665.
469	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128T. Soil Samples Received February 10, 2000. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 63p. SAA 178361 - SAA 178423.
470	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128T. Soil Samples Received February 10, 2000. TCLP Herbicides Data Package." 90p. SAA 178185 - SAA 178274.
471	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128T. Soil Samples Received February 10, 2000. TCLP Metals Data Package." 142p. SAA 176081 - SAA 176222.
472	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128T. Soil Samples Received February 10, 2000. TCLP Pesticides/PCBs Data Package." 187p. SAA 176703 - SAA 176889.
473	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128T. Soil Samples Received February 10, 2000. TCLP Semivolatiles Data Package." 89p. SAA 175992 - SAA 176080.
474	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128T. Soil Samples Received February 10, 2000. TCLP Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 102p. SAA 176348 - SAA 176449.
475	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128A. Water Samples Received February 8, 10, and 11, 2000. Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 253p. SAA 176450 - SAA 176702.
476	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128A. Water Samples Received February 8, 10, and 11, 2000. Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 253p. SAA 176450 - SAA 176702.
477	Bonifas, MJ. [Hull & Associates, Inc.]. February 10, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #45 for January 12, 2000 through February 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0103.DOC." 2p. SAD 043158 - SAD 043159.
478	Turley, WL. [Hull & Associates, Inc.]. February 11, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #18 for January 10, 2000 through February 11, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0031." 2p. SW 118067 - SW 118068.
479	CA Rich Consultants, Inc. (Plainview, NY). March 2000. "Final Engineering Report and Operations & Maintenance Manual, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 120p. SAD0068060 - SAD068179.

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No.	Reference
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481	Turley, WL. [Hull & Associates, Inc.]. March 13, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #19 for February 11, 2000 through March 13, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0032." 2p. SAD 036015 - SAD 036016.
482	New York State, Dept. of Environmental Conservation (NYSDEC). March 17, 2000. "Order on consent [In the Matter of the Development and Implementation of a Focused Remedial Investigation/Focused Feasibility Study for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Grand Machinery Exchange, Inc.]." INDEX # W1-0863-00-01, 16p. BPM 295859 - BPM 295874.
483	CA Rich Consultants, Inc. (Plainview, NY). April 2000. "First Quarter 2000 Quarterly Monitoring Report, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 56p. SAD068181 - SAD068236.
484	Bonifas, MJ. [Hull & Associates, Inc.]. April 10, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #47 for March 11, 2000 through April 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0105.DOC." 2p. SAD 122517 - SAD 122518.
485	Bonifas, MJ. [Hull & Associates, Inc.]. April 10, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #50 for July 10, 2000 through August 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0109.DOC." 2p. SAD 043122 - SAD 043123.
486	Turley, WL. [Hull & Associates, Inc.]. April 10, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #20 for March 13, 2000 through April 10, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0033." 2p. SAD 036013 - SAD 036014.
487	FPM Group (Ronkonkoma, NY). May 2000. "Supplemental Focussed Remedial Investigation Report for the Property Located at 118-130 Swalm Street, Westbury, New York." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 149p. SAD 085623 - SAD 085771.
488	FPM Group (Ronkonkoma, NY). May 2000. "Supplemental Focussed Remedial Investigation Report for the Property Located at 118-130 Swalm Street, Westbury, New York." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 149p. SAD 085623 - SAD 058623.
489	Stearns & Wheler, LLC (Cazenovia, NY). May 2000. "Groundwater Sampling Results, November 1999 Event, General Semiconductor, Inc., Hicksville, New York (Revised)." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 44p. SAD 112232 - SAD 112275.
490	Impact Environmental Consulting, Inc.. May 1, 2000. "Focussed Remedial Investigation Draft Work Plan 00-096, Site Code # 1-30-043U, 36 Sylvester Street, Westbury, New York." Report to Grand Machinery Exchange, Inc. (New York, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 161p. GME-000066 - GME-000226.
491	Bonifas, MJ. [Hull & Associates, Inc.]. May 10, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #48 for April 10, 2000 through May 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0106.DOC." 2p. SW 121638 - SW 121639.
492	Turley, WL. [Hull & Associates, Inc.]. May 15, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #21 for April 10, 2000 through May 15, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0034." 2p. SSB 003799 - SSB 003800.
493	Anson Environmental Ltd. (Huntington, NY). May 17, 2000. "Draft Proposed Interim Remedial Measure Action Plan, Operable Unit 02, On-site Groundwater, Utility Manufacturing/Wonder King, 700 Main Street, Westbury, New York, Site #1-30-043H." 22p. SAD 048118 - SAD 048140.
494	Thomas, DA. [Hull & Associates, Inc.]. June 12, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #49 for May 10, 2000 through June 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0107.DOC." 2p. SSB 003801 - SSB 003802.
495	Turley, WL. [Hull & Associates, Inc.]. June 12, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #22 for May 15, 2000 through June 12, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0038." 2p. SSB 003803 - SSB 003804.
496	General Consolidated Industries, Inc. (Hauppauge, NY). June 19, 2000. "Interim Remedial Measure Work Plan, Tishcon Corp., New Cassel Industrial Area, 29 New York Avenue, New Cassel, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 216p. SAD 081865 - SAD 081877SAD 082628 - SAD 082830.
497	Kleaka, K. [Impact Environmental Consulting, Inc.]. June 26, 2000. "Letter to R. Lilley (New York State Department of Environmental Conservation) re: 36 Sylvester Street Site No. 1-30-043U, Draft FRI Work Plan." 4p. SAD 052203 - SAD 052206.

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No.	Reference
498	Anson Environmental Ltd. (Huntington, NY). June 28, 2000. "Proposed Interim Remedial Measure Action Plan, Operable Unit 02, On-site Groundwater, Utility Manufacturing/Wonder King, 700 Main Street, Westbury, New York, Site #1-30-043H." 13p. SAD 048091 - SAD 048103.
499	CA Rich Consultants, Inc. (Plainview, NY). July 2000. "Quarterly Monitoring Report, Second Quarter 2000, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 50p. SAD068238 - SAD068286SAD 046523.
500	O'Brien & Gere Engineers, Inc.. July 2000. "History Report: Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York." Report to GTE Operations Support Inc.. 46p. SSB 192225 - SSB 192270.
501	Stearns & Wheler, LLC (Cazenovia, NY). July 2000. "Groundwater Sampling Results, June 2000 Event, General Semiconductor, Inc., Hicksville, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 25p. SAD 112206 - SAD 112230.
502	Anson Environmental Ltd. (Huntington, NY). July 7, 2000. "Proposed Interim Remedial Measure Action Plan, Operable Unit 02, On-site Groundwater, Utility Manufacturing/Wonder King, 700 Main Street, Westbury, New York, Site #1-30-043H." 23p. SSB 019255 - SSB 019277.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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565	O'Brien & Gere Engineers, Inc.. June 2001. "Soil Clean Up Level Support Document: Former Sylvania Electric Products, Inc. Facility, Hicksville, New York." Report to GTE Operations Support Inc.. 229p. SDOH 246600 - SDOH 246828.
566	O'Brien & Gere Engineers, Inc.. June 2001. "Soil Clean Up Level Support Document: Former Sylvania Electric Products, Inc. Facility, Hicksville, New York." Report to GTE Operations Support Inc.. 227p. SAR 268202 - SAR 268428.
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579	Severn Trent Laboratories, Inc. (STL) (Buffalo, NY). August 11, 2001. "NYS DEC Contract #C004154 - Region 1, NYSDEC - SW8463 8260/5 ML, Analysis Data Sheet." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 19p. SSB 205710 - SSB 205728.
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582	Dermody, P. [Enviroscience Consultants, Inc.]. September 4, 2001. "Letter to J. Jones (NYSDEC) re: 118-130 Swalm Street, Westbury, NY, NYSDEC Site No. 1-30-043P." 9p. Albem-Review0002855 - Albem-Review0002861; SW 140366 - SW 140367.
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585	Impact Environmental (Kings Park). October 2001. "Appendix G: Laboratory Analytical Report Regarding: 36 Sylvester Street Site, Site Code 1-30-043U, Westbury, New York." 332p. SAD 080727 - SAD 081058.
586	O'Brien & Gere Engineers, Inc.. October 2001. "Data Validation Report: Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York." Report to GTE Operations Support Inc.. 35p. SAD 102989 - SAD 103023.
587	Parrish, RS ; Kleaka, KC. [Impact Environmental]. October 2001. "Draft Interim Remedial Measures Work Plan Proposed for: 299 Main Street Site, Site Code 1-30-043S, Westbury, New York." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 139p. SAD 080237 - SAD 080375.
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592	CA Rich Consultants, Inc. (Plainview, NY). November 2001. "Quarterly Monitoring Report, Third Quarter 2001, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 53p. SAD068729 - SAD068781.
593	CA Rich Consultants, Inc. (Plainview, NY). November 2001. "Off-Site Remedial Design Report, Operable Unit 2 (OU-2), Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 35p. SSB 032365 - SSB 032399.
594	Stearns & Wheler, LLC (Hyannis, MA). November 2001. "Remedial Investigation Phase V, General Semiconductor, Inc., Hicksville, New York (Draft)." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 102p. SSB 235482 - SSB 235583.
595	Stearns & Wheler, LLC (Hyannis, MA). November 2001. "Off-Site Groundwater Investigation (Phase IV) and Semi Annual Sampling Event, July 2001, General Semiconductor, Inc., Hicksville, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 29p. SAD 112347 - SAD 112375.
596	Osmundsen, SJ ; Weinstock, EA. [CA Rich Consultants, Inc.]. November 8, 2001. "Letter to C. Vasudevan (NYSDEC) re: Off-Site Remedial Design Report - Addendum No. 1, Operable Unit 2 (OU-2), Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York, NYSDEC Site No.: 130043E." 2p. SAD 046397 - SAD 046398.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
597	Hull & Associates, Inc. (Mason, OH) ; Turley, WL. November 9, 2001. "Letter Report to J. Jones (NYSDEC) re: Progress Report #2 for October 19, 2001 through November 9, 2001 for the Focused Groundwater Remediation at the NYSDEC Site Code #130043A in Westbury, New York (Site); NMB007.200.0007." 145p. SAD 060016 - SAD 060160.
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599	Lancaster Laboratories (Lancaster, PA). November 12, 2001. "NYSDEC ASP Category B Data Package: IMC Magnetics - NY, Water Samples, Collected on 09/28/01 - 10/01/01, Sample No. 3699890 - 3699903." Report to Hull & Associates, Inc.. 451p. SSB 024912 - SSB 025362.
600	CA Rich Consultants, Inc. (Plainview, NY). December 2001. "Interim Remedial Measures Report and Operations & Maintenance Manual, Utility Manufacturing Company, 700 Main Street, Westbury, New York." Report to Utility Manufacturing Co. (Westbury, NY). 192p. SAD 072943 - SAD 072945SSB 018326 - SSB 018514.
601	New York State, Dept. of Environmental Conservation (NYSDEC). December 5, 2001. "Order on consent [In the Matter of the Development and Implementation of a Remedial Program for Operable Unit 2 of an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Tishcon Corporation]." INDEX # WI-0799-00-03, 66p. SW 128299 - SW 128364.
602	Finan, JD. [Hull & Associates, Inc.]. December 10, 2001. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #66 for November 10, 2001 through December 10, 2001 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0126.DOC." 2p. SAD 043021 - SAD 043022.
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604	Robins, K. [Dvirka and Bartilucci Consulting Engineers]. December 14, 2001. "Letter to J. Jones (NYSDEC) re: New Cassel Industrial, off-site groundwater monitoring and assessment program, Work Assignment No. D003600-25, D&B No. 1898." 23p. SAD 055310 - SAD055332.
605	Robins, KS. [Dvirka and Bartilucci Consulting Engineers]. December 17, 2001. "Letter to J. Jones (NYSDEC) re: New Cassel Industrial Area, off-site groundwater monitoring and assessment program, Work Assignment No. D003600-25, D&B No. 1898." 26p. SAD 055284 - SAD 055309.
606	Chemtech (Mountainside, NJ). 2002. "Supporting data for Utility Manufacturing." 23p. SAD 047894 - SAD 047916.
607	Chemtech (Mountainside, NJ). 2002. "Supporting data for Utility Manufacturing." 76p.
608	Severn Trent Laboratories, Inc. (STL). 2002. "Analytical methods summary." 277p. SAD 097781 - SAD 098057.
609	CA Rich Consultants, Inc. (Plainview, NY). January 2002. "Quarterly Monitoring Report, Fourth Quarter 2001, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 121p. SAD068783 - SAD068830SAD 073619 - SAD 073691.
610	Dillon Consulting Ltd.. January 2002. "Geophysical Surveys, Former GTE Sylvania Facility, Hicksville, New York." Report to URS Corporation. 24p. SAD 107856-SAD 107879.
611	Stearns & Wheler, LLC (Cazenovia, NY). January 2002. "Draft Groundwater IRM Ozone Injection System Design Report, Vishay General Semiconductor, Hicksville, New York." Report to Vishay General Semiconductor, Inc.. 108p. SSB 237449 - SSB 237556.
612	Finan, JD. [Hull & Associates, Inc.]. January 10, 2002. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #68 for December 10, 2001 through January 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0127.DOC." 2p. SAD 042979 - SAD 042980.
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614	Davis, SO. [FPM Group]. January 15, 2002. "Letter to J. Jones (NYSDEC) re: Addendum to November 2000 groundwater remediation work plan, Arkwin Industries, Inc., Westbury, New York, FPM File No. 652-00-03." 7p. SAD 066523 - SAD 066529.
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618	Lancaster Laboratories (Lancaster, PA). February 8, 2002. "NYSDEC ASP Category B Data Package, IMC Magnetics - NY, Water Samples, Collected on 01/04/02, Sample No. 3753742-3753745." 254p. SSB 024650 - SSB 024903.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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621	Impact Environmental (Kings Park, NY). February 21, 2002. "Phase II Environmental Site Assessment, Limited Subsurface Investigation 01-173A, Conducted at: 75 State Street, Westbury, New York, Nassau County Tax Map Designation: Section II; Block 79; Lots 63, 64, 303, and 304." Report to Lee Agency, LLC (College Point, NY). Submitted to The Bank of New York (White Plains, NY). 105p. ALBED00133690 - ALBED00133794.
622	Severn Trent Services ; Curran, JC. February 25, 2002. "SDG Narrative, Project ID: Hicksville-SVE." Report to S&W Services. 3p. SAD 112389 - SAD 112391.
623	New York State, Dept. of Environmental Conservation (NYSDEC). February 26, 2002. "Order on consent [In the Matter of the Development and Implementation of a Remedial Program for Operable Unit 2 Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Arkwin Industries, Inc.]." INDEX # WI-0861-00-02, 70p. SW 127369 - SW 127438.
624	URS Corp.. February 28, 2002. "Monitoring Well Installation and Ground Water Investigation, Former Sylvania Electric Products, Incorporated Facility, Cantiague, Rock Road, Hicksville, New York." Report to GTE Operations Support Inc.. 117p. SAR 267321-SAR 267437.
625	URS Corp.. February 28, 2002. "Monitoring Well Installation and Ground Water Investigation, Former Sylvania Electric Products, Incorporated Facility, Cantiague, Rock Road, Hicksville, New York." Report to GTE Operations Support Inc.. 119p. SSB 191111 - SSB 191229.
626	URS Corporation; Envirocon, Inc.; MHF Logistical Solutions, Inc.; Envirocare of Utah, Inc.. March 2002. "Soil Remediation Program Work Plan, Former Sylvania Electric Products Facility, Hicksville, New York." Report to GTE Operations Support Inc.. 322p. SAR 255094-SAR 255415.
627	Finan, JD. [Hull & Associates, Inc.]. March 11, 2002. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #70 for February 10, 2002 through March 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0129." 2p. SAD 042968 - SAD 042969.
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629	CA Rich Consultants, Inc. (Plainview, NY). April 2002. "Quarterly Monitoring Report, First Quarter 2002, Utility Manufacturing Company, 700 Main Street, Westbury, New York." Report to Utility Manufacturing Co. (Westbury, NY). 73p. SAD 073619 - SAD 073691.
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631	Impact Environmental ; Allen, J ; Kleaka, KC. April 2002. "Interim Remedial Measures Work Plan Approved for: 36 Sylvester Street Site, Site Code 1-30-043U, Westbury, New York (Final)." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 140p. SAD 080447 - SAD 080586.
632	Stearns & Wheler, LLC (Cazenovia, NY). April 2002. "Groundwater IRM Ozone Injection System Design Report, General Semiconductor, Inc., Hicksville, New York." Report to General Semiconductor, Inc.. 194p. SAD 112430 - SAD 112623.
633	Finan, JD. [Hull & Associates, Inc.]. April 10, 2002. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #71 for March 10, 2002 through April 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0130.DOC." 2p. SSB 002956 - SSB 002957.
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635	Robins, KS. [Dvirka and Bartilucci Consulting Engineers]. April 29, 2002. "Letter to J. Jones (New York State Department of Environmental Conservation) re: New Cassel Industrial Area, off-site groundwater monitoring and assessment program, Work Assignment No. D003600-25, D&B No. 1898." 3p. SAD 087666 - SAD 087668.
636	CA Rich Consultants, Inc. (Plainview, NY). May 2002. "Quarterly Monitoring Report, First Quarter 2002, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 79p. SAD068832 - SAD068910.
637	Hull & Associates, Inc. (Mason, OH). May 2002. "Focused Groundwater Remediation Report for the 570 Main Street Property, Westbury New York (NYSDEC Site Code #130043A). Volume I of V." Report to IMC Eastern Corp. (Chatsworth, CA). 236p.
638	Hull & Associates, Inc. (Mason, OH). May 2002. "Focused Groundwater Remediation Report for the 570 Main Street Property, Westbury New York (NYSDEC Site Code #130043A). Volume II of V: Appendix E-1. Appendix E-2." Report to IMC Eastern Corp. (Chatsworth, CA). NMBOOB.200.0016, 485p. SAD 056746 - SAD 057230.
639	Hull & Associates, Inc. (Mason, OH). May 2002. "Focused Groundwater Remediation Report for the 570 Main Street Property, Westbury New York (NYSDEC Site Code #130043A). Volume III of V: Appendix E-2 (Cont'd)." Report to IMC Eastern Corp. (Chatsworth, CA). 455p. SAD 057231 - SAD 057685.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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642	Stearns & Wheler, LLC (Hyannis, MA). May 2002. "Work Plan: Remedial Investigation Phase V, Vishay General Semiconductor, Hicksville, New York." Report to Vishay General Semiconductor, Inc.. 110p. SAD 112630 - SAD 112739.
643	URS Corp.. May 3, 2002. "Groundwater Investigation Work Plan, Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York." Report to GTE Operations Support Inc.. 23p. SAR 251876-SAR 251898.
644	URS Corp.. May 3, 2002. "Soil Boring Work Plan, Former Sylvania Electric Products Incorporated Facility, Hicksville, New York." Report to GTE Operations Support Inc.. 19p. SAR 251858-SAR 251875.
645	Finan, JD. [Hull & Associates, Inc.]. May 10, 2002. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #72 for April 10, 2002 through May 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0132." 2p. SW 122426 - SW 122427.
646	Severn Trent Laboratories, Inc. (STL) Connecticut (Shelton, CT) ; Hobart, PT. May 13, 2002. "Analytical Report (Job Number: 201016), Hicksville - Monthly." Report to S & W Services. 14p. SAD 099660 - SAD 099673.
647	Finan, JD. [Hull & Associates, Inc.]. June 10, 2002. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #73 for May 10, 2002 through June 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0133." 2p. SW 121540 - SW 121541.
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649	Hineline, TL. [Stearns & Wheler, LLC]. June 12, 2002. "Letter to K. Carpenter (NYSDEC) re: Vishay General Semiconductor, Site Number: 1-30-020, Operable Unit 2, Remedial Investigation Phase V Work Plan, S&W Job No. 90281. Addendum to Remedial Investigation Phase V Work Plan." 9p. SSB 221645 - SSB 221653.
650	Severn Trent Laboratories, Inc. (STL) (Shelton, CT) ; Hobart, PT. June 13, 2002. "Analytical Report (Job Number: 201192), Project: Hicksville - Monthly." Report to S & W Services. 21p. SAD 099674 - SAD 099694.
651	CA Rich Consultants, Inc. (Plainview, NY). July 2002. "Quarterly Monitoring Report, Second Quarter 2002, Utility Manufacturing Company, 700 Main Street, Westbury, New York." Report to Utility Manufacturing Co. (Westbury, NY). 78p. SAD 073540 - SAD 073617.
652	FPM Group (Ronkonkoma, NY). July 2002. "Soil Vapor Extraction and Air Sparge Pilot Test Report, Arkwin Industries, Inc. Site, Westbury, New York, NYSDEC Site # 1-30-043D." Report to Arkwin Industries, Inc.. Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 342p. SAD066904 - SAD067245.
653	Finan, JD. [Hull & Associates, Inc.]. July 10, 2002. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #74 for June 10, 2002 through July 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0134.DOC." 2p. SW 121292 - SW 121293.
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655	CA Rich Consultants, Inc. (Plainview, NY). August 2002. "Quarterly Monitoring Report, Second Quarter 2002, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 82p. SAD068912 - SAD068993.
656	CA Rich Consultants, Inc. (Plainview, NY). August 2002. "Off-Site RD/RA Progress Report, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 4p. SAD 046716 - SAD 046719.
657	Impact Environmental ; Allen, J ; Kleaka, KC. August 2002. "Focused Remedial Investigation Report Conducted at 36 Sylvester Street Site, Site Code 1-30-043U, Westbury, New York (Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 22p. SAD 081700 - SAD 081721.
658	Finan, JD. [Hull & Associates, Inc.]. August 12, 2002. "Letter to G. Bobersky (NYSDEC) re: Progress Report #75 for July 10, 2002 through August 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0135.DOC." 2p. SSB 002964 - SSB 002965.
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No.	Reference
662	URS Corp.. September 2002. "Soil Boring Work Plan, Former Sylvania Electric Products Incorporated Facility, Hicksville, New York." Report to GTE Operations Support Inc.. 110p. SAD 108174 - SAD 108283.
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664	Robins, KS. [Dvirka and Bartilucci Consulting Engineers]. September 9, 2002. "Letter to J. Jones (NYSDEC) re: New Cassel Industrial Area, off-site groundwater monitoring and assessment program, Work Assignment No. D003600-25, D&B No. 1898." 28p. SAD 055256 - SAD 055283.
665	Finan, JD. [Hull & Associates, Inc.]. September 10, 2002. "Letter to G. Bobersky (NYSDEC) re: Progress Report #76 for August 10, 2002 through September 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0136." 2p. SW 120506 - SW 120507.
666	Hull & Associates, Inc. (Mason, OH) ; Turley, WL. September 10, 2002. "Letter Report to J. Jones (NYSDEC) re: Progress Report #11 for August 12, 2002 through September 10, 2002 for the Focused Groundwater Remediation at the NYSDEC Site Code #130043A in Westbury, New York (Site); NMB008.200.0025." 130p. SAD 059764 - SAD 059767SSB 028948 - SSB 029073.
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668	CA Rich Consultants, Inc. (Plainview, NY). October 2002. "Quarterly Monitoring Report, Third Quarter 2002, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 53p. SAD068995 - SAD069047.
669	Stearns & Wheler, LLC (Hyannis, MA). October 2002. "Off-Site Groundwater Investigation, Phase V, Summer 2002, Vishay-General Semiconductor, Inc., Hicksville, New York (Draft)." Report to Vishay-General Semiconductor, Inc. (Hicksville, NY). 138p. SSB 235344 - SSB 235481.
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672	Robins, KS. [Dvirka and Bartilucci Consulting Engineers]. October 1, 2002. "Letter to J. Jones (NYSDEC) re: New Cassel Industrial Area (Site No. 1-30-043), off-site groundwater monitoring and assessment program, Work Assignment No. D003600-25, D&B No. 1898." 33p. SAD 055223 - SAD 055255.
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674	Turley, WL. [Hull & Associates, Inc.]. October 11, 2002. "Letter to J. Jones (NYSDEC) re: Progress Report #12 for September 10, 2002 through October 11, 2002 for the Focused Groundwater Remediation at the NYSDEC Site Code #130043A in Westbury, New York (Site); NMB008.200.0026." 2p. SAD 042935 - SAD 042936.
675	Miller, GG. [S&W Services, Inc.]. October 17, 2002. "Letter to J. Black (ESC Engineering of New York, P.C.) re: Sampling and analysis requirements for Areas B and C, Area A - Soil vapor extraction system optimization, General Semiconductor Site - Hicksville, NY, Site Code 1-30-020, S&W No. 80147.5." 4p. SAD 103925 - SAD 103928.
676	Miller, GG. [S&W Services, Inc.]. October 17, 2002. "Letter to J. Black (ESC Engineering of New York, P.C.) re: SVE operations report - May - June 2002, General Semiconductor Site - Hicksville, NY, Site Code 1-30-020, S&W No. 80147.5." 39p. SSB 221900 - SSB 221902SAD 099624 - SAD 099659.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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726	Dvirka and Bartilucci Consulting Engineers (Woodbury, NY). June 2003. "Annual Report, September 2001 through July 2002. Offsite Groundwater Monitoring and Assessment Program, New Cassel Industrial Area, New Cassel, Nassau County, New York (Site No. 1-30-043), Work Assignment No. D003600-25 (Draft)." Report to New York State. Dept. of Environmental Conservation (NYSDEC). 103p. SAD 053750 - SAD 053852.
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733	CA Rich Consultants, Inc. (Plainview, NY). July 2003. "Post Remediation Groundwater Monitoring Report, Operable Unit - 1 (OU-1), Utility Manufacturing Company, 700 Main Street, Westbury, New York." Report to Utility Manufacturing Co. (Westbury, NY). 72p. SAD 074174 - SAD 074245.
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738	Lancaster Laboratories (Lancaster, PA). August 2, 2003. "NYSDEC ASP Category B Data Package, IMC Magnetics - NY/611531, Water Samples, Collected on 7/16/03, Sample No. 4085609 - 4085622." Report to Hull & Associates, Inc.. 239p. SSB 028434 - SSB 028672.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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767	Chemtec (Mountainside, NJ). 2004. "Data Package for Volatile Organics." Report to CA Rich Consultants, Inc. (Plainview, NY). 40p. SAD 047589 - SAD 047628.
768	Severn Trent Laboratories, Inc. (STL). 2004 ?"Cell 2 Status Report." 4p. SSBED00034401 - SSBED0034404.
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770	Severn Trent Laboratories, Inc. (STL). 2004 ?"Cell 9 Status Report." 5p. SSBED00034819 - SSBED00034823.
771	Severn Trent Laboratories, Inc. (STL). 2004 ?"Cell 10 Status Report." 4p. SSBED00034078 - SSBED00034081.
772	Severn Trent Laboratories, Inc. (STL). 2004 ?"Cell 11 Status Report." 5p. SSBED00034133 - SSBED00034137.
773	Severn Trent Laboratories, Inc. (STL). 2004 ?"Attachment C: Cell 13 MARSSIM Evaluation Results Using Severn Trent Laboratories, Inc. Sample Results." 5p. SSBED00034269 - SSBED00034273.
774	Severn Trent Laboratories, Inc. (STL). 2004 ?"Cell 1-Attachment C: MARSSIM Evaluation Results Using Severn Trent Laboratories, Inc. Sample Results." 11p. SSBED00034049 - SSBED00034059.
775	Severn Trent Laboratories, Inc. (STL). 2004 ?"Cell 2-Attachment C: MARSSIM Evaluation Reports Using Severn Trent Laboratories, Inc. Sample Results." 10p. SSBED00034427 - SSBED00034436.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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796	URS Corp.. April 2004. "Historic Leaching Pool Bias Sampling Protocol, Former Sylvania Electric Products Incorporated Facility, Hicksville, New York." Report to GTE Operations Support Incorporated. 3p. SSB 202963-SSB 202965.
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805	Dennis, B. [Hull & Associates, Inc.]. May 10, 2004. "Letter to G. Bobersky (NYSDEC) re: Progress Report #96 for April 11, 2004 through May 10, 2004 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York (Site); NMB004.200.0151." 2p. SAD 042686 - SAD 042687.
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808	ESC Engineering of New York, P.C. (Cazenovia, NY). May 18, 2004. "Groundwater Interim Remedial Measure, Operable Unit No. 2, Full-Scale Design Report, Groundwater Circulation Well System, Former General Instrument Corporation Site, Hicksville, New York (Revision No. 1)." 160p. SAD 115011 - SAD 115170.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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820	Brathovde, RD. [URS Corp.]. July 12, 2004. "Letter to J. Agostinelli (GTE Operations Support Incorporated) re: Voluntary Cleanup Agreement for GTE Former Sylvania Electric Products Incorporated Facility, By GTE Operations Support Incorporated, Site #: V-00089-1, Index #: W1-0903-01-12, UST Report, Cell 10, 100 Cantiague Rock Road, Hicksville, New York." 45p. SAR 261075 - SAR 261119.
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828	URS Corp.. September 2004. "Systematic Subsurface Soil Sampling and Analysis Plan West of the 140 and 100 Buildings and Southwest of the 100 Building, Former Sylvania Electric Products Incorporated Facility, Hicksville, New York." Report to GTE Operations Support Inc.. 12p. SSB 212707-SSB 212718.
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842	ESC Engineering of New York, P.C. (Cazenovia, NY). November 17, 2004. "June 2004 Semiannual Groundwater Monitoring Report, Former General Instrument Corporation Site, Hicksville, New York (Revision No. 1)." 105p. SAD 115408 - SAD 115512.
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857	Severn Trent Laboratories, Inc. (STL). 2005 ?"Attachment C: Cell 8 MARSSIM Evaluation Results Using Severn Trent Laboratories, Inc. Sample Results." 12p. SSBED00034789 - SSBED00034800.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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No.	Reference
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1066	James, V. [New York State, Dept. of Environmental Conservation (NYSDEC)]. August 7, 2008. "Letter to M. Tone (Nixon Peabody LLP) re: Sulzer Metco, Site # 130178." 2p. ALBEM00074489 - ALBEM00074490.
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1093	Cancemi, BT ; Davis, SO. [FPM Group]. December 9, 2008. "Letter to J. Jones (NYSDEC) re: Soil vapor investigation, Arkwin Industries, Inc. Westbury, New York, NYSDEC Registry # 1-30-043D, FPM File No. 652-08-08." 53p. ALBED00149565 - ALBED00149617.
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1101	Sobstyl, S. [CA Rich Consultants, Inc.]. February 4, 2009. "Letter to J. Jones (NYSDEC) re: Progress Report; January 2009, 299 Main St., Site 1-30-43S, New Cassel Industrial Area, Agreement Index #W1-1072-05-07." 3p. Albem-Review0008534 - Albem-Review0008536.
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1112	Sobieraj, JA. [WSP Engineering of New York, P.C.]. March 25, 2009. "Letter to R. DeCandia, Jr. (New York State Department of Environmental Conservation) re: Operable Unit 2 - Groundwater Interim Measure (IRM) Progress Report, Former General Instrument Corporation Site, Hicksville, New York." 30p. Albem-Review0039798 - Albem-Review0039827.
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1114	Weinstock, EA. [CA Rich Consultants, Inc.]. April 3, 2009, May 8, 2009. "Letters to J. Jones (NYSDEC) re: Monthly Progress Reports - March 2009 and April 2009, Tischon Corporation, Site No.: 130043E, 30 New York Avenue, Agreement Index No.: W1-0758-95-05; Tischon file #36." 2p. SDOH260857 - SDOH260858.
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1116	Heaney, JM III. [Walden Associates]. May 8, 2009. "Letter to J. Dyber (NYSDEC) re: Progress report: April 2009, Frost Street Sites: Site ID #s 1-30043 I, L, M, New Cassel Industrial Area, Westbury, New York." 13p. Albem-Review0035250 - Albem-Review0035262.

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No.	Reference
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1119	CA Rich Consultants, Inc. (Plainview, NY). June 2009. "First Quarter 2009 Quarterly Monitoring Report, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 85p. Albem-Review00149704 - Albem-Review00149788.
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1124	Sobieraj, JA. [WSP Engineering of New York, P.C.]. July 27, 2009. "Letter to R. DeCandia, Jr. (New York State Department of Environmental Conservation) re: Operable Unit 2 - Groundwater Interim Remedial Measure (IRM) Final Progress Report, Former General Instrument Corporation Site, Hicksville, New York." 51p. ALBED00150766 - ALBED00150816.
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Dear Ms. LaPoma:

This firm represents IMC Eastern Corp. f/k/a IMC Magnetics Corp. We attach hereto on behalf of IMC Eastern Corp. f/k/a IMC Magnetics Corp. the Comment to Proposed Remedial Plan of the New Cassel/Hicksville Groundwater Contamination Site prepared by Gradient Corporation.

Respectfully submitted,

Robert R. Lucic

Enc.
Cc: Beverly Kolenberg, Esquire

Comments On the Proposed Plan for Operable Unit 1 of the New Cassel/Hicksville Groundwater Contamination Superfund Site

Prepared for
IMC Eastern Corporation

September 23, 2013

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Abbreviations

1,1-DCA	1,1-Dichloroethane
1,2-DCB	1,2-Dichlorobenzene
BGEWD	Bowling Green Estate Water District
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compound
D&B	Dvirka & Bartilucci Consulting Engineers
DCE	Dichloroethylene
DNAPL	Dense Non-aqueous Phase Liquid
RI/FS	Remedial Investigation/Feasibility Study
GI	General Instruments
HAS	Hollow Stem Auger
IMC	IMC Eastern Corporation
IRM	Interim Remedial Measure
MNA	Monitored Natural Attenuation
NAPL	Non-aqueous Phase Liquid
NCDH	Nassau County Department of Health
NCIA	New Cassel Industrial Area
NYSDEC	New York Department of Environmental Conservation
OU1	Operable Unit 1
PCE	Tetrachloroethene
PDI	Pre-design Investigation
PSA	Preliminary Site Assessment
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SCG	New York State Cleanup Goals for Groundwater
SVE/AS	Soil Vapor Extraction/Air Sparge
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
TMW	Temporary Monitoring Wells
UGA	Upper Glacial Aquifer
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Compound

1 Introduction

On behalf of IMC Eastern Corporation f/k/a IMC Magnetics Corp. (IMC), Gradient submits the following comments regarding United States Environmental Protection Agency's (USEPA's) Proposed Plan for Operable Unit 1 (OU1) of the New Cassel/Hicksville Groundwater Contamination Superfund Site (Site; Figure 1.1), dated July 2013 [USEPA Region II, 2013a]. IMC is a former lessee of a facility located at 570 Main Street, Westbury, New York [NYSDEC, 2003]. That facility is located within an area known as the New Cassel Industrial Area (NCIA; Figure 1.2).

Our comments demonstrate that USEPA's Conceptual Site Model (CSM) is fundamentally flawed and does not correctly characterize groundwater contamination in OU1. The USEPA CSM:

- Does not consider a significant amount of data collected from within and upgradient of the NCIA and from within OU1, but instead relies on a relatively small and unrepresentative data set;
- Depicts a groundwater flow and plume migration direction that is incorrect and is not consistent with the conclusion reached by the New York Department of Environmental Conservation (NYSDEC);
- Relies on groundwater monitoring wells that are too shallow and hence fail to characterize a portion of the Eastern Plume that migrates deeper under the influence of the Bowling Green Estate Water District (BGEWD) pumping wells;
- Relies on an incorrect chlorinated ethenes molar ratio analysis approach – leading to unsupportable conclusions regarding plume chemical signatures;
- Utilizes unreliable data from temporary monitoring wells (TMWs) that were installed using inappropriate methods and are not reproducible; and
- Fails to consider that contamination originating from sites located upgradient of the NCIA (Upgradient Plume) is affecting groundwater quality within OU1 – a conclusion that has been acknowledged and documented by consultants working on behalf of the Upgradient Parties.

USEPA's CSM reaches conclusions regarding groundwater flow direction, plume fate and transport, and the source identification that are not supportable by sound science. In our comments, we discuss the shortcomings of the USEPA CSM and present a revised CSM, which demonstrates that:

- The NCIA Western Plume[1] was limited in spatial extent and attenuated to concentrations below the New York State Cleanup Goals for Groundwater (SCGs) before reaching Old Country Road;
- The plume depicted as the OU1 Western Plume in USEPA's Proposed Plan is the western extent of the comingled Central and Eastern Plumes;
- The NCIA Eastern Plume continues to contribute significant contaminant mass to OU1 and to affect groundwater quality within OU1; and

[1] Note, throughout this document we use the name of the operable unit together with the source area (*e.g.*, NCIA Eastern Plume and OU1 Eastern Plume) to denote the presence of a plume within a given area. That is, the term NCIA Eastern Plume refers to the Eastern Plume within the NCIA, whereas the term OU1 Eastern Plume refers to USEPA's depiction of the Eastern Plume within OU1.

- The Upgradient Plume continues to contribute contaminant mass to OU1 and to affect groundwater quality within OU1.

The remedy proposed by USEPA is also inappropriate since it relies on a flawed CSM, utilizes a remedial technology that NYSDEC previously rejected and has already been tried unsuccessfully just east of OU1, and is not-cost effective. Specific deficiencies of the proposed remedy include:

- The proposed remediation wells are not appropriately located since the USEPA conclusion regarding groundwater and contaminant migration direction are incorrect. This results in USEPA proposing wells in areas that have relatively low levels of contamination and a sub-optimal orientation of wells.
- One of the remedial technologies selected by USEPA, in-well stripping, was previously considered and rejected by NYSDEC due to the presence of anisotropies in the aquifer. The infeasibility of this approach at this Site has been corroborated by a failed attempt at using in-well stripping to remediate the Upgradient Plume, just east of OU1.
- The proposed remedy also places a disproportionately large number of remediation wells in the areas depicted by the USEPA as the OU1 Western and OU1 Central Plumes, with only a few wells in the Eastern Plume. As discussed in the revised CSM, the NCIA Eastern and Upgradient Plumes are continuing to contribute a significant amount of contaminant mass to OU1 and hence active remediation efforts at OU1 need to target the eastern portion of OU1.
- The remainder of the OU1 Plumes (Central and Western) have naturally attenuated over the years and are best addressed by Monitored Natural Attenuation (MNA). Given that potential groundwater exposures are being controlled by well head treatment at the BGEWD and by local institutional controls and the OU1 Central and Western Plumes attenuate, MNA is the most appropriate and cost-effective remedy for these portions of the Site.

In summary, the USEPA CSM is based on an incomplete and unrepresentative dataset, has significant inaccuracies (*e.g.*, the incorrect chlorinated ethane molar ratios), and reaches conclusions that are not based on sound science. The proposed remedial design suffers from the shortcomings of the CSM, utilizes a remedial technology that was not only rejected by NYSDEC but has also been tried unsuccessfully near OU1, and is not cost-effective. Given that exposure control measures are already in-place and the OU1 Central and Western Plumes attenuate, the eastern portion of OU1 is the only area requiring active remedial measures.

2 USEPA's CSM – the Basis for the Proposed Plan – is Fundamentally Flawed and Does Not Characterize Groundwater Contamination Correctly

USEPA's CSM relies on unrepresentative data collected from within OU1 and does not account for decades of environmental investigation-related data collected upgradient of OU1. In addition, the chlorinated ethenes molar ratio signature approach used by USEPA was inappropriately implemented. As a result, USEPA's conclusions regarding the groundwater flow direction, extent of plumes, and attribution of plumes to NCIA source areas is incorrect. As discussed in detail in this section, consideration of all available data within the NCIA and OU1, the temporal evolution of the NCIA-related plumes and the Upgradient Plume from the Sylvania and General Instruments (GI)/Vishay facilities, consideration of the correct groundwater flow direction and correctly undertaking the chlorinated ethenes molar ratio analysis leads to the following conclusions, which are completely different than those reached by USEPA:

- The NCIA Western Plume has always been limited in spatial extent and attenuates to concentrations below the SCGs before reaching Old Country Road;
- The plume depicted as the OU1 Western Plume in USEPA's Proposed Plan is the western extent of the comingled Central and Eastern Plumes;
- The NCIA Eastern Plume continues to contribute significant contaminant mass to OU1 and to affect groundwater quality within OU1; and
- The Upgradient Plume continues to contribute contaminant mass to OU1 and to affect groundwater quality within OU1.

These conclusions and their technical basis is presented and discussed in detail in the following sub-sections.

2.1 A Significant Amount of Critical Data Collected from Within the NCIA, Upgradient of the NCIA, and in OU1 Were Not Considered by USEPA in the Proposed Plan

Groundwater and soil data have been collected over a period greater than three decades in areas both within and upgradient of OU1. More than 7,400 soil and groundwater samples have been collected from over 1,100 locations within and adjacent to the NCIA, OU1, and the Upgradient Plume (Figure 2.1). Consideration of these data are crucial for understanding the source(s) of the current OU1 groundwater plumes and the fate of the plumes over time. Below is a summary of the key investigations that have been performed:

- *BGEWD Well Sampling:* Groundwater samples have been collected from the BGEWD pumping wells by the Nassau County Department of Health (NCDH) beginning at least as early as 1977 (NYSDEC, 2000). These samples provide an indication of timing and the nature of the

contamination reaching the BGEWD well, as well as the evolution of the groundwater plume in OU1.

- *United States Geological Survey (USGS)/NCDH Investigations:* Between 1983 and 1985, NCDH installed 30 monitoring wells within the NCIA, primarily in the Central and Western portions, six wells north (upgradient) of the NCIA, five wells within OU1, and three wells south or west of OU1 (NCDH and D&B, 1986). During this time period, a total of 128 groundwater samples were collected and analyzed (NYSDEC, 2000). Between 1986 and 1991, USGS installed 22 additional monitoring wells both *within and downgradi*ent of the NCIA; during this time period, more than 350 groundwater samples were collected and analyzed (USGS, 1996; NYSDEC, 2000).
- *NYSDEC Preliminary Site Assessments (PSAs):* Due to the detection of chlorinated volatile organic compounds (CVOCs) at the BGEWD pumping wells, NYSDEC performed a series of investigations to determine the source(s) of the groundwater contamination. As part of these PSAs, which were conducted between 1992 and 1997, a total of more than 900 groundwater and 250 soil samples were collected from sites within the NCIA (LMS, 1994, 1995, 1996, 1997).
- *Supplemental NCIA Investigations and Remedial Actions:* As a result of the PSAs, NYSDEC identified 17 Class 2 sites within the NCIA (NYSDEC, 2003). Soil and groundwater samples were collected at each site to characterize conditions, and to design, implement, and monitor remedial actions, as appropriate. In total, more than 1,700 groundwater samples and 300 soil samples were collected and analyzed between 1997 and 2010 during these remedial activities (Appendix A).
- *Upgradient Plume Investigations:* Between 1981 and 2010, over 2,300 soil and groundwater samples were also collected both on and downgradient of the Sylvania and GI/Vishay properties.
- *NCIA and Off-Site Groundwater Investigations:* Additional investigations were performed by NYSDEC within the NCIA and OU1 between 1999 and 2000 (LMS, 2000). Four shallow groundwater monitoring wells were installed and vertical profile data were collected from four hydropunch locations. In total, over 140 groundwater samples were collected and analyzed (LMS, 2000).
- *Additional Off-Site Groundwater Investigations:* Between 2008 and 2011, three different pre-design investigations (PDIs) were performed in the area downgradient of the NCIA. The first was performed by Dvirka & Bartilucci Consulting Engineers (D&B) in 2009 (D&B, 2009); the other two were performed by HDR in 2010 (HDR, 2010) and 2011 (HDR, 2011), respectively. In total, 30 monitoring wells were installed and more than 150 groundwater samples were collected and analyzed during this time period.

Appendix A lists all the studies that USEPA should have considered in the development of the CSM and the Proposed Plan. Despite the presence of a significant amount of data near and upgradient of OU1, USEPA has relied on a limited and unrepresentative dataset (see Section 2.4) in the development of its CSM for OU1 and the remedial actions specified in the Proposed Plan.[2] In summary, the data not considered by USEPA include, but are not limited to the following (Figure 2.1):

- Over 2,500 groundwater samples collected from locations within the NCIA;
- Over 150 groundwater samples collected from locations within OU1; and
- Over 2,500 groundwater samples collected from locations associated with the Upgradient Plume – including samples from within OU1.

[2] Figure 2 of the Proposed Plan presents the data that USEPA used to generate the depictions of the OU1 plumes, which forms the basis of their CSM.

These data are critical for understanding the location and characteristics of source(s) of plumes that originate from the NCIA and the upgradient parties, the chemical signature of the plumes at the source areas, and the fate and transport characteristics of these plumes as they migrate into OU1. As discussed in detail in Sections 2.5 through 2.7, one of the critical flaws in the USEPA analysis stems from inadequate examination of groundwater quality at the NCIA source areas.

2.2 Data from Temporary Monitoring Wells, Relied on by USEPA, Were Collected Using Inappropriate Methods and are Not Reproducible

A significant portion of the OU1 data, relied on by USEPA, were collected using inappropriate methods. Nine TMWs were installed in 2008 as part of a PDI conducted by D&B (2009; Figure 2.2). Seven of the nine temporary wells were installed and sampled inappropriately, causing cross-contamination between the shallow and deep groundwater samples. Furthermore, groundwater quality data from the TMWs are not reproducible. USEPA did not exercise sufficient care in the use of this data in the development of their CSM.

Seven TMWs (TMW-1, TMW-2, TMW-4, TMW-5, TMW-6, TMW-7, and TMW-9) were installed and sampled using inappropriate techniques. Each of these TMWs was drilled to 285 ft-below ground surface (ft-bgs) with a hollow stem auger (HSA). The use of HSAs for this type of well installation is inappropriate because soil and groundwater during drilling are transported up the auger flights; these drill cuttings contact the sides of the borehole as they are raised and, likely cause cross-contamination between different depth intervals. Technical literature, including regulatory guidance documents, warn about cross-contamination that may be caused by the drilling methods used by D&B:

- *Guidance Manual for Groundwater Investigations (CalEPA, 1995, p. 17):* "Because drill cuttings are in contact with the entire length of the borehole as they are transported up the auger flights, hollow-stem augers may cause cross-contamination of sub-surface materials."
- *Handbook of Environmental Site Characterization and Ground-Water Monitoring (Einarson, 2006. p. 834):* When using HSAs, "contaminants can be smeared against the borehole wall. This can impart a long-lived positive bias to groundwater samples collected from a multi-level well."

Furthermore, sampling at these seven TMWs was conducted contrary to USEPA-recommended sampling protocol; samples were first collected from the deeper sampling horizons that have higher levels of contamination, and then as each temporary well was raised, samples were collected from shallow, relatively clean groundwater. USEPA guidance (2002) recommends collecting samplings from the most impacted zones last, in order to minimize cross-contamination.

- *Ground-Water Sampling Guidelines for Superfund and Resource Conservation and Recovery Act (RCRA) Project Managers (USEPA, 2002, p. 11):* "The effects of cross-contamination can be minimized by sampling the least contaminated (zone) first and progressing to the more contaminated (zones)."

Groundwater quality data at these seven TMWs demonstrate that shallow groundwater was cross-contaminated due to the inappropriate sampling technique utilized. The downward flow gradient in the Magothy Aquifer carries plumes vertically downward with the groundwater (see Section 2.3), as they migrate laterally away from source area(s). Because the TMWs were installed generally at least several thousand feet from the NCIA source areas, groundwater impacts are at depth; shallow groundwater is

relatively unimpacted. However, at all seven of these TMW locations, shallow groundwater quality impacts were observed, contrary to demonstrated plume behavior. Groundwater quality impacts observed in shallow groundwater, defined as the 50 to 150 ft-bgs depth interval (roughly, the top 100 ft of the water column), are summarized below (Table 2.1; Figure 2.3 and 2.4).

Table 2.1 Impacts Observed in Shallow Groundwater at select TMW Wells[a]

Temporary Well ID	Maximum Detected Concentration in Shallow Groundwater (µg/L)	
	PCE	TCE
TMW-1	270	61
TMW-2	250	310
TMW-4	57	17
TMW-5	330	870
TMW-6	14	63
TMW-7	870	45
TMW-9	280	120

Notes:
(a) Shallow groundwater is defined as groundwater present from 50 to 150 ft-bgs.
PCE = Tetrachloroethene; TCE = Trichloroethene.

It is important to note that two other TMWs were installed during this investigation using a more appropriate method. TMW-3D and TMW-8D were installed to 500 ft-bgs using a mud rotary drill and groundwater samples were collected using a hydropunch at each sampling interval. Thus, at these locations, samples were collected first in shallow groundwater and then at deeper intervals as drilling progressed (*i.e.*, from the least-impacted zone to the most-impacted). Using this drilling and sampling approach, contamination was only found in deeper groundwater; no impacts were detected in the top 150 ft (approximately 100 ft below the water table) at TMW-3D or the top 250 ft (approximately 200 ft below the water table) at TMW-8D (Figures 2.3 and 2.4).

Groundwater samples collected from permanent monitoring wells confirm that the temporary monitoring wells data from TMW-1, TMW-2, TMW-4, TMW-5, TMW-6, TMW-7, and TMW-9 are unreliable. During the supplemental PDI performed in 2011 by HDR, permanent monitoring wells and extraction wells were installed adjacent to several of the prior temporary well locations. Monitoring wells MW-11S and MW-11D were installed adjacent to TMW-1; extraction well EX-2 was installed south of TMW-2 (Figure 2.2). Samples collected at the new permanent well locations from the same depth intervals contained significantly lower concentrations of key compounds [tetrachloroethene (PCE), trichloroethene (TCE), and 1,1,1-trichloroethane (TCA)], some by an order of magnitude, than were detected in the nearby TMWs in 2008 (Table 2.2). Data collected at the two permanent wells demonstrate the unreliability of the data collected at the inappropriately installed and sampled TMWs.

Table 2.2 Comparison of Data Collected at 2008 Temporary Wells and 2011 Permanent Wells

Well ID	TMW-2	EX-2
Date	8/18/2008	4/12/2011
Sample Depth (ft-bgs)	285	285
PCE (µg/L)	390	130
TCA (µg/L)	3.4	ND
TCE (µg/L)	1,400	140

Well ID	TMW-1	MW-11S	TMW-1	MW-11D
Date	8/27/2008	4/4/2011	8/26/2008	4/4/2011
Sample Depth (ft-bgs)	225	225	285	285
PCE (µg/L)	3,700	140	530	460
TCA (µg/L)	21	3.8	18	10
TCE (µg/L)	230	190	650	400

Notes:
ND = Not Detected; PCE = Tetrachloroethene; TCE = Trichloroethene; TCA = 1,1,1-Trichloroethane.

USEPA acknowledged in the Supplemental Feasibility Study (USEPA Region II, 2013a) that "there is greater uncertainty with the groundwater sampling data collected from the temporary well locations relative to the permanent monitoring locations." This uncertainty is magnified by the inability to reproduce the sample results collected from the temporary wells and the likely cross-contamination that has impacted the shallow groundwater data at seven of the TMW locations. Nonetheless, because the TMWs were installed in useful locations and span important depths intervals, we believe that the TMW data can be used, albeit judiciously, to delineate groundwater plumes in OU1. However, the conclusion that shallow groundwater is contaminated in this area is unfounded.

2.3 The Groundwater Flow and Plume Direction Portrayed in the Proposed Plan is Incorrect and Inconsistent with Measured Groundwater Elevations

The groundwater flow direction and the resulting plume transport direction depicted by USEPA in the Proposed Plan are incorrect. The Plan shows the groundwater flow direction (Figure 2; USEPA Region II, 2013a) and all OU1 plumes migrating primarily to the south. This portrayal is inconsistent with historic groundwater elevation data collected within OU1 that clearly indicate groundwater flow direction to the southwest. This conclusion has been confirmed in a number of reports produced by the NYSDEC and its consultants:

- *Remedial Investigation (RI)/Feasibility Report (LMS, 2000):* "Following NYSDEC and USEPA regulations, both the [Upper Glacial Aquifer] UGA and Magothy are protected as sole source aquifers on Long Island. Depth to water is about 50 to 55 ft below the ground surface in the study area and the hydraulic gradient is approximately 0.0006 ft/ft to the southwest."
- *Record of Decision (ROD; NYSDEC, 2003):* "The UGA and the Magothy are in direct hydraulic connection; however, clay lenses are often found in the upper Magothy in this area. Depth of water table is between 55-65 ft-bgs in the NCIA, and groundwater flows in a southwesterly direction."
- *PDI Report (D&B, 2009):* "The NCIA topography is generally flat. Three commingled volatile organic compound (VOC) plumes are located in this area and are migrating in the direction of regional groundwater flow, which is roughly to the southwest."

The direction of plume transport depicted in technical reports prepared by NYSDEC corroborate the southwesterly groundwater flow direction. In addition, plume maps presented in the 2003 ROD issued by NYSDEC (2003) [reproduced in Figure 2.5], indicate that NCIA-related plumes migrate to the southwest. The ROD (NYSDEC, 2003) states that "the axis of the plume is generally in the direction of the flow of shallow groundwater."

Recent groundwater elevation data confirm the southwesterly groundwater flow direction (Figures 2.6a and 2.6b). Groundwater elevations in the UGA, presented in the 2000 Remedial Investigation/Feasibility Study (RI/FS) (LMS, 2000) indicate that the shallow groundwater flows to the southwest (Figure 2.6a). In the 2011 PDI (HDR, 2011), HDR installed 11 additional monitoring wells in the OU1 Magothy and measured groundwater elevations in both new and existing wells (Figure 2.2). Several of the new wells (MW-11S/D, MW-16S/D, and MW-17S/D) were couplets where adjacent shallow and deep monitoring wells were installed. Thus, elevation data from these wells provide further corroboration of the flow directions within the Magothy Aquifer and also provide a more robust dataset for evaluating the vertical flow gradient within OU1. The results of the HDR monitoring confirm that shallow groundwater (130-140 ft-bgs) flows to the southwest (Figure 2.6b). Furthermore, at mid-aquifer depth (205 ft-bgs), the groundwater flow direction has a much stronger westerly flow component (Figure 2.6b).[3]

Our conclusion that the groundwater flow direction in OU1 is toward the southwest is not only consistent with the conclusion reached by NYSDEC, but is also supported by the OU1 groundwater quality data. As discussed in detail in Sections 2.5 through 2.7, TCA and its degradation products are marker compounds for the NCIA's Central Plume.[4] The spatial orientation of the TCA and its degradation products plume (Figures 2.18c, 2.19c, and 2.20c), including the sharp westerly transport of these compounds within OU1, further corroborates the groundwater flow direction. The HDR groundwater elevation data and groundwater quality data (discussed further in Sections 2.5 through 2.7) also indicate that there is a groundwater flow divide in the eastern portion of OU1 (Figure 2.6). Groundwater quality data indicate that the NCIA Eastern Plume is being split with contaminant mass flowing both to the south and the southwest, as a result of the flow divide.

The groundwater elevation data collected at the monitoring well couplets also indicate the presence of downward vertical gradients in OU1. As expected, there is a larger downward vertical gradient near the BGEWD water supply wells (0.0064 to 0.0078 ft/ft; Table 2.3), whereas the downward vertical gradient is smaller in the western portion of OU1 (0.0017 ft/ft; Table 2.3). These vertical gradient values indicate that as the NCIA-related plumes migrate laterally, they also sink downward. In addition, given the groundwater flow direction and the influence of the BGEWD pumping wells, groundwater plumes in the eastern portion of OU1 are expected to descend more rapidly than those in the western portion. Additionally, while the plumes are sinking, they are simultaneously influenced by the strong westerly groundwater flow component.

[3] Note, the groundwater elevation contours at a depth of 285 ft-bgs depicted in HDR (2011) appear to be affected by a precipitation event that occurred on 4/16/2011 (1.38 inches); an examination of groundwater elevation data collected prior to this precipitation event (*e.g.*, April 15, 2011) indicate a stronger westerly flow component, similar to that depicted on Figure 9 of the HDR report.

[4] Note, TCA and its degradation products were also detected in the Eastern and Western Plumes within the NCIA, but these concentrations were relatively low, hence enabling the use of TCA as a NCIA Central Plume marker compound.

Table 2.3 OU1 Summary of Vertical Hydraulic Gradients

Monitoring Well Couplet	Downward Vertical Hydraulic Gradient (ft/ft)	Notes
MW-11S/D	0.0017	Based on 1 measurement on 4/25/2011 (HDR, 2011)
MW-16S/D	0.0078	Based on 2 measurements on 4/14/2011 and 4/25/2011 (HDR, 2011)
MW-17S/D	0.0064	Based on 2 measurements on 4/13/2011 and 4/25/2011 (HDR, 2011)

In summary, an accurate assessment of the spatial and vertical variability of the groundwater hydraulics is essential for properly designing any groundwater remediation system. The differences between the groundwater flow direction depicted by USEPA and the correct flow direction are significant since they have a profound effect on interpreting groundwater quality data, development of an accurate CSM, and the Site's remedial design. Consequences of failing to correctly consider the OU1 groundwater flow hydraulics are incorrect plume depictions, incorrect source attributions, and a flawed proposed remedy design.

2.4 Key Data, Relied on by USEPA, Fail to Correctly Delineate OU1 Plumes Because Monitoring Wells were Installed Too Shallow

Data relied upon by USEPA in the Proposed Plan were collected from wells that are too shallow to delineate the extents of the OU1 plumes. As discussed in Section 2.3, a downward vertical flow gradient causes plumes to sink as they migrate through OU1 away from the source area(s). However, key OU1 monitoring wells are screened in the zone of relatively unimpacted groundwater above the plume, and consequently these data are not adequate for delineating the plumes.

An example of a well couplet that is too shallow to adequately delineate groundwater impacts is MW-16S/D. This couplet was installed by HDR (2011) immediately adjacent to the location where TMW-8D was installed in 2008 (D&B, 2009). MW-16S was installed with a well screen from 215 to 225 ft-bgs; MW-16D was installed with a well screen from 275 to 285 ft-bgs. Yet, the plume had already been delineated at TMW-8D to be present at depths ranging from 292 to 372 ft-bgs, with the maximum concentration being present at a depth of 337 ft-bgs. Thus, MW-16S or MW-16D were installed at depth intervals where prior groundwater vertical profiling had found concentrations to be either non-detect or well below New York SCGs. Therefore, the decision to install this monitoring well cluster at these depths is truly perplexing. Furthermore, USEPA's decision to ignore the groundwater quality data at TMW-8D in the development of its CSM and for delineating OU1 plumes (Figure 2 of the Proposed Plan) is also inexplicable.

Other key wells in OU1 screened at depths that are also too shallow to delineate the plume include:

- MW-15: Well screen installed from 185-205 ft-bgs; and

  GWHP-2: Samples collected from 58-150 ft-bgs.

USEPA used these shallow monitoring well data to incorrectly dismiss the southwest flow component of the NCIA Eastern Plume. As a consequence, the USEPA CSM is flawed and incomplete because it is based on unrepresentative data and fails to reconcile available information.

2.5 USEPA's Chlorinated Ethenes Molar Ratio Analyses and Plume Fingerprinting are Incorrect

The molar ratio analysis presented in the Supplemental RI Technical Memorandum (Bolduc, 2013) and relied on by USEPA in its Proposed Plan is incorrect. The RI molar ratio analysis assumes that all dichloroethylene (DCE) isomers (cis-1,2-DCE, trans-1,2-DCE, and 1,1-DCE) are degradation products of the higher molecular weight chlorinated ethenes (PCE and TCE). While cis-1,2-DCE is the predominant dichloroethylene isomer formed during the degradation of PCE and TCE, the 1,1-DCE isomer is formed by the abiotic hydrolysis of TCA (Wiedemeier *et al*., 1999). Thus, the RI molar ratio analysis presented by USEPA mischaracterizes the breakdown pathways and does not allow for the differentiation between the degradation products in PCE/TCE and TCA plumes. Because TCA and its daughter products are indicators of the Central Plume, correctly depicting the chlorinated PCE/TCE and TCA degradation chains is essential for delineating the spatial extents of the OU1 plumes and for appropriately assigning plumes to source areas.

The sequence of microbially mediated and abiotic reactions that degrade PCE/TCE and TCA to non-chlorinated reaction products is well established. PCE/TCE degradation occurs *via* microbially mediated reactions, leading to a series of breakdown (or daughter) products, as shown in Figure 2.7. Although degradation of TCE can produce all three isomers of DCE (cis-1,2-DCE, trans-1,2-DCE, and 1,1-DCE), it is well documented that cis-1,2-DCE is by far the dominant breakdown product and 1,1-DCE is comparatively insignificant (Wiedemeier *et al*., 1999). Degradation of TCA can occur *via* microbial degradation to 1,1-dichloroethane (1,1-DCA) and by abiotic hydrolysis of the parent compound to either 1,1-DCE or acetate (Figure 2.7). Approximately 20% of the TCA hydrolysis products are 1,1-DCE, which is the most likely source of 1,1-DCE in contaminated groundwater (McCarty, 1997). Therefore, when evaluating molar ratios of parent to daughter compounds, 1,1-DCE is a significant breakdown product of TCA and not of PCE/TCE and is a marker of the NCIA and OU1 Central Plumes.

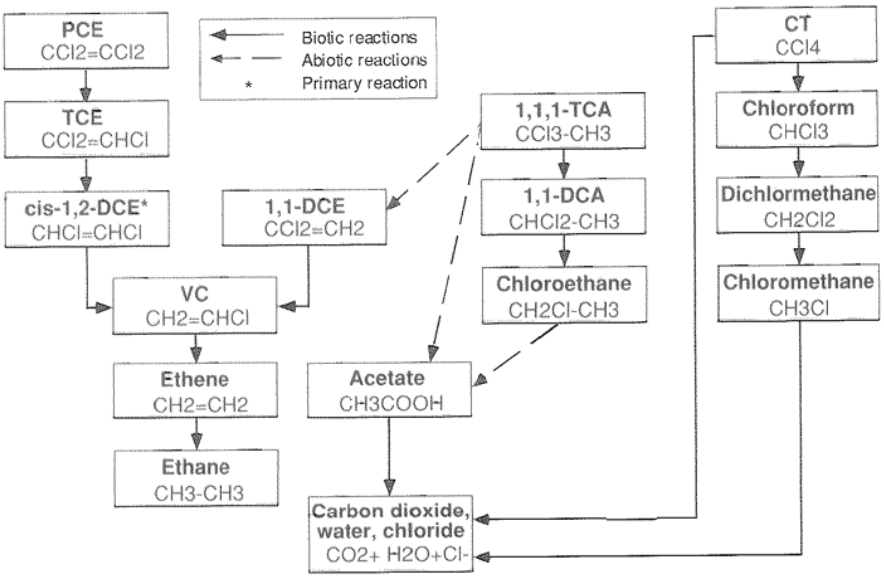

Figure 2.7 Degradation Pathways for Chlorinated Ethenes, Ethanes, and Methanes (From Wiedemeier *et al.*, 1999)

USEPA's incorrect molar ratio analysis leads to a mischaracterization of the spatial extents of the OU1 plumes and to incorrect attribution of plumes to source areas. We reevaluated the molar analysis using the correct degradation pathways. For the chlorinated ethenes, we have analyzed the molar fractions of PCE, TCE, cis-12-DCE, and vinyl chloride in OU1 monitoring wells (Figure 2.8). For the TCA degradation chain, we have analyzed the molar fractions of TCA, 1,1-DCE, and 1,1-DCA (Figure 2.9). Conclusions drawn from this corrected analysis, summarized below, differ significantly from those presented in the RI.

- Monitoring wells located downgradient of the NCIA Central Plume (TMW-6, MW-5/6, TMW-5, MW-1, MW-2/3/4, MW-10, GWHP-1, MW-3, MW-4, TMW-3D, and TMW-2; Figure 2.9) contain high mole fractions of TCA degradation products (1,1-DCE and 1,1-DCA). At these wells, 1,1-DCE mole fractions range up to 71% of the total TCA degradation chain; 1,1-DCA mole fractions range up to 45%. These monitoring wells delineate the Central Plume flow path through OU1.
- PCE and TCE are the two primary chlorinated ethenes detected in OU1 (Figure 2.8).
    - High PCE mole fractions, ranging up to 98% of the total chlorinated ethenes, have been detected in wells located downgradient of the NCIA Eastern Plume (FSMW-14A/B, FSMW-13A/B, TMW-7, MW-14, EW-1B, and EX-1).
    - High TCE mole fractions, ranging up to 90% of the total chlorinated ethenes, have been detected in wells located downgradient of the NCIA Central Plume. Monitoring wells with high TCE mole fractions are the same wells where high 1,1-DCE and 1,1-DCA molar concentrations (compounds that are indicators of the Central Plume) have been found.
    - PCE and TCE are both present in the western portion of OU1, which is caused by the mixing of the OU1 Eastern and OU1 Central Plumes.
- Cis-1,2-DCE is not a significant component of the total chlorinated ethenes in OU1 (Figure 2.8). On average throughout OU1, cis-12-DCE makes up about 14% of the total chlorinated ethene molar concentrations in OU1.[5]

The TCE signature that USEPA attributed to the OU1 Western Plume is incorrect. USEPA states in the Proposed Plan that "The Western Plume has a generally higher molar fraction of TCE compared to PCE" (USEPA Region II, 2013a). However, a review of groundwater quality data at the NCIA source areas demonstrates that PCE and not TCE is the predominant chlorinated ethene associated with NCIA Western Plume. To define the NCIA source area chlorinated ethene plume signature, we utilized all groundwater samples in which either the PCE or TCE concentration exceeded 1,000 µg/L. Additionally, because cis-12-DCE has only been detected at relatively low concentrations, we utilized the ratio of PCE to TCE to delineate plumes within OU1.

The revised molar ratio analysis indicates that PCE is the predominant compound in both the Eastern and Western NCIA source areas. However, in the Eastern NCIA source area, the PCE to TCE molar ratio is approximately 10 times higher than the average molar ratio for the Western NCIA source area (*i.e.*, 51 *vs.* 5; Table 2.4). The high molar ratio in the Eastern NCIA source area is due to the presence of PCE dense non-aqueous phase liquid (DNAPL) (discussed in Section 2.7.2). In the Central Plume, the average PCE to TCE ratio is 0.07 (Table 2.4); molar ratios less than 1 indicate that TCE is present at higher concentrations than PCE. The low PCE to TCE molar ratios within the NCIA Central Plume are likely associated with the known historical use of TCE at two of the Central Plume sites (LMS, 1995, 1996; Anson, 1994).

[5] Based on all data shown on Figure 2.8.

Table 2.4 PCE to TCE Molar Ratios Within the NCIA Source Areas

Source Area	Average PCE to TCE Molar Ratio
Eastern NCIA	51
Central NCIA	0.07
Western NCIA	5

Note:
NCIA = New Cassel Industrial Area.

The revised molar ratio analysis for OU1 also demonstrates that monitoring wells downgradient of the Central Plume (TMW-6, EW-2B, TMW-5, MW-2, MW-3, MW-4, and TMW-2) contain higher concentrations of TCE than PCE (*i.e.*, the PCE to TCE molar ratio of less than 1), which are consistent with the NCIA Central Plume signature (Figure 2.10). High PCE to TCE molar ratios are located along the Eastern Plume flow path at the Frost Street Sites, TMW-7, TMW-8D, and at TMW-1 (Figure 2.10). As distance from the Eastern NCIA source area increases, the PCE to TCE molar ratio declines due to attenuation of the PCE plume and commingling of the Eastern Plume (high PCE molar fraction) with the Central Plume (high TCE molar fraction).

2.6 USEPA Has Not Considered Contributions from the Upgradient Plume which is Migrating into OU1 and Affecting Groundwater Quality

The Upgradient Plume results from multiple source areas present at two industrial facilities: Sylvania and GI/Vishay, located northeast of the NCIA. Environmental investigations have been undertaken at these Sites since the 1980s with oversight from county, state, and federal authorities (Bolduc, 2013). Historical chlorinated solvent usage at both sites was similar to the industrial facilities located within the NCIA. Elevated PCE and/or TCE concentrations in groundwater, consistent with the presence of non-aqueous phase liquid (NAPL), have been found at the Sylvania and GI/Vishay Sites. PCE concentrations up to 32,000 µg/L (P-108, 74 ft-bgs; Bolduc, 2013) have been detected at the Sylvania facility, and TCE has been detected at concentrations up to 48,000 µg/L (W-1-75, 65-75 ft-bgs; ESC, 2006) at the GI/Vishay facility.

The chlorinated VOC plume from the Sylvania and GI/Vishay facilities migrates in a southwesterly direction into the NCIA and OU1. The conclusion that the Sylvania and GI/Vishay chlorinated organics plume has entered and is affecting groundwater quality in the NCIA and OU1 is supported by multiple lines of evidence:

- 1,2-Dichlorobenzene (1,2-DCB) is a distinct marker of the Upgradient Plume, uniquely associated with the GI/Vishay facility (WSP, 2010), and is found within the NCIA. In addition, 1,2-DCB is not known to have been used at any of the NCIA facilities. GI/Vishay acknowledged that 1,2-DCB was a unique marker of their operations and used this compound to delineate the approximate extent of their VOC plume (WSP, 2010).[6] Groundwater quality data collected as part of this investigation found 1,2-DCB to be present at depths ranging from 240 ft-bgs to 418 ft-bgs within and just east of the NCIA (WP-01 and WP-02 and WP-03) (Figure 2.11 and Table 2.5).

[6] Note, the plume defined on the basis of 1,2-DCB provides an approximate delineation of the VOC plume due to differences in migration rates between 1,2-DCB and PCE/TCE. As acknowledged by GI/Vishay's consultant, PCE and TCE are expected to result in a larger plume than 1,2-DCB, since their migration rate in groundwater is faster than 1,2-DCB (Appendix E; WSP, 2010).

Table 2.5 Upgradient Plume Impacts Using 1,2-DCB as a Marker Compound

Depth Profile ID	Location	Depth Interval Associated with Upgradient Plume - based on 1,2-DCB presence (ft-bgs)	Range of PCE Concentrations in Upgradient Plume Depth Interval (µg/L)	Range of TCE Concentrations in Upgradient Plume Depth Interval (µg/L)	Range of Cis-1,2-DCE Concentrations in Upgradient Plume Depth Interval (µg/L)
WP-01	NCIA	285-366	ND-500	490-3,700	70-1,500
WP-02	East of NCIA	240-378	39-490	210-550	27-1,900
WP-03	East of NCIA	276-418	0.4-160	2.6-1,400	0.6-1,100

Note:
ND = Not Detected; 1,2-DCB = 1,2-Dichlorobenzene; PCE = Tetrachloroethene; TCE = Trichloroethene; cis-1,2-DCE = cis-1,2-Dichloroethylene; NCIA = New Cassel Industrial Area.

- Elevated concentrations of PCE, TCE, and cis-1,2-DCE associated with the Upgradient Plume and distinct from the Frost Street Sites were also found at other locations, WP-06 and WP-07 (Figure 2.12). These chlorinated ethenes represent an additional source of contamination to OU1 because:
  - The chlorinated ethenes groundwater contamination related to the Frost Street Sites at the NCIA is relatively shallow (50 to 150 ft-bgs), whereas the Upgradient Plume enters the NCIA and OU1 at much deeper depths, ranging from 200 to 430 ft-bgs. For example, at WP-07, contamination associated with the Frost Street Sites is located at approximately 50 to 100 ft-bgs, whereas the Upgradient Plume is located at approximately 260 to 430 ft-bgs (Figure 2.12). Overall, the Upgradient Plume continues to sink as it migrates towards the southwest and is present at significant depths within the NCIA and OU1. The migration of the Upgradient Plume from the source areas into the NCIA and OU1 is clearly depicted on Figure 2.13.
  - In addition to the difference in contamination depths, the chemical signature (chlorinated ethene molar ratios) of the Upgradient Plume is different than the signature associated with the groundwater contamination at the Frost Street Sites within the NCIA. As previously discussed (Section 2.5), the NCIA Eastern Plume is PCE enriched (with PCE to TCE ratios typically on the order of 50), whereas the Upgradient Plume that is entering the NCIA and OU1 is a mix of TCE, PCE, and Cis-1,2-DCE. For example, this difference in chemical signatures can clearly be observed at WP-07 (Figure 2.12).
- Finally, groundwater and contaminant transport modeling undertaken by GI/Vishay also demonstrates that the Upgradient Plume is migrating into the NCIA and OU1. GI/Vishay used the measured concentrations for 1,2-DCB, a GI/Vishay marker compound (Table 2.5), to first calibrate a contaminant transport model, which was then used to estimate the downgradient extent of the PCE and TCE plumes associated with <u>just</u> the GI/Vishay facility (WSP, 2010). Note, the model-estimated plume extents were to be used to guide the placement of future monitoring wells – an effort that was abandoned once NYSDEC decided to refer the groundwater contamination sites in this area to the USEPA for potential placement on the National Priorities List. Regardless, the GI/Vishay model-predicted plumes for PCE and TCE, attributable <u>just to the GI/Vishay sources</u> extend a considerable distance (up to 1,600 feet) into OU1 (Figures 2.14 and 2.15). The full down-gradient extents of these model-predicted plumes have not been corroborated by the additional sampling originally contemplated by NYSDEC and GI/Vishay.

In summary, groundwater quality data demonstrate the presence of a marker compound (1,2-DCB) uniquely associated with the Upgradient Plume within the NCIA, presence of elevated PCE, TCE and degradation products co-located with the 1,2-DCB, clear differences in depth and chemical signature

between the Upgradient Plume and the NCIA Frost Street/Eastern Plume, and modeling results generated by a consultant working on behalf of one the Upgradient Parties demonstrating that the Upgradient Plume is entering OU1. Overall, there is compelling evidence demonstrating that the Upgradient Plume is affecting groundwater quality in OU1, the full extent of which has not yet been determined. Consequently, USEPA needs to revise their CSM and proposed remediation plan to address the contributions from the Upgradient Plume.

2.7 The Correct CSM Demonstrates that the NCIA Eastern and Central Plume Sources and the Upgradient Plume are Resulting in the Groundwater Contamination Observed in OU1

The CSM, which is the basis of USEPA's Proposed Plan, is fundamentally flawed in multiple facets. The Plan does not consider decades of environmental data collected within the NCIA and the Upgradient Plume – critical for defining source area plume characteristics. USEPA's failure to consider valuable source chemistry data, together with an incorrect characterization of groundwater flow direction and misinterpretation of the chlorinated organics degradation chains (and incorrect molar ratio calculations) results in OU1 plume depictions that are not supported by sound science. The failure of the USEPA CSM to accurately depict Site conditions is best illustrated by the CSM's inability:

- To acknowledge that the BGEWD wells are contaminated or explain the sources that are affecting groundwater quality at these production wells. In fact, according to the USEPA proposed CSM, the CVOCs plume does not reach the BGEWD wells, while in reality CVOCs have been detected at the BGEWD wells since 1983, and total CVOC concentrations have exceeded 100 µg/l (USEPA's threshold concentration for depicting plumes on Figure 2 of the Proposed Plan) since at least 2003 (Figures 2.16 and 2.17).
- To account for the presence of elevated levels of CVOCs at TMW-8D in the depiction of OU1 plumes (Figure 2 of Proposal Plan). Groundwater quality data from this location clearly demonstrates that the NCIA Eastern Plume migrates in a southwesterly direction. However, USEPA in drawing its plumes ignores these data completely and apparently relies on wells MW-16S/D, which are too shallow (Section 2.4).

The correct CSM, which rectifies the USEPA deficiencies, demonstrates that the NCIA Eastern and Central Plumes and the Upgradient Plume are the source(s) of the contamination reaching the BGEWD wells and causing the groundwater contamination observed within OU1. The correct CSM also demonstrates that the NCIA Western Plume is currently contained entirely within the NCIA, was limited in extent, and has never impacted the BGEWD water supply wells (Section 2.7.4). A key component of our analysis was understanding the temporal and spatial evolution of plumes at the NCIA source areas and in OU1. Since investigations at the NCIA, OU1, and at the Upgradient Plume were conducted over a prolonged period and were undertaken by separate entities, we combined the datasets into the following three time intervals to draw plume maps:

- *1994 to 1998:* This interval corresponds to the time during which a significant amount of data was collected during the PSAs within the NCIA (Figures 2.18a through 2.18c).
- *1999 to 2007:* During this time period, NYSDEC-required remedial actions were being implemented at most of the NCIA source area properties. Furthermore, plumes were delineated to a greater extent in OU1 and downgradient of GI/Vishay and Sylvania (Figures 2.19a through 2.19c).

- *2008 to 2011:* This time interval includes the relatively recent data and is the best representation of current conditions at OU1 and its vicinity (Figures 2.20a through 2.20c). However, as discussed in Section 2.2, concentrations recorded in the monitoring wells installed as part of the HDR PDI (HDR, 2011) study indicate much lower concentrations in the vicinity of some of the TMW locations (sampled in 2008). Hence, the plume maps for this time period, which include the TMW data, may overstate the extent of current contamination in OU1.

Using these plume maps together with other information, such as source area characterization and remediation data at the NCIA and areas associated with the Upgradient Plume, the revised molar ratio analyses (Section 2.5), and the area's hydrogeologic characteristics, the following subsections present a revised CSM for the Upgradient Plume, the NCIA Eastern Plume, the NCIA Central Plume, and the NCIA Western Plume.

2.7.1 Upgradient Plume

The Upgradient Plume, which originates at the GI/Vishay and Sylvania properties northeast of the NCIA, is a comingled PCE, TCE, and cis-1,2-DCE plume. TCE is the predominant compound associated with the GI/Vishay facility, whereas PCE is the key compound related to the Sylvania facility. However, given the close proximity of the two facilities, these plumes comingle and then migrate in a south-southwesterly direction (Figures 2.18a, 2.18b, 2.19a, 2.19b, 2.20a, and 2.20b). As discussed in Section 2.6, concentrations indicative of NAPL are present at the source area(s). In the vicinity of the source area(s), the CVOC plume is found at relatively shallow depths (60 to 120 ft-bgs); however, as the plume migrates laterally, it also moves vertically downward (Figure 2.13).

An interim remedial measure (IRM) was installed in 2003 to control CVOC migration downgradient from the GI/Vishay facility. Three in-well vapor stripping wells were installed to depth of 392 ft-bgs (ESC, 2004). Between 2003 and 2009, the IRM treated approximately 224 million gallons of groundwater and removed more than 2,500 lbs of VOCs (Sobieraj, 2009). However, groundwater impacts were far wider and deeper than initially thought and, consequently, the IRM was not capable of achieving its objective of controlling CVOC migration (Sobieraj, 2009). Thus, operation of the IRM was terminated in 2009.

A component of the Upgradient Plume flows into the NCIA and OU1. The Upgradient Plume is rich in TCE and cis-1,2-DCE (with lower relative PCE concentrations) when it enters the NCIA and OU1 (sampling locations WP-07, WP-06, and WP-01; Figure 2.12). This chemical signature (low PCE to TCE molar ratio), which is very distinct from the NCIA Eastern Plume signature, and the depth at which the plume enters (200 to 430 ft-bgs) allows it to be clearly differentiated from the shallower NCIA Eastern Plume. Consistent with the GI/Vishay PCE and TCE solute transport modeling results, groundwater quality data collected within OU1 confirm that the Upgradient Plume has entered OU1. For example, the low PCE to TCE ratio associated with the Upgradient Plume is clearly visible at deeper depth horizons, such as depth intervals greater than and equal to 437 ft-bgs at TMW-8D. In fact, at this location, there appears to be a distinct "clean" horizon (all CVOCs <5 µg/l at 392 ft-bgs) separating the Upgradient Plume from the overlying NCIA Eastern Plume (see Figure 4-1; D&B, 2009).

Overall, based on the preceding analysis, we conclude that the Upgradient Plume has reached OU1. USEPA needs to update their CSM to include the Upgradient Plume.

2.7.2 NCIA Eastern Plume

The NCIA Eastern Plume is the most significant source of CVOCs to OU1 and accounts for a vast majority of the contaminant mass present in OU1. The plume is predominantly PCE at the source area(s), with a PCE to TCE molar ratio of approximately 50 (Table 2.4). PCE concentrations as high as 120,000 µg/l (>50% of the aqueous solubility limit of PCE) have been detected in the NCIA Eastern Plume (FSMW-4A). PCE concentrations exceed 1% of its aqueous solubility (a threshold for potential NAPL presence (USEPA, 1992; Cohen & Mercer, 1993) over an area of approximately 160,000 ft^2 (~3.7 acres). The large aerial extent and high PCE concentrations within the NCIA Eastern Plume source area are visible in the plume maps for all the three time intervals (Figures 2.18a, 2.19a, and 2.20a). In addition, PCE concentrations exceeding the NAPL threshold extend to approximately 140 ft-bgs, indicating that DNAPL has penetrated to approximately 90 ft below the water table surface at the NCIA Eastern Plume source area (Figure 2.21 and 2.22). High concentrations of TCE have also been detected (*e.g.*, 5,900 µg/L at GP-72, 83-85 ft-bgs; 5,000 µg/L at GP-97, 83-85 ft-bgs; NYSDEC, 2000) in the Eastern Plume source areas (Figures 2.18b, 2.19b, and 2.20b).

Groundwater remediation at the NCIA Eastern Plume source(s) has had a limited effect on restoring groundwater quality and limiting contaminant migration into OU1. Remedial measures were not implemented at the Frost Street Sites until 2005 (Heaney, 2010), whereas remediation at most other Sites within the NCIA started in the 1990s and had largely completed NYSDEC requirements by the mid-2000s. Furthermore, the remedial measures implemented to-date at the Frost Street Sites appear to have had a limited beneficial impact on groundwater quality, with concentrations at a number of monitoring wells within the source area still exceeding 10,000 µg/l (Figure 2.20a). A letter from Walden Associates (a consultant for the Frost Street Sites) to NYSDEC (Heaney, 2010) summarizes the ineffectiveness of the soil vapor extraction/air sparge (SVE/AS) system installed at the Frost Street Sites:

> Although the *SVE/AS* system has been effective in the areas of FSMW-8A and FSMW-9A, unchanged groundwater concentrations were observed at monitoring well FSMW-4A after nearly three and a half (3.5) years *of SVE/AS* remedial system operation. Walden conducted three Geoprobe® investigations in 2009 to locate groundwater and soil hot spots potentially contributing to FSMW-4A groundwater contaminant concentrations and to delineate the 89 Frost Street suspected source area, as summarized in the Work Plan. Results of these investigations detected high soil concentrations of 3,200,000 ug/kg in one area located upgradient of FSMW-4A (in the vicinity of sampling location GWP-4 shown on Figure 3 of the Work Plan). This location also appears to correlate with the location of a former septic system structure. Additionally, a clay interval with varying thickness was encountered between 45 and 50 feet below grade (bg) in each boring installed in the vicinity of GWP-4. The extent of this clay has not been delineated, but it is suspected to have acted as a partial confining layer, that, at its edges, has provided a continuing source of soil contamination to the groundwater in this area.

Due to the ineffectiveness of the remedy to address the contaminant mass present at Eastern Plume source areas, significant contaminant mass continues to migrate *via* the Eastern Plume into OU1. This can be observed on the PCE plume maps (Figures 2.18a, 2.19a, 2.20a, and 2.21) that consistently show elevated PCE concentrations (on the order of 1,000 µg/l or higher) entering OU1, immediately downgradient of the Eastern Plume source area (Figures 2.18a, 2.19a, 2.20a, and 2.21). Using groundwater quality data collected near the Eastern Plume NCIA/OU1 boundary between 2000 and 2011, we have estimated that as much as 750 kgs/yr of total CVOC mass migrates from the Eastern Plume source areas into OU1.[7]

[7] Mass flux calculations based on data from monitoring wells FSMW-5, FSMW-17, FSMW-14, FSMW-13, FSMW-11, FSMW-6, FS-B4, FS-B5, FS-B6, FS-B7, FS-B8, FS-B9, FS-UVB-1, FS-UVB-2, FSMW-18, FSMW-16, and FSMW-12; the hydraulic

A portion of the NCIA Eastern Plume migrates to the southwest, affecting groundwater quality at the BGEWD wells and downgradient areas. A groundwater flow divide is present in OU1 immediately downgradient of the southeastern section of the NCIA (Figure 2.6 and Section 2.3). Consequently, a portion of the NCIA Eastern Plume migrates to the southwest and a portion migrates to the south (toward TMW-7 and MW-17D). USEPA's CSM acknowledges the southern component of the Eastern Plume but has ignored the component that migrates to the southwest. The southwest component of the plume is defined by TMW-8D, TMW-5, and other downgradient locations, where the plume becomes comingled with the Central Plume (*e.g.*, TMW-3D and TMW-2).[8] The contributions of the Central Plume at these comingled locations are discernible due to the presence of TCA and its breakdown products (discussed further in Sections 2.7.3 and 2.5).

The NCIA Eastern Plume's chlorinated ethene molar signature (high PCE to TCE ratio) helps track its progression across OU1. As demonstrated on Figure 2.10, the high PCE to TCE ratios can be observed at the Frost Street Site, TMW-7, TMW-8D, and at TMW-1. At these locations, the PCE to TCE ratios are generally on the order of 10 or higher, especially in the depth intervals where high concentrations have been observed.[9] Groundwater quality data collected at these key locations also indicate that the Eastern Plume sinks very rapidly to significant depths in the vicinity of the BGEWD wells. For example, PCE concentrations were found between 292 and 372 ft-bgs at TMW-8D (D&B, 2009).[10] Due to the presence of the BGEWD wells and the stronger downward gradients present in the vicinity of the wells, the OU1 Eastern Plume plunges quickly west of TMW-7. In addition, there is a large recharge basin (Basin 51) present immediately to the south of the BGEWD well field. Groundwater elevations collected at monitoring wells located near the recharge basin (MW-15, MW-16S/D, and MW-17S/D) rose sharply (0.5 to 1 foot) on April 17, 2011, in response to a 1.38 inch precipitation event on April 16, 2011 (HDR, 2011, Figure 15).[11] This hydraulic response also indicates that the recharge basin could be further increasing the downward vertical gradient in this area (due to the groundwater mound associated with the recharge basin), thereby pushing the Eastern Plume deeper.

The Eastern Plume contributes to the groundwater contamination observed at the BGEWD wells. PCE and TCE are the key CVOCs detected at the BGEWD wells (Figures 2.16 and 2.17). Given the high PCE and TCE concentrations associated with the Eastern Plume (PCE up to 120,000 µg/L and TCE up to 5,900 µg/L), the presence of strong vertical gradients in the area where the Eastern Plume is present and in the vicinity of the well field (based on groundwater elevation measurements, presence of the recharge basin, and observed CVOC concentrations), the observed PCE and TCE concentrations at the BGEWD well field are in all likelihood being caused by the Eastern Plume.

2.7.3 NCIA Central Plume

The chemical signature of the NCIA Central Plume is distinct from the Eastern and Western Plumes. TCA and TCE are the primary CVOCs at the source areas within the NCIA. Groundwater quality data

parameters used to calculate the groundwater flux were: Kh –Magothy = 81 ft/day; Kh – Upper Glacial = 170 ft/day; hydraulic gradient = 0.0015 ft/ft.

[8] Travel time analyses further confirm that the NCIA Eastern Plume accounts for the impacts observed in the western portion of OU1.

[9] Note, as discussed in Section 2.2, there are uncertainties associated with the quality of the data at shallow depths at seven of the TMWs, given the sampling techniques utilized. Notwithstanding these data limitations, we have used these data in our analysis.

[10] Note, HDR installed additional monitoring wells MW-15 and MW-16S/16D along a flow line between TMW-7 and TMW-8D to better define groundwater quality in this area. However, these monitoring wells are too shallow (base of wells ranged from 205 to 285 ft-bgs) and hence would have missed the plume in this area.

[11] These groundwater elevation data were collected prior to the pump test at well EX-1 as part of the supplemental PDI (HDR, 2011).

indicate that both TCA and TCE were present at elevated concentrations in the 1990s at the NCIA Central Plume properties (Figures 2.18c, 2.19c, and 2.20c). TCA has been detected in groundwater at concentrations as high as 79,000 µg/L (N-10470, 55-65 ft-bgs, NYSDEC, 2000; NC-24, 46-56 ft-bgs; LMS, 1995) which is in excess of 1% of its aqueous solubility and thus an indication that NAPL may be present. TCE has been detected at concentrations as high as 3,700 µg/L (GP-150, 78-81 ft-bgs, NYSDEC, 2000).

The Central Plume's unique chemical signature (TCA, 1,1-DCE, and TCE) enables tracking of this plume as it migrates into OU1. Groundwater quality data and the corrected molar ratio analysis show that the Central Plume flows in a southwest direction. As previously discussed (Section 2.5), 1,1-DCE is uniquely associated with the degradation of TCA and is not expected to be generated at appreciable concentrations as a degradation product of PCE or TCE. Elevated TCA concentrations were found in the south-central portion of the NCIA (*e.g.*, >10,000 µg/l at wells N-01470, NC-24, MDCW-1S, N-11855, MDC-1S, and GW-4), on and downgradient of the Tishcon properties (Figure 2.18a). As this TCA-related plume migrates into OU1, the presence of 1,1-DCE defines the path of the Central Plume, which extends through the following key wells: TMW-6, MW-5/6, TMW-5, MW-1, MW-2/3/4, MW-10, GWHP-1, MW-3, MW-4, TMW-3D, and TMW-2 (Figure 2.9). In addition to TCA and its degradation products, the low PCE to TCE molar ratio is another useful line of evidence for defining the Central Plume's flow path. At locations TMW-6, EW-2B, TMW-5, MW-2, MW-3, MW-4 and TMW-2, the PCE to TCE molar ratio is strongly aligned with the Central Plume signature (molar ratios <1; Figure 2.10). At TMW-3D, the signature is consistent with the comingling of the Central and Eastern Plumes.

The vertical progression of the NCIA Central plume can be traced from wells in the NCIA Central Plume source area into OU1 (Figure 2.23). In the Central Plume source area, TCA and its degradation byproducts are located at depths ranging from 40 ft-bgs to 100 ft-bgs (*e.g.*, MDCW-1, MDC-1, and TGPA-60/80); at MW5/6 in OU1, the center of the plume is located at 110 ft-bgs; at TMW-5, GWHP-1, and MW-1/2/3/4, the highest concentrations are located at about 140 ft-bgs; and at TMW-2 in western OU1, the highest concentrations are located at about 250 ft-bgs.

The Central Plume is a significant contributor to groundwater contamination within OU1.

2.7.4 NCIA Western Plume

The NCIA Western Plume originates from industrial facilities located in the western portion of the NCIA (Figure 1.2). Elevated PCE and TCE concentrations have been detected in groundwater on the Western NCIA properties; PCE has been detected at a maximum concentration of 12,000 µg/L in groundwater (GP-95, 83-85 ft-bgs; NYSDEC, 2000); TCE has been detected at a maximum concentration of 7,200 µg/L (N-10319; NYSDEC, 2000). The NCIA western plume's molar ratio indicates that PCE is the predominant compound, with an average PCE to TCE molar ratio of 5.

The NCIA Western Plume is shallow and groundwater concentrations attenuate rapidly with depth on the NCIA Western Plume properties. The highest PCE and TCE concentrations detected within the NCIA Western Plume were found at depths ranging from 50 to 85 ft-bgs, approximately the top 35 ft of the water column (*e.g.* GP-186, GP-184, AW-2U-IMC, AGGW-05; Figures 2.24 and 2.25). However, both PCE and TCE concentrations attenuate significantly with depth (*e.g.*, 130 to 140 ft-bgs; Table 2.6).

Table 2.6 NCIA Western Plume – Attenuation With Depth[12]

	MW-5U/L-IMC	MW-6U/L-IMC	MW-7U/L-IMC
Maximum PCE Concentration Detected			
Shallow (45-60 ft-bgs)	310 µg/L	140 µg/L	26 µg/L
Deep (130-140 ft-bgs)	16 µg/L	11 µg/L	13 µg/L
Attenuation Factor	19	13	2

Note:
PCE = Tetrachloroethene.

The NCIA Western Plume flows to the southwest consistent with regional hydrogeology (Figures 2.18a, 2.19a, and 2.20a). The maximum historical extent of the NCIA Western Plume did not migrate south of Old Country Road and or the boundary of the New Cassel Hicksville Contaminated Groundwater Superfund Site (Figures 2.18a, 2.24, and 2.25). Sample location IRM-HP-3, located about 340 ft south of the OU1 boundary and approximately 1,250 ft from the NCIA Western Plume source areas defines the maximum downgradient extent and maximum depth of the NCIA Western Plume (Figures 2.24 and 2.25). Data from this location, collected in 1997, show PCE concentrations ranging from non-detect to 77 µg/L and TCE concentrations ranging from non-detect to 202 µg/L (NYSDEC, 2000). The vertical limits of the NCIA Western Plume at IRM-HP-03 (defined as any concentration measured in excess of the New York SCGs) extended from 90 to 130 ft-bgs (Figures 2.24 and 2.25). Thus, even at the maximum historical downgradient extent of the NCIA Western Plume, it remained shallow.

The NCIA Western Plume has never impacted the BGEWD water supply wells. The NCIA Western Plume sources are located 3,000 ft northwest of the BGEWD water supply wells (Figure 2.16). Because the natural groundwater flow direction is to the southwest, it is not possible for any Western NCIA sources to have caused any impacts at the BGEWD wells. Furthermore, because the NCIA Western Plume is shallow, it is not hydraulically influenced by operation of the BGEWD pumping wells approximately 500 ft-bgs. The operation of the BGEWD pumping wells produces a strong local downward vertical flow gradient (see Table 2.3) and facilitates the downward vertical transport of upgradient NCIA Central and NCIA Eastern Plumes, but this does not extend to the NCIA Western Plume. Finally, Dr. Vasudevan, the director of the Remedial Bureau at NYSDEC, stated in his January 2010 Declaration (Vasudevan, 2010), "it is unlikely that BGEWD supply wells 1 and 2 were ever impacted by the [NCIA] Western Plume."

No NAPL has ever been visually observed in groundwater on the NCIA Western Plume properties. However, PCE has been detected in a few samples at concentrations in excess of 1% of its aqueous solubility. Despite the presence of limited elevated historical PCE concentration data, the rapid attenuation of concentrations with distance and with time, and the lack of any deep plume migration, lead us to conclude that the extent of NAPL, if any, was localized and was effectively addressed by remedial actions undertaken at the source areas in the Western NCIA.

The spatial and vertical extent of the NCIA Western Plume has always been smaller than the other NCIA plumes. The limited extent of the NCIA Western Plume was affirmed in the 2003 ROD for off-Site groundwater (NYSDEC), which concluded that the downgradient extent of the NCIA Western Plume was limited even before source remediation actions were undertaken. As reported in the ROD (NYSDEC, 2003) (Figure 2.27), the maximum PCE concentration detected in the downgradient NCIA Western Plume (south of Old Country Road) was 1 µg/L, TCE was not detected, and the maximum reported total VOC concentration was 3 µg/L. None of these concentrations exceed the New York SCGs.

[12] Monitoring wells shown in this table are located adjacent to Swalm Street, south of Main Street.

[NCIA] Western Plume
1996 - 2000 Data

Contaminant of Concern	Range of Detected Concentration North of Old Country Road (ppb)				Range of Detected Concentration South of Old Country Road (ppb)				SCGs (ppb)
	50-99 ft	100-124 ft	125-200 ft	200+ ft	50-99 ft	100-124 ft	125-200 ft	200+ft.	
Trichloroethylene	2 j-73	2 j-8 j	-	-	ND	ND	ND	-	5
Tetrachloroethylene	1 j-96	1 j-4 j	-	-	1 j	ND	ND	-	5
Trichloroethane	1 j-52	3 j	-	-	1 j-2 j	2 j	2 j	-	5
Total VOC's*	1-207	1-38	-	-	1-3	ND	1-3	-	100

Figure 2.27 NCIA Western Plume Groundwater Concentration Summary (Source: Table 2 of ROD; NYSDEC, 2003)

Source remediation was implemented early (*e.g.*, starting in 1993) in the western portion of the NCIA and have effectively reduced groundwater concentrations in and downgradient of the source areas. As a result of aggressive source remedial actions and the natural flushing of the aquifer, PCE and TCE concentrations in the NCIA Western Plume have attenuated significantly over the past 20 years. The average PCE concentration in groundwater samples collected in the western portion of the NCIA (sample locations used in this analysis are shown on Figure 2.28) has declined from 238 µg/L to 21 µg/L; the average TCE concentration has declined from 119 µg/L to 2 µg/L (Table 2.7).

Table 2.7 PCE, TCE, and TCA Concentrations over Time in the NCIA Western Plume

Time Interval	No. of Groundwater Samples Collected	Average PCE Concentration (µg/L)	Average TCE Concentration (µg/L)	Average TCA Concentration (µg/L)
1994-1998	189	238	119	12
1999-2007	458	25	5	5
2008-2011	46	21	2	2

Notes:
PCE = Tetrachloroethene; TCE = Trichloroethene; TCA = 1,1,1-Trichloroethane

Time *versus* concentration plots which present data from all wells in the NCIA Western Plume show similar declining concentration trends (Figures 2.29 through 2.31). Both the median PCE and TCE concentration detected in the NCIA Western Plume over the last 6 years is less than 10 µg/L (Figures 2.29 through 2.31). Additionally, concentration versus time plots for selected wells along the NCIA Western Plume flow path provide further evidence of attenuation (Figure 2.32). For example, at N-10477, a downgradient well in the NCIA Western Plume flow path, concentrations of PCE declined from 640 µg/L in 1985 to non-detect in 2000. At N-10324, concentrations of TCA declined from 4,400 µg/L in 1985 to 52 µg/L in 2000. At N-10319, between 1987 and 1997, concentrations of TCE declined from 7,200 µg/L[13] to 290 µg/L and PCE declined from 2,200 to 510 µg/L. Due to the rapid attenuation over time, the current extent of the NCIA Western Plume is contained entirely within the NCIA and does not enter either OU1 or the New Cassel/Hicksville Groundwater Superfund Site at concentrations in excess of SCGs (Figures 2.33 and 2.34).

The NCIA Western Plume was shallow, limited in spatial extent, and was aggressively remediated. The Western Plume has no impact on groundwater quality in OU1.

[13] This is the maximum TCE concentration ever detected in the NCIA Western Plume.

3 The Remedial Approach Proposed by USEPA is Inappropriate Since it Relies on a Flawed CSM, Utilizes Remedial Technologies that NYSDEC Rejected Previously, and will be Disruptive, Difficult to Implement, and Not Cost-effective

This section critiques the USEPA-proposed remedial design for OU1. In addition to a flawed CSM, USEPA did not adequately assess the remedial alternatives as part of the Feasibility Study, *e.g.*, did not undertake any evaluation of the time required to achieve cleanup targets for the MNA alternative and summarily dismissed this option. Consequently, the remedial design proposed by USEPA is unnecessarily onerous, not cost-effective, and does not comply with the requirements of the National Contingency Plan. In addition, one of the remedial technologies selected by USEPA, in-well vapor stripping, was not only previously rejected by NYSDEC, but the approach was implemented just east of OU1 and failed.

3.1 USEPA's Proposed Plan is Inappropriate Since it Relies on a Flawed CSM

By failing to accurately characterize the groundwater flow and plume migration directions, USEPA's Proposed Plan is fundamentally flawed and will not achieve the Remedial Action Objectives (RAOs). Figures 3.1 and 3.2, which present an overlay of the proposed USEPA remedy on the current PCE and TCE plume configuration, illustrate the problems with the proposed remedy design. The remedy was designed so that both groundwater extraction wells and in-well vapor stripping wells "blanketed" the plumes; however, because USEPA's CSM relied on an incorrect chlorinated organics molar ratio analysis approach and an incorrect groundwater flow direction (Sections 2.5 and 2.3, respectively), the proposed remedial well locations are not optimally placed. For example, USEPA has placed four in-well stripping wells and an intermediate groundwater extraction well in the northern portion of the OU1 Western Plume based on its conclusion that contaminants from the western portion of the NCIA are continuing to migrate into OU1. These wells are completely unnecessary, since as demonstrated in the corrected CSM (Section 2.7), the NCIA Western Plume is not contributing to concentrations measured in the OU1 Western Plume; due to the low concentrations in the OU1 Western Plume, MNA is a more appropriate remedy for this portion of the Site (Section 3.2).

The number of active remediation wells proposed for the three USEPA-designated OU1 Plumes are not consistent with the observed contamination. The Proposed Plan locates a significant number of wells (20 in-well stripping wells and 3 groundwater extraction wells) at the downgradient edges of the plumes, but in comparison, does very little to address the head of the plume (*i.e.*, the OU1 Eastern Plume), which is contributing a significant majority (approximately 750 kgs/yr; see Section 2.7.2) of the contaminant mass to OU1 (Figures 3.1 and 3.2). As discussed in Section 2.7, a significant quantity of DNAPL is present at the Frost Street sites (NCIA Eastern Plume) and high groundwater concentrations are continuing to flow into OU1 in this area. Figure 3.1 shows that that the highest PCE (and other CVOC) concentrations are

present immediately downgradient of the eastern section of the NCIA. In addition, the Proposed Plan ignores the southwestern component of the Eastern Plume that sinks to depths greater than 400 ft-bgs in the vicinity of the BGEWD wells and is among the key sources of contamination reaching these water supply wells.

The Proposed Plan also does not address the groundwater contamination associated with the Upgradient Plume. The Upgradient Plume has been demonstrated to be extending into the NCIA and OU1 at a depth of 200 to 430 ft-bgs (Section 2.6). Despite this, USEPA has completely ignored the presence of and the need for remedial measures to address this contamination. The proposed groundwater extraction wells are not deep enough and are not placed in the appropriate locations to address the contamination related to the Upgradient Plume. The estimated PCE/TCE groundwater plume extent attributable to the Upgradient Plume (Figures 2.20a, 2.20b, and 2.13), along with vertical profiling results (WP-07; Figure 2.12), should be used by USEPA to determine the placement of additional remediation well locations to address this contamination.

3.2 Monitored Natural Attenuation is the Appropriate Remedy for the Dilute Plume

Continued groundwater treatment at the BGEWD wells and MNA is the most appropriate remedial approach for addressing the residual contamination present in the central and western portions of OU1. The Proposed Plan specifies the following RAOs:

- Prevent or minimize current and potential future human exposure (*via* ingestion and dermal contact) to VOCs in groundwater at concentrations in excess of federal and state standards;
- Minimize the potential for further migration of groundwater with VOC contaminant concentrations greater than federal and state standards; and
- Restore the impacted aquifer to its most beneficial use as a source of drinking water by reducing contaminant levels to the federal and state standards.

Continued wellhead treatment at the BGEWD wells and MNA will meet these RAOs in a much more cost-effective manner than the other alternatives considered by USEPA in the Feasibility Study.

Current and potential future human exposures are already being controlled by wellhead treatment and the institutional controls that are already in-place. The only current human health exposure pathway to OU1 groundwater is *via* the BGEWD supply wells. However, because an effective wellhead treatment system has been installed, the supply wells are not an exposure pathway of concern – a conclusion also reached by the State of New York. Furthermore, restrictions on the development of OU1 groundwater as a potable water source are already in place. Consequently, there is no current or potential future human health exposure related to impacted OU1 groundwater. The 2003 off-Site groundwater ROD (NYSDEC, 2003) affirms this conclusion:

> The area is served by public water, however, the underlying aquifer is the source of the water supply for the Bowling Green Water District customers. A supplemental treatment system, air stripping followed by carbon polishing, was constructed in 1996 to mitigate the impact of the groundwater contamination on the Bowling Green Water District water supply wells. The Bowling Green water supply wells are routinely monitored for volatile organic contamination. Presently, no site specific contaminants exceeding drinking water standards have been detected in water distributed to the public. Early warning

> monitoring wells have been installed south of Old Country Road, in locations downgradient of the NCIA hazardous waste disposal sites and upgradient of the water supply wells, as a precautionary measure. Because of the supplementary treatment system, use of the groundwater in the area is not currently considered to be an exposure pathway of concern. Additionally, existing use and development restrictions prevent the use of groundwater as a source of potable or process water without necessary treatment as required by the Nassau County Department of Health (NCDH). (NYSDEC, 2003)

In scenarios like this where there is no human health exposure pathway, MNA is the appropriate remedy for the dilute portions of the plume. Active remedies should only be required for concentrated portions of the plume. In a technical guidance document on use of MNA, USEPA states, "following source control measures, natural attenuation may be sufficiently effective to achieve remediation objectives without the aid of other (active) remedial measures, although this must be conclusively demonstrated by long-term performance monitoring. More typically, active remedial measures (*e.g.*, SVE, air-sparging) will be applied in source areas with high concentrations of contaminants while MNA is employed for the dilute contaminant plume" (USEPA, 2004). Although there is no uniform standard for what constitutes a "dilute" or "concentrated" plume, precedent has been set by USEPA. The Five Year Review Report for the Picillo Pig Farm Superfund Site in Rhode Island distinguishes the "concentrated plume area" from the "dilute plume area"; the former is defined as the area of the plume with total VOC concentrations greater than 1,000 µg/L (USEPA Region I, 2008).

There is further precedent for the implementation of MNA in dilute, chlorinated organics plumes with characteristics similar to those of the Western portion of OU1, as summarized below.

- The Peninsula Boulevard Groundwater Plume Superfund Site located in Hempstead, NY, contains a combined PCE/TCE groundwater plume measuring approximately 3,500 ft long by 1,000 ft at the widest point, and extending up to 75 ft-bgs (USEPA Region II, 2011). The USEPA-selected source remedy was groundwater pump and treat, with in-situ chemical treatment of targeted higher concentration zones (USEPA Region II, 2011). MNA was the selected remedy for the edges and downgradient areas of the plume where TCE concentrations range from 5 to 100 µg/L (USEPA Region II, 2011; ASTDR, 2007).
- The Pohatcong Valley Groundwater Contamination Superfund Site located in Washington and Franklin Townships, NJ, contains a 2,746-acre PCE and TCE groundwater plume (CH2M Hill, 2005; USEPA Region II, 2013b). Groundwater extraction and treatment was the selected remedy for portions of the plume with TCE concentrations greater than 500 µg/L; MNA was the selected remedy for areas with TCE concentrations less than 500 µg/L (USEPA, 2006a).
- The West Kingstown Town Dump/University of Rhode Island Disposal Area Superfund Site located in South Kingstown, RI, contains a combined PCE/TCE plume measuring approximately 2,500 ft long. In-situ chemical oxidation was the selected remedy for the source area, while MNA was the selected remedy for the downgradient area, where TCE concentrations reach a maximum of 324 µg/L (USEPA, 2006b).
- The Dover Municipal Landfill Superfund Site located in Dover, NH, contains two VOC plumes – PCE, TCE, toluene, and vinyl chloride – measuring approximately 3,200 ft long by 2,400 ft wide in total. Groundwater extraction and treatment was the selected remedy for the Southern Plume, while MNA was the selected remedy for the more dilute Eastern Plume, where all VOC concentrations are under 1,000 mg/L (USEPA, 1991).

Finally, USEPA, in its rejection of the MNA alternative in the Feasibility Study and the Proposed Plan, did not adequately evaluate Site conditions and the potential effectiveness of MNA. USEPA's (Region II, 2013a, p. 11) rationale for dismissing the MNA alternative is that: a) "… RAOs would not be achieved in a reasonable time frame based on Site-specific conditions" (USEPA Region II, 2013a, p. 11); and b) "Alternative 2 [MNA] does not prevent the migration of contaminants, and based on the natural attenuation evaluation conducted at the Site, there is uncertainty that biodegradation would progress at a rate such that cleanup levels would be achieved in a reasonable time" (p. 14). USEPA's (Region II, 2013a, p. 11) basis for the dismissal of MNA is completely unfounded because:

- In the Proposed Plan, USEPA acknowledges that the "time frame to meet groundwater RAOs in OU1 is difficult to predict since EPA's Supplemental FS Memorandum did not include modeling to estimate remediation time frames" (USEPA Region II, 2013a, p. 11). Since USEPA did not undertake the modeling to determine cleanup durations for the MNA alternative, the Agency's conclusion that RAOs would not be achieved in a reasonable time *has no technical basis and is mere speculation*.
- USEPA's assertion regarding the uncertainty in the biodegradation rate and its effect on meeting RAOs within a reasonable time frame is also misguided. As USEPA (Region II, 2013a, p. 11), acknowledges in the Proposed Plan, MNA includes consideration of multiple mechanisms that reduce contaminant concentrations: "biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction of contaminants." Even though there may be some uncertainty regarding the biodegradation rate,[14] it is important to note that in a highly permeable aquifer, such as the Magothy, mechanisms like dispersion and dilution, play an extremely important role in plume attenuation. The sharp decline in groundwater concentrations observed at wells within the NCIA and OU1 (Figure 2.32) at distal locations, downgradient of source areas that have been effectively remediated, indicates that natural attenuation is occurring at the Site.
- Finally, USEPA's concern regarding MNA's inability to prevent migration of contaminants is misplaced. Groundwater quality immediately downgradient of OU1 indicates the presence of relatively low concentrations (individual CVOC concentrations ranging from 4 to 21 ug/l and 0.5 to 5 µg/l at MW-12 and MW-13, respectively). These concentrations will further decline with time as concentrations within OU1 continue to attenuate. Therefore, given the low concentrations present at the downgradient OU1 boundary and given that these concentrations are expected to decline with time, USEPA is overstating the need for preventing contaminant migration.

Overall, USEPA inappropriately and prematurely dismissed the MNA alternative, given that this alternative, together with continued wellhead treatment at the BGEWD wells and the in-place restrictions regarding installation of private wells, will meet all the RAOs, and do so most cost-effectively. Groundwater concentrations within the NCIA, downgradient of the Central and Western Plume sources, quickly attenuated after remedial measures were implemented. Once source control measures capture the NCIA Eastern Plume and migration of the Upgradient Plume into OU1 has been stopped, the downgradient portions of the OU1 plume will naturally attenuate relatively quickly.

[14] Note, declining PCE to TCE ratios along the OU1 Eastern Plume path clearly indicates that biodegradation is occurring; similarly, the generation of 1,1-DCA and 1,1-DCE along the TCA flow path demonstrates that both biodegradation and abiotic degradation are playing a significant role in attenuation of the TCA plume.

3.3 The Effectiveness of In-well Vapor Stripping at the Site is Highly Uncertain due to Significant Local Anisotropies and the Presence of Low Permeability Layers

USEPA has proposed to use in-well vapor stripping in the distal portions of the OU1 plume as part of the remedy designed to remove chlorinated solvents from groundwater. Although in-well vapor stripping may be an appropriate technology under certain conditions (Naval Research Laboratory, 1999), a prior report by D&B (2009) stated that the characteristics of the Magothy aquifer in the distal portions of the plume are not optimal for peak effectiveness of this technology. Furthermore, after approximately 6 years of operating an in-well vapor stripping well just east of the NCIA and OU1, a consultant for GI/Vishay concluded that heterogeneities within the Magothy Aquifer made this an unsuitable remedial technology for this site (Sobieraj, 2009). USEPA has not considered these prior conclusions in its proposed remedial design.

For optimal performance of in-well stripping, aquifer anisotropy ratios (ratio of horizontal to vertical permeability) should be in the range of 3 to 10 and low permeability layers (*e.g.*, clay and silt layers) should be absent (Naval Research Laboratory, 1999). Either high anisotropy ratios or the presence of low permeability layers (or both) can potentially limit groundwater circulation in the vicinity of wells, depending on the design of the wells and pumping system (Naval Research Laboratory, 1999). Prior investigations in the region, including two Site-specific studies, have shown that anisotropy ratios are higher than the optimal range for this technology and that low permeability clay and silt layers are present at the Site. For example, USGS reported in 1988 that anisotropy ratios in the Magothy aquifer were in the range of about 45 to 100 (USGS, 1988, Table 1). In a 2009 study, D&B concluded that in-well stripping would not be an effective remedy due to high anisotropies and the presence of "significant low permeability zones" in the area targeted for treatment (D&B, 2009). Although D&B reported anisotropy ratios, ranging from 206 to 215,642, that are considered high for the Magothy aquifer, their interpretation of gamma ray logs revealed the presence of low permeability clay and silt zones in every borehole investigated. Thus, D&B concluded that geologic conditions in the Magothy aquifer would "inhibit remediation with in-well vapor stripping." During a subsequent investigation in 2011, HDR again measured anisotropy ratios in the Magothy aquifer and reported values in the range of 17-100 (HDR, 2011), notably lower than values reported by D&B (2009) but consistent with the range previously reported by USGS (1988, Table 1). Overall, prior investigations indicated that anisotropy ratios are higher (likely on the order of 10 to 100) than the range that is considered optimal (3 to 10) for in-well vapor stripping, and there are significant low permeability clay and silt layers observed in on-site wells.

USEPA has pointed to these prior results of Site-specific investigations to conclude that in-well vapor stripping would be effective in the Magothy Aquifer and, on that premise, included it as a component of its proposed remedy for the OU1 plume. However, D&B (2009) has previously stated that the anisotropy ratios at the site are outside the "rule-of-thumb" range (, 3 to 10) and there are significant low permeability layers present (some greater than 5 feet in thickness) in every borehole. Both of these hydrogeological characteristics create the potential for reduced circulation between the upper and lower screens of the wells, which might cause this component of the remedy to be ineffective (Naval Research Laboratory, 1999). USEPA has not addressed potential performance issues related to the Site-specific hydrogeological conditions that have been previously discussed by D&B (2009) and HDR (2011).

GI/Vishay also concluded that in-well vapor stripping is not an appropriate technology for the Magothy Aquifer based on approximately 6 years of operational experience of an in-well vapor stripping IRM. The IRM was installed in 2003 in the Magothy Aquifer east of the NCIA and OU1. Soon after operation

began, problems developed including biological fouling, metal scaling, and flowing sands, as summarized in the Final IRM Progress Report below (Sobieraj, 2009):

- "In early May 2004, after approximately 10 months of operation, the first sign of biological fouling of the wells screens in UVB-1 was observed. The fouling of the well screens caused the recharge rate into the lower screen interval to decrease."
- "Fouling of the well screens in UVB-1 began again in late January 2005, just months after acid cleaning the well in October 2004. At around the same time the packers in both wells UVB-2 and UVB-3 deflated due to leaks in the packers or associated tubing, and data also indicated fouling of the UVB-2 well screens."
- "During rehabilitation of the wells in early 2005, water generated during redevelopment of the wells initially contained fine-grained materials but rapidly cleared up. The middle screened interval of well UVB-3 produced more fine-grained materials than any of the other well screens."
- "The upper screen of well UVB-1 became fouled in a shorter period of time than previously encountered, reducing the efficiency of this well. The lower screened interval of well UVB-3 became fouled in December 2006, and after the blower for well UVB-1 failed, the system was turned off for another well cleaning event in January 2007."
- "Within days of restarting the system, well UVB-1 automatically shut down due to either power failures or high water alarms caused by a blockage in the recharge line to the lower screened interval. This blockage was the result of fine-grained material entering the middle screened interval of the well during operation. After the material was removed using air-lift techniques, the well operated for only weeks before shutting down again due to a high water level alarm. At the same time, the packers were not holding the minimum pressure required to maintain inflation, and a significant amount of sand was observed in the stripping trays of the well."
- "The fourth well maintenance and cleaning event using either the Aqua Freed® process or the Aqua Gard® equipment was completed in August 2007; however, it was noted that sand was still being generated from the extraction interval of well UVB-1, causing the submersible pump to seize. Cracked fittings on the air line to the packers on both wells UVB-1 and UVB-3 were replaced, and a suction flow control device similar to that in well UVB-3 was installed in well UVB-1 as an attempt to prevent the flow of sand into the well under normal operating conditions."
- "In summary, due to down times related to damage to the IRM system by others, as well as significant down times due to well cleaning events and replacement of corroded piping, the operational efficiency of the IRM system was reduced to 28 percent in 2007."
- "When in operation, the minimal water that was removed was recharged to the upper screened interval due to blockage by sand in the lower screened interval. Finally, this well was rendered completely inoperable by the fine sands in the formation in June 2008."

After 6 years of remedy operation, GI/Vishay's consultant concluded the following (Sobieraj, 2009):

> Based on WSP Engineering's operational experience, circulation well technology does not appear to be adaptable to the specific hydrogeologic conditions encountered within the groundwater bearing zones carrying the various regional plumes. Dvirka & Bartilucci, the State's engineers conducting the pre-design report for the Bowling Green/NCIA OU-3, reached a similar conclusion in their draft pre-design report.

> WSP Engineering attributes the overwhelming flow of fine sand into UVB-1 to the variable, heterogeneous nature of the aquifer materials. […] Therefore, WSP Engineering concludes that it would be infeasible to design a screen size and filter pack that could both: 1) withstand long term operations and the intensive well cleaning required to control chemical and biological fouling, and 2) achieve the extraction and recharge flow rates necessary for successful development of a circulation cell.

USEPA, in its Proposed Plan, has failed to consider in-well vapor stripping literature guidance, prior state consultant's conclusions about the effectiveness of the technology, and 6 years of unsuccessful attempts to implement in-well vapor stripping in the Magothy Aquifer east of OU1.

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Appendix A

List of Documents and Data Sources that USEPA Should Have Relied Upon in Developing Their CSM

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
1	Black, JP ; Sobieraj, JA. [ESC Engineering of New York, P.C.]. February 14, 200e. "Letter to K. Carpenter (NYSDEC) re: Clarifications on Revision No. 1 to the Groundwater IRM Pilot Test Design Report, Former General Instruments Corporation Site, Hicksville, New York." 3p. ALBED00132681 - ALBED00132683.
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100	Anson Environmental Ltd. (Huntington, NY). March 1994. "Phase II Investigation Report for Nassau County Section 11, Block 7, Lots 13-15, 69-72, 67 Sylvester Street, Westbury, NewYork [Doak Pharmacal], New Cassel Industrial Area (Site No. 130043) Inactive Hazardous Waste Disposal Site, Nassau County, New York." 154p. SSB 011228 - SSB 011381.
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102	Lawler, Matusky & Skelly Engineers. May 1994. "PSA Tasks 5 and 6 Work Plans for New Cassel Industrial Area Site." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 43p. SSB 015858 - SSB 015900.
103	Fanning, Phillips & Molnar (Ronkonkoma, NY). June 1994. "Interim Remedial Measures Report for the Uniflex, Inc., Site, 474 Grand Blvd., Westbury, New York." Report to Uniflex, Inc. ; Rivkin, Radler and Kremer. 50p. SSB 033473 - SSB 033524.
104	Roth, RJ ; Peterson, RM. [Terra Vac]. July 13, 1994. "Letter to C. Gorsch (General Instrument Corp.) re: IRM monthly report-Month #2, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4156." 17p. SSB 226456 - SSB 226472.
105	Roth, RJ ; Peterson, RM. [Terra Vac]. July 13, 1994. "Letter to C. Gorsch (General Instrument Corp.) re: IRM startup report, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4156." 24p. SSB 226473 - SSB226496.
106	Welkin Environmental Engineering Management Co. (Massapequa, NY).. August 1994. "Decontamination Closure Report of Wafer 'A,' General Instrument Corp., Hicksville Facility, 600 West John Street, Hicksville, NY 11802." Report to General Instrument Corp. (Melville, NY).. 35p. SSB 235200 - SSB 235234.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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115	Macri, J. [Sulzer Metco, Inc.]. October 24, 1994. "Letter to A. Gara (NYSDEC) re: Transfer of ownership." 1p. SSB246062.
116	Anson, D. [Anson Environmental Ltd.]. November 8, 1994. "Letter to R. Eichenwald (IMC Magnetics) re: Status report, 570 Main Street, Westbury, NY." 3p.
117	H2M Labs, Inc. (Melville, NY). December 1994. "Analytical Data Package for New York State Department of Environmental Conservation, Contract No.: C003180, Case No.: SH194, SDG No.: 1213, ASP A Protocol. Volatile Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 17p. SSB 233490 - SSB 233523.
118	Roth, RJ ; Malmanis, E. [Terra Vac]. December 8, 1994. "Letter to C. Gorsch (General Instrument Corp.) re: IRM monthly report, operating period: October 7 - November 9, 1994, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4156." 7p. SSB 226449 - SSB 226455.
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120	General Consolidated Industries, Inc. (East Farmingdale, NY). February 14, 1995. "Phase I Environmental Site Assessment and Phase II Subsurface Investigation, One Stop Auto & Truck Center, 299 Main Street, Westbury, New York 11590.
121	Roth, R ; Malmanis, E. [Terra Vac]. February 16, 1995. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period: November 9, 1994 - January 31, 1995, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4156." 7p. SSB 234010 - SSB 234016.
122	Roth, R ; Malmanis, E. [Terra Vac]. April 3, 1995. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period: February 1, 1995 - February 14, 1995, General Instrument Site, Hicksville Site, Terra Vac Project #40-41569-7." 7p. SSB 225639 - SSB 225645.
123	Roth, R ; Malmanis, E. [Terra Vac]. May 5, 1995. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period: March 9, 1995 - April 27, 1995, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4225." 15p. SSB 225 - 669 - SSB 225683.
124	CA Rich Consultants, Inc. (Sea Cliff, NY). June 1995. "Hazardous Waste Reduction Plan." Report to Tishcon Corp. (Westbury, NY). 22p. SAA 185897 - SAA 186102.
125	Dvirka and Bartilucci Consulting Engineers (Syosset, NY). June 1995. "Packed Tower Aeration System at Bowling Green Estates Water District, Wells 1 and 2, Pre-Engineered Metal Building and Mechanical Construction Contract, P.W. No. 41-95, Town of Hempstead, Department of Water, Nassau County, New York." 13p. TOHDOW001442 - TOHDOW001454.
126	Dvirka and Bartilucci Consulting Engineers (Syosset, NY). June 1995. "Packed Tower Aeration System at Bowling Green Estates Water District, Wells 1 and 2, General Construction Contract, P.W. No. 35-95, Town of Hempstead, Department of Water, Nassau County, New York." 156p. TOHDOW001149 - TOHDOW001304.
127	Vinci, A ; Roth, R. [Terra Vac]. June 14, 1995. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period: April 28, 1995 - May 31, 1995, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4225." 12p. SSB 234216 - SSB 234227.
128	Dvirka and Bartilucci Consulting Engineers (Syosset, NY). July 1995. "Packed Tower Aeration System at Bowling Green Estates Water District, Wells 1 and 2, Electrical Construction Contract, P.W. No. 42-95, Town of Hempstead, Department of Water, Nassau County, New York." 213p. NCDOH000569 - NCDOH000781.
129	Fanning, Phillips and Molnar (Ronkonkoma, NY). July 1995. "Draft Focussed Source Area Remedial Investigation Work Plan for Metpar Corporation, 95, 97, and 99 State Street, New Cassel, New York." Report to Metpar Corporation. Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 89p. SAA 158312 - SAA 158400.
130	Stearns & Wheler (Cazenovia, NY). August 1995. "IRM Work Plan, Excavation of Former Sump Area, General Instrument Corporation, Hicksville, New York." Report to General Instrument Corp.. 43p. SAA 185268 - SAA 185310.
131	Vinci, A ; Roth, R. [Terra Vac]. August 7, 1995. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period: June 1, 1995 to June 28, 1995, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4225." 9p. SSB 225659 - SSB 225667.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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133	H2M Labs, Inc. (Melville, NY). September 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: SH095, SDG#: 0927, Water Samples Received September 28 & 29, 1995. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 100p. SAD 063538 - AD 063637.
134	H2M Labs, Inc. (Melville, NY). September 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: SH095, SDG#: 0927, Water Samples Received September 28 & 29, 1995: Volatile Data. Volume 1 of 2." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 308p. SAD 053115 - SAD 053422.
135	H2M Labs, Inc. (Melville, NY). September 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: SH095, SDG#: 0927, Water Samples Received September 28 & 29, 1995: Volatile Data. Volume 2 of 2." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 104p. SAD 063812 - SAD 063915.
136	H2M Labs, Inc. (Melville, NY). September 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Contract #: C003180, Case #: SH095, SDG#: 0928, Water Samples Received 9/29/95: Sample Data Dummary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 119p. SAD 063418 - SAD 063536.
137	Lawler, Matusky & Skelly Engineers (Pearl River, NY). September 1995. "PSA Tasks 1 to 3 Work Plans for New Cassel Industrial Area Multisite PSA." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 48p. BPM 317293 - BPM 317340.
138	Anson Environmental Ltd. (Huntington, NY). September 7, 1995. "Work Plan, Utility Manufacturing aka Wonder King Manufacturing Site, Site ID# 130043H, 700-712 Main Street, Westbury, New York 11590." 14p. SAD 090954 - SAD 090967.
139	Anson Environmental Ltd. (Huntington, NY). October 1995. "Phase II Investigation, Utility Manufacturing/Former Wonder King, 700-712 Main Street, Westbury, New York 11590 [New York State Departtment of Environmental Conservation New Cassel Industrial Area "P" Site Investigation]." 71p. SAD 072244 - SAD 072314.
140	Anson Environmental Ltd. (Huntington, NY). October 1995. "Phase II Investigation Report for Nassau County Section 11, Block 328, Lots 142, 154, 160, 162, 178, 179, and 181; 750 Main Street/1099 Old Country Road, 770 Main Street/1111 Old Country Road [New Cassel Industrial Area ("P" Site No.130043I) Block 328 Properties, Inactive Hazardous Waste Disposal Site]." 41p. SAD 348557 - SAD 348597.
141	Fanning, Phillips and Molnar (Ronkonkoma, NY). October 1995. "Focussed Source Area Remedial Investigation Work Plan for Metpar Corporation, 95, 97, and 99 State Street, New Cassel, New York." Report to Metpar Corporation (New Cassel, NY). Submitted to New York State Department of Environmental Conservation. 92p. SSB 034340 - SSB 034431.
142	H2M Labs, Inc. (Melville, NY). October 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: CE095, SDG#: 0927, Water Samples Received October 26, 1995: Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 174p. SAD 063638 - SAD 063811.
143	H2M Labs, Inc. (Melville, NY). October 1995. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: CD095, SDG#: 0927, Water Samples Received October 26, 1995: Volatile Data." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 137p. SAD 063675 - SAD 063511.
144	Vinci, A ; Callaghan, JF. [Terra Vac]. October 30, 1995. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period August 4, 1995 to October 12, 1995, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4225." 7p. SSB 225596 - SSB 225602.
145	CA Rich Consultants, Inc. (Sea Cliff, NY). November 1995. "Focused Remedial Investigation Work Plan, Sampling & Analysis Plan and Health & Safety Plan, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 45p. SW 129914SW 131304 - SW 131347.
146	Anson Environmental Ltd.. November 2, 1995. "Work Plan, Atlas Graphics, Inc., 567 Main Street, Westbury, NY, Site No. 130043D." 16p. SW 123879 - SW 123894.
147	ABB Environmental Services (Portland, ME). December 1995. "Focused Remedial Investigation/Feasibility Study Work Plan - Task 1, Phase B Deliverable: 68 Kinkel Street - Former Tishcon Site, New Cassell Industrial Area, North Hempstead, New York, Site No. 1-30-43F." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 37p. SSB 002992 - SSB 003028.
148	CA Rich Consultants, Inc. (Sea Cliff, NY). December 1995. "Focused Remedial Investigation Work Plan, Sampling & Analysis Plan and Health & Safety Plan, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 79p. SAD 064098 - SAD 064181.
149	New York State, Dept. of Environmental Conservation (NYSDEC). December 5, 1995. "Order on consent [In the Matter of the Development and Implementation of a Focussed Remedial Investigation/Feasibility Study for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Raylene Holding Corporation and Metpar Corp.]." INDEX # W1-0739-95-11, 17p. SAA 185174 - SAA 185190.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
150	Fanning, Phillips and Molnar (Ronkonkoma, NY). 1996 ?"Focussed Source Area Remedial Investigation Report, Metpar Corp. Site, New Cassel Industrial Area (Revised)." Report to Metpar Corporation. Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 123p. SSB 034679 - SSB 034801.
151	Fanning, Phillips and Molnar (Ronkonkoma, NY). 1996 ?"Focussed Source Area Remedial Investigation Report, Metpar Corp. Site, New Cassel Industrial Area." Report to Metpar Corporation (New Cassel, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 121p. SSB 034434 - SSB 034554.
152	H2M Labs, Inc. (Melville, NY). January 1996. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Contract #: C003180, Case #: RS195, SDG#: 0118, Soil Samples Received January 18, 1996: Sample Data Summary." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 82p. SSB 233524 - SSB 233605.
153	H2M Labs, Inc. (Melville, NY). January 1996. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Contract #: C003180, Case #: RS195, SDG#: 0118, Soil Samples Received January 18, 1996: Volatile Data." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 417p. SSB 232671 - SSB 233087.
154	H2M Labs, Inc. (Melville, NY). January 1996. "Analytical Data Package for New York State Department of Environmental Conservation, Contract No.: C003180, Case No.: SH195, SDG No.: 0117, ASP CLP Package. Received January 17, 1996: Volatile Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 236p. SAA 188855 - SAA 189090.
155	Vinci, A ; Callaghan, JF. [Terra Vac]. January 12, 1996. "Letter to M. Sinayuk (General Instrument Corp.) re: IRM monthly report, operating period October 13, 1995 to December 17, 1995, General Instrument Site, Hicksville, New York, Terra Vac Project #40-4225." 5p. SDOH 242187 - SDOH 242191.
156	Lawler, Matusky & Skelly Engineers LLP. February 1996. "Multi-site PSA Report, New Cassel Industrial Area Site, North Hempstead, Nassau County. Volume IV: Appendix E (Continued)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 422p. OAG005713 - OAG006134.
157	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). February 1996. "Multi-site PSA Report, New Cassel Industrial Area Site, North Hempstead, Nassau County. Volume I (Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 161p. OAG004959 - OAG005119.
158	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). February 1996. "Multi-site PSA Report, New Cassel Industrial Area Site, North Hempstead, Nassau County. Volume II: Appendices A-D (Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 169p. OAG005120 - OAG005288.
159	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). February 1996. "Multi-site PSA Report, New Cassel Industrial Area Site, North Hempstead, Nassau County. Volume III: Appendix E (Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 424p. OAG005289 - OAG005712.
160	Stearns & Wheler, LLC (Cazenovia, NY). February 1996. "Supplemental Remedial Investigation Scope of Work, General Instrument Corporation, Hicksville Facility, Operable Unit 2 (Groundwater)." Report to General Instrument Corp.. 14p. SAD 112062 - SAD 112075.
161	YEC, Inc. (Valley Cottage, NY). February 1996. "Multi-Site Preliminary Site Assessment, Detailed Site History, New Cassel Industrial Area Site, North Hempstead, Nassau County (Draft)." Report to Lawler, Matusky & Skelly Engineers (Pearl River, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 49p. SAA 158644 - SAA 158691.
162	Weinstock, EA. [CA Rich Consultants, Inc.]. February 29, 1996. "Letter to J. Trad (NYSDEC) re: Remedial Investigation Work Plan Addendum, Tishcon Corp., 125 State Street, Westbury, New York, NYSDEC Site No.: 130043C." 2p. SW 124835 - SW 124836.
163	ABB Environmental Services (Portland, ME). March 1996. "Focused Remedial Investigation/Feasibility Study Work Plan: 68 Kinkel Street - Former Tishcon Site, New Cassell Industrial Area, North Hempstead, New York, Site No. 1-30-43F." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 167p. SSB 032522 - SSB 032688.
164	Hull & Associates, Inc. (Dublin, OH) ; Land Tech Remedial, Inc. (Farmingdale, NY). March 1996. "Work Plan for the Investigation and Design of the Interim Remedial Measure for the Vadose Zone at the Former IMC Magnetics Corp. Manufacturing Facility, Westbury, New York." Report to IMC Magnetics Corp.. HAI Document #NMB004D.009, 303p.
165	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). March 1996. "Multisite PSA Report, New Cassel Industrial Area Site, North Hempstead, Nassau County, Report and Appendices A-C." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 255p. OAG006135 - OAG006389.
166	New York State, Dept. of Environmental Conservation (NYSDEC). March 26, 1996. "Order on consent [re: In the Matter of the Development and Implementation of an Interim Remedial Measure Program for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by IMC Eastern Corporation (formerly known as IMC Magnetics Corp.)]." INDEX # 1-W1-0750-96-02, 23p. BPM 296977 - BPM 296999.

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No.	Reference
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168	Anson Environmental Ltd. (Huntington, NY). April 1996. "Environmental Investigation, 50 Bond Street, Westbury, New York." 30p. SSB 013214 - SSB 013243.
169	Anson Environmental Ltd. (Huntington, NY). April 1996. "Environmental Investigation, 44 Bond Street, Westbury, New York." 27p. SSB 013287 - SSB 013313.
170	Anson Environmental Ltd. (Huntington, NY). April 1996. "Environmental Investigation at Nassau County Section 11, Block 7, Lot 13-15, 62 Kinkel Street, Westbury, New York [New Cassel Industries Area (Site No.130043) Inactive Hazardous Waste Disposal Site]." 35p. SAA 164656 - SAA 164690.
171	Anson Environmental Ltd. (Huntington, NY). April 1996. "Environmental Investigation, 770 Main Street and 1111 Old Country Road, Westbury, New York." 41p. SAD 348598 - SAD 348638.
172	Anson Environmental Ltd. (Huntington, NY). April 1996. "Environmental Investigation, 89 Frost Street, Westbury, New York." 37p. SAD 348519 - SAD 348555.
173	Anson Environmental Ltd. (Huntington, NY). April 1996. "Environmental Investigation, 101 Frost Street, Westbury, New York." 43p. SAD 348476 - SAD 348518.
174	Anson Environmental Ltd. (Huntington, NY). April 1996. "Environmental Investigation, 720 Main Street, Westbury, New York." 46p. SSB 013168 - SSB 013213.
175	Anson Environmental Ltd. (Huntington, NY). April 1996. "Environmental Investigation, 750 Summa Avenue, Westbury, New York." 43p. ALBEM00076539 - ALBEM00076581.
176	Stearns & Wheler, LLC (Cazenovia, NY). April 1996. "Feasibility Study, Operable Unit No. 1 (Soils), General Instrument Corporation, Hicksville, New York (Draft Report)." Report to General Instrument Corp.. 80p. SSB 237061 - SSB 237140.
177	Stearns & Wheler, LLC (Cazenovia, NY). April 1996. "Remediation Work Plan, Operable Unit 1, Area of Concern C, General Instrument Corporation, Hicksville, New York." Report to General Instrument Corp.. 77p. SAA 185312 - SAA 185388.
178	Anson, D II. [Anson Environmental Ltd.]. April 19, 1996. "Letter to R. Marino (NYSDEC) re: Application for the deletion of property designated as Section 11, Block 164, Lot 68, Westbury, New York, Inactive Hazardous Waste Disposal Site # 1-30-043B." 2p. SSB 004305 - SSB 04306.
179	ABB Environmental Services (Portland, ME). May 1996. "Focused Remedial Investigation Report Working Draft: 68 Kinkel Street - Former Tishcon Site, New Cassell Industrial Area, North Hempstead, Nassau County, New York, Site No. 1-30-43F." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 129p. SSB 033096 - SSB 033224.
180	Bonifas, MJ. [Hull & Associates, Inc.]. May 9, 1996. "Letter to C. Vasudevan (NYSDEC) re: Monthly Progress Report #1 for March 26, 1996 through May 9, 1996 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.026." 3p. SSB 003401 - SSB 003403.
181	Roth, RJ ; Callghan, JF. [Terra Vac]. June 4, 1996. "Letter to B. Curtis (General Instrument Corp.) re: Response to letter of May 29, 1996 regarding IRM, General Instrument Corporation, Hicksville, NY, Terra Vac Project 40-4225." 3p. SDOH 241433 - SDOH 241435.
182	New York State, Dept. of Environmental Conservation (NYSDEC). June 5, 1996. "Order on consent [In the Matter of the Development and Implementation of a Focussed Remedial Investigation/Feasibility Study for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Tishcon Corporation]." INDEX # W1-0758-95-05, 18p. BPM 298667 - BPM 298684.
183	Bonifas, MJ. [Hull & Associates, Inc.]. June 10, 1996. "Letter to C. Vasudevan (NYSDEC) re: Monthly Progress Report #2 for May 10, 1996 through June 9, 1996 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.027." 3p. SW 122949 - SW 122951.
184	ABB Environmental Services (Portland, ME). July 1996. "Focused Remedial Investigation Report: 68 Kinkel Street - Former Tishcon Site, New Cassell Industrial Area, North Hempstead, Nassau County, New York, Site No. 1-30-43F." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 238p. SSB 032855 - SSB 033092.
185	Bonifas, MJ. [Hull & Associates, Inc.]. July 10, 1996. "Letter to C. Vasudevan (NYSDEC) re: Monthly Progress Report #3 for June 10, 1996 through July 9, 1996 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.031." 3p. SW 122943 - SW 122945.
186	Bonifas, MJ. [Hull & Associates, Inc.]. July 12, 1996. "Letter Report to C. Vasudevan (NYSDEC) re: Interim Report for the Interim Remedial Measure (IRM) at the Former IMC Magnetics Corporation Facility (NYSDEC Site Code # 130043A) in Westbury, New York; NMB004D.030." 24p.
187	New York State, Dept. of Environmental Conservation (NYSDEC). July 26, 1996. "Order on consent [In the Matter of the Development and Implementation of a Focussed Remedial Investigation/Feasibility Study for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Arkwin Industries, Inc.]." INDEX # WI-0754-95-06, 43p. SAA 156352 - SAA156394.
188	Naeva Geophysics Inc. (Tappan, NY). July 30, 1996. "Results of Subsurface Investigation, Tishcon Corporation, 30-36 New York Avenue and 31-33 Brooklyn Avenue, New Cassel, New York." Report to CA Rich Consultants, Inc. (Sea Cliff, NY). 10p. SAA 185583 - SAA 185592.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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195	S&W Services, Inc.. September 1996. "Project Manual, Construction of Soil Vapor Extraction System, General Instrument Corporation, Hicksville, NY." Report to General Instrument Corp.. 20p. SAA 189577 - SAA 189596.
196	Stearns & Wheler, LLC (Cazenovia, NY). September 1996. "Remediation Work Plan, Operable Unit 1 (Soils), General Instrument Corporation, Hicksville, New York (Draft)." Report to General Instrument Corp.. 61p. SAA 185390 - SAA 185450.
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203	Bonifas, MJ. [Hull & Associates, Inc.]. November 11, 1996. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #6 for September 10, 1996 through November 9, 1996 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.039." 2p. SAD 043685 - SAD 043686.
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205	CA Rich Consultants, Inc. (Sea Cliff, NY). December 1996. "Focused Remedial Investigation Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 256p. SAD 064183 - SAD 064438.
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210	H2M Labs, Inc. (Melville, NY). 1997. "Sample Data Summary Package, New York State Department of Environmental Conservation, Region 1, Contract: C003180, Case: RA096, SDG: 0121, Sample Received 1/23/1997." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 48p. SAA 177246 - SAA 177293.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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215	H2M Labs, Inc. (Melville, NY). January 1997. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Contract #: C003180, Case #: RA096, SDG #: 0124, Water and Soil Samples Received January 24, 1997: Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 70p. SAA 175694 - SAA 175769.
216	H2M Labs, Inc. (Melville, NY). January 1997. "Analytical Data Package for New York State Department of Environmental Conservation, Contract No.: C003180, Case No.: RA096, SDG No.: 0123, ASP CLP Package. Received January 24, 1997: Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 63p. SAA 177362 - SAA 177424.
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225	YEC, Inc. (Valley Cottage, NY). January 1997. "Draft Preliminary Site Assessment, Detailed Site History, New Cassel Industrial Area Site, North Hempstead, Nassau County." Report to Lawler, Matusky & Skelly Engineers (Pearl River, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 30p. SAD 350064 - SAD 350093.
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228	Anson Environmental Ltd. (Huntington, NY). February 1997. "Delisiting Petition Investigation Report, Utility Manufacturing Site, Former Wonder King Chemical Site, 700-712 Main Street, Westbury, New York 11590, New Cassel Industrial Area, Site ID# 13-0043-H." 83p. SW 132305 - SW 132387.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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232	Bonifas, MJ. [Hull & Associates, Inc.]. February 10, 1997. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #9 for January 10 through February 9, 1997 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.050." 2p. SAD 043610 - SAD 043611.
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234	Fanning, Phillips and Molnar (Ronkonkoma, NY). March 1997. "Focussed Source Area Remedial Investigation/Interim Remedial Measures Work Plan for 675 Main Street, Westbury, New York." Report to Permafuse Properties. Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 77p. SSB 016749 - SSB 016825.
235	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). March 1997. "Multisite PSA Task 4 Report, New Cassel Industrial Area Site, North Hempstead, Nassau County, Report and Appendix A." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation (Albany, NY). 179p. WPED00015071 - WPED00015249.
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238	O'Brien & Gere Engineers, Inc.. April 1997. "Voluntary Cleanup Program Application: Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York. Volume 1 of 2." Report to GTE Operations Support Inc.. 121p. SAD 106248 - SAD 106368.
239	O'Brien & Gere Engineers, Inc.. April 1997. "Work Plan: Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York." Report to GTE Operations Support Inc.. 307p. SAD 106369 - SAD 106678.
240	Bonifas, MJ. [Hull & Associates, Inc.]. April 10, 1997. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #11 for March 10 through April 9, 1997 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.056." 2p. SAD 043602 - SAD 043603.
241	New York State, Dept. of Environmental Conservation (NYSDEC). April 22, 1997. "New York State Department of Environmental Conservation, SARA Title III, Toxic Release Inventory Data, Facility Report." 7p.
242	CA Rich Consultants, Inc. (Sea Cliff, NY). May 1997. "Final Focused Remedial Investigation Report, Tishcon Corporation, 30-36 New York Avenue and 31-33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corporation. 306p. SSB 031977 - SSB 032282.
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246	Merklin, WD. [Dvirka and Bartilucci Consulting Engineers]. May 8, 1997. "Letter to D. Davis (Town of Hempstead, Dept. of Water) re: Bowling Green Estates Water District, Expansion of Packed Tower Aeration System, D&B No. 1243-Q." 7p. TOHDOW002319 - TOHDOW002325.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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250	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). June 1997. "Work Plan, Former LAKA Site and Bowling Green Early Warning Wells Remedial Investigation/Feasibility Study." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 110p. SAD 346943 - SAD 347052.
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259	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). August 1997. "Field Activities Plan, Former LAKA Site and Bowling Green Early Warning Wells, Remedial Investigation/Feasibility Study." Report to New York State, Dept. of Environmental Conservation (NYSDEC) Division of Environmental Remediation (Albany, NY). 60p. SAD 074516 - SAD 074575.
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263	New York State, Dept. of Environmental Conservation (NYSDEC). August 26, 1997. "Order on consent [In the Matter of the Development and Implementation of a Focussed Remedial Investigation/ Feasibility Study and Interim Remedial Measure Program for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, of the Environmental Conservation Law of the State of New York by Dermkraft, Inc.]." 14p. SAA 164938 - SAA 164951.
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265	CA Rich Consultants, Inc. (Sea Cliff, NY). September 1997. "Interim Remedial Measures Letter Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 5p. SAD 063166 - SAD 063170.
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271	Bonifas, MJ. [Hull & Associates, Inc.]. September 10, 1997. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #16 for August 12 through September 10, 1997 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004D.061." 2p. SAD 043566 - SAD 043567.
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279	Anson Environmental Ltd. (Huntington, NY). November 1997 (Revised)"Work Plan, Utility Manufacturing/Wonder King Site, Site ID # 1-30-043H, 700-712 Main Street, Westbury, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation. 65p. SW 132221 - SW 132285.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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296	Bonifas, MJ. [Hull & Associates, Inc.]. March 11, 1998. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #22 for February 11, 1998 through March 11, 1998 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York, NMB004D.070." 2p. SW 122892 - SW 122893.
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321	Lawler, Matusky & Skelly Engineers (Pearl River, NY). August 1998. "Updated Health & Safety Plan (HASP) and Quality Assurance Project Plan (QAPjP) for the New Cassel Industrial Area Site, Arkwin Industries OU2 RI/FS." Report to New York State, Dept. of Environmental Conservation (NYSDEC) (Albany, NY). 32p. SAA 157541 - SAA 157572.
322	Bonifas, MJ. [Hull & Associates, Inc.]. August 7, 1998. "Letter to J. Hussey (NYSDEC) re: Progress Report #1 for June 18 through August 6, 1998 for the Focused Ground-Water Investigation at the NYSDEC Site Code #1-W1-0750-96-02 in Westbury, New York. NMB007.200.0002." 3p. SW 121548 - SW 121550.
323	Turley, WL. [Hull & Associates, Inc.]. August 8, 1998. "Letter to J. Jones (NYSDEC) re: Progress Report #2 for August 7 through September 8, 1998 for the Focused Ground-Water Investigation at the NYSDEC Site Code #1-W1-0750-96-02 in Westbury, New York; NMB007.200.0005." 3p. SAD 043256 - SAD 043258.
324	Bonifas, MJ. [Hull & Associates, Inc.]. August 10, 1998. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #27 for July 11 through August 10, 1998 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0082.DOC." 2p. SW 122890 - SW 122891.
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No.	Reference
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333	Hull & Associates, Inc. (Mason, OH). September 1998. "Focused Ground-Water Investigation Report at the 570 Main Street Manufacturing Facility, Westbury, New York, NYSDEC Site Code #130043A. Volume III." Report to IMC Eastern Corp.. 206.
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335	Bonifas, MJ. [Hull & Associates, Inc.]. September 10, 1998. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #28 for August 11, 1998 through September 10, 1998 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.083.DOC." 2p. SW 120803 - SW 120804.
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337	Impact Environmental (Kings Park, NY). September 18, 1998. "Focused Remedial Investigation Work Plan: Site Code # 1-30-043S, 299 Main Street, Westbury, New York. Appendices." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 249p. SAD 079465 - SAD 079713.
338	Impact Environmental (Kings Park, NY). September 18, 1998. "Focused Remedial Investigation Work Plan: 98-335, Site Code # 1-30-043S, 299 Main Street, Westbury, New York." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 297p. SSB 017393 - SSB 017689.
339	Anson Environmental Ltd. (Huntington, NY). October 1998. "Laboratory Analysis, Utility Manufacturing/Wonder King Site, Site ID No. 1-30-043H, 700-712 Main Street, Westbury, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation. 125p. SAD 072322 - SAD 072446.
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342	Fanning, Phillips & Molnar (Ronkonkoma, NY). October 1998. "Focussed Remedial Investigation Work Plan for 118-130 Swalm Avenue, New Cassel, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 99p. SSB 017875 - SSB 017973.
343	Anson Environmental Ltd. (Huntington, NY). October 2, 1998, January 21, 1999 (Revised)"Phase One Field Investigation Report, Focused Remedial Investigation to Comply with Work Plan for Utility Manufacturing/Wonder King Site dated November 1997, Site ID No. 1-30-043H, 700-712 Main Street, Westbury, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation. 246p. SSB 018076 - SSB 018321.
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345	Bonifas, MJ. [Hull & Associates, Inc.]. October 12, 1998. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #29 for September 11, 1998 through October 12, 1998 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0084.DOC." 2p. SW 121648 - SW 121649.
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352	Turley, WL. [Hull & Associates, Inc.]. November 6, 1998. "Letter to J. Jones (NYSDEC) re: Progress Report #3 for October 8 through November 6, 1998 for the Focused Water Investigation at the NYSDEC Site Code-W1-0750-96-02 in Westbury, New York, NMB007.200.0009." 2p. SW 121728 - SW 121729.
353	Buck, L. [Fanning, Phillips and Molnar]. November 11, 1998. "Letter to J. Lovejoy (Nassau County Department of Health) re: Permafuse Site, Westbury, New York, FPM File No. 459-97-01." 13p. SAA 182559 - SAA 182571.
354	Impact Environmental ?. November 23, 1998. "Focused Remedial Investigation Final Work Plan 98-335, Site Code # 1-30-043S, 299 Main Street, Westbury, New York." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 54p. SSB 017337 - SSB 017390.
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356	Bonifas, MJ. [Hull & Associates, Inc.]. December 10, 1998. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #31 for November 12, 1988 through December 10, 1998 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York, NMB004.300.0086." 2p. SW 122726 - SW 122727.
357	Phillips, KJ. [Fanning, Phillips and Molnar]. December 22, 1998. "Letter to R. Lilley, Jr. (NYSDEC) re: Permafuse Site, Westbury, New York, FPM File No. 459-97-01." 1p. SAA 182541.
358	Holzmacher, JR. [P.W. Grosser Consulting Engineer & Hydrogeologist, P.C.Kalogeras & Grosser Consulting Engineers, P.C.]. December 23, 1998. "Letter to B. Mackay (Nassau County Department of Health) re: Sulzer Metco (US) Inc., 1101 Prospect Avenue, floor drain and discharge point documentation." 3p. SAD356704 - SAD356706.
359	Phillips, KJ. [Fanning, Phillips and Molnar]. December 29, 1998. "Letter to J. Lilley, Jr. (NYSDEC) re: Permafuse Site, Westbury, New York, FPM File No. 459-97-01." 1p. SAA 182540.
360	CA Rich Consultants, Inc. (Sea Cliff, NY). January 1999. "Post-Remediation Groundwater Quarterly Monitoring Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 14p. SW 125785 - SW 125798.
361	H2M Labs, Inc. (Melville, NY). January 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Case No.: RA098, SDG No.: X0118. Soil & Water Samples Received 1/19-1/29/99. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 9p. SAD 037200 - SAD 037208.
362	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY) ; Lehtinen, M. January 5, 1999. "Letter Report to R. Lilley (NYSDEC) re: Upgradient Soil Sampling & Additional Monitoring Well Sampling." 199p. SAA 077229 - SAA 077427.
363	Lilley, RJ Jr.. [New York State, Dept. of Environmental Conservation (NYSDEC)]. January 6, 1999. "Letter to P. Dermody (Fanning, Phillips & Molnar) re: Permafuse Site, 675 Main Street Westbury, New York." 1p. SAD 037199.
364	Turley, WL. [Hull & Associates, Inc.]. January 8, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #5 for December 6, 1998 through January 8, 1999 for the Focused Ground-Water Investigation at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0012." 2p. SW 122347 - SW 122348.
365	Lancaster Laboratories (Lancaster, PA). January 11, 1999. "Data Package - IMC Magnetics, 507 Main St., Westbury, NJ. Water Samples Collected on 11/24/1998. Sample No. 3047375-3047376." Report to Hull & Associates, Inc.. 192p. SSB 020519 - SSB 020710.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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368	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). February 1999. "Field Activities Plan, Remedial Investigation/Feasibility Study, New Cassel Industrial Area Offsite Groundwater (Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 40p. BPM 313651 - BPM 313690.
369	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). February 1999. "Work Plan, Remedial Investigation/Feasibility Study, New Cassel Industrial Area Offsite Groundwater." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 66p. SAD 088845 - SAD 088910.
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371	Bonifas, MJ. [Hull & Associates, Inc.]. February 10, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #33 for January 12, 1999 through February 10, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0088." 2p. SW 122862 - SW 122863.
372	H2M Labs, Inc. (Melville, NY). March 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127C. Soil Samples Received March 16 & 21, 1999. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 62p. SAA 175132 - SAA 175193.
373	H2M Labs, Inc. (Melville, NY). March 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127C. Soil Samples Received March 16 & 21, 1999. Volatile Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 225p. SAA 175468 - SAA 175692.
374	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). March 1999. "Focused Remedial Investigation Report, Arkwin Industries. Volume II: Appendices G." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 537p. SAA 155013 - SAA 155549.
375	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). March 1999. "Focused Remedial Investigation Report, Arkwin Industries Volume I: Report and Appendices A-F." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 182p. SAD 064981 - SAD 065162.
376	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). March 1999. "Focused Remedial Investigation Report, Arkwin Industries. Volume III: Appendix G (Continued)." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 559p. SAA 155550 - SAA 156108.
377	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). March 1999. "Immediate Investigation Work Assignment, Atlas Graphics. Volume I: Report and Appendices A-B." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 60p. SSB 003247 - SSB 003306.
378	Impact Environmental (Kings Park, NY). March 1, 1999. "Focused Remedial Investigation Final Work Plan: 98-335, Site Code # 1-30-043S, 299 Main Street, Westbury, New York." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State Department of Environmental Conservation (Albany, NY). 59p. SAD 085363 - SAD 085421.
379	Turley, WL. [Hull & Associates, Inc.]. March 8, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #7 for February 8, 1999 through March 8, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0016." 2p. SAD 036743 - SAD 036744.
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381	Impact Environmental (Kings Park). March 17, 1999. "Final Work Plan: Focused Remedial Investigation to be Conducted at: Site Code # 1-30-043S, 299 Main Street, Westbury, New York." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State Department of Environmental Conservation (Albany, NY). 57p. SAD 079354 - SAD 079410.

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No.	Reference
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383	New York State, Dept. of Environmental Conservation (NYSDEC). March 26, 1999. "Order on consent [In the Matter of Development and Implementation of a Focussed Remedial Investigation/Focussed Feasibility Study for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Equity Share I Associates]." INDEX # WI-0828-98-05, 16p. BPM 296384 - BPM 296399.
384	CA Rich Consultants, Inc. (Sea Cliff, NY). April 1999. "Post-Remediation Groundwater Quarterly Monitoring Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 14p. SSB 004390 - SSB 004403.
385	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.:0127B. Soil Samples Received April 15, 1999. TCLP Wet Chemistry Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 13p. SAA 172747 - SAA 172759.
386	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA098, SDG No.: 0127A. Water Samples Received 4/15 & 4/16/99. Volatile Data." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 322p. SAA 179238 - SAA 179559.
387	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127B. Soil Samples Received April 15, 1999. PCB (total) Data Package." 119p. SAA 173314 - SAA 173432.
388	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA-098, SDG No.: 0127. Water Samples Received April 13 & 15, 1999. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 86p. SAA 178737 - SAA 178822.
389	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127B. Soil Samples Received April 15, 1999. TCLP Herbicides Data Package." 87p. SAA 174207 - SAA 174293.
390	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127B. Soil Samples Received April 15, 1999. TCLP Metals Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 167p. SAA 175300 - SAA 175466.
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392	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA-098, SDG No.: 0127. Water Samples Received April 13 & 15, 1999. Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 387p. SAA 173433 - SAA 173819.
393	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA098, SDG No.: 0127A. Water Samples Received 4/15 & 4/16/99. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 80p. SAA 174127 - SAA 174206.
394	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA-098, SDG No.: 0127. Water Samples Received April 13 & 15, 1999. Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 387p. SAA 173433 - SAA 173819.
395	H2M Labs, Inc. (Melville, NY). April 1999. "Analytical Data Package for NYS DEC, Contract No.: C003786, Case No.: RA098, SDG No.: 0127B. Soil Samples Received April 15, 1999. TCLP Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 106p. SAA 175194 - SAA 175299.
396	Bonifas, MJ. [Hull & Associates, Inc.]. April 9, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #35 for March 11, 1999 through April 9, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0093." 2p. SW 122849 - SW 122850.
397	Fanning, Phillips & Molnar (Ronkonkoma, NY). May 1999. "Focussed Remedial Investigation Report for 118-130 Swalm Street, New Cassel, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 65p. SAD 085452 - SAD 085515.
398	Fanning, Phillips & Molnar (Ronkonkoma, NY). May 1999. "Focussed Remedial Investigation Report for 118-130 Swalm Street, New Cassel, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 65p. SAD 085452 - SAD 085515.
399	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). May 1999. "Focused Feasibility Study Report, Former LAKA Industries Site." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 22p. SSB 016263 - SSB 016284.
400	Bonifas, MJ. [Hull & Associates, Inc.]. May 11, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #36 for April 10, 1999 through May 11, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0094." 2p. SAD 043193 - SAD 043194.

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No.	Reference
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402	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). June 1999. "Feasibility Study Report, Arkwin Industries Site." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 139p. SAA 156110 - SAA 156248.
403	New York State, Dept. of Environmental Conservation (NYSDEC). June 1999. "Record of Decision, National Heatset Printing Site, Town of Babylon, Suffolk County, New York." 73p.
404	Bonifas, MJ. [Hull & Associates, Inc.]. June 10, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #37 for May 12, 1999 through June 10, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0095." 2p. SW 122740 - SW 12741.
405	Turley, WL. [Hull & Associates, Inc.]. June 10, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #10 for May 10, 1999 through June 10, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0020." 2p. SW 122742 - SW 122743.
406	Chemtech (Englewood, NJ). June 30, 1999. "Data Package for Volatile Organics, 29 New York Avenue." Report to GCI, Inc.. 194p. SAA 172029 - SAA 172287.
407	CA RICH Consultants, Inc. (Sea Cliff, NY). July 1999. "Remedial Investigation for On-Site Ground Water, Tishcon Corporation, 30-36 New York Avenue and 31-33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corporation (Westbury, NY). 154p. SSB 031785 - SSB 031938.
408	CA Rich Consultants, Inc. (Sea Cliff, NY). July 1999. "Remedial Investigation for On-Site Ground Water, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 179p. SSB 031785 - SSB 031963.
409	Fanning, Phillips & Molnar (Ronkonkoma, NY). July 1999. "Closure Plan for Uniflex, Inc., 474 Grand Boulevard, Westbury, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 24p. SSB249348 - SSB249371.
410	Chemtech (Englewood, NJ). July 9, 1999. "Data Package for Volatile Organics, Part I, 29 New York Avenue." Report to GCI, Inc.. 456p. SAA 172288 - SAA 172745.
411	Chemtech (Englewood, NJ). July 10, 1999. "Data package for PP metals & TPH, Part III, 29 New York Avenue." Report to GCI, Inc.. 202p. SAA 171786 - SAA 171987.
412	Chemtech (Englewood, NJ). July 10, 1999. "Data Package for PP Metals & TPH, Part III, 29 New York Avenue." Report to GCI, Inc.. 202p. SAA 171786 - SAA 171987.
413	Bonifas, MJ. [Hull & Associates, Inc.]. July 12, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #38 for June 11, 1999 through July 12, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0096." 2p. SAD 043191 - SAD 043192.
414	Dermody, P. [Fanning, Phillips and Molnar]. July 12, 1999. "Letter to R. Gaborow (NYS Department of Environmental Conservation) re: 118-130 Swalm Street, New Cassel, New York, FPM File No. 486-98-03." 9p. SAD 050609 - SAD 050617.
415	Turley, WL. [Hull & Associates, Inc.]. July 13, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #11 for June 10, 1999 through July 13, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0022." 2p. SAD 036719 - SAD 036720.
416	Impact Environmental (Kings Park, NY). July 15, 1999. "Remote Survey: Focussed Remedial Investigation/Feasibility Study Conducted at: Site No. 1-30-043S, 299 Main Street, Westbury, New York." Report to 2632 Realty Development Corp. (Westbury, NY). Submitted to New York State Department of Environmental Conservation (Albany, NY). 61p. SSB 016826 - SSB 016886.
417	CA Rich Consultants, Inc. (Sea Cliff, NY). August 1999. "On-Site Remedial Design Report, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 94p. SAD068463 - SAD068556.
418	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). August 1999. "Remedial Investigation/Feasibility Study (RI/FS), Frost Street Sites. Volume I." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 566p. SAD 075826 - SAD 076391.
419	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). August 1999. "Remedial Investigation/Feasibility Study (RI/FS), Frost Street Sites. Volume II: Appendices A-F." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 142p. OAG000882 - OAG001023.
420	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). August 1999. "Remedial Investigation/Feasibility Study (RI/FS), Frost Street Sites. Volume III: Appendix G." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 529p. OAG001259 - OAG001787.
421	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). August 1999. "Remedial Investigation/Feasibility Study (RI/FS), Frost Street Sites. Volume IV: Appendix H." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 511p. OAG001788 - OAG002298.
422	Turley, WL. [Hull & Associates, Inc.]. August 8, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #8 for March 8, 1999 through April 8, 1999 for the Focused Ground-Water Investigation at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0017." 2p. SAD 036734 - SAD 036735.

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No.	Reference
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424	Turley, WL. [Hull & Associates, Inc.]. August 12, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #12 for July 10, 1999 through August 12, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code #W1-0750-96-02 in Westbury, New York; NMB007.200.0023." 2p. SW 122285 - SW 122286.
425	Parrish, R. [Impact Environmental Consulting, Inc.]. August 31, 1999. "Letter to A. Ruepp (New York State Department of Environmental Conservation) re: 299 Main Street Site No. 1-30-043S, Notice of Completion/Work Schedule." 3p. SAD 051484 - SAD 051486.
426	H2M Labs, Inc. (Melville, NY). September 1999. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: TI99, SDG No.: 09281. Water Samples Received September 30, 1999. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 27p. SAD 062378 - SAD 062404.
427	H2M Labs, Inc. (Melville, NY). September 1999. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: TI99, SDG No.: 09281. Water Samples Received Septmber 30, 1999. Volatile Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 100p. SAD 062405 - SAD 062504.
428	Hull & Associates, Inc. (Mason, OH). September 1999. "Focused Ground-Water Feasibility Study for the 570 Main Street Manufacturing Facility, Westbury, New York, NYSDEC Site Code #130043A." Report to IMC Eastern Corp.. HAI Document #NMB007.200.0019, 91p.
429	Hull & Associates, Inc. (Mason, OH). September 1999, November 1999 (Revised)"Focused Ground-Water Feasibility Study for the 570 Main Street Manufacturing Facility, Westbury, New York, NYSDEC Site Code #130043A." Report to IMC Eastern Corp.. HAI Document #NMB007.200.0019, 93p.
430	Hull & Associates, Inc. (Mason, OH). September 1999. "Focused Ground-Water Feasibility Study for the 570 Main Street Manufacturing Facility, Westbury, New York, NYSDEC Site Code #130043A." Report to IMC Eastern Corporation. 91p.
431	Mitkem Corp. (Warwick, RI) ; Chiu, KS. September 1, 1999. "Letter Report to B. Williams (LMS Engineers) re: Client Project 650-422 NCIA/Frost St., Lab Project #: 61519 (Data report)." Report to LMS Engineers (Pearl River, NJ). 151p. SAA 163944 - SAA 164094.
432	Turley, WL. [Hull & Associates, Inc.]. September 9, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #13 for August 12, 1999 through September 9, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0024." 2p. SAD 036717 - SAD 036718.
433	Bonifas, MJ. [Hull & Associates, Inc.]. September 10, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #40 for August 11, 1999 through September 11, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0098." 2p. SAD 043187 - SAD 043188.
434	Parrish, R. [Impact Environmental Consulting, Inc.]. September 27, 1999. "Letter to A. Ruepp (New York State Department of Environmental Conservation) re: 299 Main Street Site No. 1-30-043S, Notice of Completion/Work Schedule." 5p. SSB 007478 - SSB 007482.
435	CA Rich Consultants, Inc. (Sea Cliff, NY). October 1999. "Post-Remediation Groundwater Monitoring Report, Tishcon Corporation, 125 State Street, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 20p. SAD 045069 - SAD 045088.
436	Chemtech. October 1999. "IE Volatile Organics Analysis Data Sheet, Tentatively Identified Compounds, Sample Group 335-GP-021." Report to Impact Environmental. 19p. SAD 051425 - SAD 051443.
437	H2M Labs, Inc. (Melville, NY). October 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Case No.: RA098, SDG No.: 1004A. Water Samples Received 10/8/99. Volatile Data." 122p. SAA 179560 - SAA 179681.
438	H2M Labs, Inc. (Melville, NY). October 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Case No.: RA098, SDG No.: 1004A. Soil & Water Samples Received 10/8/99. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 148p. SAA 172760 - SAA 172907.
439	H2M Labs, Inc. (Melville, NY). October 1999. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA098, SDG No.: X1011. Water Samples Received October 12, 1999/October 14-15, 1999. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 158p. SAA 178924 - SAA 179081.
440	H2M Labs, Inc. (Melville, NY). October 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Case No.: RA098, SDG No.: X1018. Soil Samples Received 10/19/99. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 156p. SAA 179082 - SAA 179237.
441	H2M Labs, Inc. (Melville, NY). October 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Case No.: RA098, SDG No.: X1018A. Water Samples Received 10/19/99. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 101p. SAA 178823 - SAA 178923.

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No.	Reference
442	H2M Labs, Inc. (Melville, NY). October 1999. "Analytical Data Package for New York State Department of Environmental Conservation, Region 0, Case No.: RA098, SDG No.: X1018A. Water Samples Received 10/19/99. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 101p. SAA 178823 - SAA 178923.
443	Lawler, Matusky & Skelly Engineers LLP. October 1999. "New Cassel Industrial Area Offsite Groundwater RI/FS, Workplan Amendment #1." 56p. SAD 036954 - SAD 037009.
444	Kleaka, K. [Impact Environmental Consulting, Inc.]. October 4, 1999. "Letter to A. Ruepp (New York State Department of Environmental Conservation) re: 299 Main Street Site No. 1-30-043S, Sample Acquisition Plan." 1p. SAD 051465.
445	Kleaka, K. [Impact Environmental Consulting, Inc.]. October 7, 1999. "Letter to A. Ruepp (New York State Department of Environmental Conservation) re: 299 Main Street Site No. 1-30-043S, Work Plan Modification." 3p. SSB 007474 - SSB 007476.
446	Bonifas, MJ. [Hull & Associates, Inc.]. October 11, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #41 for September 11, 1999 through October 11, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0099." 2p. SAD 043184 - SAD 043185.
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449	Lawler, Matusky & Skelly Engineers LLP. October 28, 1999. "New Cassel Industrial Area Offsite Groundwater RI/FS, Workplan Amendment #1." 73p. BPM 313577 - BPM 313649.
450	Hull & Associates, Inc. (Mason, OH). November 1999. "Focused Ground-Water Feasibility Study for the 570 Main Street Manufacturing Facility, Westbury, New York, NYSDEC Site Code #130043A (Revised)." Report to IMC Eastern Corporation. 93p.
451	Bonifas, MJ. [Hull & Associates, Inc.]. November 10, 1999. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #42 for October 12, 1999 through November 10, 1999 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0100." 2p. SW 121652 - SW 121653.
452	Turley, WL. [Hull & Associates, Inc.]. November 11, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #15 for October 11, 1999 through November 11, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0027." 2p. SW 117493 - SW 117494.
453	CA Rich Consultants, Inc. (Sea Cliff, NY). December 1999. "Feasibility Study Report for Off-Site Groundwater Operable Unit (OU) - 2, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 14p. SW 129544 - SW 129556.
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456	Turley, WL. [Hull & Associates, Inc.]. December 13, 1999. "Letter to J. Jones (NYSDEC) re: Progress Report #16 for November 11, 1999 through December 13, 1999 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0028." 2p. SAD 043175 - SAD 043176.
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458	General Consolidated Industries, Inc. (Hauppauge, NY). January 2000. "Focused Remedial Investigation Report, Tishcon Corporation, New Cassel Industrial Area, 29 New York Avenue, New Cassel, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 115p. SAD 347921 - SAD 348035.
459	H2M Labs, Inc. (Melville, NY). January 2000. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA000, SDG No.: 0120. Water Samples, Samples Received 1/21 &1/25/00. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 68p. SAA 177294 - SAA 177361.
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No.	Reference
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462	H2M Labs, Inc. (Melville, NY). January 2000. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA000, SDG No.: 0110. Water Samples, Samples Received 1/11, 1/13, 1/14 & 1/18/00. Metals Data." 150p. SAA 177890 - SAA 178039.
463	H2M Labs, Inc. (Melville, NY). January 2000. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA000, SDG No.: 0110. Water Samples, Samples Received 1/11, 1/13, 1/14 & 1/18/00. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 246p. SAA 179682 - SAA 179927.
464	H2M Labs, Inc. (Melville, NY). January 2000. "Analytical Data Package for New York State Department of Environmental Conservation, Region 1, Case No.: RA000, SDG No.: 0110. Water Samples, Samples Received 1/11, 1/13, 1/14 & 1/18/00. Wet Chemistry Data." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 145p. SAA 178040 - SAA 178184.
465	O'Brien & Gere Engineers, Inc.. January 2000. "Investigative Report: Former Sylvania Electric Products Inc., Facility, Hicksville, New York (Excerpt)." 24p. SAD 102273 - SAD 102296.
466	Stearns & Wheler, LLC (Cazenovia, NY). January 2000. "Groundwater Sampling Results, November 1999 Event, General Semiconductor, Inc., Hicksville, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 32p. SSB 197005 - SSB 197036.
467	Turley, WL. [Hull & Associates, Inc.]. January 10, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #17 for December 13, 1999 through January 10, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0030." 2p. SW 118069 - SW 118070.
468	Bonifas, MJ. [Hull & Associates, Inc.]. January 11, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #44 for December 11, 1999 through January 11, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0102.DOC." 2p. SW 121664 - SW 121665.
469	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128T. Soil Samples Received February 10, 2000. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 63p. SAA 178361 - SAA 178423.
470	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128T. Soil Samples Received February 10, 2000. TCLP Herbicides Data Package." 90p. SAA 178185 - SAA 178274.
471	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128T. Soil Samples Received February 10, 2000. TCLP Metals Data Package." 142p. SAA 176081 - SAA 176222.
472	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128T. Soil Samples Received February 10, 2000. TCLP Pesticides/PCBs Data Package." 187p. SAA 176703 - SAA 176889.
473	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128T. Soil Samples Received February 10, 2000. TCLP Semivolatiles Data Package." 89p. SAA 175992 - SAA 176080.
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475	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128A. Water Samples Received February 8, 10, and 11, 2000. Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 253p. SAA 176450 - SAA 176702.
476	H2M Labs, Inc. (Melville, NY). February 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0128A. Water Samples Received February 8, 10, and 11, 2000. Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 253p. SAA 176450 - SAA 176702.
477	Bonifas, MJ. [Hull & Associates, Inc.]. February 10, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #45 for January 12, 2000 through February 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0103.DOC." 2p. SAD 043158 - SAD 043159.
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479	CA Rich Consultants, Inc. (Plainview, NY). March 2000. "Final Engineering Report and Operations & Maintenance Manual, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 120p. SAD0068060 - SAD068179.

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481	Turley, WL. [Hull & Associates, Inc.]. March 13, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #19 for February 11, 2000 through March 13, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0032." 2p. SAD 036015 - SAD 036016.
482	New York State, Dept. of Environmental Conservation (NYSDEC). March 17, 2000. "Order on consent [In the Matter of the Development and Implementation of a Focused Remedial Investigation/Focused Feasibility Study for an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Grand Machinery Exchange, Inc.]." INDEX # W1-0863-00-01, 16p. BPM 295859 - BPM 295874.
483	CA Rich Consultants, Inc. (Plainview, NY). April 2000. "First Quarter 2000 Quarterly Monitoring Report, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 56p. SAD068181 - SAD068236.
484	Bonifas, MJ. [Hull & Associates, Inc.]. April 10, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #47 for March 11, 2000 through April 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0105.DOC." 2p. SAD 122517 - SAD 122518.
485	Bonifas, MJ. [Hull & Associates, Inc.]. April 10, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #50 for July 10, 2000 through August 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0109.DOC." 2p. SAD 043122 - SAD 043123.
486	Turley, WL. [Hull & Associates, Inc.]. April 10, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #20 for March 13, 2000 through April 10, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0033." 2p. SAD 036013 - SAD 036014.
487	FPM Group (Ronkonkoma, NY). May 2000. "Supplemental Focussed Remedial Investigation Report for the Property Located at 118-130 Swalm Street, Westbury, New York." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 149p. SAD 085623 - SAD 085771.
488	FPM Group (Ronkonkoma, NY). May 2000. "Supplemental Focussed Remedial Investigation Report for the Property Located at 118-130 Swalm Street, Westbury, New York." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 149p. SAD 085623 - SAD 058623.
489	Stearns & Wheler, LLC (Cazenovia, NY). May 2000. "Groundwater Sampling Results, November 1999 Event, General Semiconductor, Inc., Hicksville, New York (Revised)." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 44p. SAD 112232 - SAD 112275.
490	Impact Environmental Consulting, Inc.. May 1, 2000. "Focussed Remedial Investigation Draft Work Plan 00-096, Site Code # 1-30-043U, 36 Sylvester Street, Westbury, New York." Report to Grand Machinery Exchange, Inc. (New York, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 161p. GME-000066 - GME-000226.
491	Bonifas, MJ. [Hull & Associates, Inc.]. May 10, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #48 for April 10, 2000 through May 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0106.DOC." 2p. SW 121638 - SW 121639.
492	Turley, WL. [Hull & Associates, Inc.]. May 15, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #21 for April 10, 2000 through May 15, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0034." 2p. SSB 003799 - SSB 003800.
493	Anson Environmental Ltd. (Huntington, NY). May 17, 2000. "Draft Proposed Interim Remedial Measure Action Plan, Operable Unit 02, On-site Groundwater, Utility Manufacturing/Wonder King, 700 Main Street, Westbury, New York, Site #1-30-043H." 22p. SAD 048118 - SAD 048140.
494	Thomas, DA. [Hull & Associates, Inc.]. June 12, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #49 for May 10, 2000 through June 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0107.DOC." 2p. SSB 003801 - SSB 003802.
495	Turley, WL. [Hull & Associates, Inc.]. June 12, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #22 for May 15, 2000 through June 12, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0038." 2p. SSB 003803 - SSB 003804.
496	General Consolidated Industries, Inc. (Hauppauge, NY). June 19, 2000. "Interim Remedial Measure Work Plan, Tishcon Corp., New Cassel Industrial Area, 29 New York Avenue, New Cassel, New York 11590." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 216p. SAD 081865 - SAD 081877SAD 082628 - SAD 082830.
497	Kleaka, K. [Impact Environmental Consulting, Inc.]. June 26, 2000. "Letter to R. Lilley (New York State Department of Environmental Conservation) re: 36 Sylvester Street Site No. 1-30-043U, Draft FRI Work Plan." 4p. SAD 052203 - SAD 052206.

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No.	Reference
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499	CA Rich Consultants, Inc. (Plainview, NY). July 2000. "Quarterly Monitoring Report, Second Quarter 2000, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 50p. SAD068238 - SAD068286SAD 046523.
500	O'Brien & Gere Engineers, Inc.. July 2000. "History Report: Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York." Report to GTE Operations Support Inc.. 46p. SSB 192225 - SSB 192270.
501	Stearns & Wheler, LLC (Cazenovia, NY). July 2000. "Groundwater Sampling Results, June 2000 Event, General Semiconductor, Inc., Hicksville, New York." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 25p. SAD 112206 - SAD 112230.
502	Anson Environmental Ltd. (Huntington, NY). July 7, 2000. "Proposed Interim Remedial Measure Action Plan, Operable Unit 02, On-site Groundwater, Utility Manufacturing/Wonder King, 700 Main Street, Westbury, New York, Site #1-30-043H." 23p. SSB 019255 - SSB 019277.
503	Impact Environmental (Kings Park, NY). July 10, 2000. "Focussed Remedial Investigation Final Work Plan 00-096: Site Code # 1-30-043U, 36 Sylvester Street, Westbury, New York." Report to Grand Machinery Exchange, Inc. (New York, NY). Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 162p. SAD 081120 - SAD 081281.
504	Thomas, DA. [Hull & Associates, Inc.]. July 10, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #50 for June 10, 2000 through July 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0108.DOC." 2p. SAD 043126 - SAD 043127.
505	Turley, WL. [Hull & Associates, Inc.]. July 10, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #23 for June 12, 2000 through July 10, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0040." 2p. SAD 036004 - SAD 036005.
506	CA Rich Consultants, Inc. (Plainview, NY). August 2000. "Off-Site Remedial Design Report, Operable Unite 2 (OU-2), Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 37p. SAD068288 - SAD068324.
507	H2M Labs, Inc. (Melville, NY). August 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0818. Soil Samples Received 8/17/00. Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 116p. SAA 171432 - SAA 171547.
508	H2M Labs, Inc. (Melville, NY). August 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0818. Soil Samples Received 8/17/00. Metals Data Package." 238p. SAA 171548 - SAA 171785.
509	H2M Labs, Inc. (Melville, NY). August 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0818. Soil Samples Received 8/17/00. Metals Data Package." 238p. SAA 171548 - SAA 171785.
510	H2M Labs, Inc. (Melville, NY). August 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0818. Soil Samples Received 8/17/00. Volatiles Data Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 46p. SAA 171340 - SAA 171385.
511	H2M Labs, Inc. (Melville, NY). August 2000. "Analytical Data Package for NYS DEC, Region 1, Contract No.: C003786, Case No.: RA000, SDG No.: 0818. Soil Samples Received 8/17/00. Sample Data Summary Package." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 46p. SAA 171385 - SAA 171431.
512	O'Brien & Gere Engineers, Inc.. August 14, 2000. "Investigative Report: Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York (Revision 1)." Report to GTE Operations Support Inc.. 683p. SAD 105564 - SAD 106246.
513	Turley, WL. [Hull & Associates, Inc.]. August 16, 2000. "Letter to J. Jones (NYSDEC) re: Progress Report #24 for July 10, 2000 through August 16, 2000 for the Focused Ground-Water Investigation and Feasibility Study at the NYSDEC Site Code W1-0750-96-02 in Westbury, New York; NMB007.200.0041." 2p. SAD 043120 - SAD 043121.
514	Impact Environmental ; Parrish, R ; Kleaka, K. September 2000. "Final Focussed Remedial Investigation Report Regarding: 299 Main Street Site, Westbury, New York (Site Code 1-30-043S)." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 80p. SSB 016887 - SSB 016966.
515	Impact Environmental (Kings Park, NY). September 2000. "Appendix A.1 through A.5: Focussed Remedial Investigation Report Regarding: 299 Main Street Site, Westbury, New York (Site Code 1-30-043S)." 169p. SSB 016967 - SSB 017135.
516	Impact Environmental (Kings Park, NY). September 2000. "Appendix A.1 through A.5: Focussed Remedial Investigation Report Regarding: 299 Main Street Site, Westbury, New York (Site Code 1-30-043S)." 169p. SSB 016967 - SSB 017135.
517	Impact Environmental (Kings Park, NY). September 2000. "Final Focussed Remedial Investigation Report Regarding: 299 Main Street Site, Westbury, New York (Site Code 1-30-043S)." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 80p. SSB 016887 - SSB 016966.
518	Lawler, Matusky & Skelly Engineers LLP. September 2000. "Remedial Investigation/Feasibility Study (RI/FS) Report, New Cassel Industrial Area, Offsite Groundwater, Town of North Hempstead, Nassau County. Volume III: Appendices A-L." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 531p. OAG010572 - OAG011102.

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520	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). September 2000. "Remedial Investigation/Feasibility Study (RI/FS) Report, New Cassel Industrial Area, Offsite Groundwater, Town of North Hempstead, Nassau County. Volume I: Remedial Investigation Report." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 136p. SAD 088485 - SAD 088620.
521	Lawler, Matusky & Skelly Engineers LLP (Pearl River, NY). September 2000. "Remedial Investigation/Feasibility Study (RI/FS) Report, New Cassel Industrial Area, Offsite Groundwater, Town of North Hempstead, Nassau County. Volume II: Feasibility Study Report." Report to New York State, Dept. of Environmental Conservation (NYSDEC), Division of Environmental Remediation (Albany, NY). 223p. SAD 088621 - SAD 088843.
522	O'Brien & Gere Engineers, Inc.. September 2000. "Supplemental Investigation Work Plan: Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York (Revised)." Report to GTE Operations Support Inc.. 199p. SSB 191664 - SSB 191862.
523	Chemtech (Edison, NJ). September 1, 2000. "Data Package for General Chemistry, Part IV, 29 New York Avenue." Report to GCI, Inc.. 27p. SAD 083041 - SAD 083067.
524	Thomas, DA. [Hull & Associates, Inc.]. September 11, 2000. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #52 for August 10, 2000 through September 10, 2000 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0110.DOC." 2p. SW 123038 - SW 123039.
525	Anson Environmental Ltd. (Huntington, NY). September 20, 2000. "Remedial Design/Remedial Action Work Plan, Atlas Graphics, 567 Main Street, Westbury, NY 11590, Site #1-30-043B." 41p. SW 124320 - SW 124360.
526	New York State, Dept. of Environmental Conservation (NYSDEC). September 28, 2000. "Order on consent [In the Matter of the Development and Implementation of a Remedial Program for Operable Unit 1 of an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Atlas Graphics, Inc.]." INDEX #WI-0861-99-16. 15p. SAA 162520 - SAA 162534.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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582	Dermody, P. [Enviroscience Consultants, Inc.]. September 4, 2001. "Letter to J. Jones (NYSDEC) re: 118-130 Swalm Street, Westbury, NY, NYSDEC Site No. 1-30-043P." 9p. Albem-Review0002855 - Albem-Review0002861; SW 140366 - SW 140367.
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585	Impact Environmental (Kings Park). October 2001. "Appendix G: Laboratory Analytical Report Regarding: 36 Sylvester Street Site, Site Code 1-30-043U, Westbury, New York." 332p. SAD 080727 - SAD 081058.
586	O'Brien & Gere Engineers, Inc.. October 2001. "Data Validation Report: Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York." Report to GTE Operations Support Inc.. 35p. SAD 102989 - SAD 103023.
587	Parrish, RS ; Kleaka, KC. [Impact Environmental]. October 2001. "Draft Interim Remedial Measures Work Plan Proposed for: 299 Main Street Site, Site Code 1-30-043S, Westbury, New York." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 139p. SAD 080237 - SAD 080375.
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590	Kleaka, K. [Impact Environmental Consulting, Inc.]. October 26, 2001. "Letter to J. Jones (New York State Department of Environmental Conservation) re: FRI 299 Main Street Site-1-30-043S, Supplemental Investigation Report for Pollution Source PS-10." 7p. SAD 079851 - SAD 079857.
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594	Stearns & Wheler, LLC (Hyannis, MA). November 2001. "Remedial Investigation Phase V, General Semiconductor, Inc., Hicksville, New York (Draft)." Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 102p. SSB 235482 - SSB 235583.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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601	New York State, Dept. of Environmental Conservation (NYSDEC). December 5, 2001. "Order on consent [In the Matter of the Development and Implementation of a Remedial Program for Operable Unit 2 of an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Tishcon Corporation]." INDEX # WI-0799-00-03, 66p. SW 128299 - SW 128364.
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604	Robins, K. [Dvirka and Bartilucci Consulting Engineers]. December 14, 2001. "Letter to J. Jones (NYSDEC) re: New Cassel Industrial, off-site groundwater monitoring and assessment program, Work Assignment No. D003600-25, D&B No. 1898." 23p. SAD 055310 - SAD055332.
605	Robins, KS. [Dvirka and Bartilucci Consulting Engineers]. December 17, 2001. "Letter to J. Jones (NYSDEC) re: New Cassel Industrial Area, off-site groundwater monitoring and assessment program, Work Assignment No. D003600-25, D&B No. 1898." 26p. SAD 055284 - SAD 055309.
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607	Chemtech (Mountainside, NJ). 2002. "Supporting data for Utility Manufacturing." 76p.
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610	Dillon Consulting Ltd.. January 2002. "Geophysical Surveys, Former GTE Sylvania Facility, Hicksville, New York." Report to URS Corporation. 24p. SAD 107856-SAD 107879.
611	Stearns & Wheler, LLC (Cazenovia, NY). January 2002. "Draft Groundwater IRM Ozone Injection System Design Report, Vishay General Semiconductor, Hicksville, New York." Report to Vishay General Semiconductor, Inc.. 108p. SSB 237449 - SSB 237556.
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616	Davis, SO. [FPM Group]. January 31, 2002. "Letter to J. Jones (NYSDEC) re: Second Addendum to November 2000 groundwater remediation work plan, Arkwin Industries, Inc., Westbury, New York, FPM File No. 652-00-03." 85p. SAD 046292 - SAD 046293; SW 127024 - SW 127106.
617	Impact Environmental ; Allen, J ; Kleaka, KC. February 2002. "Interim Remedial Measures Work Plan Proposed for: 36 Sylvester Street Site, Site Code 1-30-043U, Westbury, New York (Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 59p. DOHED00090201 - DOHED00090259.
618	Lancaster Laboratories (Lancaster, PA). February 8, 2002. "NYSDEC ASP Category B Data Package, IMC Magnetics - NY, Water Samples, Collected on 01/04/02, Sample No. 3753742-3753745." 254p. SSB 024650 - SSB 024903.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
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623	New York State, Dept. of Environmental Conservation (NYSDEC). February 26, 2002. "Order on consent [In the Matter of the Development and Implementation of a Remedial Program for Operable Unit 2 Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York by Arkwin Industries, Inc.]." INDEX # WI-0861-00-02, 70p. SW 127369 - SW 127438.
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631	Impact Environmental ; Allen, J ; Kleaka, KC. April 2002. "Interim Remedial Measures Work Plan Approved for: 36 Sylvester Street Site, Site Code 1-30-043U, Westbury, New York (Final)." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 140p. SAD 080447 - SAD 080586.
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636	CA Rich Consultants, Inc. (Plainview, NY). May 2002. "Quarterly Monitoring Report, First Quarter 2002, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 79p. SAD068832 - SAD068910.
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No.	Reference
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644	URS Corp.. May 3, 2002. "Soil Boring Work Plan, Former Sylvania Electric Products Incorporated Facility, Hicksville, New York." Report to GTE Operations Support Inc.. 19p. SAR 251858-SAR 251875.
645	Finan, JD. [Hull & Associates, Inc.]. May 10, 2002. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #72 for April 10, 2002 through May 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0132." 2p. SW 122426 - SW 122427.
646	Severn Trent Laboratories, Inc. (STL) Connecticut (Shelton, CT) ; Hobart, PT. May 13, 2002. "Analytical Report (Job Number: 201016), Hicksville - Monthly." Report to S & W Services. 14p. SAD 099660 - SAD 099673.
647	Finan, JD. [Hull & Associates, Inc.]. June 10, 2002. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #73 for May 10, 2002 through June 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0133." 2p. SW 121540 - SW 121541.
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650	Severn Trent Laboratories, Inc. (STL) (Shelton, CT) ; Hobart, PT. June 13, 2002. "Analytical Report (Job Number: 201192), Project: Hicksville - Monthly." Report to S & W Services. 21p. SAD 099674 - SAD 099694.
651	CA Rich Consultants, Inc. (Plainview, NY). July 2002. "Quarterly Monitoring Report, Second Quarter 2002, Utility Manufacturing Company, 700 Main Street, Westbury, New York." Report to Utility Manufacturing Co. (Westbury, NY). 78p. SAD 073540 - SAD 073617.
652	FPM Group (Ronkonkoma, NY). July 2002. "Soil Vapor Extraction and Air Sparge Pilot Test Report, Arkwin Industries, Inc. Site, Westbury, New York, NYSDEC Site # 1-30-043D." Report to Arkwin Industries, Inc.. Submitted to New York State, Dept. of Environmental Conservation (NYSDEC). 342p. SAD066904 - SAD067245.
653	Finan, JD. [Hull & Associates, Inc.]. July 10, 2002. "Letter to C. Vasudevan (NYSDEC) re: Progress Report #74 for June 10, 2002 through July 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0134.DOC." 2p. SW 121292 - SW 121293.
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655	CA Rich Consultants, Inc. (Plainview, NY). August 2002. "Quarterly Monitoring Report, Second Quarter 2002, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 82p. SAD068912 - SAD068993.
656	CA Rich Consultants, Inc. (Plainview, NY). August 2002. "Off-Site RD/RA Progress Report, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 4p. SAD 046716 - SAD 046719.
657	Impact Environmental ; Allen, J ; Kleaka, KC. August 2002. "Focused Remedial Investigation Report Conducted at 36 Sylvester Street Site, Site Code 1-30-043U, Westbury, New York (Draft)." Report to New York State, Dept. of Environmental Conservation (NYSDEC). 22p. SAD 081700 - SAD 081721.
658	Finan, JD. [Hull & Associates, Inc.]. August 12, 2002. "Letter to G. Bobersky (NYSDEC) re: Progress Report #75 for July 10, 2002 through August 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0135.DOC." 2p. SSB 002964 - SSB 002965.
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660	Severn Trent Laboratories, Inc. (STL) (Shelton, CT) ; Hobart, PT. August 30, 2002. "Analytical Report (Job Number: 201601), Project: Gen. Semiconductor." Report to Stearns & Wheler, LLC (Hyannis, MA). 56p. SDOH 248569 - SDOH 248624.
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663	Severn Trent Laboratories, Inc. (STL) (Shelton, CT) ; Hobart, PT. September 3, 2002. "Analytical report (Job Number: 201602), Project: Gen. Semiconductor." Report to Stearns & Wheler, LLC (Hyannis, MA).. 198p. SDOH 248625 - SDOH 248822.
664	Robins, KS. [Dvirka and Bartilucci Consulting Engineers]. September 9, 2002. "Letter to J. Jones (NYSDEC) re: New Cassel Industrial Area, off-site groundwater monitoring and assessment program, Work Assignment No. D003600-25, D&B No. 1898." 28p. SAD 055256 - SAD 055283.
665	Finan, JD. [Hull & Associates, Inc.]. September 10, 2002. "Letter to G. Bobersky (NYSDEC) re: Progress Report #76 for August 10, 2002 through September 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0136." 2p. SW 120506 - SW 120507.
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668	CA Rich Consultants, Inc. (Plainview, NY). October 2002. "Quarterly Monitoring Report, Third Quarter 2002, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 53p. SAD068995 - SAD069047.
669	Stearns & Wheler, LLC (Hyannis, MA). October 2002. "Off-Site Groundwater Investigation, Phase V, Summer 2002, Vishay-General Semiconductor, Inc., Hicksville, New York (Draft)." Report to Vishay-General Semiconductor, Inc. (Hicksville, NY). 138p. SSB 235344 - SSB 235481.
670	URS Corp. ; Envirocon, Inc. ; MHF Logistical Solutions, Inc. ; Envirocare of Utah, Inc.. October 2002. "Soil Remediation Program Work Plan, Former Sylvania Electric Products Facility, Hicksville, New York, Site Number V00089-1 (Revision 2)." Report to GTE Operations Support Inc.. 326p. SSB 238798 - SSB 239158.
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672	Robins, KS. [Dvirka and Bartilucci Consulting Engineers]. October 1, 2002. "Letter to J. Jones (NYSDEC) re: New Cassel Industrial Area (Site No. 1-30-043), off-site groundwater monitoring and assessment program, Work Assignment No. D003600-25, D&B No. 1898." 33p. SAD 055223 - SAD 055255.
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675	Miller, GG. [S&W Services, Inc.]. October 17, 2002. "Letter to J. Black (ESC Engineering of New York, P.C.) re: Sampling and analysis requirements for Areas B and C, Area A - Soil vapor extraction system optimization, General Semiconductor Site - Hicksville, NY, Site Code 1-30-020, S&W No. 80147.5." 4p. SAD 103925 - SAD 103928.
676	Miller, GG. [S&W Services, Inc.]. October 17, 2002. "Letter to J. Black (ESC Engineering of New York, P.C.) re: SVE operations report - May - June 2002, General Semiconductor Site - Hicksville, NY, Site Code 1-30-020, S&W No. 80147.5." 39p. SSB 221900 - SSB 221902SAD 099624 - SAD 099659.
677	Carpenter, K. [New York State, Dept. of Environmental Conservation (NYSDEC)]. October 23, 2002. "Letter to J. Black (ESC Engineering of New York, P.C.) re: General Instruments Site, Site Number 1-30-020, Operable Unit 1, SVE system sampling and optimization, comments on S&W Services, Inc, letter dated October 17, 2002." 4p. SDOH 242019 - SDOH 242022.
678	Stearns & Wheler, LLC (Hyannis, MA). November 2002. "Work Plan: Hicksville Water District, Groundwater Monitoring Well Installation." Report to Vishay General Semiconductor, Inc.. 94p. SAD 112743 - SAD 112836.
679	Finan, JD. [Hull & Associates, Inc.]. November 11, 2002. "Letter to G. Bobersky (NYSDEC) re: Progress Report #78 for October 10, 2002 through November 10, 2002 for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code #130043A in Westbury, New York; NMB004.300.0138." 2p. SAD 042929 - SAD 042930.
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684	Turley, WL. [Hull & Associates, Inc. (Mason, OH)]. December 12, 2002. "Memorandum to file re: Summary of Field Activities and Results from the Second Quarterly Groundwater Sampling Event at the Former IMC Magnetics Property, Westbury, New York (Site), NMB008.200.0033." 140p. SSB 028804 - SSB 028943.
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689	Severn Trent Laboratories, Inc. (STL). 2003 ?"Cell 7 Status Report." 4p. SSBED00034709 - SSBED00034712.
690	CA Rich Consultants, Inc. (Plainview, NY). January 2003. "Quarterly Monitoring Report, Fourth Quarter 2002, Soil Vapor Extraction and Air Sparging System, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York." Report to Tishcon Corp. (Westbury, NY). 64p. SAD069918 - SAD69981.
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693	ESC Engineering of New York, P.C. (Reston, VA). January 13, 2003. "Groundwater Interim Remedial Measure Pilot Test Design Report, Groundwater Recirculation Well Technology, Operable Unit No. 2, Former General Instrument Corporation Site, Hicksville, New York (Revision No. 1)." 151p. SAD 112840 - SAD 112990.
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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

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1132	TestAmerica Laboratories, Inc. (Shelton, CT). January 19, 2010. "Analytical Report (Job Number: 220-6689-1, SDG Number: 220-6689-1), SPGL0100 - Westbury, NY." Report to Walden Associates (Oyster Bay, NY). 194p. Albem-Review0038311 - Albem-Review0038504.
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1135	CA Rich Consultants, Inc. (Plainview, NY). Novenber 2006. "On-Site and Limited Off-Site Soil Vapor Intrusion Investigation Work Plan, Tishcon Corporation, 30 - 36 New York Avenue and 31 - 33 Brooklyn Avenue, Westbury, New York, NYSDEC Site No. 130043E." Report to Tishcon Corp. (Westbury, NY). 6p. ALBEM00031339 - ABLEM00031344.

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No.	Reference
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1139	Undated. "State Superfund Standby Contract Work Assignment, Site Characterization, Sulzer Metco Inc., Site No. 130178, 110 Prospect Avenue, Westbury, NY." 3p. ALBEM00073974 - ALBEM0073976.
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1143	Impact Environmental ; Parrish, R ; Kleaka, K. Undated. "Focussed Remedial Investigation Report Regarding: 299 Main Street Site, Westbury, New York (Site Code 1-30-043S) (Final)." 9p. ALBEM00031366 - ALBEM00031374.
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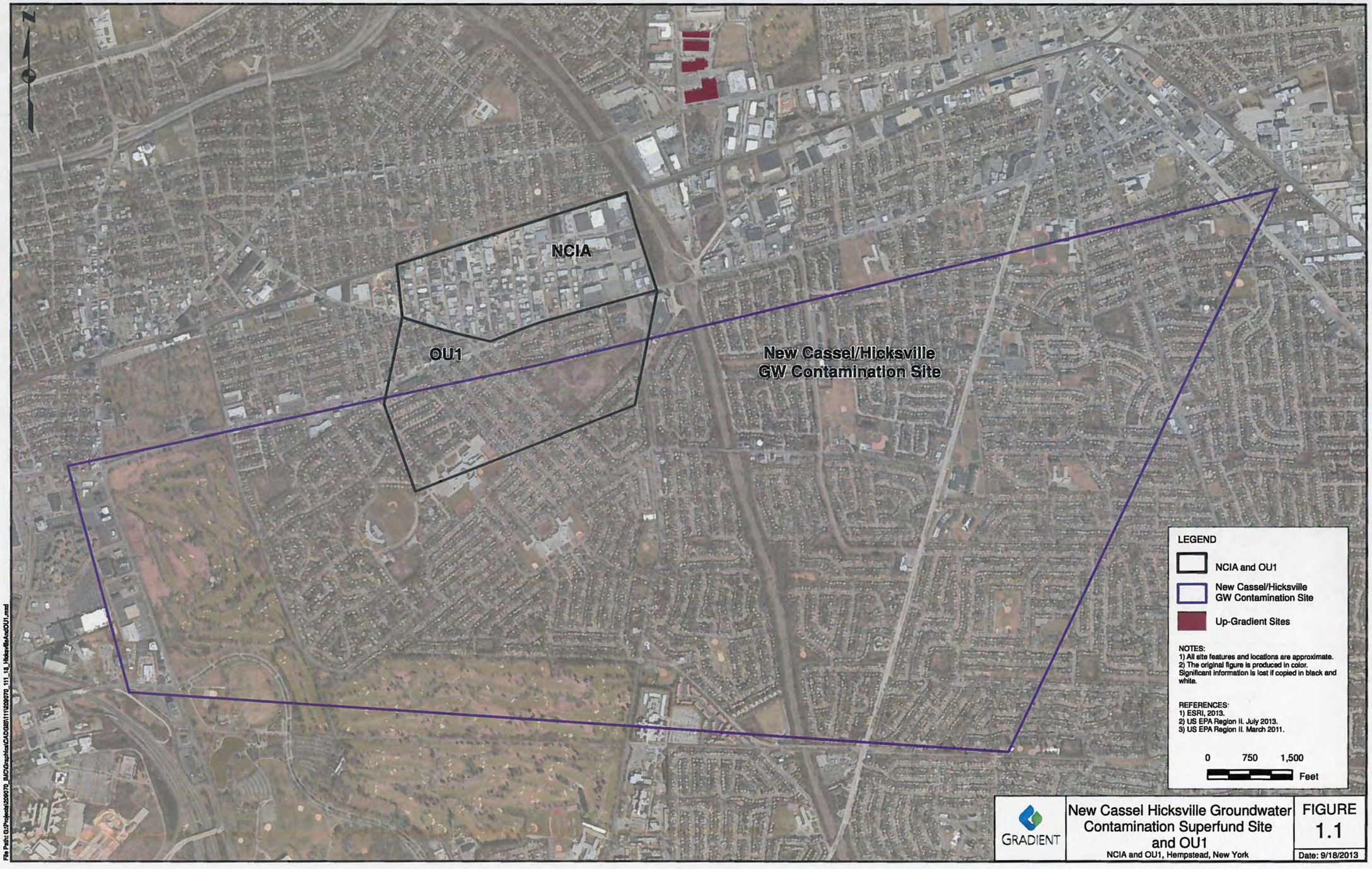
1154	Chemtech (Mountainside, NJ). Various. "Report of analysis." Report to Camp Dresser & McKee. 27p. ALBED00001255.
1155	Molloy, JJ. [H2M Labs, Inc.]. Various. "Letter to B. Stewart (NYSDEC) re: Laboratory results for Plant Nos. 4 and 5 in 2003, Hicksville Water District." 113p. SAD 094032 - SAD 094144.
1156	Various. Various."Miscellaneous Documents." 308p. SSB 004545 - SSB 004549 SSB 004835 - SSB 004857SAR 262443SSB 213072 - SSB 213100SSB 218304 - SSB 218308SDOH 241223SDOH 241216 - SDOH 241217SSB 004550 - SSB 004551SAD 047377 - SAD 047380SAD 047384 - SAD 047393SAD 112392 - SAD 112397ALBED00001237 - ALBED00001240 SSB 205345 - SSB 205356SSB 194607 - SSB 194619SSB 202969 - SSB 202977SSB 203053SSB 207719 - SSB 207741SSB 205332 - SSB05344SAD 113821 - SAD 113827SSB 194469 - SSB 194606.
1157	Cartwright, R.A (USGS). 2002. "History and Hydrologic Effects of Ground-Water Use in Kings, Queens, and Western Nassau Counties, Long Island, New York, 1800's through 1997." Water-Resources Investigations Report 01-4096
1158	Cartwright, R.A.; Chu, A. (USGS). 1996. "Data on Shallow Ground-Water Quality in the New Cassel Area, Long Island, New York, 1990-91, with Geophysical Logs of Selected Wells." Open- file Report 96-104.
1159	Carolyn E. Leamond, Ralph J. Haefner, Stephen J. Cauller, and Paul E. Stackelberg. (USGS). 1992. "Ground-Water Quality in Five Areas of Differing Land use in Nassau and Suffolk Counties, Long Island, New York ." Open-File Report 91-180
1160	Garfunkel Wild, PC (Great Neck, NY); Avena, SM. May 9, 2011. "Letter to US EPA Docket re: Comment to proposed EPA listing of the New Cassel/Hicksville Groundwater Contamination Site to the Superfund National Priority List." Report to Arkwin Industries, Inc. EPA-HQ-SFUND-2011-0074. 25p.
1161	Sheehan Phinney Bass & Green, PA (Manchester, NH); Lucic, RR. May 9, 2011. "Letter to US EPA Docket re: Comments regarding the proposed listing of the New Cassel/Hicksville Ground Water Contamination Site on the National Priority List dated March 10, 2011." Report to IMC Eastern Corp. EPA-HQ-SFUND-2011-0074. 3p.
1162	US EPA Region II. March 2011. "HRS Documentation Record re: New Cassel/Hicksville Ground Water Contamination Site (CERCLIS ID No.: NY0001095363)." 35p.
1163	Privitera, JJ. [McNamee, Lochner, Titus & Williams PC]. March 1, 2011. "Letter to T. Lieber (EPA Region II) re: New Cassel Industrial Area (NCIA) NPL consideration, Hazard Ranking System (HRS) scoring evaluation." 7p.

Appendix A: List of Documents/Data Sources that USEPA Should Have Relied Upon in Developing CSM

No.	Reference
1164	McNamee, Lochner, Titus & Williams PC. 2011. "Wellhead Treatment Precedent." 5p.
1165	US District Court, Eastern District of New York; Orenstein, ML. September 24, 2010. "Attachment B: Report and recommendation [re: State of New York et al. v. Next Millenium Realty, LLC, et al., and Next Millenium Realty, LLC, et al. v. Adchem Corp., et al]." CV 06-1133 (SJF) (MLO) 30p.
1166	Barnett, CF. [US Navy, Mid-Atlantic Region]. January 9, 2012. "Letter to J. Mitchell (US EPA Region II) re: Trustee notification - Garfield groundwater contamination, Bergen County, NJ and New Cassel/Hicksville ground water contamination, Nassau County, New York." 2p.
1167	Lockheed Martin Technology Services (Edison, NJ); Bolduc, J. July 19, 2013. "Letter Report to J. Cantanzarita (US EPA) re: Supplemental Remedial Investigation Technical Memorandum, New Cassel/Hicksville Ground Water Contamination Site, Nassau County, New York." 222p.
1168	HDR, Inc. (Pearl River, NJ) December 2011. "Pre-Design Investigation Report, New Cassel Industrial Area Offsite Groundwater OU3." Report to New York State Dept. of Environmental Conservation (NYSDEC) 677p.
1169	John Milner Associates, Inc. May 2013. "Stage 1A Cultural Resources Survey, New Cassel/Hicksville Groundwater Contamination Site, Towns of Hempstead and North Hempstead, Nassau County, New York." Report to HDR, Inc. (Pearl River, NJ) 46p.
1170	Magriples, N. [US EPA Region II]. March 5, 2013. "Internal memorandum to J. Rotola re: National Priorities List Removal Site Evaluation for New Cassel/Hicksville Groundwater Contamination Site, New Cassel/Hicksville, Nassau County, New York." 6p.
1171	Gonsalves, NL. [Nassau County (NY) Legislature]. 2011. "Invitation to Public Forum [re: New Cassel Industrial Areas Sites]." 2p.
1172	New York State Dept. of Environmental Conservation (NYSDEC) May 3, 2011. "New Cassel/Hicksville/Salisbury Groundwater Contamination Meeting Agenda." 1p.
1173	Raddant, AL. [US Dept. of the Interior, Office of Environmental Policy and Compliance]. January 27, 2012. "Letter to J. Mitchell (US EPA Region II) re: New Cassel/Hicksville ground water contamination, New York." 1p.
1174	Ramakrishnan, R. [US EPA Region II]. March 22, 2012. "Internal memorandum to J. LaPoma re: Results of Natural Resource Trustee Notification for the New Cassel/Hicksville Ground Water Contamination Site, Nassau County, New York." 2p.
1175	Schick, RW. [New York State Dept. of Environmental Conservation (NYSDEC)]. July 25, 2013. "Letter to W. Mugdan (US EPA Region II) re: New Cassel/Hicksville Ground Water Contamination Operable Unit 1 (Site No.: 130215), Superfund Proposed Plan." 1p.
1176	US EPA. May 2011. "New Cassel/Hicksville Ground Water Contamination Site Proposed to Federal Superfund List." 2p.



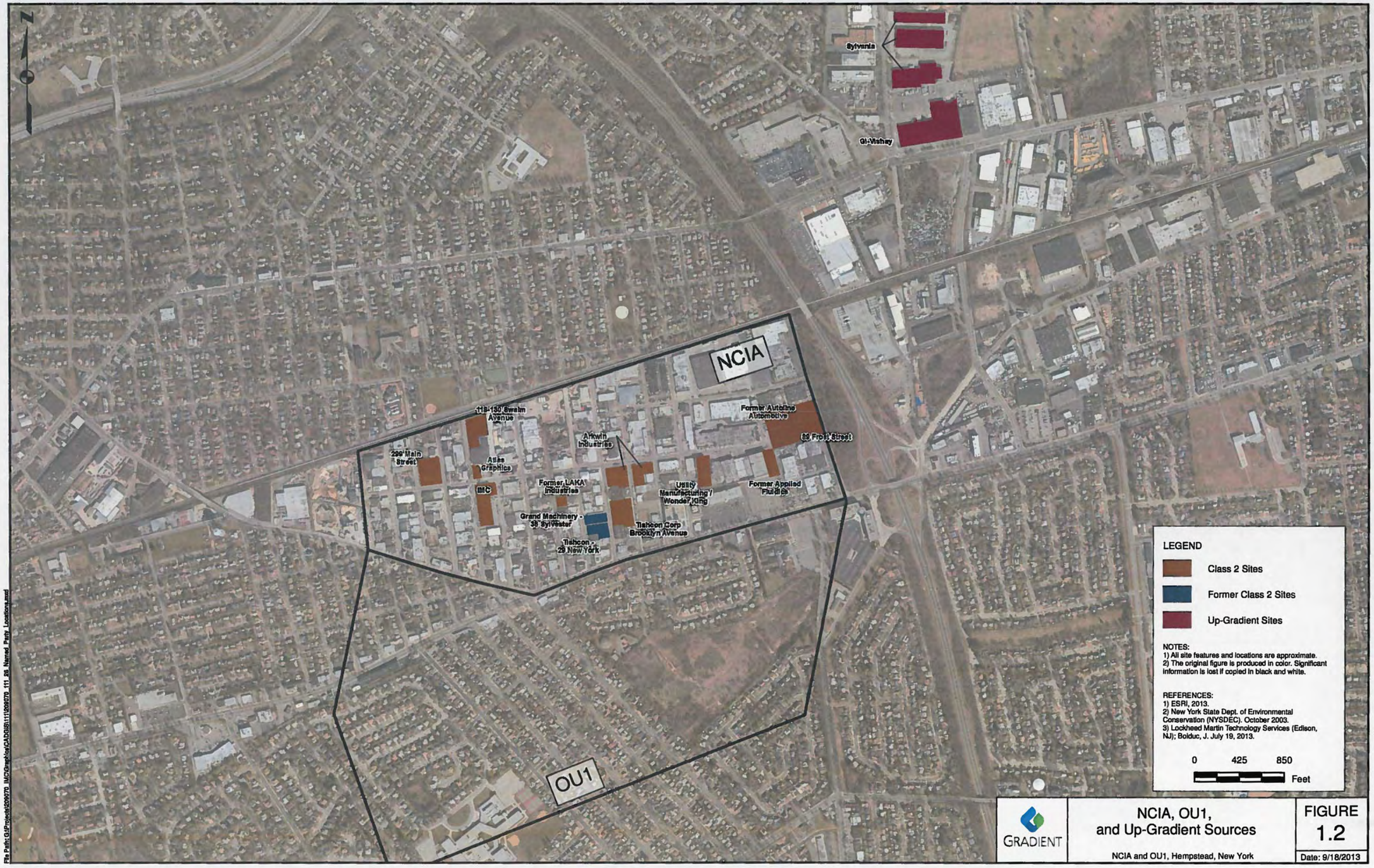
GRADIENT

New Cassel Hicksville Groundwater Contamination Superfund Site and OU1

NCIA and OU1, Hempstead, New York

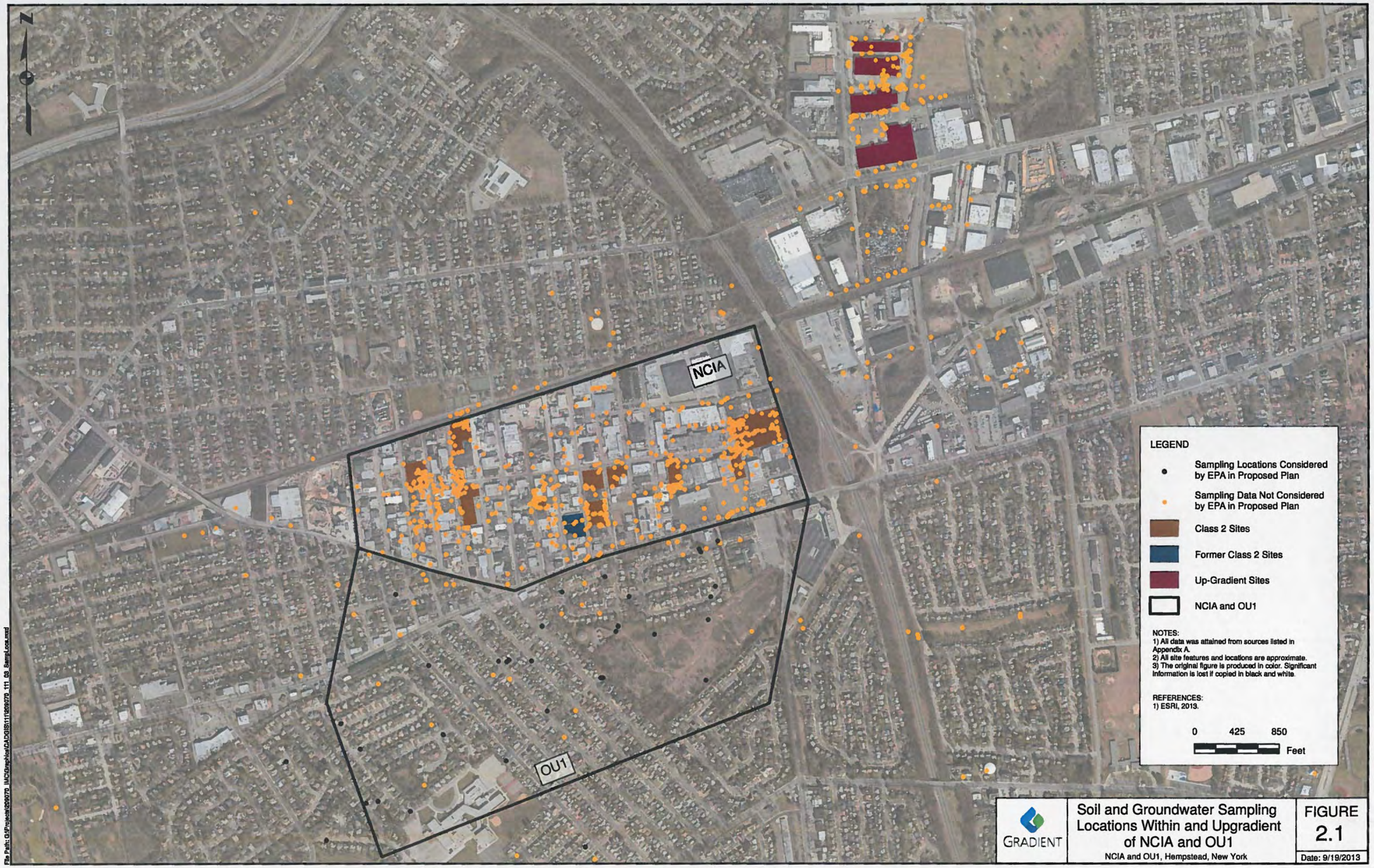
FIGURE 1.1

Date: 9/18/2013



N
Sylvania
Gi-Vishay
NCIA
118-130 Swalm Avenue
299 Main Street
Atlas Graphics
IMC
Arkwin Industries
Former LAKA Industries
Grand Machinery - 38 Sylvester
Tishcon - 29 New York
Tishcon Corp Brooklyn Avenue
Utility Manufacturing / Wonder King
Former Autoline Automotive
89 Frost Street
Former Applied Fluidics
OU1
LEGEND
Class 2 Sites
Former Class 2 Sites
Up-Gradient Sites
NOTES:
1) All site features and locations are approximate.
2) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) ESRI, 2013.
2) New York State Dept. of Environmental Conservation (NYSDEC). October 2003.
3) Lockheed Martin Technology Services (Edison, NJ); Bolduc, J. July 19, 2013.
0 425 850
Feet
GRADIENT
NCIA, OU1, and Up-Gradient Sources
NCIA and OU1, Hempstead, New York
FIGURE 1.2
Date: 9/18/2013

R2-0012697



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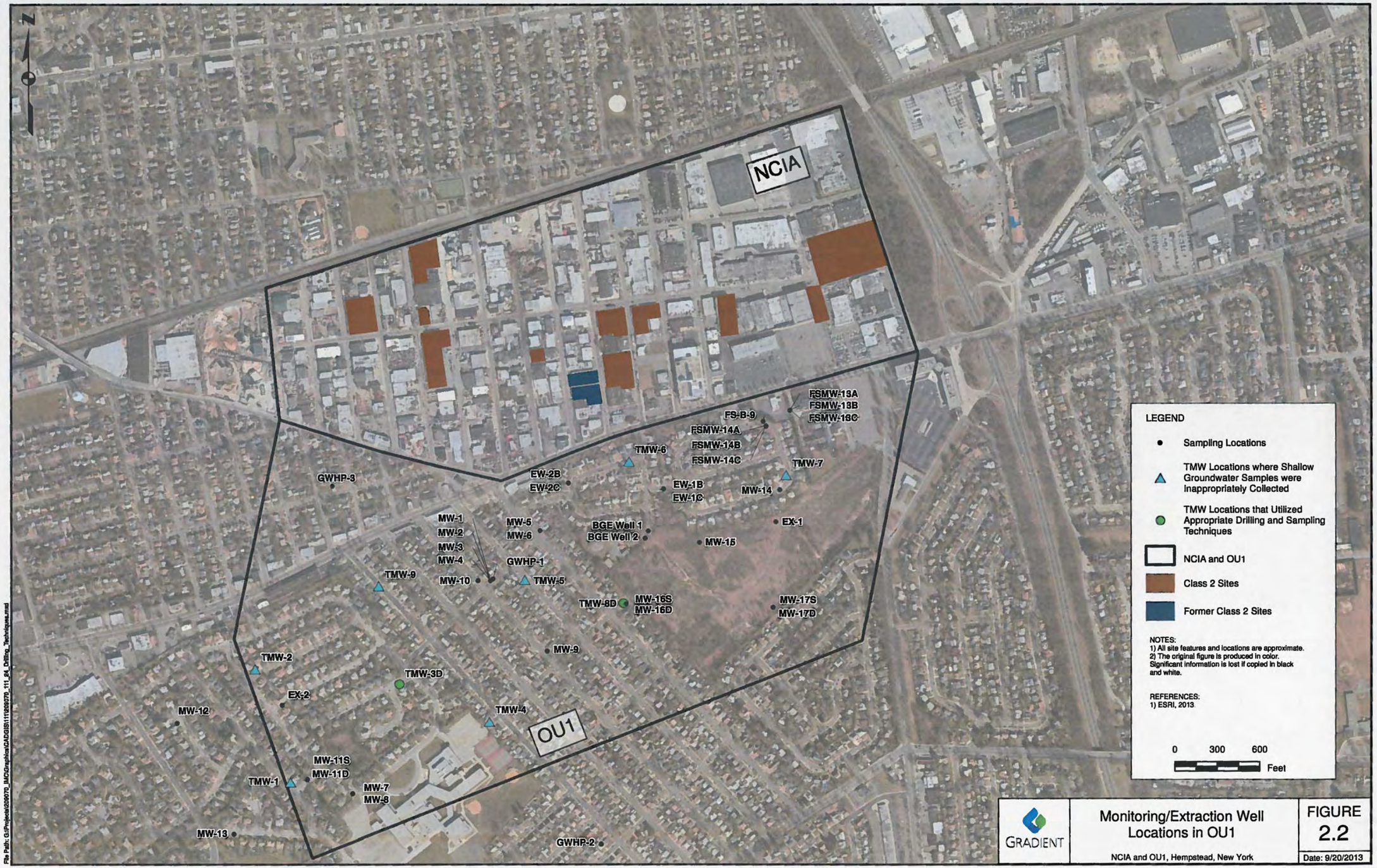
R2-0012698



GRADIENT

Monitoring/Extraction Well Locations in OU1

NCIA and OU1, Hempstead, New York

FIGURE 2.2

Date: 9/20/2013

File Path: G:\Projects\2090070_IMC\Graphics\NonCAD\XsectionNotToScale.dwg

GRADIENT

PCE Groundwater Sampling Results
Temporary Monitoring Wells
OU1, Hempstead, New York

FIGURE
2.3
Date: 9/20/2013

TMW-1
14
7
17
50
42
61
18
95
230
530
61
650
TMW-2
51
90
230
120
140
310
540
200
510
5100
2000
2400
1400
TMW-4
1
0.6
0.9
17
9
16
11
56
1
38
85
29
TMW-5
22
38
160
200
190
870
990
810
660
590
190
180
TMW-6
5
8
11
63
9
6
12
16
2
6
2
1
TMW-7
17
14
45
41
44
21
390
300
100
110
35
34
TMW-9
12
13
15
28
120
110
99
90
55
15
17
19
TMW-3D
ND
ND
ND
0.9
ND
ND
5
4
32
130
23
220
180
130
620
900
930
130
110
19
ND
ND
ND
ND
TMW-8D
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
0.7
ND
1
360
280
67
38
27
0.3
20
23
24
120
14
LEGEND
TMW-1
Sample ID
Boring Depth
Sample Interval
42
TCE Concentration (µg/L)
Shallow Groundwater Impacts Caused by Cross-Contamination due to Inappropriate Sampling Technique
Lack of Cross-Contamination at Properly Drilled and Sampled Locations
NOTES:
1) Drawing is not to scale.
2) Drawing does not imply spatial order of well locations.
REFERENCE:
1) Dvirka and Bartilucci, 2009.
GRADIENT
TCE Groundwater Sampling Results
Temporary Monitoring Wells
OU1, Hempstead, New York
FIGURE
2.4
Date: 9/20/2013
File Path: G:\Projects\2090070_IMC\Graphics\NonCAD\XsectionNotto Scale.dwg

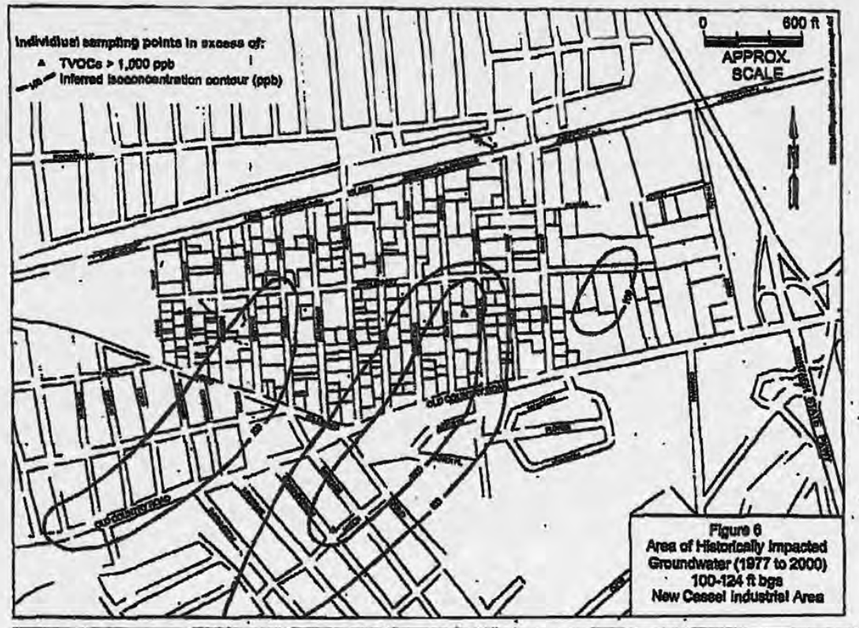


Figure 6
Area of Historically Impacted Groundwater (1977 to 2000)
100-124 ft bgs
New Cassel Industrial Area

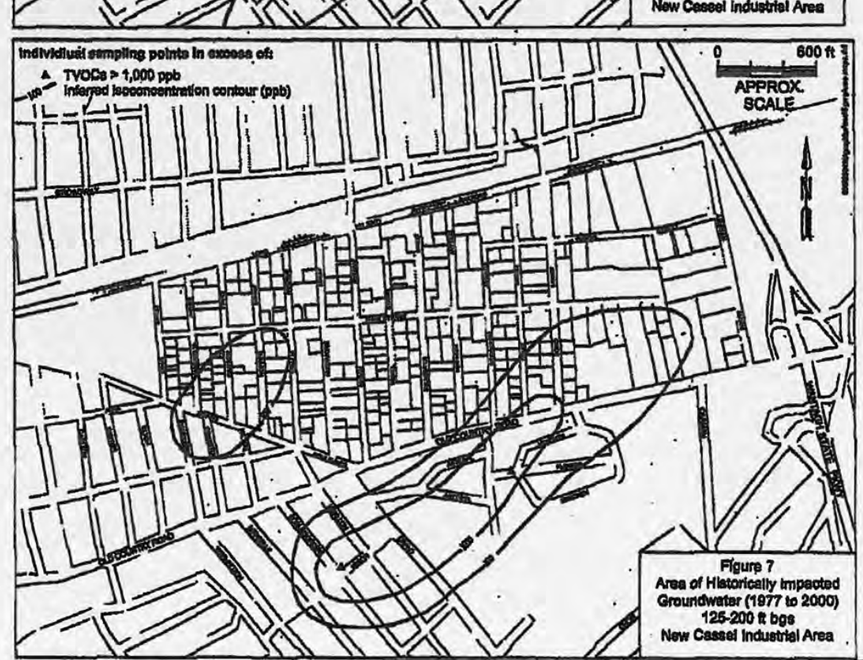


Figure 7
Area of Historically Impacted Groundwater (1977 to 2000)
125-200 ft bgs
New Cassel Industrial Area

REFERENCE:
1) NYSDEC, 2003.

GRADIENT

TVOC Plume Maps from 2003 Off-Site Groundwater ROD (NYSDEC)

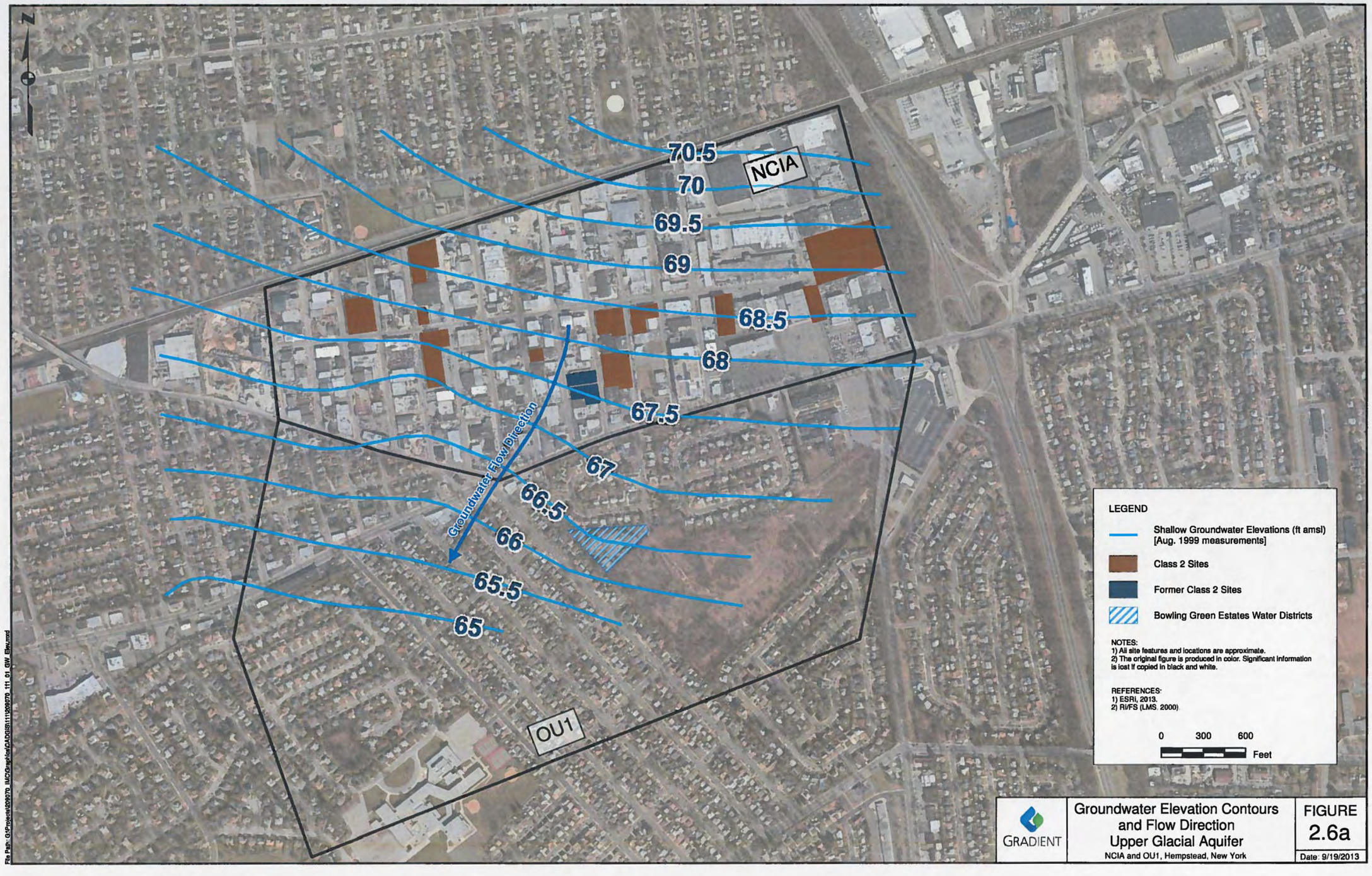
NCIA and OU1, Hempstead, New York

FIGURE 2.5

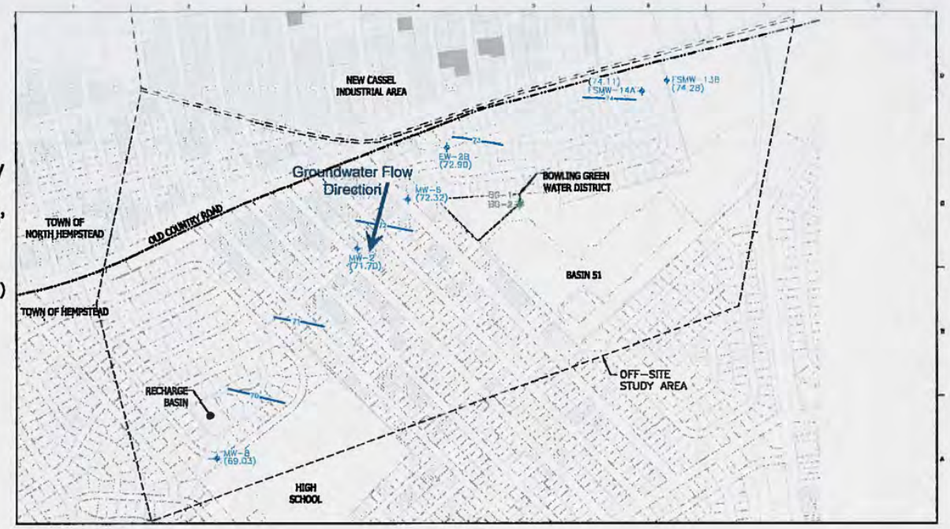
Date: 9/18/2013

File Path: G:\Projects\209070_IMC\Graphics\NonCAD\Aug2013rd\VolatileOrganicPlumes_OU1.ai

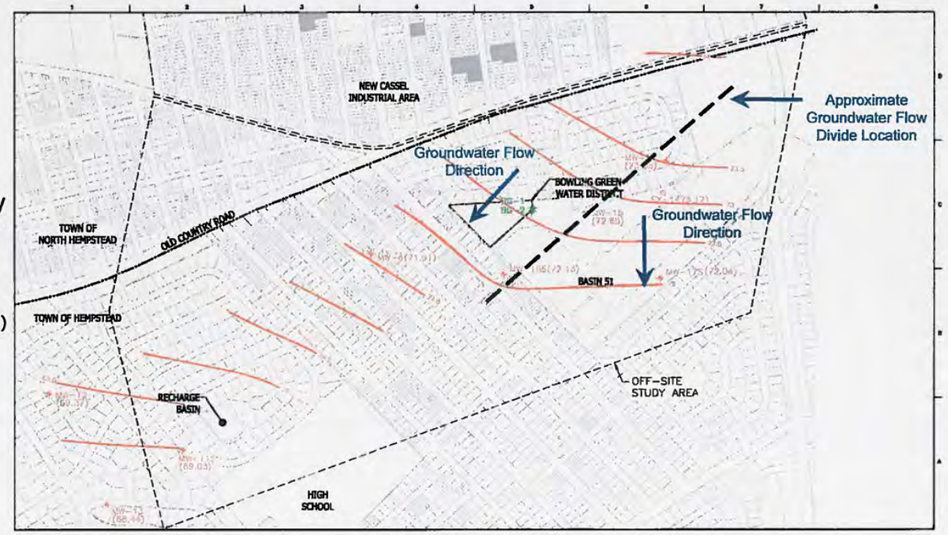
R2-0012702


N
70.5
70
69.5
69
68.5
68
67.5
67
66.5
66
65.5
65
NCIA
OU1
Groundwater Flow Direction
LEGEND
Shallow Groundwater Elevations (ft amsl) [Aug. 1999 measurements]
Class 2 Sites
Former Class 2 Sites
Bowling Green Estates Water Districts
NOTES:
1) All site features and locations are approximate.
2) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) ESRI, 2013.
2) RI/FS (LMS, 2000).
0
300
600
Feet
GRADIENT
Groundwater Elevation Contours and Flow Direction Upper Glacial Aquifer
NCIA and OU1, Hempstead, New York
FIGURE 2.6a
Date: 9/19/2013
File Path: G:\Projects\209970_IMC\Graphics\DAGIS\111209970_111_01_GW_Elev.mxd

Magothy Aquifer 130-140' BGS (Source: HDR, 2011)



Magothy Aquifer 205' BGS (Source: HDR, 2011)



File Path: G:\Projects\209070_INC\Graphics\NonCAD\Aug2013\reNGW_Flow_Elev_Contours_A.ai

GRADIENT

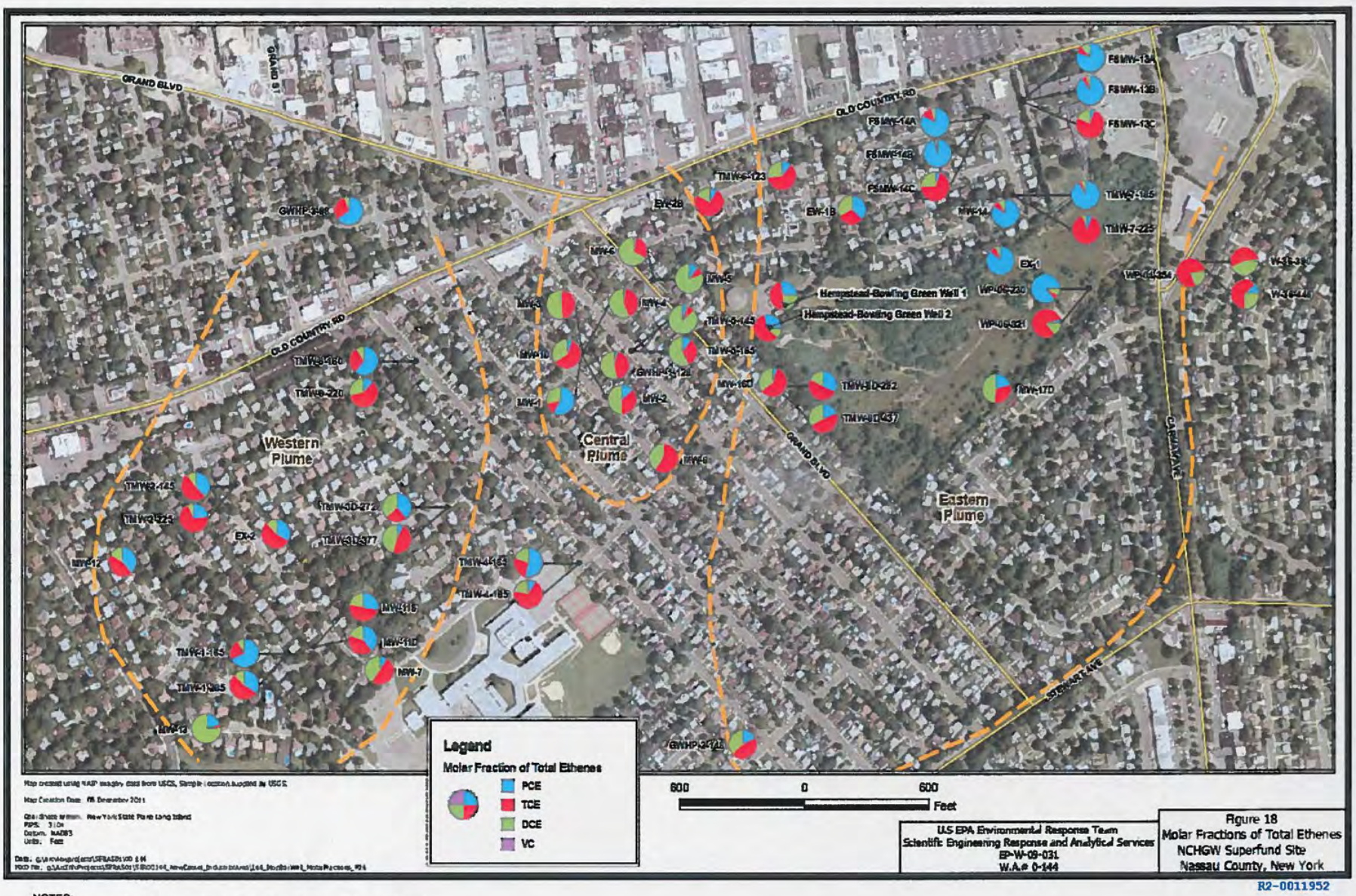
Groundwater Elevation Contours and Flow Directions Magothy Aquifer

NCIA and OU1, Hempstead, New York

FIGURE 2.6b

Date: 09/18/2013

USEPA Molar Analysis Depiction

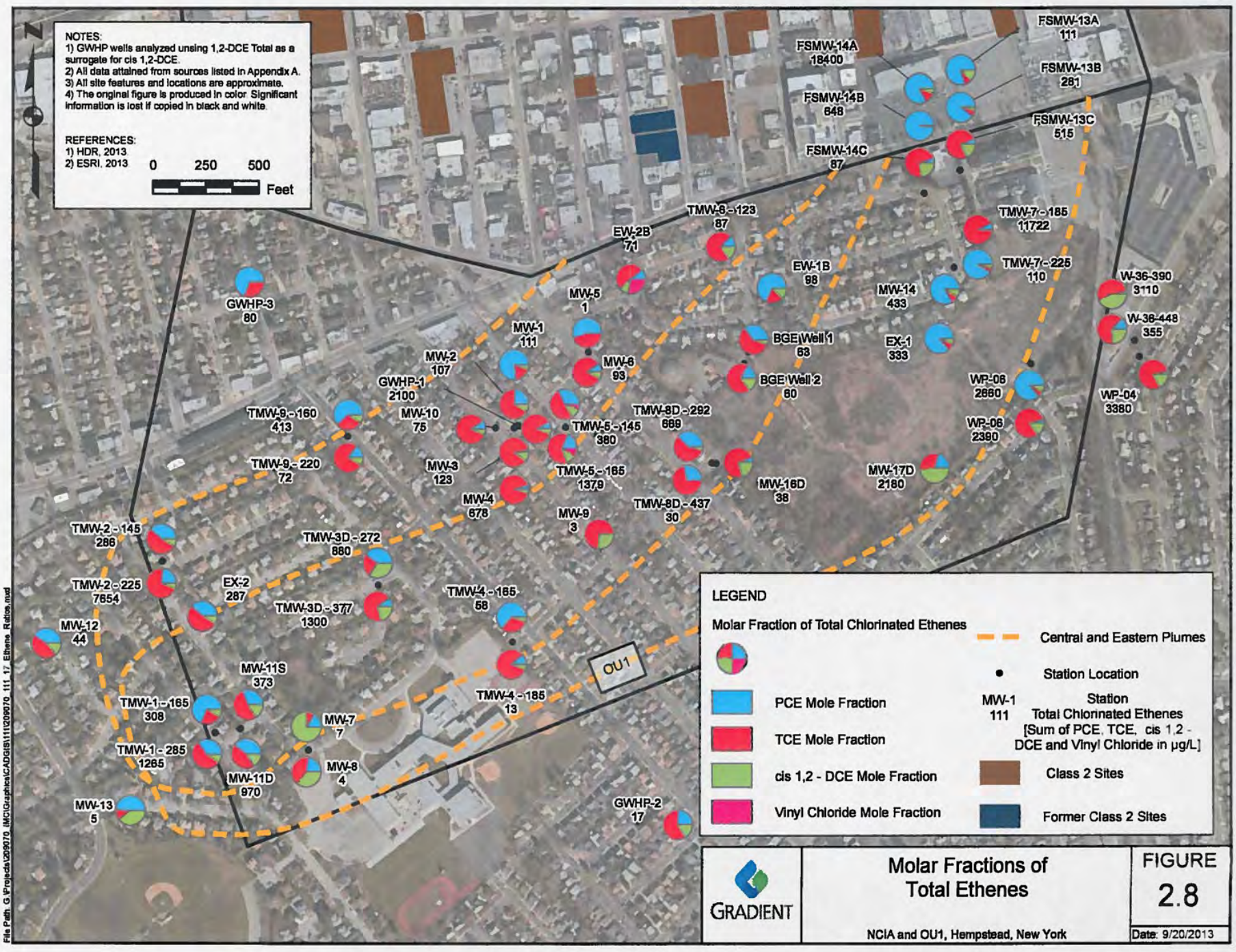


R2-0011952

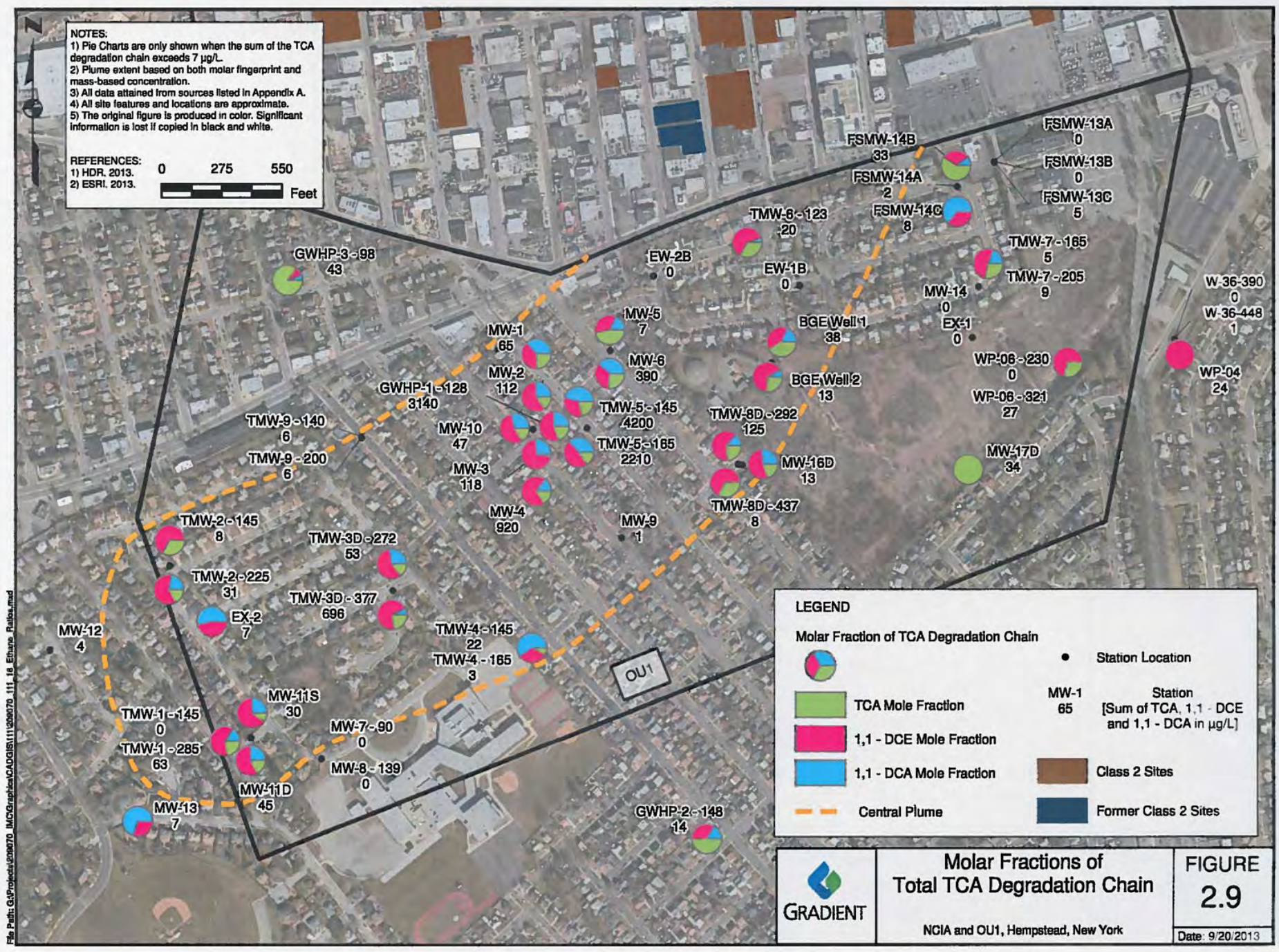
NOTES:
1) Figure obtained from Lockheed Martin Technology Services (Edison, NJ) 2013.

REFERENCE:
1) Lockheed Martin, July 2013, [213-6557]

Corrected Molar Analysis Depiction



R2-0012705


NOTES.
1) Pie Charts are only shown when the sum of the TCA degradation chain exceeds 7 µg/L.
2) Plume extent based on both molar fingerprint and mass-based concentration.
3) All data attained from sources listed in Appendix A.
4) All site features and locations are approximate.
5) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) HDR. 2013.
2) ESRI. 2013.
0 275 550
Feet
N
GWHP-3 - 98 43
EW-2B 0
EW-1B 0
TMW-6 - 123 20
FSMW-14B 33
FSMW-14A 2
FSMW-14C 8
FSMW-13A 0
FSMW-13B 0
FSMW-13C 5
TMW-7 - 165 5
TMW-7 - 205 9
MW-14 0
EX-1 0
W-36-390 0
W-36-448 1
WP-04 24
WP-06 - 230 0
WP-06 - 321 27
BGE Well 1 38
BGE Well 2 13
MW-1 65
MW-2 112
MW-5 7
MW-6 390
GWHP-1 - 128 3140
TMW-5 - 145 4200
TMW-5 - 165 2210
MW-10 47
MW-3 118
MW-4 920
MW-9 1
TMW-8D - 292 125
MW-16D 13
TMW-8D - 437 8
MW-17D 34
TMW-9 - 140 6
TMW-9 - 200 6
TMW-2 - 145 8
TMW-2 - 225 31
TMW-3D - 272 53
TMW-3D - 377 696
EX-2 7
MW-12 4
TMW-4 - 145 22
TMW-4 - 165 3
OU1
MW-11S 30
TMW-1 - 145 0
TMW-1 - 285 63
MW-7 - 90 0
MW-8 - 139 0
MW-11D 45
MW-13 7
GWHP-2 - 148 14
LEGEND
Molar Fraction of TCA Degradation Chain
Station Location
TCA Mole Fraction
1,1 - DCE Mole Fraction
1,1 - DCA Mole Fraction
Central Plume
MW-1 65
Station [Sum of TCA, 1,1 - DCE and 1,1 - DCA in µg/L]
Class 2 Sites
Former Class 2 Sites
GRADIENT
Molar Fractions of Total TCA Degradation Chain
NCIA and OU1, Hempstead, New York
FIGURE 2.9
Date: 9/20/2013
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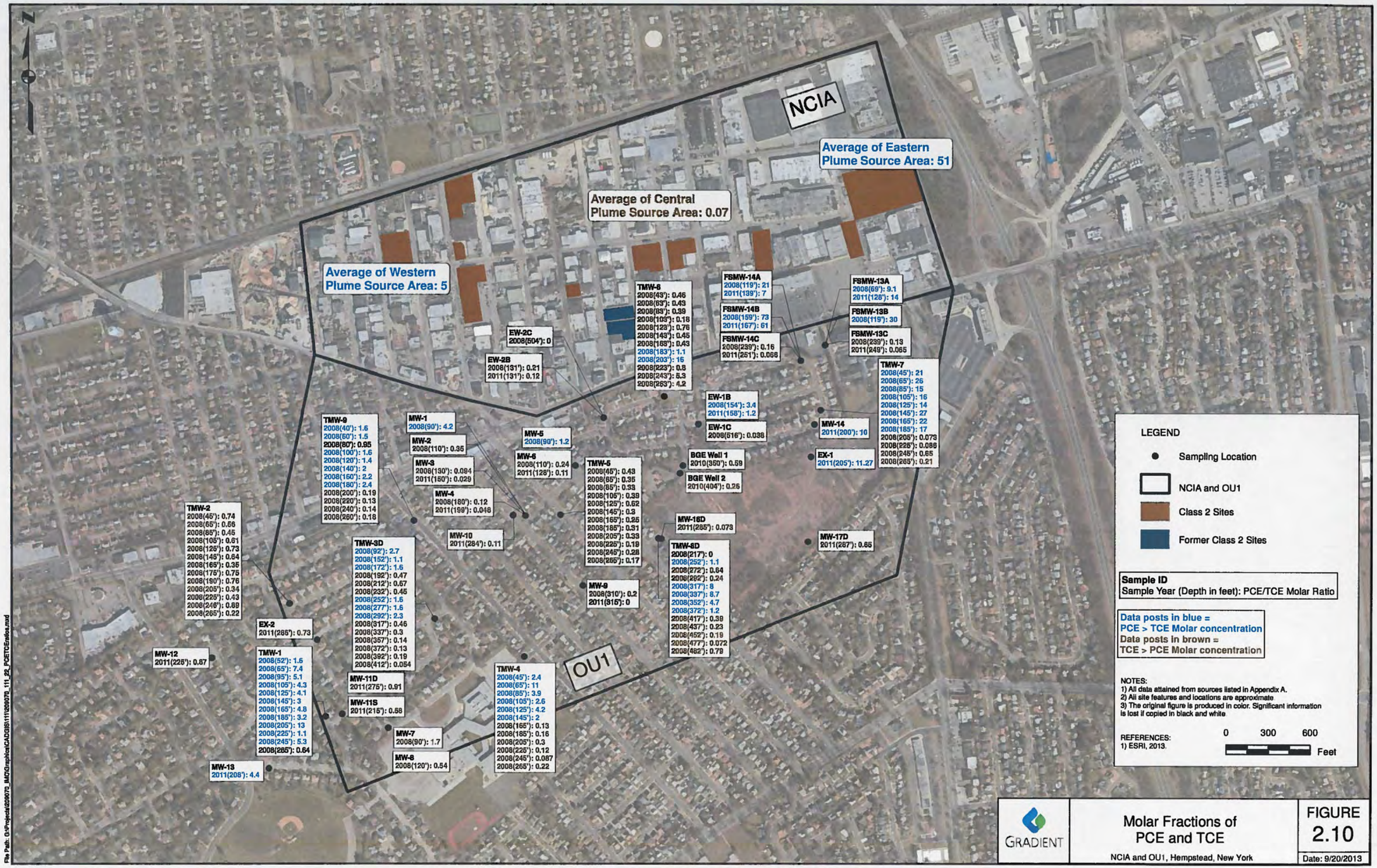
N
NCIA
Average of Eastern Plume Source Area: 51
Average of Central Plume Source Area: 0.07
Average of Western Plume Source Area: 5
OU1
TMW-8
2008(43'): 0.46
2008(63'): 0.43
2008(83'): 0.39
2008(103'): 0.18
2008(123'): 0.76
2008(143'): 0.45
2008(163'): 0.43
2008(183'): 1.1
2008(203'): 16
2008(223'): 0.8
2008(243'): 5.3
2008(263'): 4.2
FSMW-14A
2008(119'): 21
2011(139'): 7
FSMW-14B
2008(159'): 73
2011(167'): 61
FSMW-14C
2008(239'): 0.16
2011(261'): 0.066
FSMW-13A
2008(69'): 9.1
2011(128'): 14
FSMW-13B
2008(119'): 30
FSMW-13C
2008(239'): 0.13
2011(249'): 0.065
TMW-7
2008(45'): 21
2008(65'): 26
2008(85'): 15
2008(105'): 16
2008(125'): 14
2008(145'): 27
2008(165'): 22
2008(185'): 17
2008(205'): 0.073
2008(225'): 0.086
2008(245'): 0.65
2008(265'): 0.21
EW-2C
2008(504'): 0
EW-2B
2008(131'): 0.21
2011(131'): 0.12
EW-1B
2008(154'): 3.4
2011(158'): 1.2
EW-1C
2008(516'): 0.036
MW-14
2011(200'): 10
EX-1
2011(205'): 11.27
BGE Well 1
2010(350'): 0.59
BGE Well 2
2010(404'): 0.26
MW-16D
2011(285'): 0.073
MW-17D
2011(287'): 0.65
TMW-8D
2008(217'): 0
2008(252'): 1.1
2008(272'): 0.64
2008(292'): 0.24
2008(317'): 8
2008(337'): 8.7
2008(352'): 4.7
2008(372'): 1.2
2008(417'): 0.39
2008(437'): 0.23
2008(452'): 0.19
2008(477'): 0.072
2008(482'): 0.79
TMW-9
2008(40'): 1.6
2008(60'): 1.5
2008(80'): 0.95
2008(100'): 1.6
2008(120'): 1.4
2008(140'): 2
2008(160'): 2.2
2008(180'): 2.4
2008(200'): 0.19
2008(220'): 0.13
2008(240'): 0.14
2008(260'): 0.18
MW-1
2008(90'): 4.2
MW-2
2008(110'): 0.35
MW-3
2008(130'): 0.094
2011(150'): 0.029
MW-4
2008(180'): 0.12
2011(199'): 0.048
MW-5
2008(90'): 1.2
MW-6
2008(110'): 0.24
2011(128'): 0.11
TMW-5
2008(45'): 0.43
2008(65'): 0.35
2008(85'): 0.33
2008(105'): 0.39
2008(125'): 0.62
2008(145'): 0.3
2008(165'): 0.25
2008(185'): 0.31
2008(205'): 0.33
2008(225'): 0.19
2008(245'): 0.28
2008(265'): 0.17
MW-9
2008(310'): 0.2
2011(315'): 0
MW-10
2011(284'): 0.11
TMW-2
2008(46'): 0.74
2008(65'): 0.56
2008(85'): 0.45
2008(105'): 0.61
2008(126'): 0.73
2008(145'): 0.64
2008(165'): 0.35
2008(175'): 0.75
2008(190'): 0.76
2008(205'): 0.34
2008(225'): 0.43
2008(246'): 0.89
2008(265'): 0.22
TMW-3D
2008(92'): 2.7
2008(152'): 1.1
2008(172'): 1.6
2008(192'): 0.47
2008(212'): 0.67
2008(232'): 0.46
2008(252'): 1.5
2008(277'): 1.6
2008(292'): 2.3
2008(317'): 0.46
2008(337'): 0.3
2008(357'): 0.14
2008(372'): 0.13
2008(392'): 0.19
2008(412'): 0.054
EX-2
2011(265'): 0.73
MW-12
2011(226'): 0.87
TMW-1
2008(52'): 1.6
2008(65'): 7.4
2008(95'): 5.1
2008(105'): 4.3
2008(125'): 4.1
2008(145'): 3
2008(165'): 4.8
2008(185'): 3.2
2008(205'): 13
2008(225'): 1.1
2008(245'): 5.3
2008(265'): 0.64
MW-11D
2011(275'): 0.91
MW-11S
2011(215'): 0.58
MW-7
2008(90'): 1.7
MW-8
2008(120'): 0.54
MW-13
2011(208'): 4.4
TMW-4
2008(45'): 2.4
2008(65'): 11
2008(85'): 3.9
2008(105'): 2.6
2008(125'): 4.2
2008(145'): 2
2008(165'): 0.13
2008(185'): 0.16
2008(205'): 0.3
2008(225'): 0.12
2008(245'): 0.087
2008(265'): 0.22
LEGEND
Sampling Location
NCIA and OU1
Class 2 Sites
Former Class 2 Sites
Sample ID
Sample Year (Depth in feet): PCE/TCE Molar Ratio
Data posts in blue = PCE > TCE Molar concentration
Data posts in brown = TCE > PCE Molar concentration
NOTES:
1) All data attained from sources listed in Appendix A.
2) All site features and locations are approximate
3) The original figure is produced in color. Significant information is lost if copied in black and white
REFERENCES:
1) ESRI, 2013.
0
300
600
Feet
GRADIENT
Molar Fractions of PCE and TCE
NCIA and OU1, Hempstead, New York
FIGURE 2.10
Date: 9/20/2013
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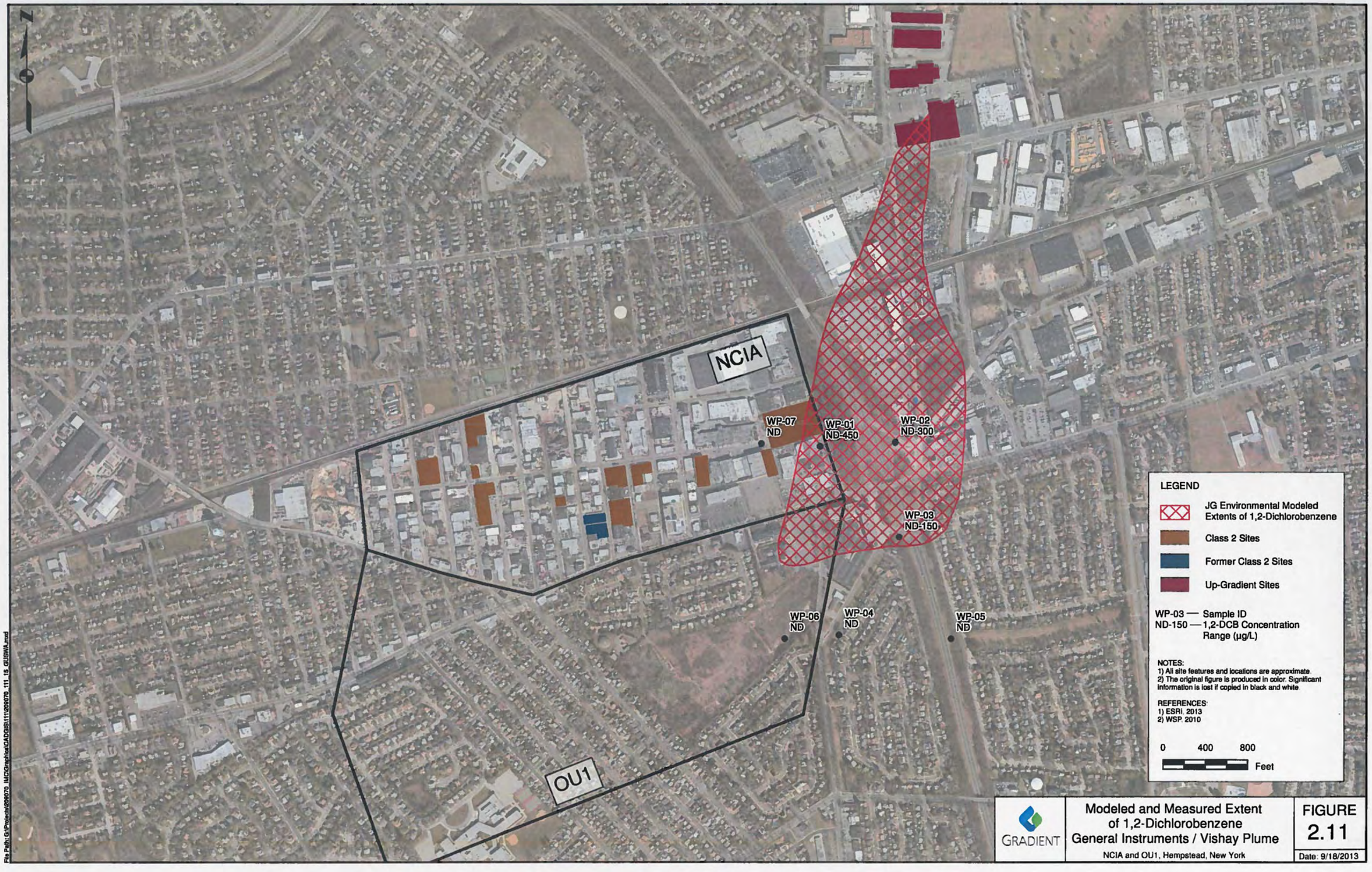
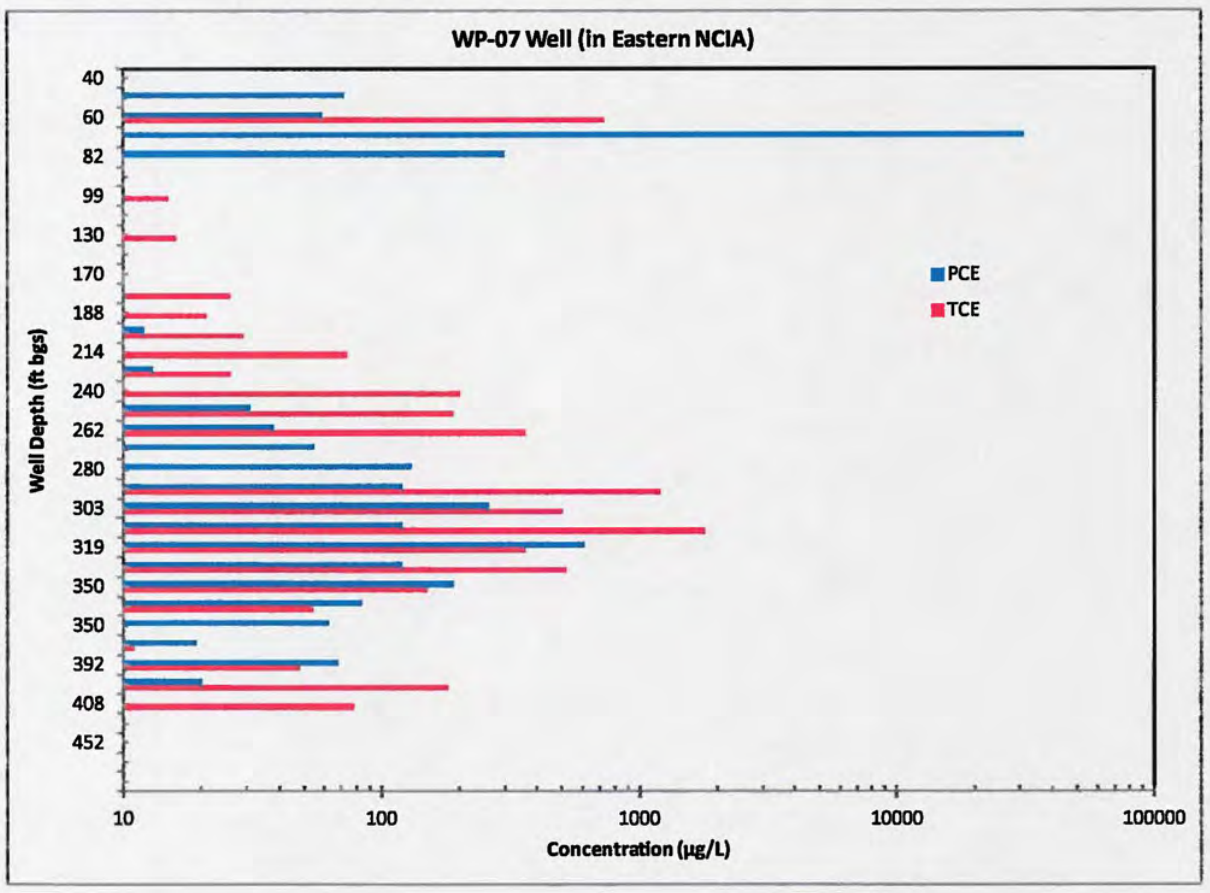
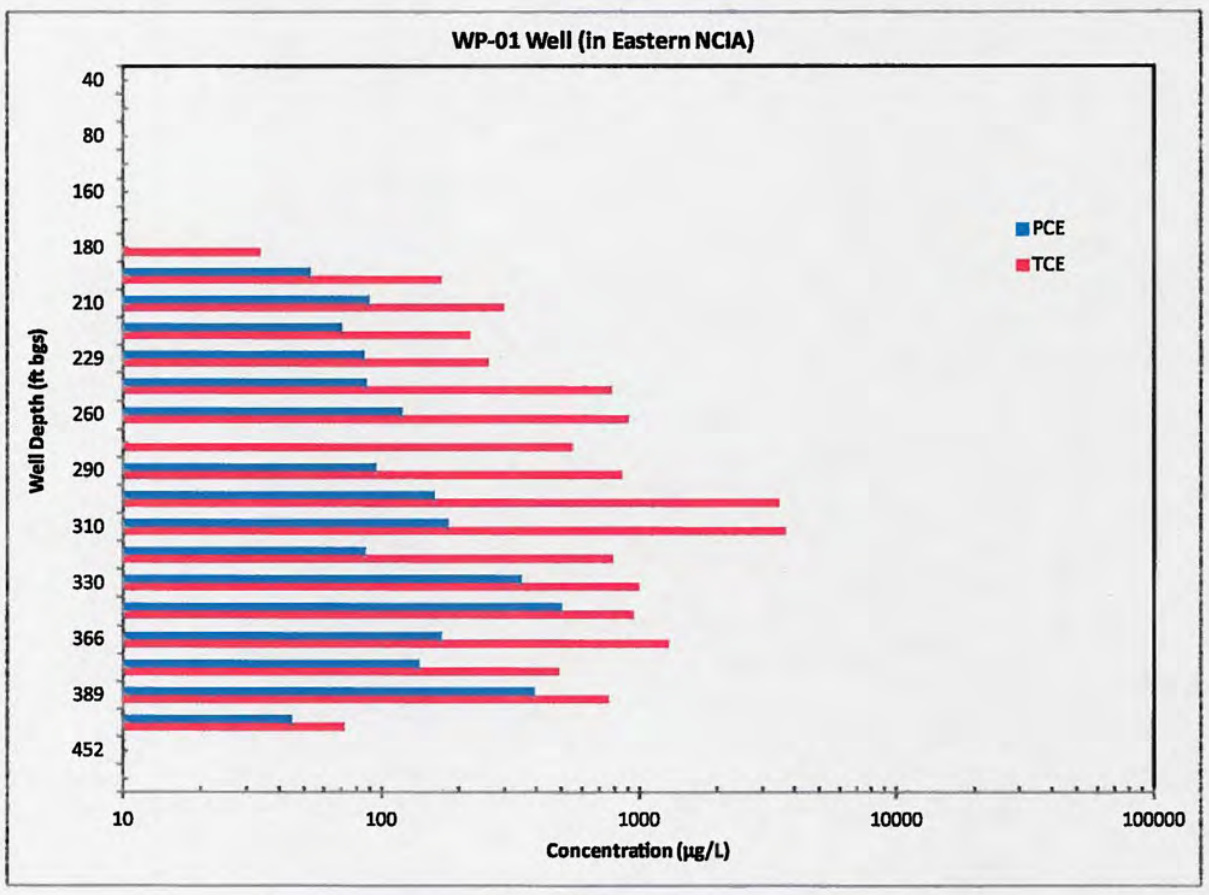
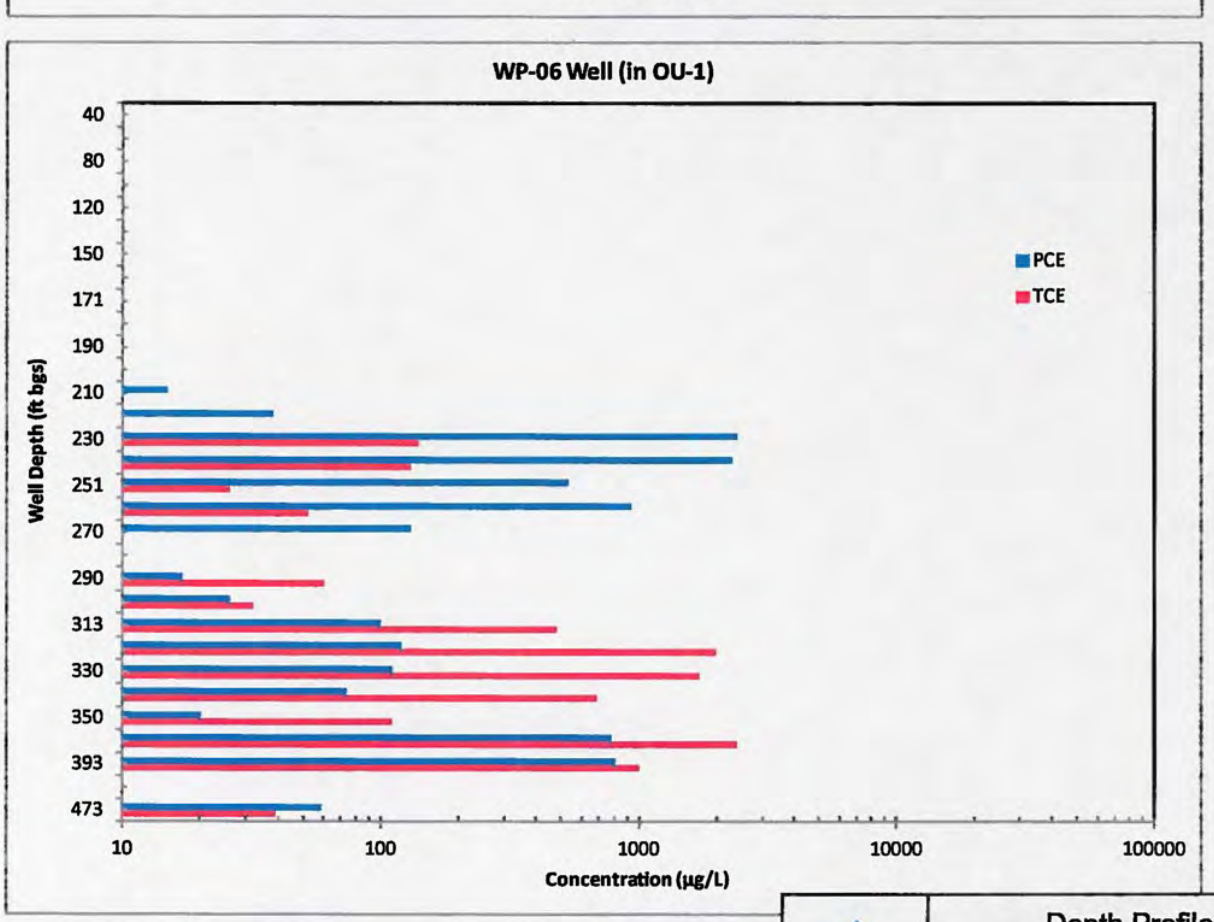

N
NCIA
OU1
WP-07
ND
WP-01
ND-450
WP-02
ND-300
WP-03
ND-150
WP-04
ND
WP-05
ND
WP-06
ND
LEGEND
JG Environmental Modeled Extents of 1,2-Dichlorobenzene
Class 2 Sites
Former Class 2 Sites
Up-Gradient Sites
WP-03 — Sample ID
ND-150 — 1,2-DCB Concentration Range (µg/L)
NOTES:
1) All site features and locations are approximate.
2) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) ESRI, 2013
2) WSP, 2010
0
400
800
Feet
GRADIENT
Modeled and Measured Extent of 1,2-Dichlorobenzene
General Instruments / Vishay Plume
NCIA and OU1, Hempstead, New York
FIGURE
2.11
Date: 9/18/2013
File Path: G:\Projects\209070_NICK\Graphics\CAD\GIS\111\209070_111_15_GIUSWA.mxd







REFERENCE:
1) WSP, 2010.

File Path: G:\Projects\209070 IMC\Graphics\NonCAD\WP-07-01-06-Charts.ai

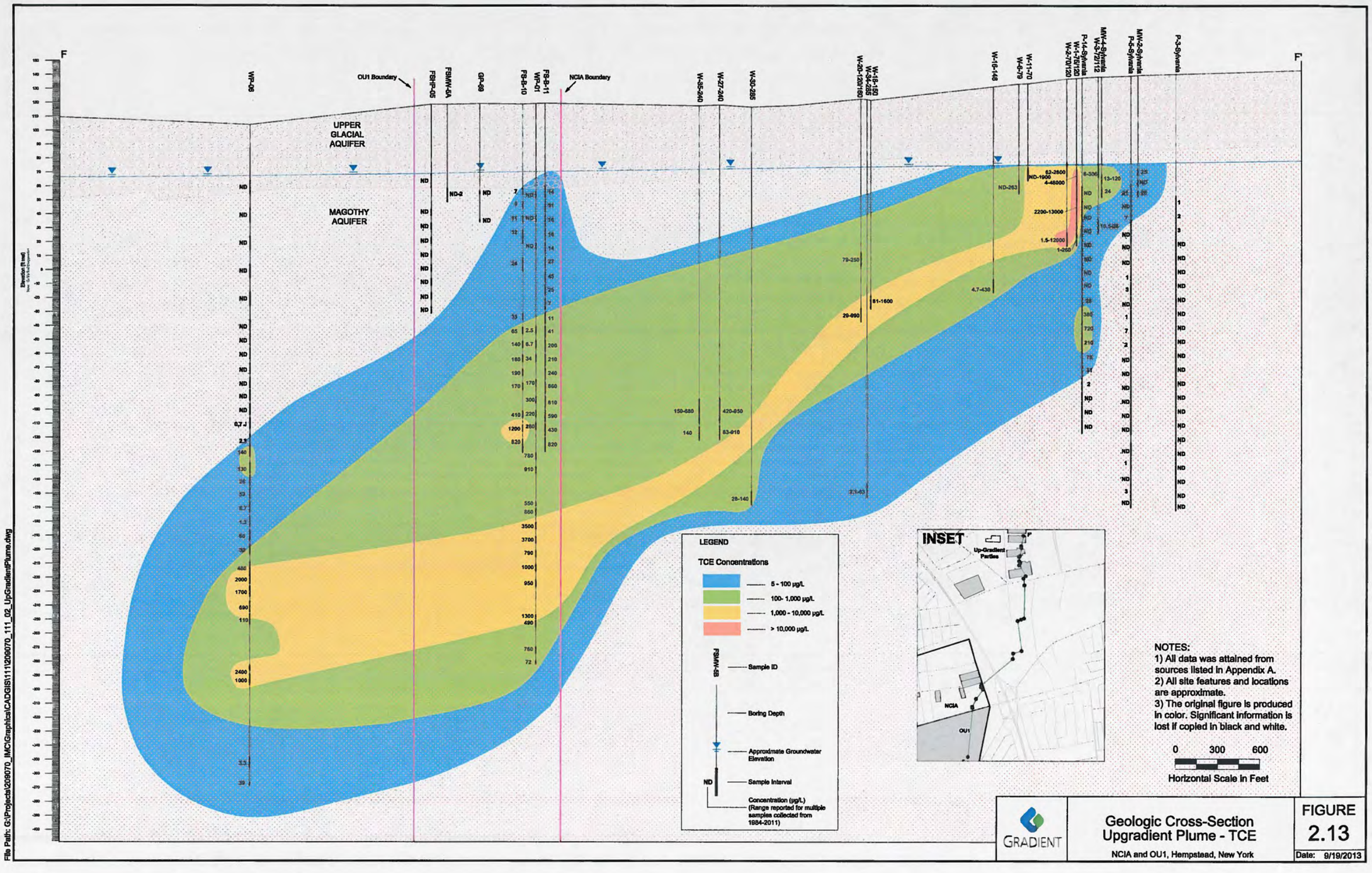
GRADIENT

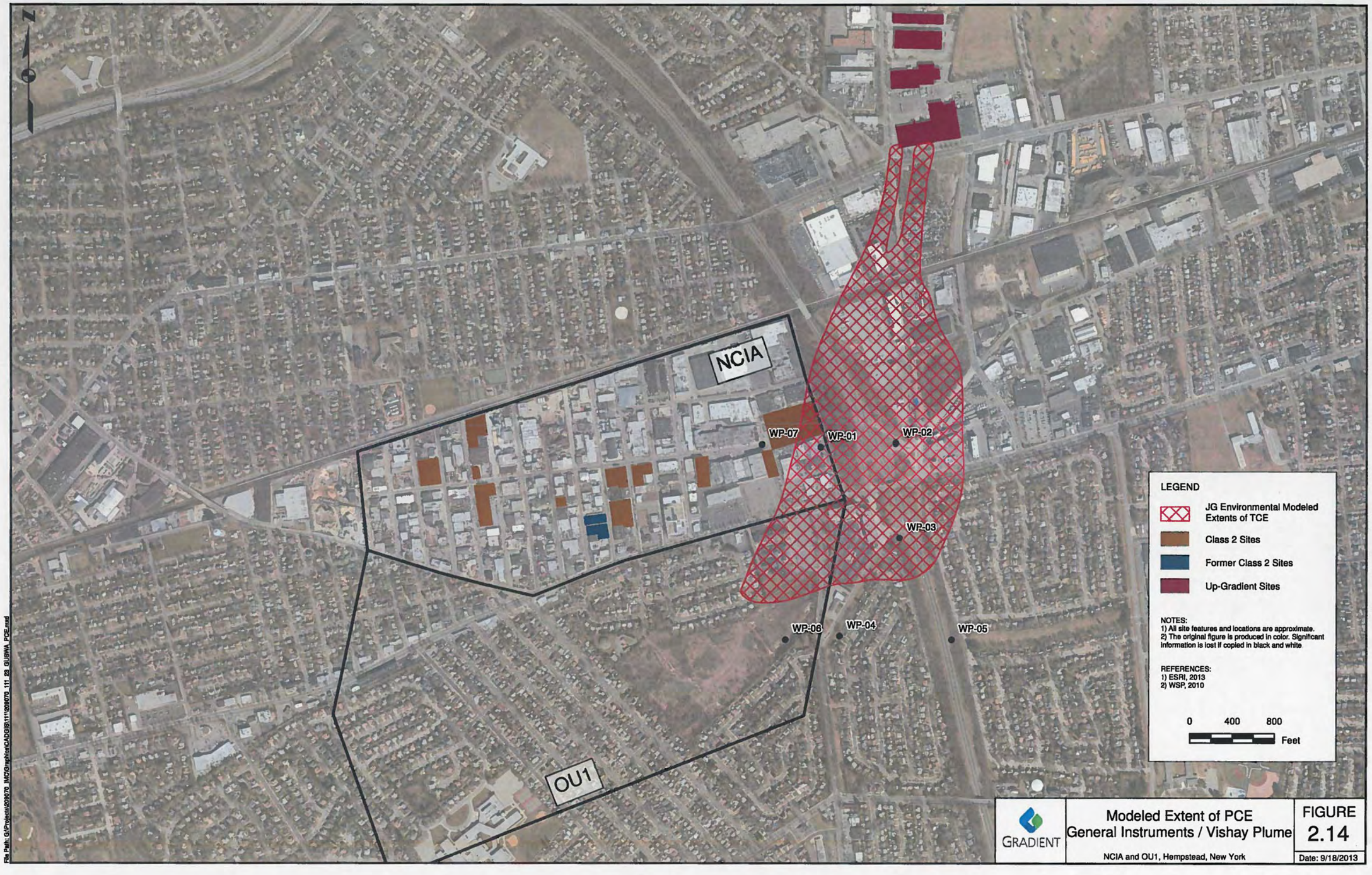
Depth Profiles for
WP-07, WP-01, and WP-06 Wells

NCIA and OU1, Hempstead, New York

FIGURE
2.12

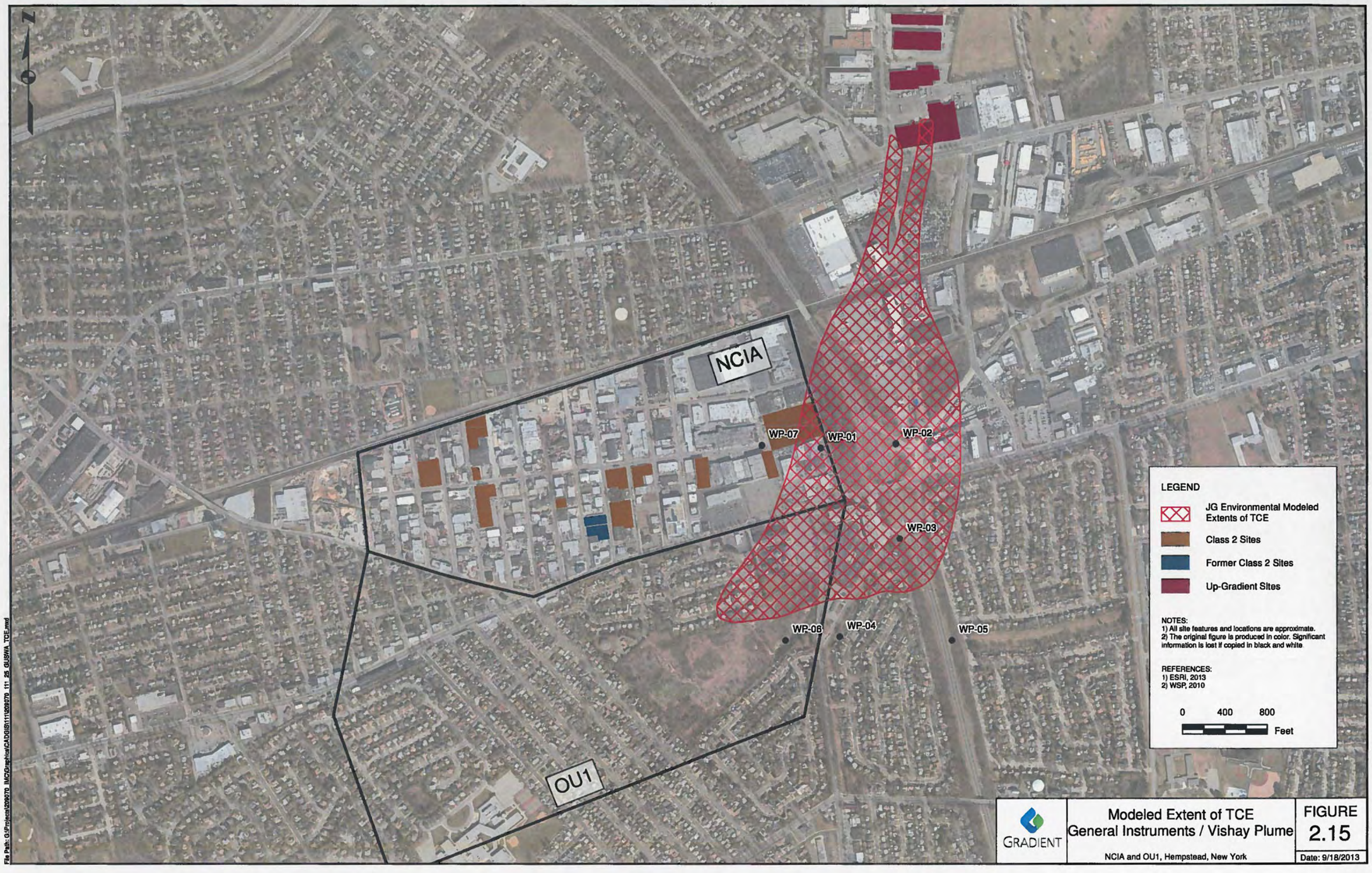
Date: 9/18/2013


F
F'
WP-06
OU1 Boundary
FBHP-05
FBMW-6A
GP-69
FS-B-10
FS-B-11
WP-01
NCIA Boundary
W-35-240
W-27-240
W-30-285
W-20-120/160
W-15-150
W-34-285
W-16-148
W-6-70
W-11-70
W-1-75/120
W-2-70/120
P-14-Sylvania
W-3-72/112
MW-4-Sylvania
MW-3-Sylvania
P-5-Sylvania
MW-2-Sylvania
P-3-Sylvania
UPPER GLACIAL AQUIFER
MAGOTHY AQUIFER
Elevation (ft msl)
File Path: G:\Projects\209070_IMC\Graphics\CADGIS\111\209070_111_02_UpGradientPlume.dwg
LEGEND
TCE Concentrations
5 - 100 µg/L
100- 1,000 µg/L
1,000 - 10,000 µg/L
> 10,000 µg/L
FSMW-6S
Sample ID
Boring Depth
Approximate Groundwater Elevation
ND
Sample Interval
Concentration (µg/L)
(Range reported for multiple samples collected from 1984-2011)
INSET
Up-Gradient Parties
NCIA
OU1
NOTES:
1) All data was attained from sources listed in Appendix A.
2) All site features and locations are approximate.
3) The original figure is produced in color. Significant information is lost if copied in black and white.
0
300
600
Horizontal Scale in Feet
GRADIENT
Geologic Cross-Section
Upgradient Plume - TCE
NCIA and OU1, Hempstead, New York
FIGURE
2.13
Date: 9/19/2013



File Path: G:\Projects\209070_IMC\Graphics\CADGIS\111\209070_111_23_GUSWA_PCE.mxd

R2-0012711



GRADIENT

Modeled Extent of TCE
General Instruments / Vishay Plume
NCIA and OU1, Hempstead, New York

FIGURE
2.15
Date: 9/18/2013

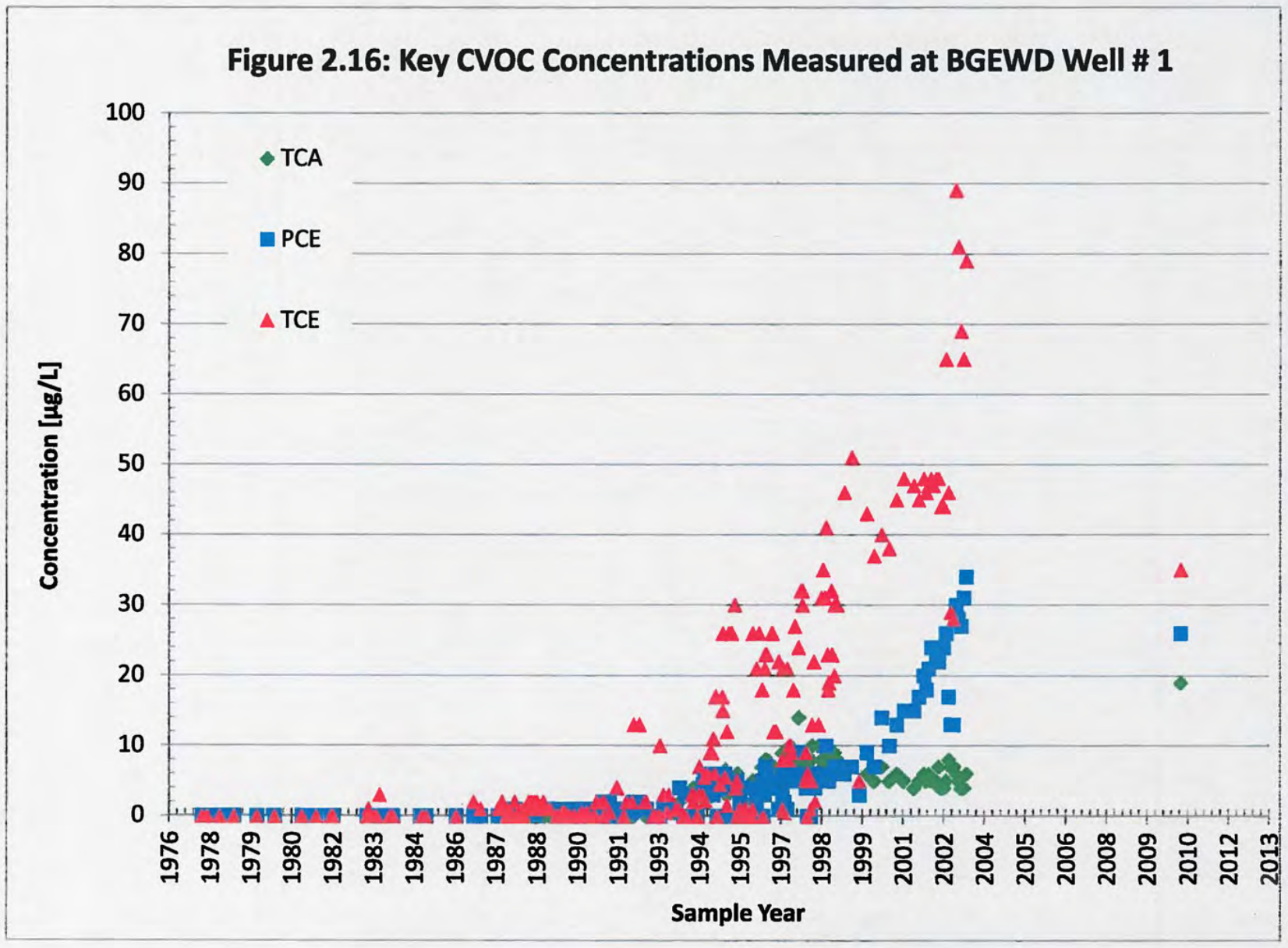


Figure 2.16: Key CVOC Concentrations Measured at BGEWD Well # 1
TCA
PCE
TCE
Concentration [µg/L]
100
90
80
70
60
50
40
30
20
10
0
1976
1978
1979
1980
1982
1983
1984
1986
1987
1988
1990
1991
1993
1994
1995
1997
1998
1999
2001
2002
2004
2005
2006
2008
2009
2010
2012
2013
Sample Year

GRADIENT

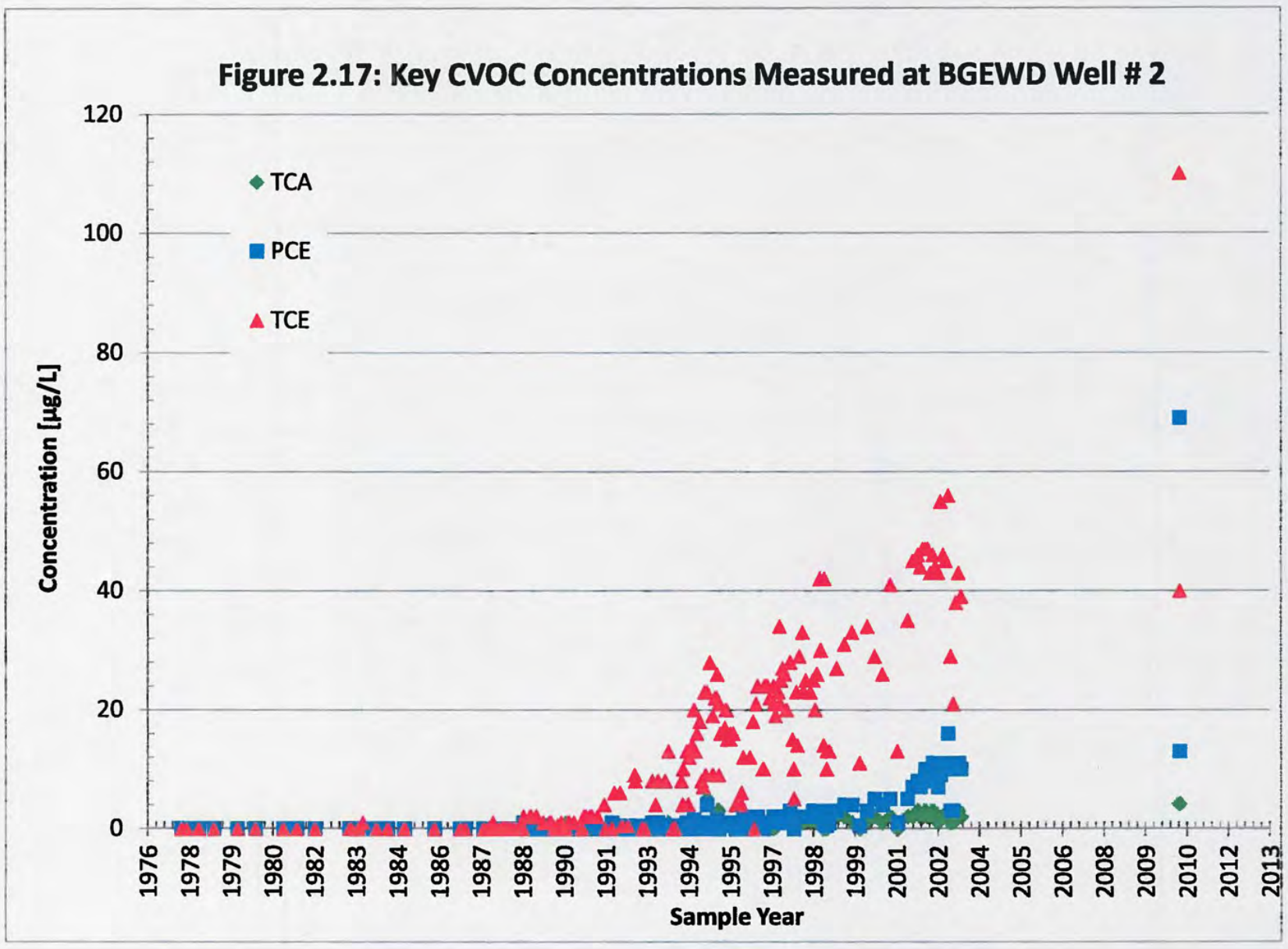
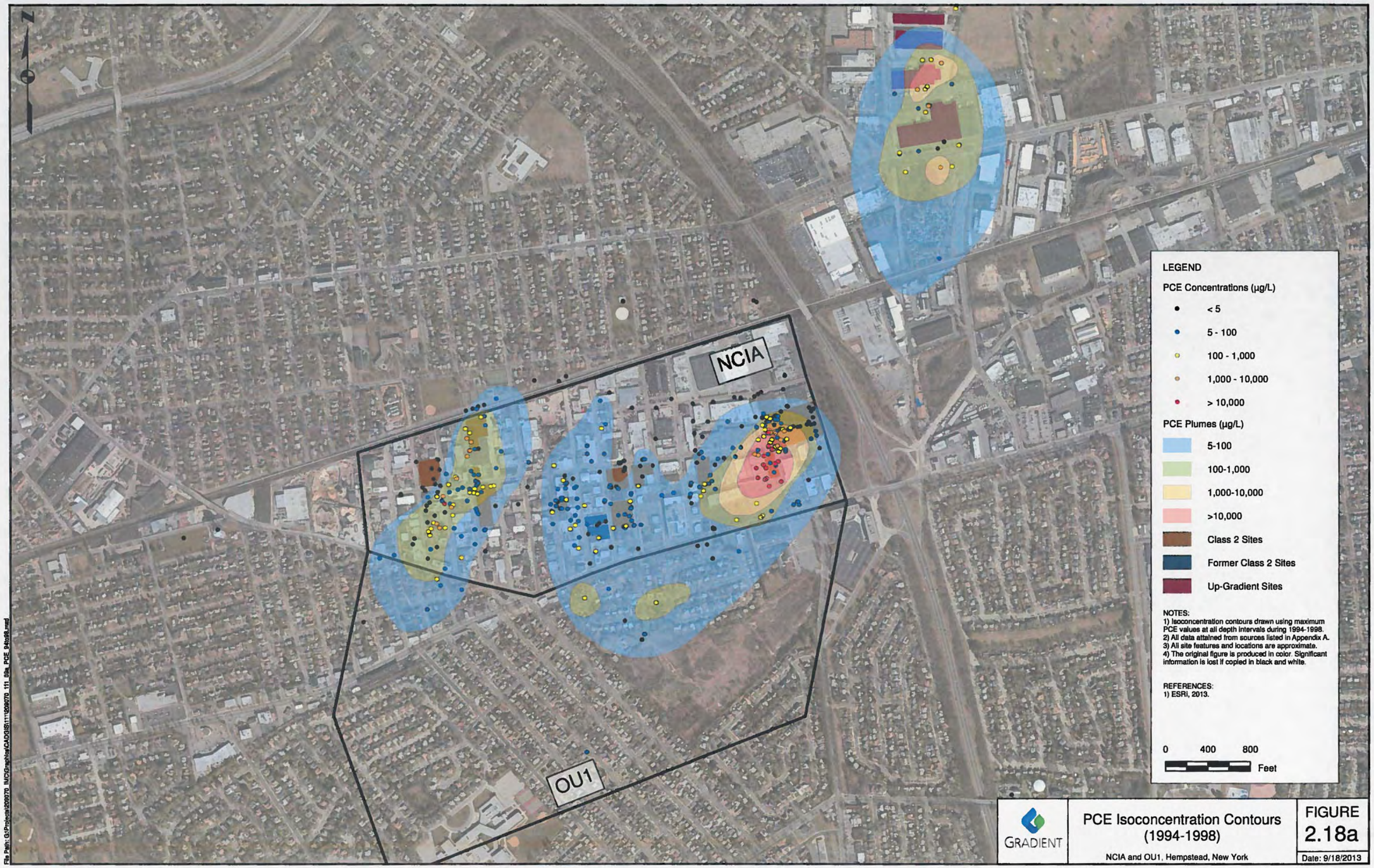
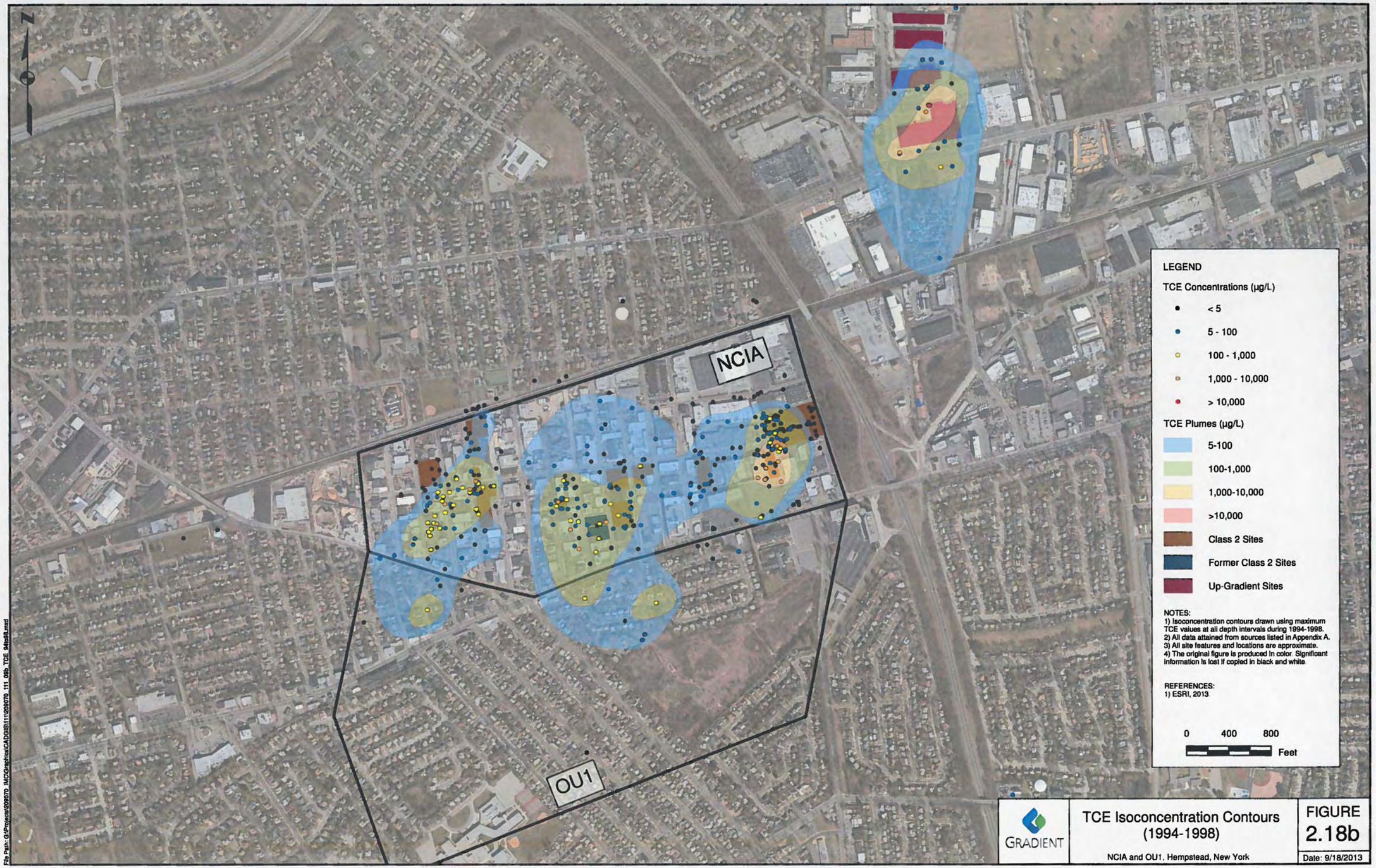
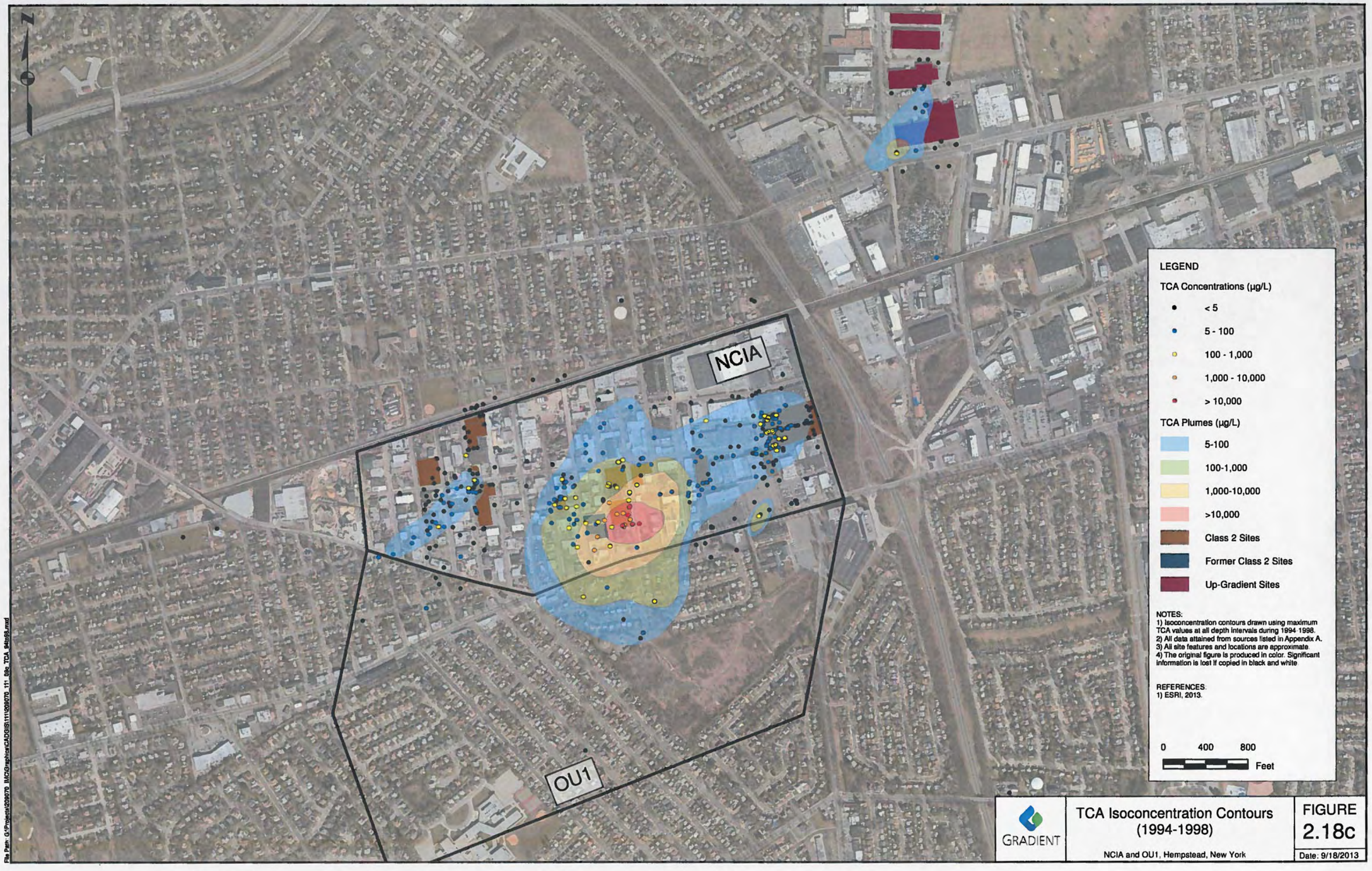


Figure 2.17: Key CVOC Concentrations Measured at BGEWD Well # 2
TCA
PCE
TCE
Concentration [µg/L]
120
100
80
60
40
20
0
1976
1978
1979
1980
1982
1983
1984
1986
1987
1988
1990
1991
1993
1994
1995
1997
1998
1999
2001
2002
2004
2005
2006
2008
2009
2010
2012
2013
Sample Year
GRADIENT

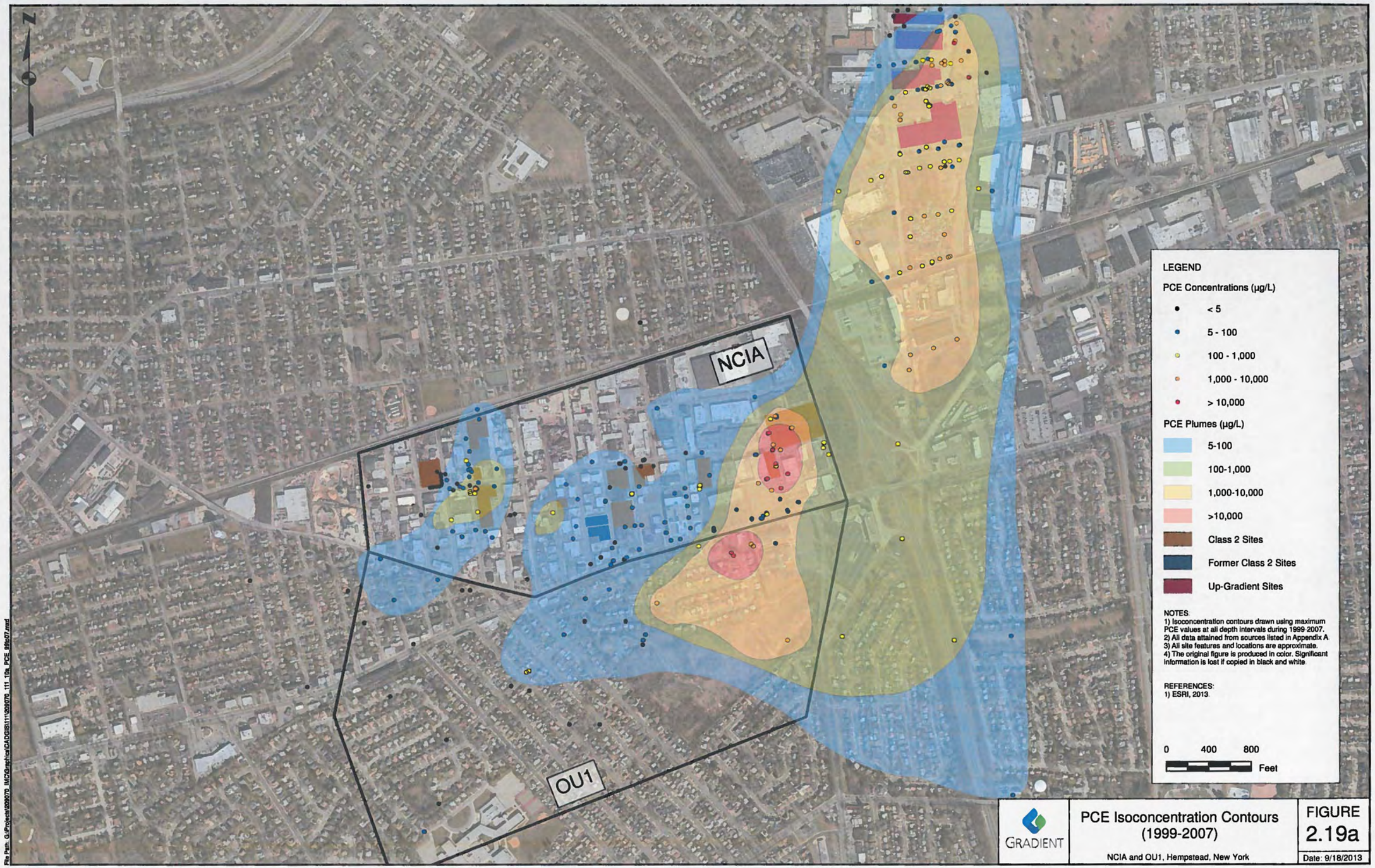

N
NCIA
OU1
LEGEND
PCE Concentrations (µg/L)
< 5
5 - 100
100 - 1,000
1,000 - 10,000
> 10,000
PCE Plumes (µg/L)
5-100
100-1,000
1,000-10,000
>10,000
Class 2 Sites
Former Class 2 Sites
Up-Gradient Sites
NOTES:
1) Isoconcentration contours drawn using maximum PCE values at all depth intervals during 1994-1998.
2) All data attained from sources listed in Appendix A.
3) All site features and locations are approximate.
4) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) ESRI, 2013.
0
400
800
Feet
GRADIENT
PCE Isoconcentration Contours (1994-1998)
NCIA and OU1, Hempstead, New York
FIGURE 2.18a
Date: 9/18/2013
File Path: G:\Projects\209270_NIC\Graphics\CAD\GIS\111\209270_111_Site_PCE_94to98.mxd

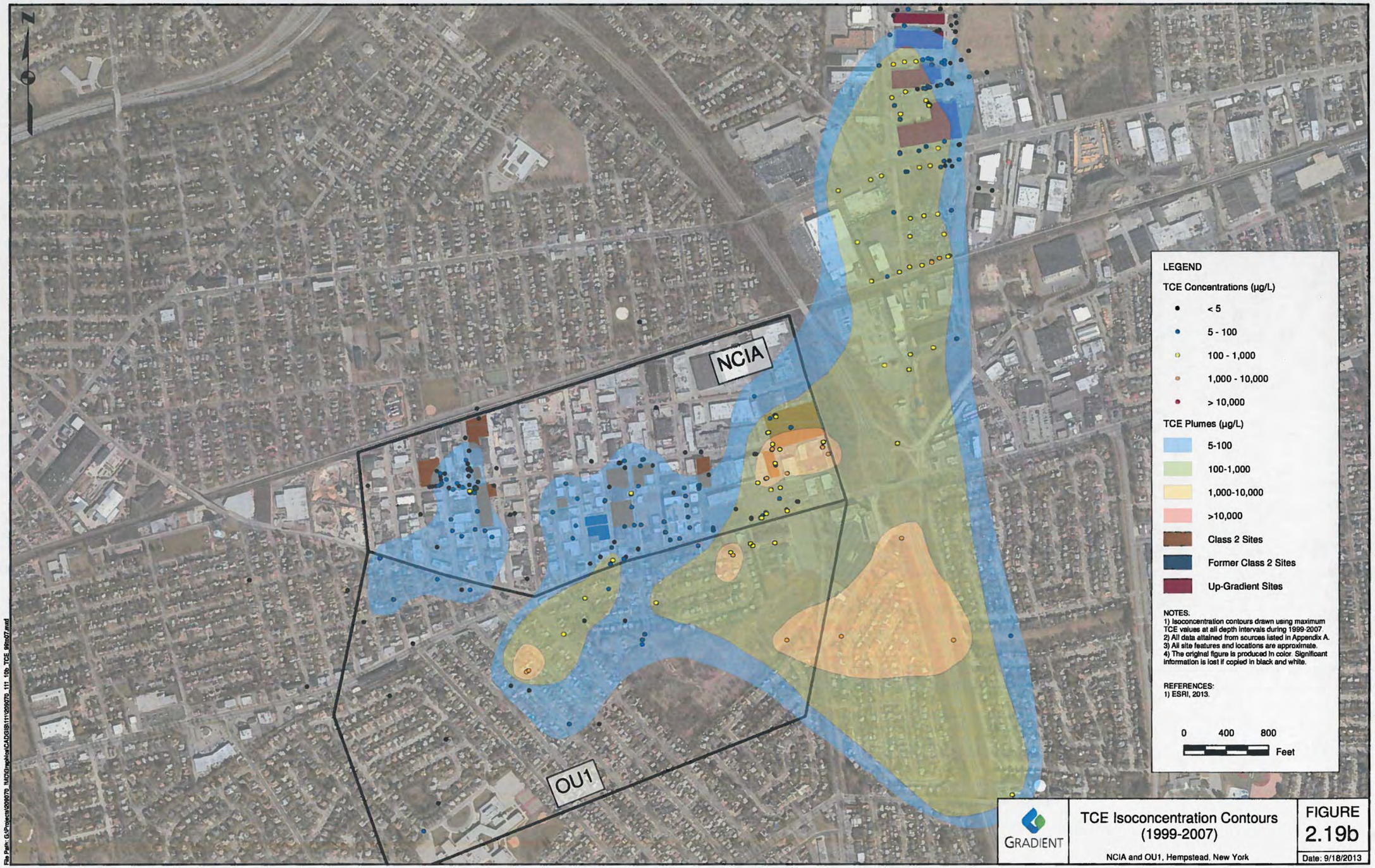

N
NCIA
OU1
LEGEND
TCE Concentrations (µg/L)
< 5
5 - 100
100 - 1,000
1,000 - 10,000
> 10,000
TCE Plumes (µg/L)
5-100
100-1,000
1,000-10,000
>10,000
Class 2 Sites
Former Class 2 Sites
Up-Gradient Sites
NOTES:
1) Isoconcentration contours drawn using maximum TCE values at all depth intervals during 1994-1998.
2) All data attained from sources listed in Appendix A.
3) All site features and locations are approximate.
4) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) ESRI, 2013.
0
400
800
Feet
File Path: G:\Projects\209270_NCIA\Graphics\CAD\GIS\111209270_111_08b_TCE_94to98.mxd
GRADIENT
TCE Isoconcentration Contours (1994-1998)
NCIA and OU1, Hempstead, New York
FIGURE 2.18b
Date: 9/18/2013

R2-0012716


NCIA
OU1
LEGEND
TCA Concentrations (µg/L)
< 5
5 - 100
100 - 1,000
1,000 - 10,000
> 10,000
TCA Plumes (µg/L)
5-100
100-1,000
1,000-10,000
>10,000
Class 2 Sites
Former Class 2 Sites
Up-Gradient Sites
NOTES:
1) Isoconcentration contours drawn using maximum TCA values at all depth intervals during 1994-1998.
2) All data attained from sources listed in Appendix A.
3) All site features and locations are approximate.
4) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) ESRI, 2013.
0 400 800
Feet
GRADIENT
TCA Isoconcentration Contours (1994-1998)
NCIA and OU1, Hempstead, New York
FIGURE 2.18c
Date: 9/18/2013

R2-0012717


N
NCIA
OU1
LEGEND
PCE Concentrations (µg/L)
< 5
5 - 100
100 - 1,000
1,000 - 10,000
> 10,000
PCE Plumes (µg/L)
5-100
100-1,000
1,000-10,000
>10,000
Class 2 Sites
Former Class 2 Sites
Up-Gradient Sites
NOTES:
1) Isoconcentration contours drawn using maximum PCE values at all depth intervals during 1999-2007.
2) All data attained from sources listed in Appendix A.
3) All site features and locations are approximate.
4) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) ESRI, 2013.
0 400 800
Feet
File Path: G:\Projects\209070_IM\CK\Graphics\CAD\GIS\111\209070_111_10a_PCE_89to07.mxd
GRADIENT
PCE Isoconcentration Contours (1999-2007)
NCIA and OU1, Hempstead, New York
FIGURE 2.19a
Date: 9/18/2013



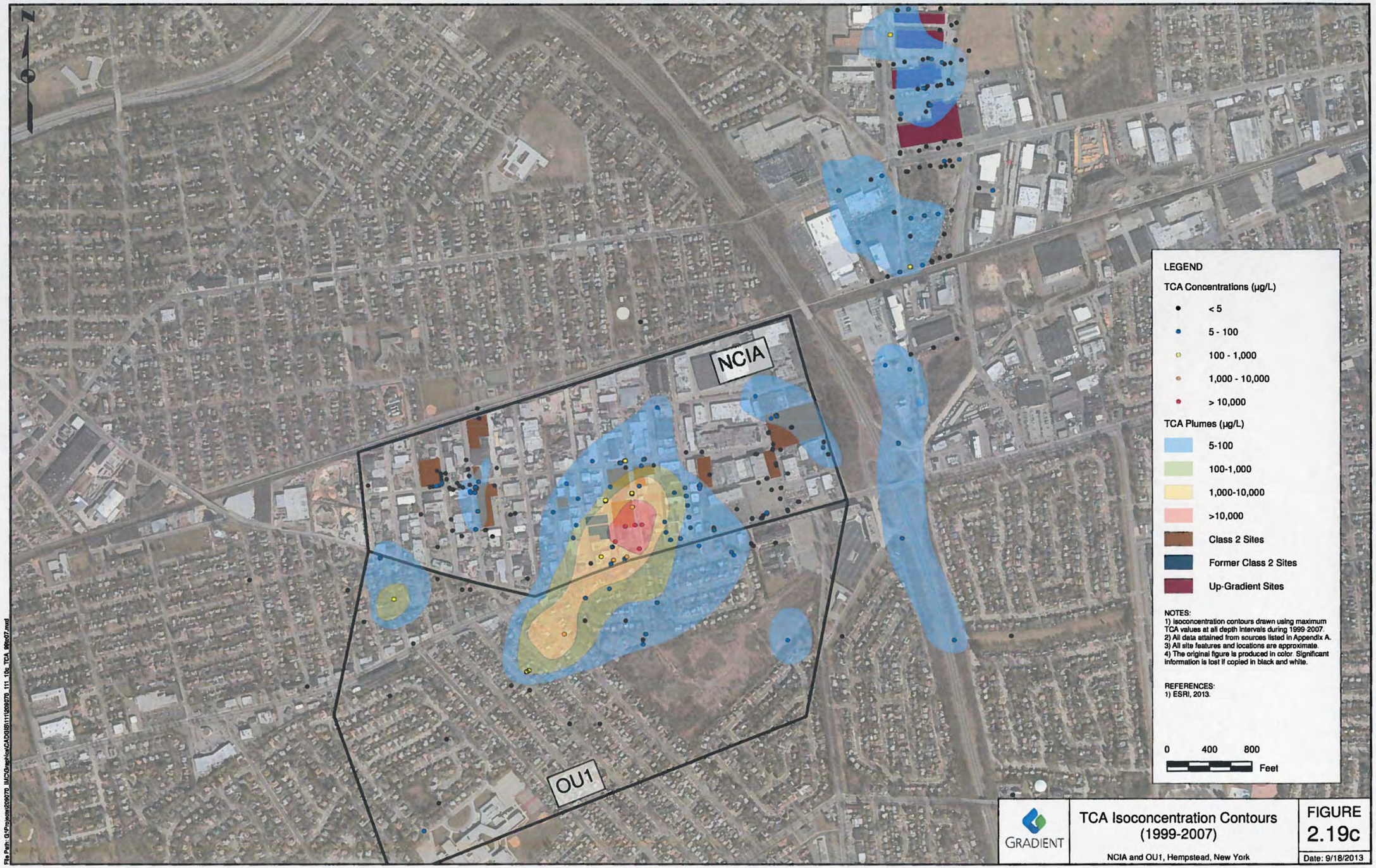
GRADIENT

TCE Isoconcentration Contours (1999-2007)

NCIA and OU1, Hempstead, New York

FIGURE 2.19b

Date: 9/18/2013



TCA Isoconcentration Contours (1999-2007)

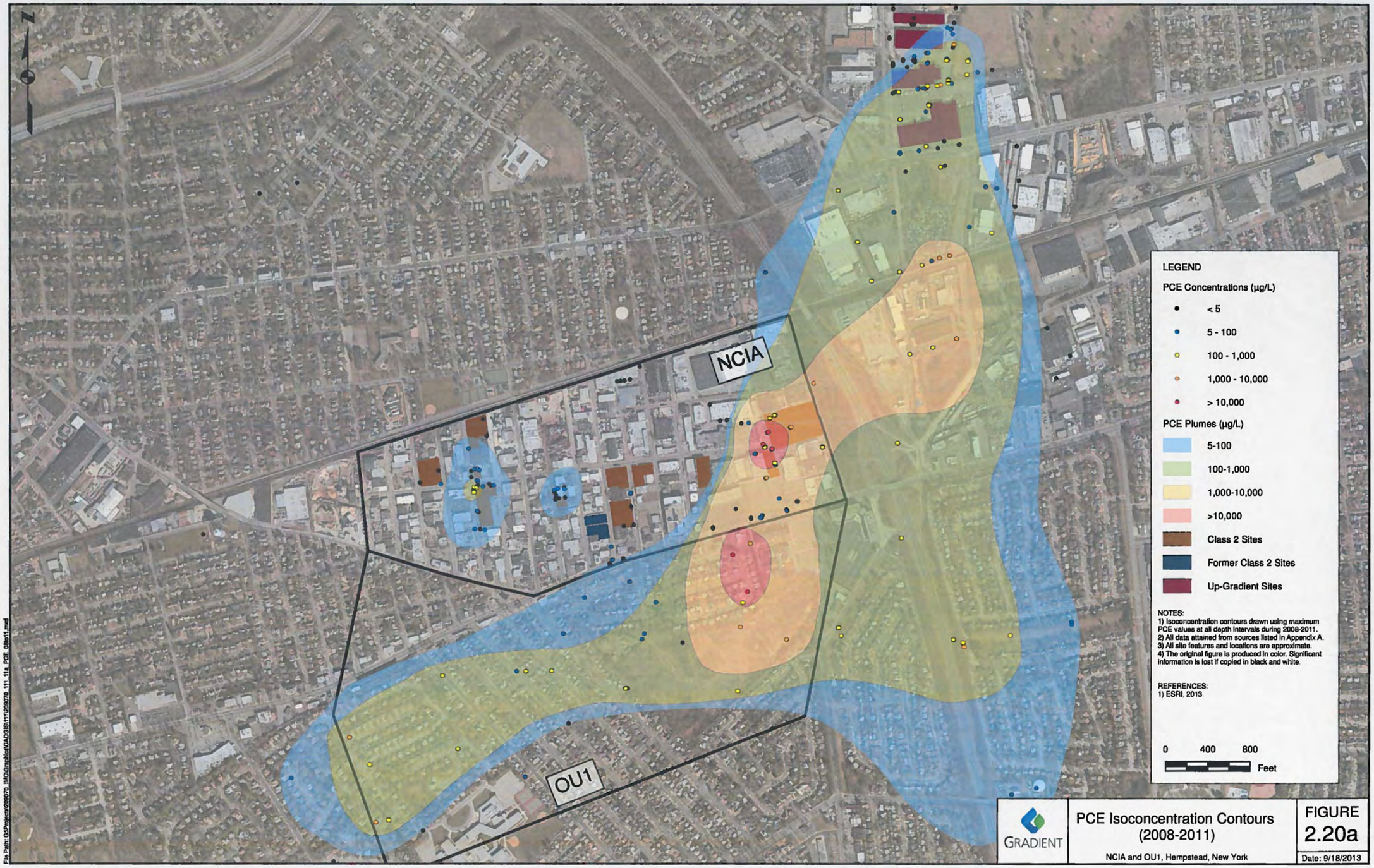
NCIA and OU1, Hempstead, New York

FIGURE 2.19c

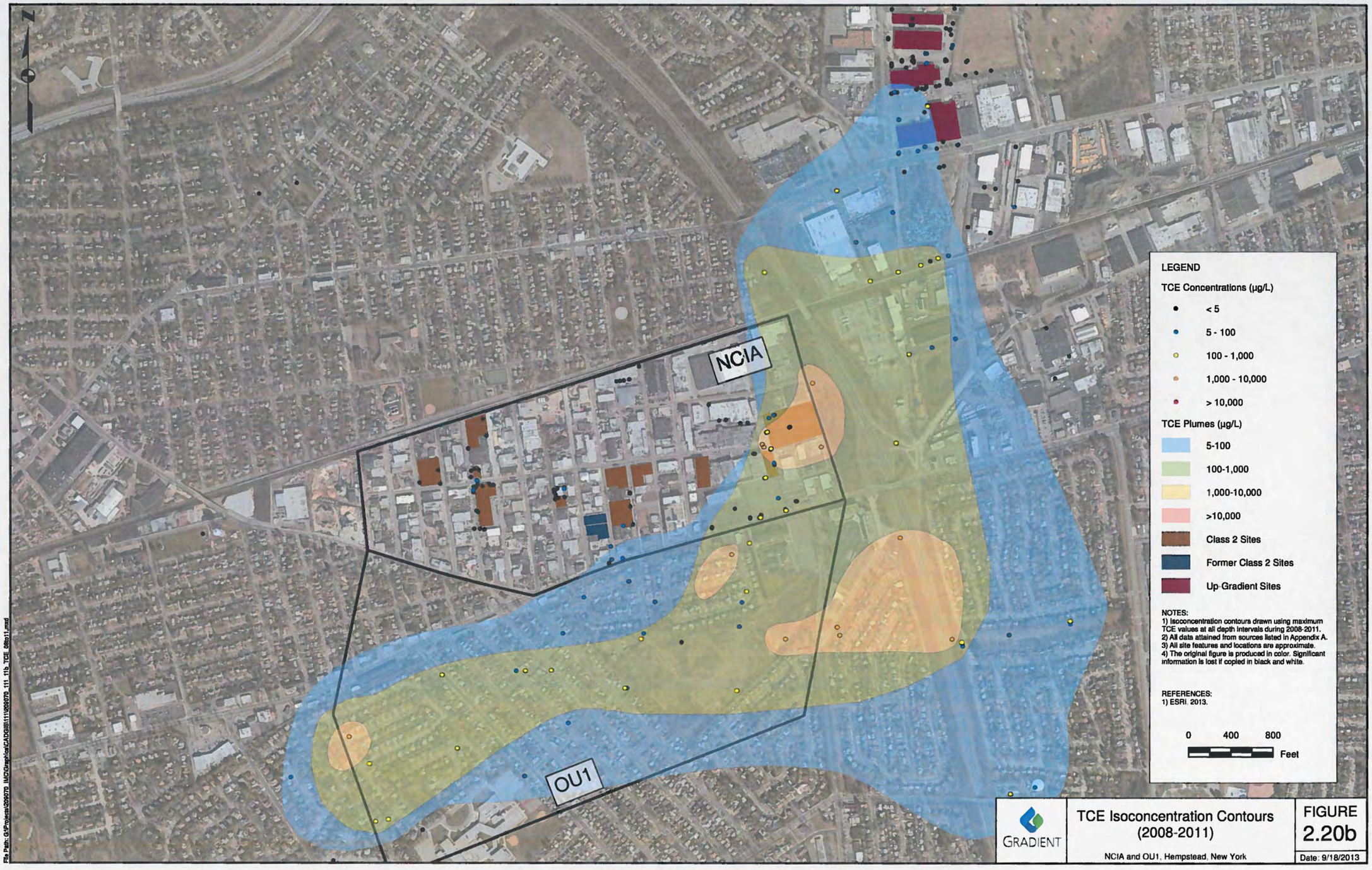
Date: 9/18/2013

File Path: G:\Projects\209070_IMC\Graphics\CADGIS\111\209070_111_10c_TCA_99to07.mxd

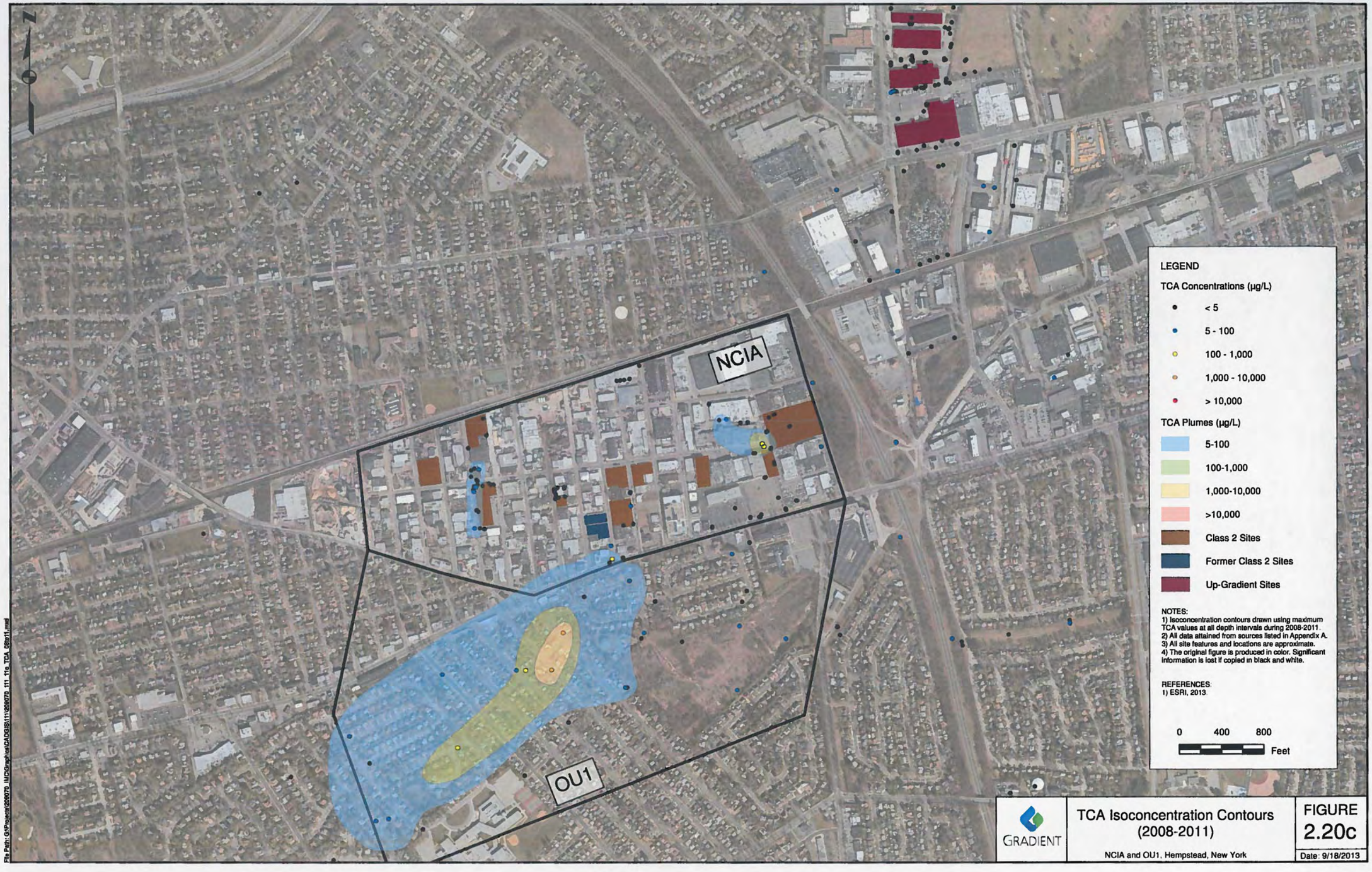
R2-0012720


N
NCIA
OU1
LEGEND
PCE Concentrations (µg/L)
< 5
5 - 100
100 - 1,000
1,000 - 10,000
> 10,000
PCE Plumes (µg/L)
5-100
100-1,000
1,000-10,000
>10,000
Class 2 Sites
Former Class 2 Sites
Up-Gradient Sites
NOTES:
1) Isoconcentration contours drawn using maximum PCE values at all depth intervals during 2008-2011.
2) All data attained from sources listed in Appendix A.
3) All site features and locations are approximate.
4) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) ESRI, 2013
0
400
800
Feet
GRADIENT
PCE Isoconcentration Contours (2008-2011)
NCIA and OU1, Hempstead, New York
FIGURE 2.20a
Date: 9/18/2013
File Path: G:\Projects\209070_NIC\Graphics\CAD\GIS\111209070_111_11a_PCE_08to11.mxd

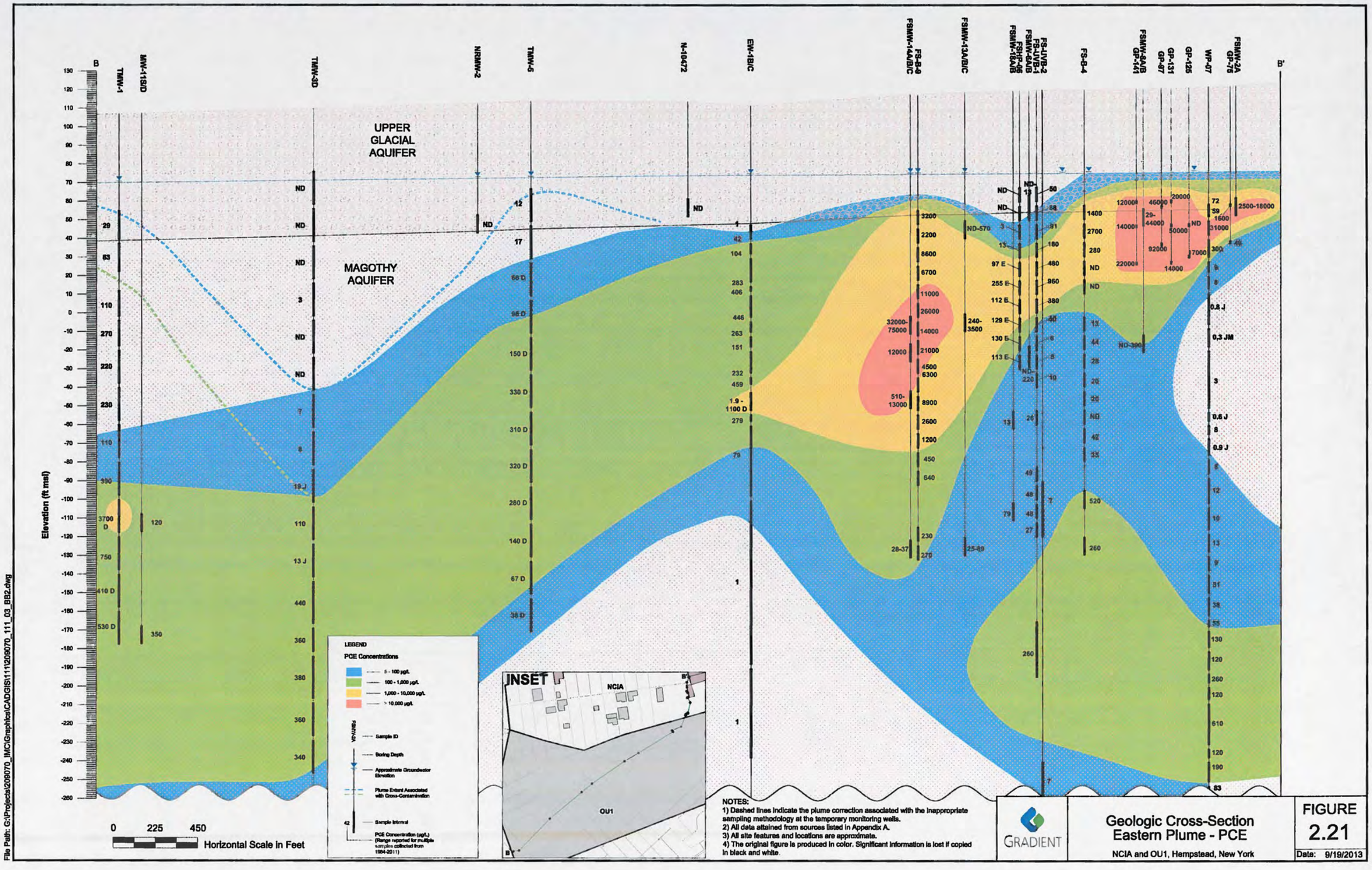
R2-0012721


NCIA
OU1
LEGEND
TCE Concentrations (µg/L)
< 5
5 - 100
100 - 1,000
1,000 - 10,000
> 10,000
TCE Plumes (µg/L)
5-100
100-1,000
1,000-10,000
>10,000
Class 2 Sites
Former Class 2 Sites
Up-Gradient Sites
NOTES:
1) Isoconcentration contours drawn using maximum TCE values at all depth intervals during 2008-2011.
2) All data attained from sources listed in Appendix A.
3) All site features and locations are approximate.
4) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) ESRI, 2013.
0 400 800
Feet
GRADIENT
TCE Isoconcentration Contours (2008-2011)
NCIA and OU1, Hempstead, New York
FIGURE 2.20b
Date: 9/18/2013

R2-0012722


NCIA
OU1
LEGEND
TCA Concentrations (µg/L)
< 5
5 - 100
100 - 1,000
1,000 - 10,000
> 10,000
TCA Plumes (µg/L)
5-100
100-1,000
1,000-10,000
>10,000
Class 2 Sites
Former Class 2 Sites
Up-Gradient Sites
NOTES:
1) Isoconcentration contours drawn using maximum TCA values at all depth intervals during 2008-2011.
2) All data attained from sources listed in Appendix A.
3) All site features and locations are approximate.
4) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) ESRI, 2013.
0 400 800
Feet
GRADIENT
TCA Isoconcentration Contours (2008-2011)
NCIA and OU1, Hempstead, New York
FIGURE 2.20c
Date: 9/18/2013

R2-0012723



NOTES:
1) Dashed lines indicate the plume correction associated with the inappropriate sampling methodology at the temporary monitoring wells.
2) All data attained from sources listed in Appendix A.
3) All site features and locations are approximate.
4) The original figure is produced in color. Significant information is lost if copied in black and white.

GRADIENT

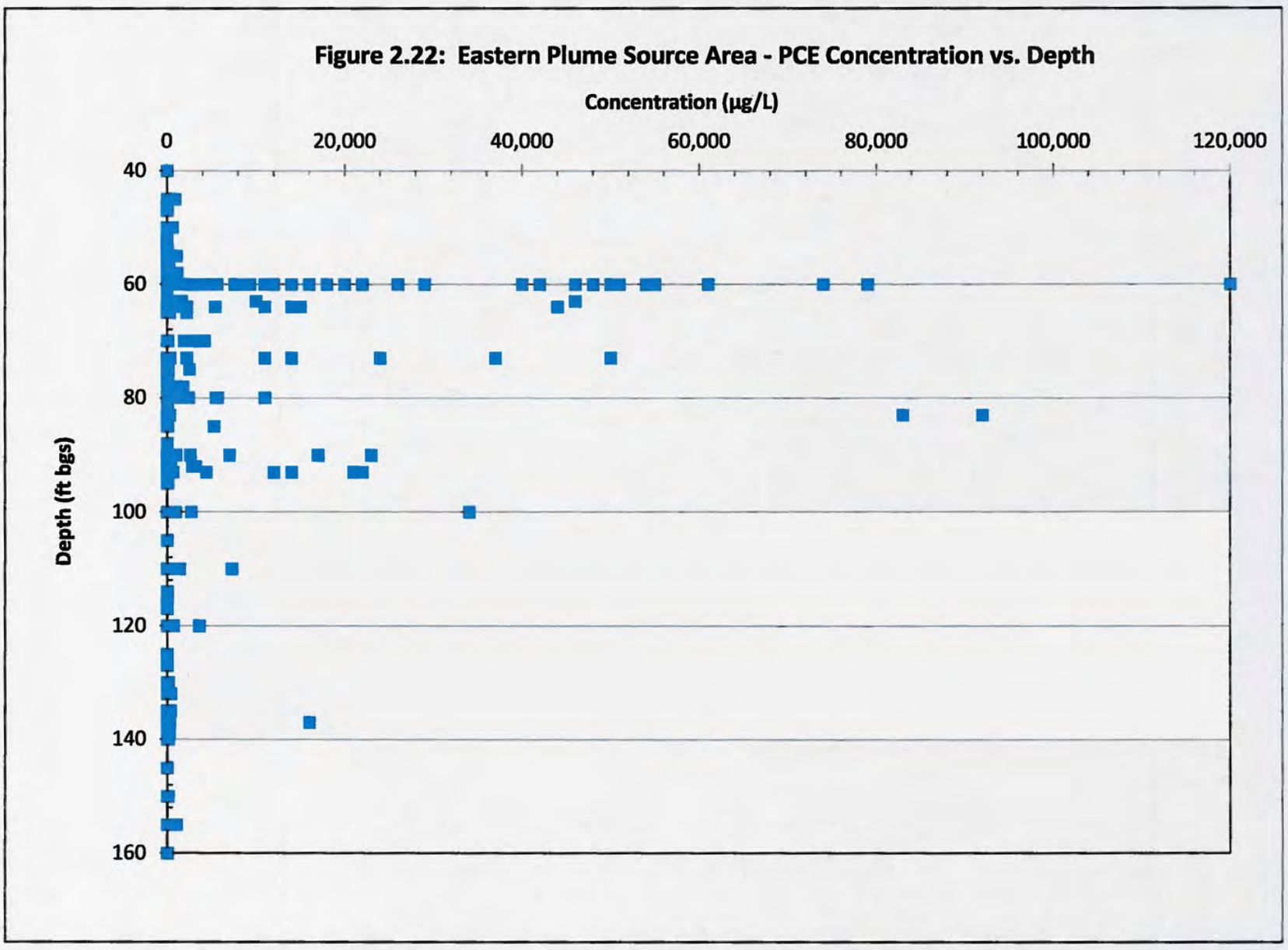
Geologic Cross-Section Eastern Plume - PCE

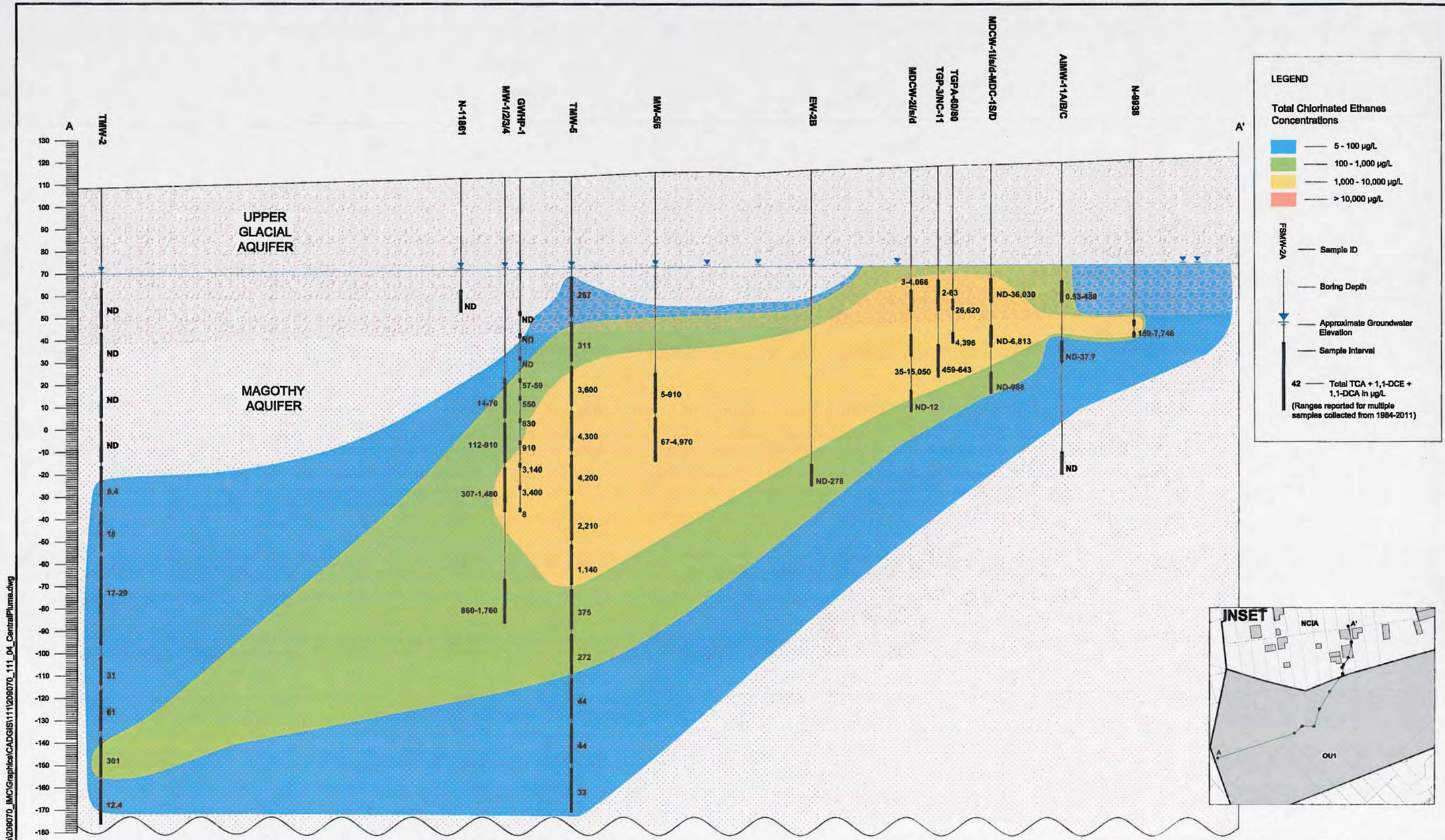
NCIA and OU1, Hempstead, New York

FIGURE 2.21

Date: 9/19/2013

Figure 2.22: Eastern Plume Source Area - PCE Concentration vs. Depth





File Path: G:\Projects\209070_IMC\Graphics\CADGIS\111\209070_111_04_CentralPlume.dwg

GRADIENT

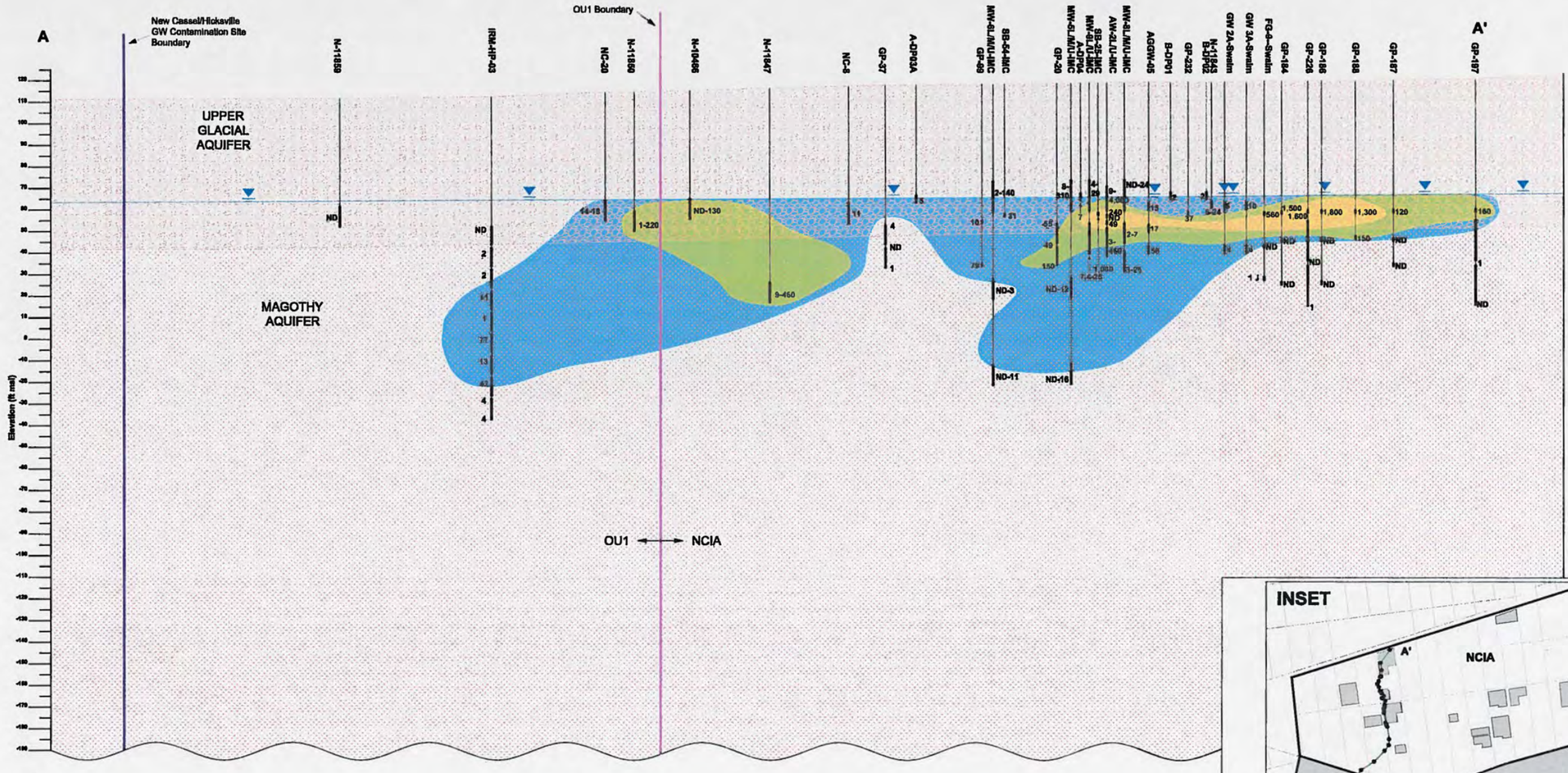
Geologic Cross-Section
Central Plume - TCA
and Degradation Byproducts

NCIA and OU1, Hempstead, New York

FIGURE 2.23

Date: 9/18/2013

R2-0012726



File Path: G:\Projects\2090070_IMC\GraphicalCADGIS\111\2090070_111_01_WesternPlume.dwg

GRADIENT

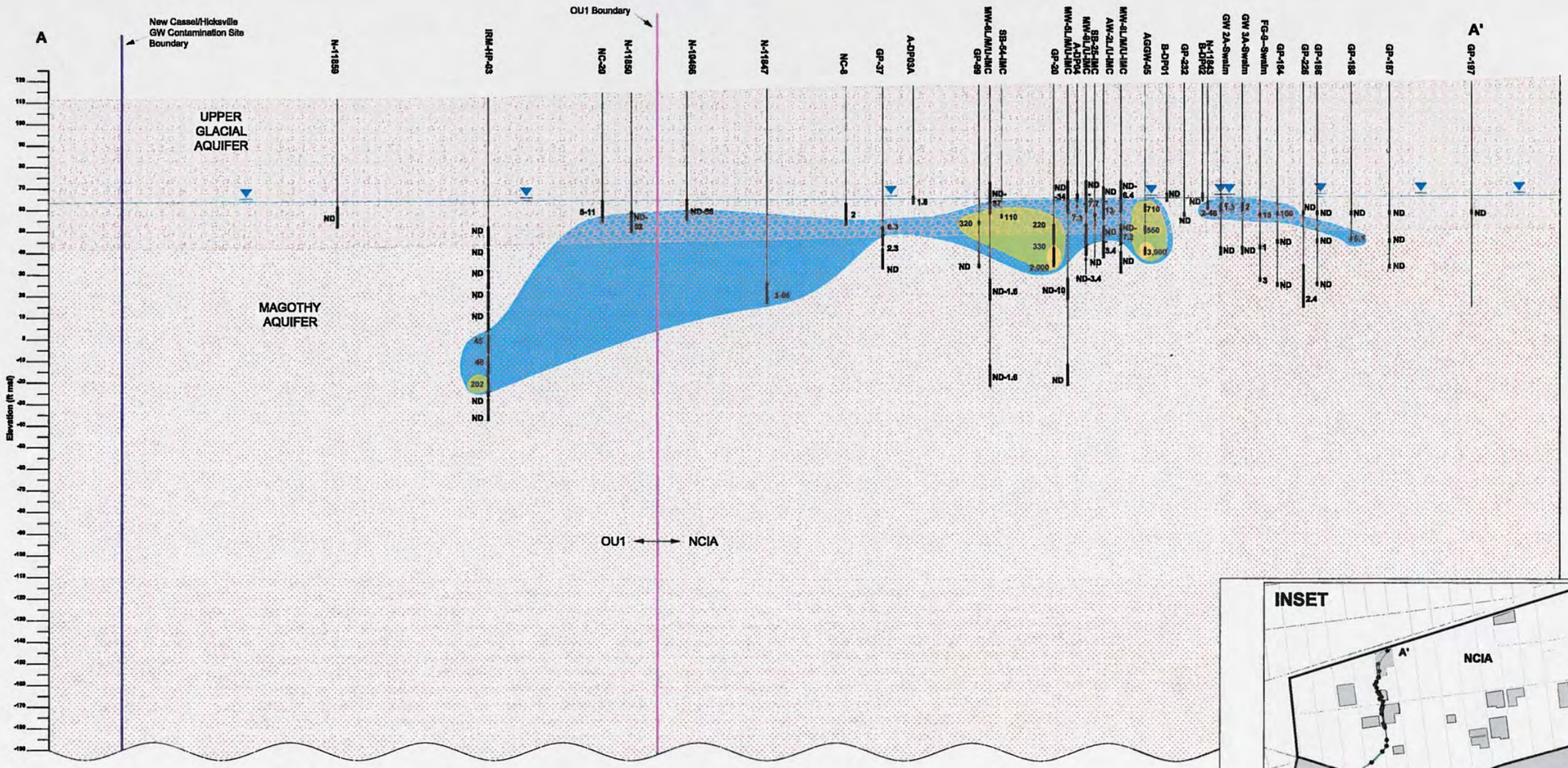
Geologic Cross-Section Maximum Extent of NCIA Western Plume - PCE

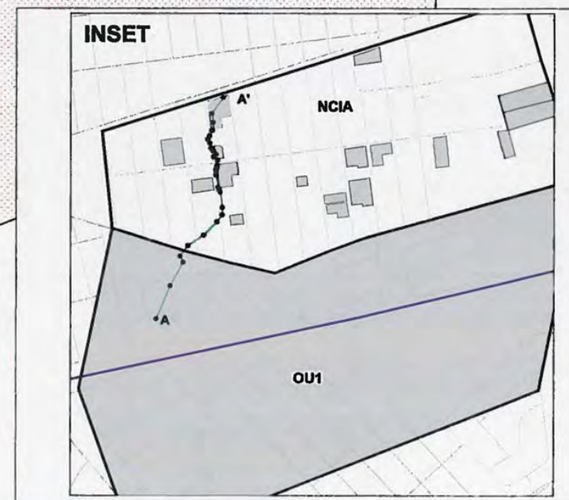
NCIA, Hempstead, New York

FIGURE 2.24

Date: 9/19/2013

R2-0012727





LEGEND

TCE Concentrations

- 5 - 100 µg/L
- 100 - 1,000 µg/L
- 1,000 - 10,000 µg/L
- > 10,000 µg/L

NC-20 — Sample ID

Boring Depth

Approximate Groundwater Elevation

TCE Concentration (µg/L) (Range reported for multiple samples collected from 1984-2011) — 48 — Sample Interval

0 125 250

Horizontal Scale in Feet

NOTES:
1) All data attained from sources listed in Appendix A.
2) All site features and locations are approximate.
3) The original figure is produced in color. Significant information is lost if copied in black and white.

GRADIENT

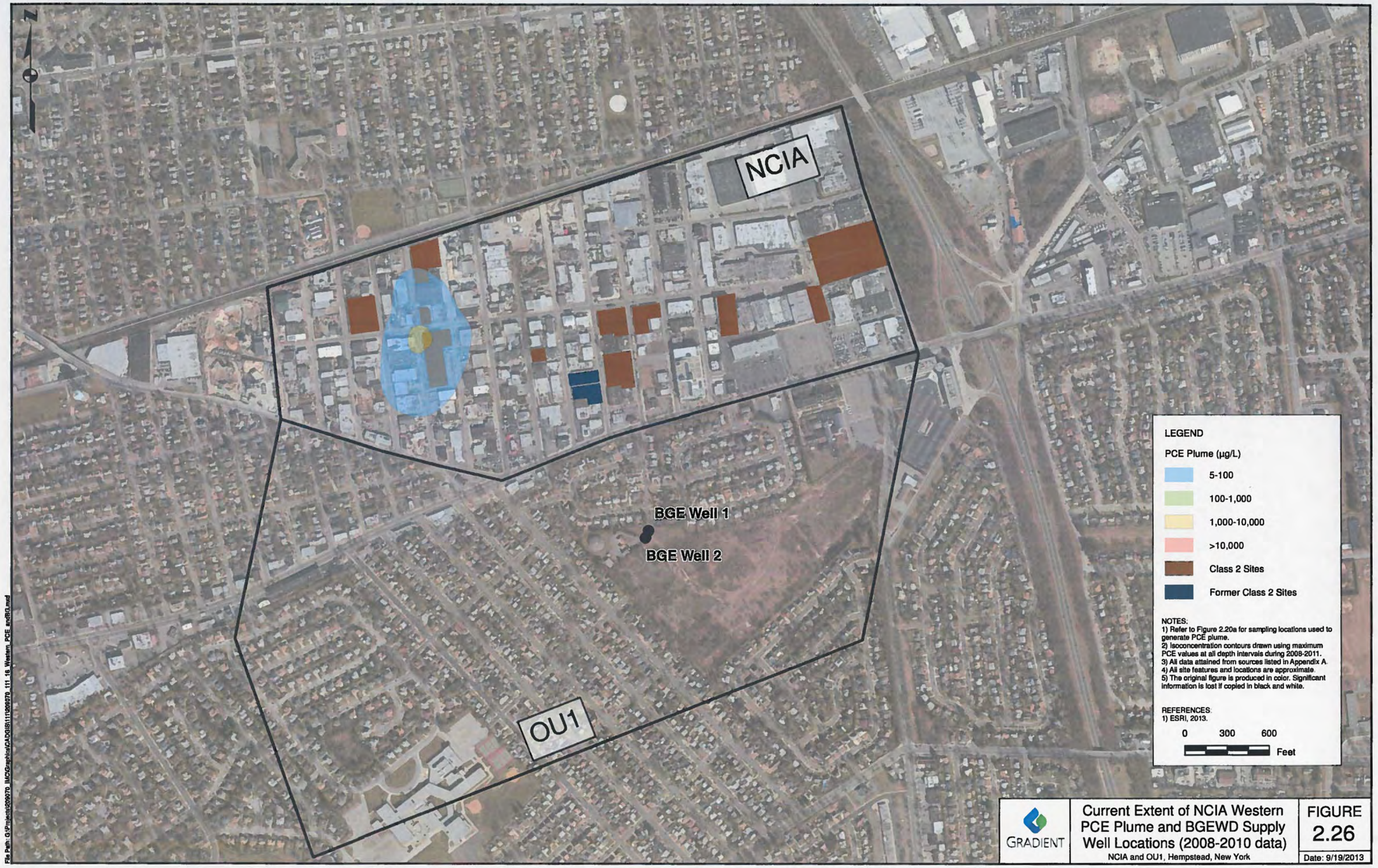
Geologic Cross-Section
Maximum Extent of NCIA
Western Plume - TCE

NCIA, Hempstead, New York

FIGURE
2.25

Date: 9/19/2013

File Path: G:\Projects\208070_IMC\Graphics\CADGIS\111\208070_111_01_WesternPlume.dwg



GRADIENT

Current Extent of NCIA Western PCE Plume and BGEWD Supply Well Locations (2008-2010 data)

NCIA and OU1, Hempstead, New York

FIGURE 2.26

Date: 9/19/2013

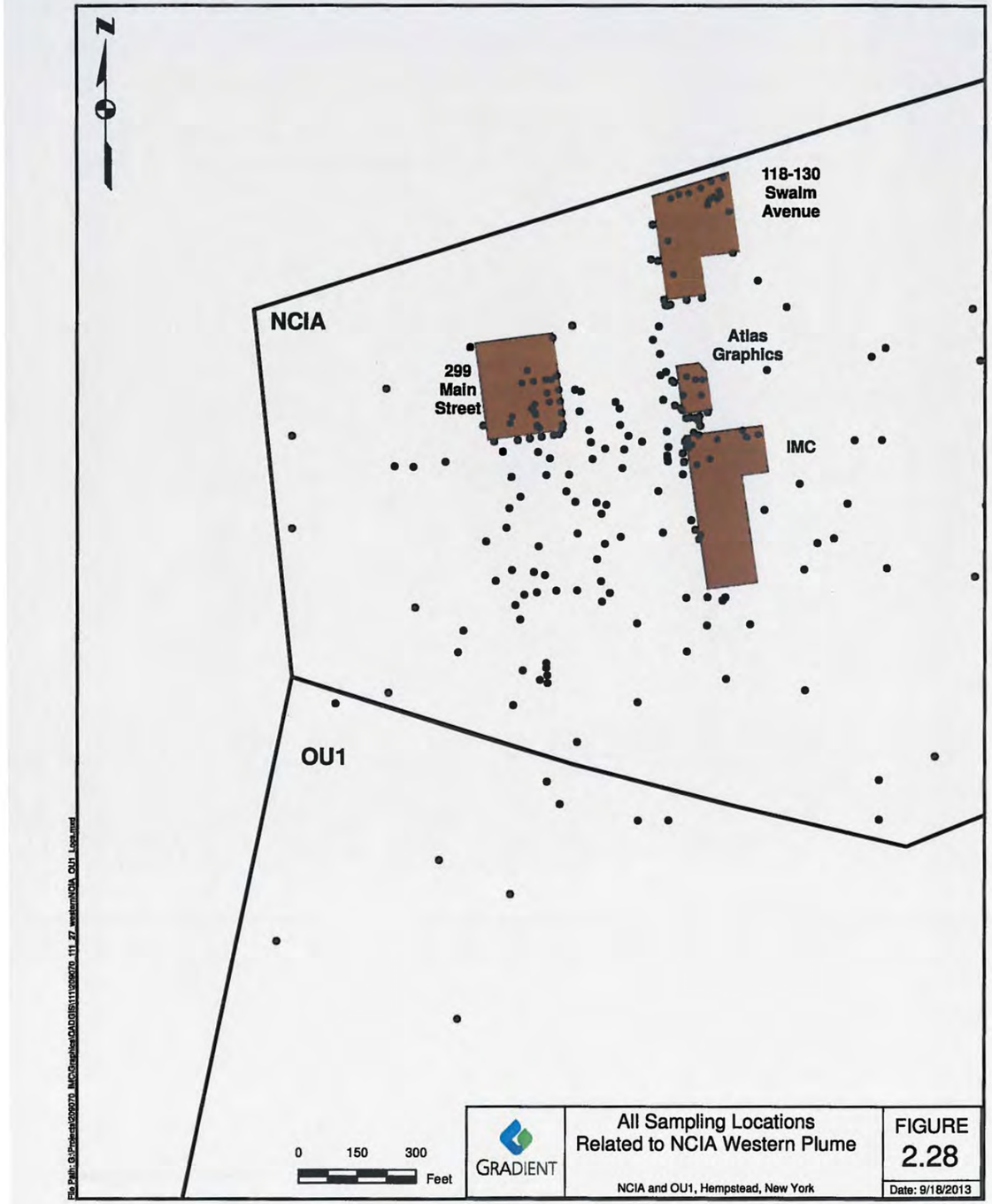
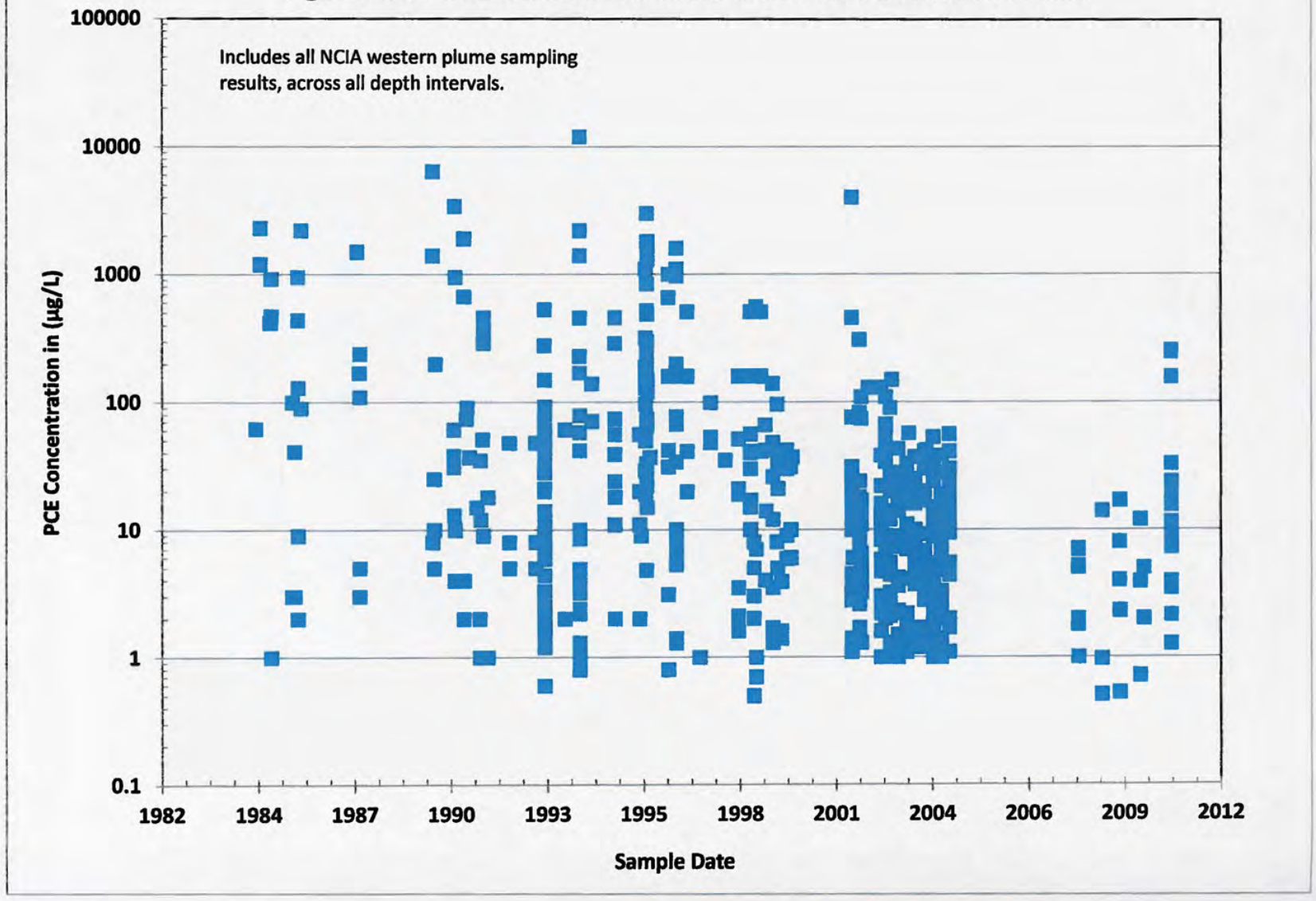

N
118-130
Swalm
Avenue
NCIA
Atlas
Graphics
299
Main
Street
IMC
OU1
0
150
300
Feet
GRADIENT
All Sampling Locations
Related to NCIA Western Plume
NCIA and OU1, Hempstead, New York
FIGURE
2.28
Date: 9/18/2013

Figure 2.29: PCE Concentration vs. Time - NCIA Western Plume



GRADIENT

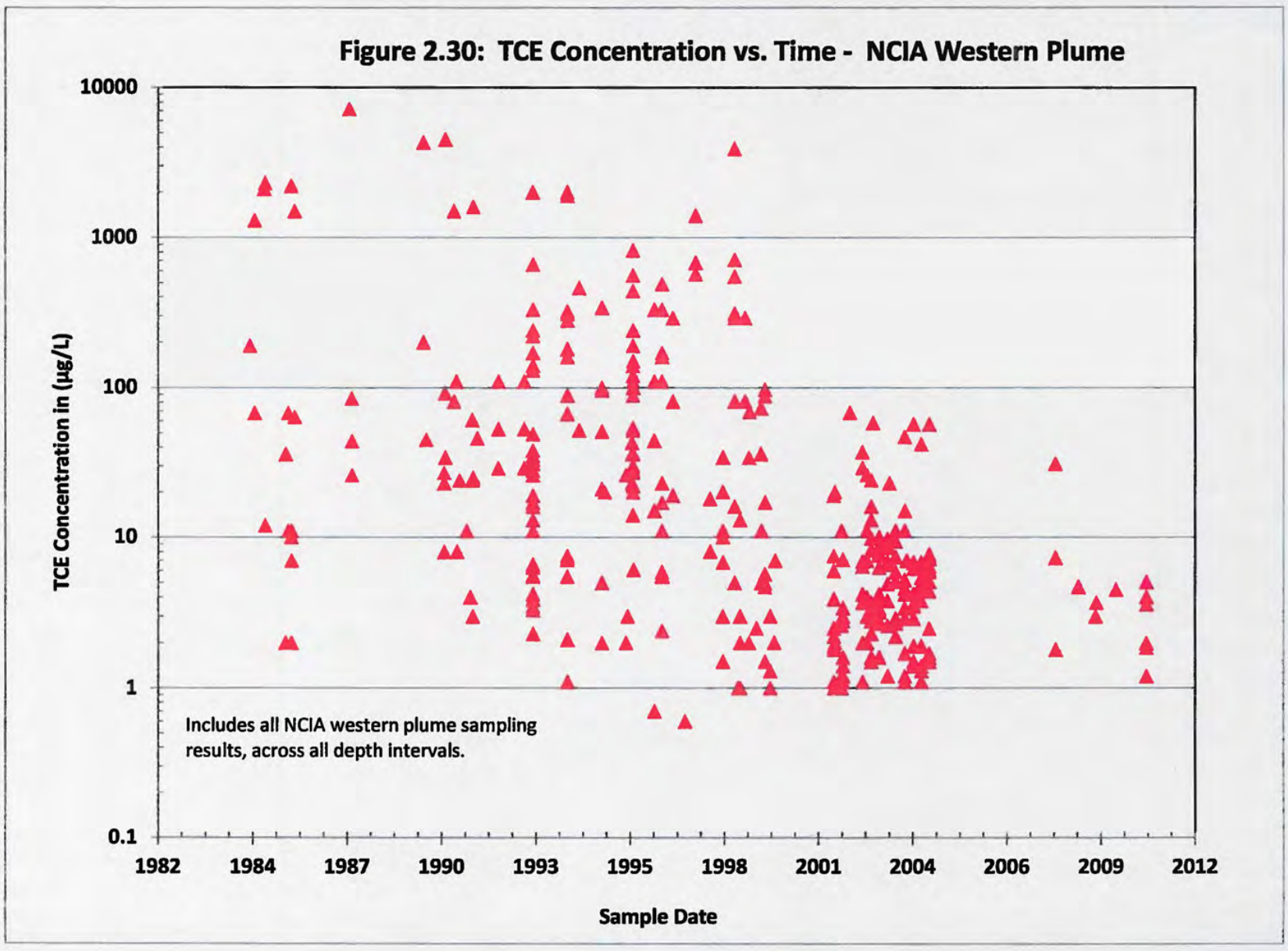
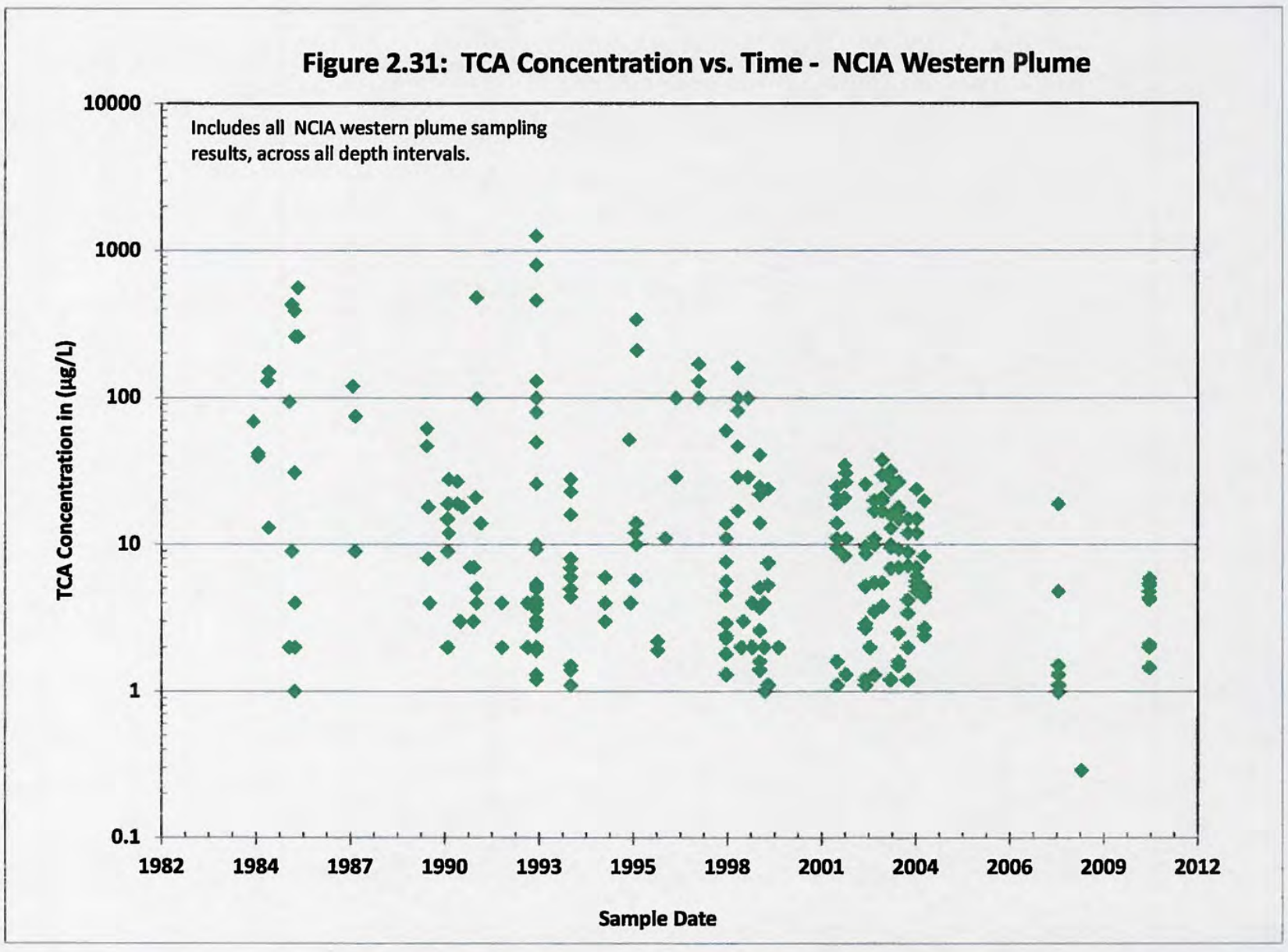


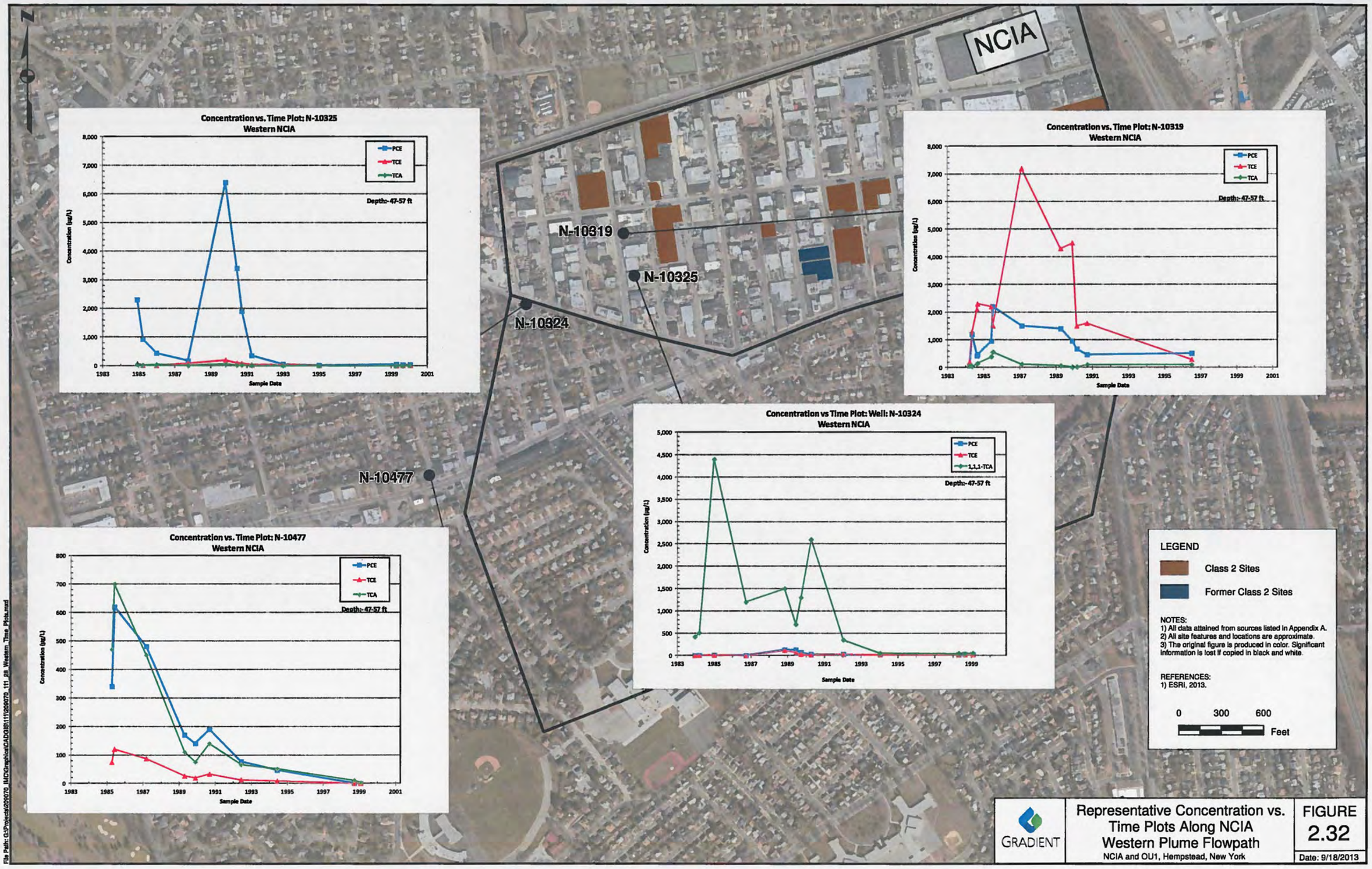
Figure 2.30: TCE Concentration vs. Time - NCIA Western Plume
TCE Concentration in (µg/L)
10000
1000
100
10
1
0.1
Includes all NCIA western plume sampling results, across all depth intervals.
1982
1984
1987
1990
1993
1995
1998
2001
2004
2006
2009
2012
Sample Date

GRADIENT

Figure 2.31: TCA Concentration vs. Time - NCIA Western Plume



GRADIENT


NCIA
N-10319
N-10325
N-10324
N-10477
Concentration vs. Time Plot: N-10325
Western NCIA
PCE
TCE
TCA
Depth:- 47-57 ft
Concentration (ug/L)
Sample Date
Concentration vs. Time Plot: N-10319
Western NCIA
PCE
TCE
TCA
Depth:- 47-57 ft
Concentration (ug/L)
Sample Date
Concentration vs Time Plot: Well: N-10324
Western NCIA
PCE
TCE
1,1,1-TCA
Depth:- 47-57 ft
Concentration (ug/L)
Sample Date
Concentration vs. Time Plot: N-10477
Western NCIA
PCE
TCE
TCA
Depth:- 47-57 ft
Concentration (ug/L)
Sample Date
LEGEND
Class 2 Sites
Former Class 2 Sites
NOTES:
1) All data attained from sources listed in Appendix A.
2) All site features and locations are approximate.
3) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) ESRI, 2013.
0
300
600
Feet
GRADIENT
Representative Concentration vs. Time Plots Along NCIA Western Plume Flowpath
NCIA and OU1, Hempstead, New York
FIGURE
2.32
Date: 9/18/2013
File Path: G:\Projects\209270_IMC\Graphics\CAD\GB111\209270_111_gb_Western_Time_Plots.mxd

A

A'

New Cassel/Hicksville GW Contamination Site Boundary

OU1 Boundary

UPPER GLACIAL AQUIFER

MAGOTHY AQUIFER

Elevation (ft msl)

MW-7L/MU-IMC | A-DP03 | MW-6L/MU-IMC | MW-5L/MU-IMC | A-DP04 | AW-1L/U-IMC | B-DP01 | B-DP03 | MW-3-Swatn | MW-1-Swatn

23 | 2 | 7 | 247 | 7 | 20 | 2 | 5 | 14 | 1 J

255

3 | 2 | 12

6 | 14 | 18

OU1 ◄——► NCIA

LEGEND

PCE Concentrations

- 5 - 100 µg/L
- 100 - 1,000 µg/L
- 1,000 - 10,000 µg/L
- > 10,000 µg/L

NC-20 — Sample ID

Boring Depth

Approximate Groundwater Elevation

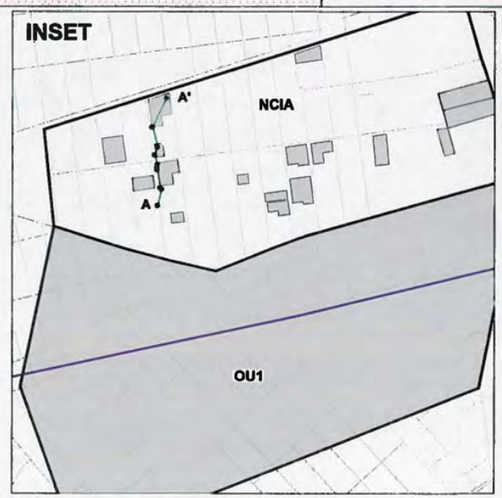
Concentration (µg/L) Most Recent Sample — 48 — Sample Interval

0 125 250

Horizontal Scale in Feet

NOTES:
1) All data attained from sources listed in Appendix A.
2) All site features and locations are approximate.
3) The original figure is produced in color. Significant information is lost if copied in black and white.

INSET



GRADIENT

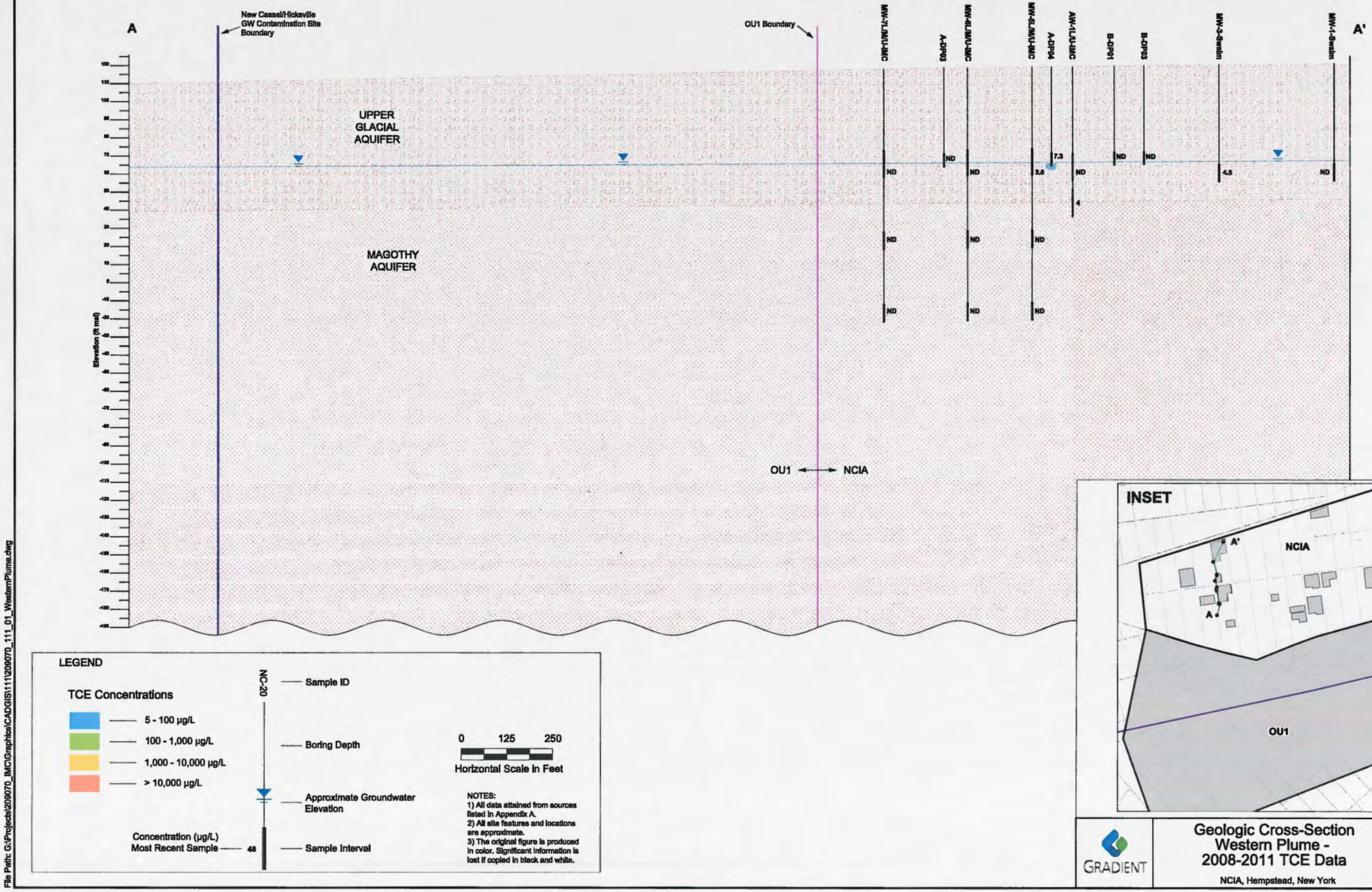
Geologic Cross-Section
Western Plume -
2008-2011 PCE Data

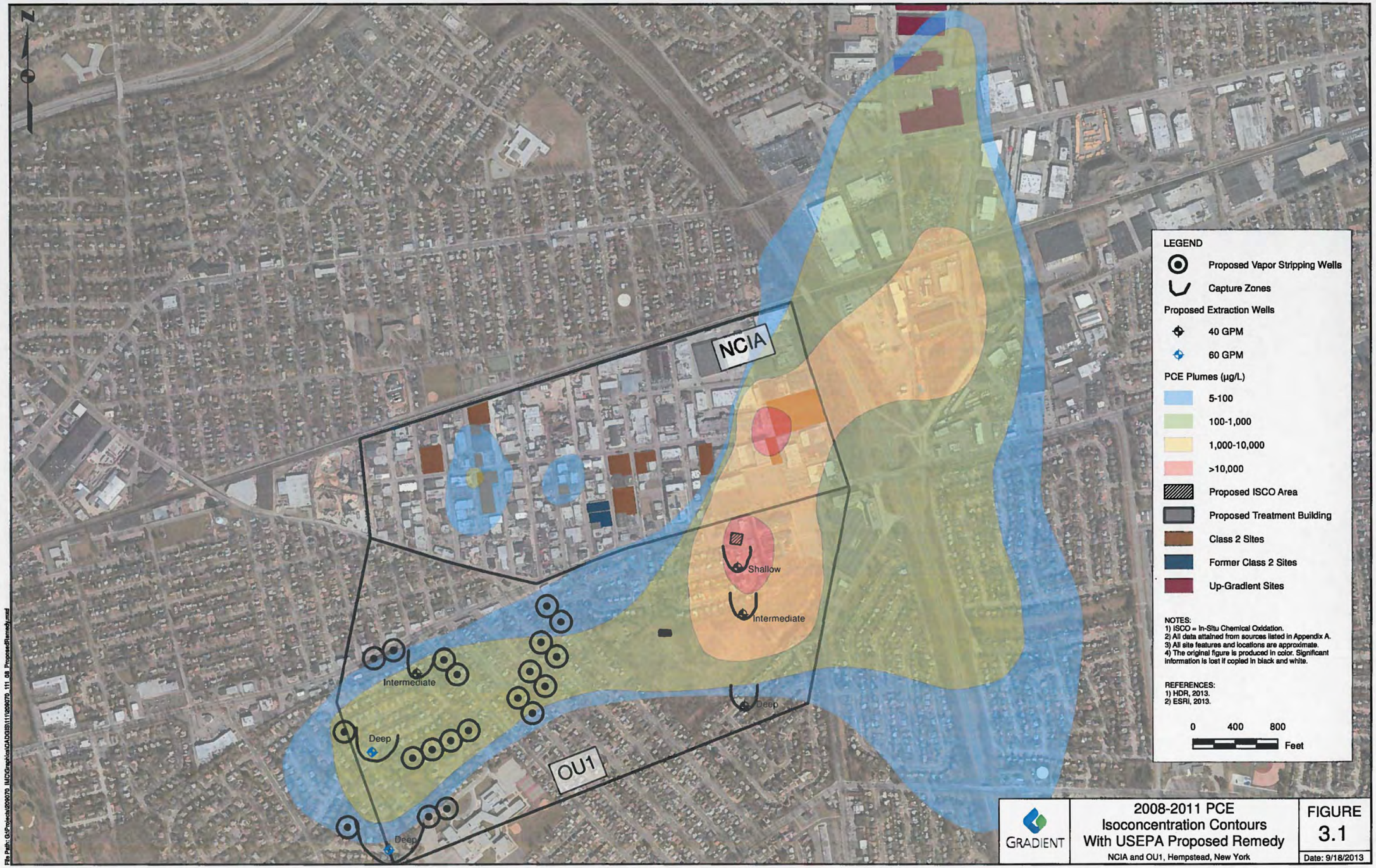
NCIA, Hempstead, New York

FIGURE
2.33

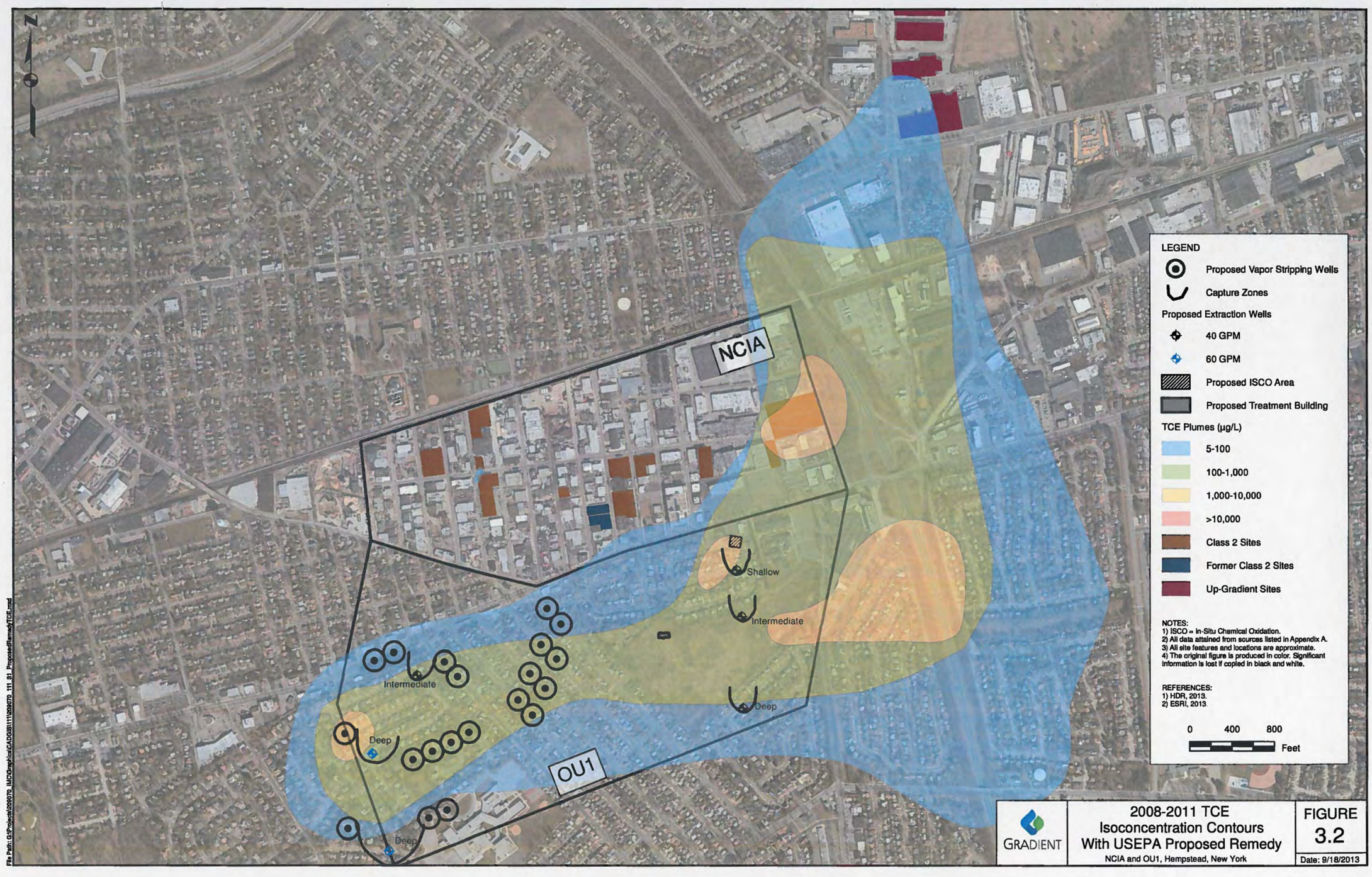
Date: 9/19/2013

File Path: G:\Projects\209070_IMC\Graphics\CADGIS\111\209070_111_01_WesternPlume.dwg


A
A'
New Cassel/Hicksville GW Contamination Site Boundary
OU1 Boundary
MW-7L/MW-7MC
A-DP03
MW-8L/MW-8MC
MW-9L/MW-9MC
A-DP04
AW-1L/AW-1MC
B-DP01
B-DP03
MW-3 Swalm
MW-1 Swalm
UPPER GLACIAL AQUIFER
MAGOTHY AQUIFER
Elevation (ft msl)
ND
7.3
3.6
4
4.5
OU1
NCIA
INSET
A
A'
NCIA
OU1
LEGEND
TCE Concentrations
5 - 100 µg/L
100 - 1,000 µg/L
1,000 - 10,000 µg/L
> 10,000 µg/L
NC-20
Sample ID
Boring Depth
Approximate Groundwater Elevation
Concentration (µg/L)
Most Recent Sample
48
Sample Interval
0
125
250
Horizontal Scale in Feet
NOTES:
1) All data attained from sources listed in Appendix A.
2) All site features and locations are approximate.
3) The original figure is produced in color. Significant information is lost if copied in black and white.
GRADIENT
Geologic Cross-Section
Western Plume -
2008-2011 TCE Data
NCIA, Hempstead, New York
FIGURE
2.34
Date: 9/19/2013
File Path: G:\Projects\209070_IMC\Graphics\CADGIS\111\209070_111_01_WesternPlume.dwg


N
NCIA
OU1
Shallow
Intermediate
Intermediate
Deep
Deep
Deep
LEGEND
Proposed Vapor Stripping Wells
Capture Zones
Proposed Extraction Wells
40 GPM
60 GPM
PCE Plumes (µg/L)
5-100
100-1,000
1,000-10,000
>10,000
Proposed ISCO Area
Proposed Treatment Building
Class 2 Sites
Former Class 2 Sites
Up-Gradient Sites
NOTES:
1) ISCO = In-Situ Chemical Oxidation.
2) All data attained from sources listed in Appendix A.
3) All site features and locations are approximate.
4) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) HDR, 2013.
2) ESRI, 2013.
0 400 800
Feet
GRADIENT
2008-2011 PCE
Isoconcentration Contours
With USEPA Proposed Remedy
NCIA and OU1, Hempstead, New York
FIGURE
3.1
Date: 9/18/2013

R2-0012737


N
NCIA
OU1
Shallow
Intermediate
Intermediate
Deep
Deep
Deep
LEGEND
Proposed Vapor Stripping Wells
Capture Zones
Proposed Extraction Wells
40 GPM
60 GPM
Proposed ISCO Area
Proposed Treatment Building
TCE Plumes (µg/L)
5-100
100-1,000
1,000-10,000
>10,000
Class 2 Sites
Former Class 2 Sites
Up-Gradient Sites
NOTES:
1) ISCO = In-Situ Chemical Oxidation.
2) All data attained from sources listed in Appendix A.
3) All site features and locations are approximate.
4) The original figure is produced in color. Significant information is lost if copied in black and white.
REFERENCES:
1) HDR, 2013.
2) ESRI, 2013.
0 400 800
Feet
GRADIENT
2008-2011 TCE
Isoconcentration Contours
With USEPA Proposed Remedy
NCIA and OU1, Hempstead, New York
FIGURE
3.2
Date: 9/18/2013

R2-0012738

McNamee, Lochner, Titus & Williams, P.C.

ATTORNEYS AT LAW

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September 20, 2013

Jennifer LaPoma
Remedial Project Manager
Western New York Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866

Dear Ms. LaPoma:

Enclosed, please find comments on the New Cassel/Hicksville Ground Water Contamination Superfund Site.

Thank you.

Sincerely,

John J. Privitera

JJP/dps
cc: Kevin Maldonado, Esq.

COMMENTARY TO EPA PROPOSED REMEDIAL ACTION PLAN FOR NEW CASSEL/HICKSVILLE GROUNDWATER CONTAMINATION SUPERFUND SITE NASSAU COUNTY, NEW YORK

FROST STREET PARTIES COMMENTARY

The Proposed Plan Is Not Cost-Effective Because it is Not Coordinated With Proposed Action by New York State

The Proposed Plan for the New Cassel/Hicksville Groundwater Contamination Superfund Site (the "Site") is inconsistent with and not effectively coordinated with remediation measures contemplated by the New York State Department of Environmental Conservation (DEC) at the Site.

The Proposed Plan acknowledges that the New Cassel Industrial Area (NCIA) is subject to remedial measures undertaken by DEC. As stated by the Proposed Plan:

> Individual facilities within the NCIA are considered to be among the sources of groundwater contamination for OU1: Those facilities continue to be addressed under NYSDEC's Superfund program. The on-going State authorized response actions to address source areas at the NCIA facilities are not the focus of this Proposed Plan, although successful completion (*i.e.*, source control or remediation) of the source area(s) at the individual NCIA facilities, under NYSDEC oversight, are essential to the full realization of the objectives of the preferred remedial alternative of this Proposed Plan.[1]

The Frost Street Parties are maintaining at their expense a soil vapor extraction system and air sparging system ("SVE/AS") at the Frost Street Site, pursuant to a State Administration Order. The Proposed Plan describes the remedial measures such as the Frost Street SVE/AS already in existence at the Site:

> Based on NYSDEC's findings, 17 individual facilities within NCIA were listed on NYSDEC's Registry of Inactive Hazardous Waste Disposal Sites (more commonly known as New York State Superfund) between May 1995 and September 1999). Investigations have been completed and remedial actions have been selected for the 17 facilities. Of the 17 facilities, five require no further action, one requires further monitoring, and 11 have on-going response actions including continued operation of air sparging and soil vapor extraction systems.[2]

However, the Proposed Plan does not, by its terms, acknowledge or even contemplate the extent and scope of the significant and expensive additional groundwater remedial measures now proposed by DEC. In fact, after discussing the pre-design investigations by DEC from 2009 to 2011, the Proposed Plan states that DEC is not planning on taking any further remedial action

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[1] Environmental Protection Agency, *Superfund Proposed Plan: New Cassel/Hicksville Ground Water Contamination Superfund Site, Nassau County, New York*, at 2 (July 2013)

[2] Environmental Protection Agency, *Superfund Proposed Plan: New Cassel/Hicksville Ground Water Contamination Superfund Site, Nassau County, New York*, at 3 (July 2013)

R2-0012740

with respect to the groundwater. ("No further remedial actions were taken by NYSDEC related to what is referred to as the groundwater contamination downgradient of the NCIA.")[3] But, after the Proposed Plan was published, DEC stated that it is contemplating further remedial actions. This must be taken into consideration by the EPA, from both a sound hydrogeological standpoint and a cost-effectiveness standpoint; the DEC proposed work is not cost-effective.

Attached please find a recent letter, dated August 9, 2013, from Jeffrey Dyber at DEC that contemplates two significant remedial expenses without any administrative or technical discussion in the Proposed Plan as to the cost-effectiveness or technical impact of these proposed expenditures.

Specifically, DEC proposes the installation of a series of groundwater circulation wells at the Site down to 150 feet below grade north of Old Country Road. DEC also proposes, at public expense, some as yet unpublicized remedial action plan for groundwater down to 250 feet in the same location. The Proposed Plan does not discuss the feasibility, impact or cost effectiveness of these proposals.

Contrary to Jeffrey Dyber's views in his August 9, 2013 letter, EPA is not contemplating these further remedial measures proposed by DEC, as the only remedial measures discussed in the PRAP are the air sparging and soil vapor extraction systems already in existence.[4]

The additional remedial measures proposed by DEC must be coordinated with EPA. A sound hydrogeological approach to the site mandates the technical consideration of all existing and contemplated remedial measures.

The DEC proposed groundwater circulation well system in the upper 150 feet would remediate and influence the groundwater at least 150 feet south of Old County Road into the geographical area covered by EPA OU1 and the Proposed Plan. Moreover, OU1 documents present different technical assumptions (for example, radius of influence) than currently proposed north of Old Country Road, which appear to be based on technical evaluation of remedy limitations.[5] Reconciliation of remedy designs needs to occur to ensure remedies are optimized, and adverse effects (e.g., oxidant influences on groundwater circulation wells) do not occur. DEC's action must be technically analyzed and publicly discussed by EPA so that cost-effectiveness and technical feasibility is achieved. Consideration should also be given to similar remedy implementations at nearby sites (e.g., General Instruments), where groundwater

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[3] Environmental Protection Agency, *Superfund Proposed Plan: New Cassel/Hicksville Ground Water Contamination Superfund Site, Nassau County, New York*, at 4 (July 2013)

[4] Environmental Protection Agency, *Superfund Proposed Plan: New Cassel/Hicksville Ground Water Contamination Superfund Site, Nassau County, New York*, at 3-4 (July 2013)

[5] *Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site, Nassau County, New York*, at 5-3 (July 2013). *Operable Unit 02 (OU2) Groundwater Circulation Well System Full Scale Remedial Design at Frost Street Sites (Site #1-30-043 I, L, M), New Cassel Industrial Area, Westbury, New York* at Appendix A (May 2009).

circulation well systems were installed and later abandoned due to adverse subsurface conditions.[6]

DEC's proposed expenses are redundant, not complementary, with the remedial measures contemplated in the Proposed Plan. It is imperative that EPA generate detailed technical analysis, and present it in the public record, of the existing and contemplated remedial measures at the Site. Many of the alternatives discussed in the OU1 feasibility study are qualified pending additional pre-design data (for example, evaluation of whether groundwater circulation well systems will achieve target removal efficiencies due to aquifer heterogeneities, or the appropriate approach for chemical oxidation).[7] These data have direct bearing on the ultimate feasibility of not only the OU1 remedy, but the proposed DEC-mandated actions as well. Without this remedial and feasibility analysis and coordinated technical review, EPA cannot achieve cost-effectiveness and thus compliance with the NCP.

[6] Letter from J.A. Sobieraj, WSP Engineering, to R.D. DeCandia, Jr., July 27, 2009. "Operable Unit 2 – Groundwater Interim Remedial Measure (IRM) Final Progress Report, Former General Instrument Corporation Site, Hicksville, New York," at page 11.

[7] *Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site, Nassau County, New York*, at 5-16 and 5-12 (July 2013).

R2-0012742

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McNamee, Lochner, Titus & Williams, P.C.

ATTORNEYS AT LAW

November 24, 2010

Peter Iwanowicz
Acting Commissioner
NYS Dept. of Environmental Conservation
625 Broadway
Albany, New York 12233-6500

Re: New Castle Industrial Area – Aquifer Remediation
Town of North Hempstead, Nassau County, New York

Dear Mr. Iwanowicz:

We respectfully request that you direct the Department to cease the further expenditure of State funds and Department resources concerning the referenced matter, until completion of the administrative process that has begun concerning nomination of the site to the Environmental Protection Agency's (EPA's) National Priorities List (NPL), which will qualify the aquifer for federal superfund monies. Specifically, we ask that you postpone both the enforcement of Department remedial decisions and the expenditure of State funds on the aquifer until after EPA makes a decision on its approach.

The private sector and the public sector must make a concerted effort to be cost effective and judicious in committing resources, personnel and funds. At this time, the Department's continued expenditure of enforcement effort, State Superfund monies and programmatic oversight of overlapping, combined and commingled "operable units" within the aquifer does not meet these objectives while the parallel NPL nomination process is also being pursued.

The Frost Street Parties[1] request that you change the Department's approach to this matter in the interest of conserving public and private resources in the best interest of the environment.

[1] The "Frost Street Parties" are the named Respondents in, In re: 101 Frost Street Associates, LP, Respondent, No. 1-30-043I (WI0799-00-05); In re: Next Millennium Realty, LLC, No. 1-30-043L (WI-0799-00-05); and In re: Next Millennium Realty, LLC, No. 1-30-043M (WI-0893-01-07). The Frost Street Parties hereby exercise their reserved right to apply to you for the relief set forth in this letter pursuant to Paragraph XV (K)(2) of each referenced order.
(M0388867.1)

R2-0012743

Unlike many property owners, operators and past owners and operators in the New Castle Industrial Area (NCIA), the Frost Street Parties are innocent landowners. Past industrial practices by other parties have contaminated the aquifer. Notwithstanding their status as innocent landowners, the Frost Street Parties have spent and continue to spend significant funds in remediating areas on the Frost Street Properties in the soils and vadose zone. This effort is ongoing and successful.

The multiparty and multisite challenges concerning contamination of the drinking water aquifer in the NCIA have lead the Department to prepare a nomination of the site to EPA's NPL, as announced by the Department in open court on April 19, 2010. Once the NCIA site is included on the NPL, EPA has an obligation to commence a remedial investigation and feasibility study (RI/FS) within six months after such inclusion. See generally, 42 USC § 9620(e)(1). And, once this process is complete, a feasible, comprehensive, cost effective and coordinated remedy may be chosen. In order for all parties to remain consistent with the National Contingency Plan (NCP), the detailed administrative process of federal decision making attendant to the National Priorities Listing, site management and the full administrative process under federal law and regulation must be respected. See generally, 40 CFR Part 300; Parts 300.510, 300.515 and appendices A and B to Part 300.

Notwithstanding our mutual obligation to follow and respect the NCP and the NPL administrative process governed by the EPA, the Department continues to push ahead with significant involvement of State resources and State Superfund monies by segmentation of the referenced, unified aquifer into "operable units" without any scientific basis for such separation and without any thought to the cost effectiveness of such duplicative effort and treatment, particularly in the face of the impending nomination to the NPL.

Specifically, over ten years ago, Commissioner Cahill signed a Record of Decision for "Operable Unit 02-'combined groundwater' at the Frost Street Sites" directing extraction wells screened to a depth of 150 feet at the Frost Street Sites. Frost Street Sites ROD, March, 2000, pp. 15, 19. "Off Site (down gradient) groundwater contamination" was noted by then Commissioner Cahill "to be addressed as part of the overall investigation of the groundwater contamination that is migrating from all Class II sites in the NCIA." Id. However, further investigation and data reveals that the selected remedial action to a depth of 150 feet may not be cost effective. Before the Department forces the Frost Street Parties to spend millions on this project, EPA should decide if it is cost effective and coordinated.

Recently, the Department decided to segment the NCIA aquifer contamination even further, by carving out a portion of Operable Unit 3 at a depth between 150 feet and 250 feet even though it is not a separate geologic unit and notwithstanding the fact that this portion of the aquifer is not identified in any public decision. See generally, Record of Decision, New Castle

R2-0012744

Industrial Area Sites, "off site groundwater" (south of New Castle Industrial Area, Operable Unit No. 3) October 2003 (Commissioner Crotty).

Please understand that there are no separate geologic units or scientifically discreet areas within the aquifer that are capable of these arbitrary definitions of various depths within the aquifer. Operable Unit OU2, down to 150' and OU3, described as all down gradient areas, are in the same geologic unit. The Department's new, unpublicized remedial area between depths of 150' and 250' is not capable of definition by any earth science as a discreetly manageable unit. Therefore, the Department's fund resources and human resources are overlapping to say the least. There is no reason for these expenditures as the shift of responsibility to EPA is under way.

In addition, the 150' – 250' zone, though it is the subject of significant expenditures and oversight under the State Superfund, is not even identified to the public as a separate remedial area in any ROD executed by any Commissioner. Thus, while the nomination process proceeds, significant State funds are being spent on this new subset of the aquifer without the public remedial selection process required by law. 6 NYCRR Part 375-1.10.

Nothing on the record suggests that this approach is cost effective. Moreover, the Department intends to entrench the infrastructure for the separate state-funded remedy in the 150' to 250' zone in the same intensely used parking lot where the proposed remedy at OU2 is supposed to be located, without a coordinated construction schedule, much less an integrated plan. This disregard for the innocent merchants and patrons at the Frost Street Properties exacerbates the problem.

We have endeavored to engage in a discussion of these issues with the Department, as set forth in the accompanying correspondence of January and September of this year, but the Department has declined to engage in a sound discussion of the best approach to this matter, driven by science, engineering and cost-effectiveness.

Please understand that the Frost Street Parties recognize their commitments and responsibilities. However, in these austere times, cost effective project management must be our mutual, top priority. The EPA will take a fresh look at this matter as the administrative process of NPL nomination, now engaged by the Department, moves through its regulatory course. As we work forward together in a cost effective manner in the interests of the environment, nothing is to be gained by engaging the State's enforcement machinery and resources, dedicating the State's Superfund monies or facilitating significant State oversight of "Operable Unit" management within a project that is about to be presented to EPA. We ask that these significant efforts and resources be withheld and postponed until after the administrative process attendant to the NPL nomination is complete.

R2-0012745

Thank you for your considered attention to this matter.

Very truly yours,

John J. Privitera

Next Millennium Realty, LLC

By: _____
Alan Eidler, Manager

By: _____
Lise Spiegel Wilks, Manager

By: _____
Pamela Spiegel Sanders, Manager

101 Frost Street Associates, L.P.
By: 101 Frost Street Corp.

By: _____
Alan Eidler, President

JJP/klh
cc:: Alali Tamuno
Jeff Dyber

{M0388867.1}

Thank you for your considered attention to this matter.

Very truly yours,

John J. Privitera

Next Millennium Realty, LLC

By: Alan Eidler, MANAGER
Alan Eidler, Manager

By: _____
Lise Spiegel Wilks, Manager

By: _____
Pamela Spiegel Sanders, Manager

101 Frost Street Associates, L.P.
By: 101 Frost Street Corp.

By: Alan Eidler, President
Alan Eidler, President

JJP/klh
cc:: Alali Tamuno
Jeff Dyber

(M0388867.1)

Thank you for your considered attention to this matter.

Very truly yours,

John J. Privitera

Next Millennium Realty, LLC

By: _____
Alan Eidler, Manager

By: _____
Lise Spiegel Wilks, Manager

By: _____
Pamela Spiegel Sanders, Manager

101 Frost Street Associates, L.P.
By: 101 Frost Street Corp.

By: _____
Alan Eidler, President

JJP/klh
cc:: Alali Tamuno
Jeff Dyber

(M0388867.1)

Thank you for your considered attention to this matter.

Very truly yours,

John J. Privitera

Next Millennium Realty, LLC

By: _____
Alan Eidler, Manager

By: Lisa Spiegel Wilks
Lisa Spiegel Wilks, Manager

By: _____
Pamela Spiegel Sanders, Manager

101 Frost Street Associates, L.P.
By: 101 Frost Street Corp.

By: _____
Alan Eidler, President

JJP/klh
cc:: Alali Tarauno
Jeff Dyber

[redacted]

TOTAL P.02

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McNamee, Lochner, Titus & Williams, P.C.

ATTORNEYS AT LAW

January 19, 2011

Commissioner Joseph Martens
NYS Department of Environmental Conservation
625 Broadway
Albany, New York 12233-6500

Re: PENDING APPEAL BY THE FROST STREET PARTIES
New Castle Industrial Area – Aquifer Remediation
Town of North Hempstead, Nassau County, New York

Dear Mr. Martens:

Please accept this letter in supplementation of the pending appeal to you taken by the Frost Street Parties in the accompanying letter of November 24, 2010 to Acting Commissioner Peter Iwanowicz.

Our expressed concerns regarding cost effectiveness, regulatory compliance, public involvement and transparency are now heightened and exacerbated by the recent disclosure that the Department now intends to devote personnel resources and State monies to funding another remedial step in the New Castle Industrial Area ("NCIA").

Specifically, on November 30, 2010, after the Frost Street Parties filed their appeal, Department representatives sent us a "Remedial Design Report" ("Report") that proposes State construction of a significant groundwater treatment system from 150 to 250 feet below ground surface. The Report targets a very limited, arbitrary, geographic and vertical zone that is not a discreet hydrogeological unit. In addition to the perplexing fact that this intent to spend State resources is expressed at the same time that the Department seeks federal takeover of the site through the NPL nomination process, the Report is deeply flawed on every level.

- The Report is not derived from any published Remedial Investigation or Feasibility Study (RI/FS), as the regulations require.
- The Report is not based on any Record of Decision (ROD) by the Department.
- The Report has not been made available to the public for comment. Indeed, best we can tell, the Department is bent upon going forward with this State expenditure without any public involvement whatsoever. The Department's cover letter to the Frost Street Parties is specific in stating, "[W]e are only requesting comments on how the remedy would impact the on-site businesses." Dyber letter, November 30, 2010.

(M0402524.1)

R2-0012750

- The Report makes no effort toward cost effectiveness in working with the Frost Street Parties concerning our obligations to remediate the groundwater on-site down to 150 feet.

- The Report fails to consider: alternative locations, such as slightly downgradient, open and public land; available, existing infrastructure as part of the system; buried utilities; known impacts of dissolved iron in the system; integration of shallow and deep systems to avoid redundant equipment, structures and construction costs; the cost effectiveness of fewer groundwater circulation wells or fewer monitoring wells; known data voids regarding the impact of clay layers at the working depths; the need for further geological information that could be gathered during construction; the relationship of the project to the existing remedy; or, overall cost.

We are confident that a proper, transparent RI/FS, ROD and Public Comment process would produce other observations.

We maintain that the regulations ought to be followed and the public ought to be informed of the Report before the proposed State expense is incurred. We believe firmly in public/private partnerships, transparency, communication and cost effectiveness. None of these attributes apply to the proposed State action set forth in the Report.

We ask that you consider our pending appeal and take these comments into consideration in the process. The Frost Street Parties recognize their obligations. When I first entered my appearance before the Department for the Frost Street Parties and sought to build a communicative platform, I was informed by Department representatives that there was "bad blood" between these parties and the Department. This continues to concern me on a number of levels. Particularly, we remain concerned that the Department's decision to fund the recommendations in the Report is driven by this history rather than fundamental programmatic goals and the bests interests of public health and the environment.

We request a meeting with you and Department representatives to discuss the regulatory status and the technical objectives of the Report.

Congratulations on your well deserved appointment.

Sincerely,

John J. Privitera

JJP/klh
cc: Alali M. Tamuno, Esq.

{M0402524.1}

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau A, 12th Floor
625 Broadway, Albany, New York 12233-7015
Phone: (518) 402-9625 • **Fax:** (518) 402-9627
Website: www.dec.ny.gov

Joe Martens
Commissioner

TRANSMITTED VIA CERTIFIED MAIL

August 9, 2013

Mr. Fred Werfel
Director of Property Operations
Spiegel Associates
375 North Broadway
Jericho, New York 11753

Re: Frost Street Sites (No. 130043I, 130043L, 130043M)

Dear Mr. Werfel:

The New York State Department of Environmental Conservation (Department) directs Next Millennium Realty, LLC; 101 Frost Street Associates, L.P.; and 101 Frost Street Corp., the Respondents to the Orders on Consent (Orders) for the Former Autoline Automotive Site, the 89 Frost Street Site and the Former Applied Fluidics Site (collectively known as the "Frost Street Sites") to resume work under the Orders for these sites. The Department also directs the Respondents to provide the Department with access to the Frost Street Sites so it may proceed to remediate the groundwater contamination in the 150-250 foot deep interval. You are listed as the Respondents' contact on the Orders for the Frost Street Sites.

The work under the Orders was suspended by the Respondents due to the listing of the New Cassel/Hicksville Ground Water Contamination site on the National Priorities List (NPL). At the time of the NPL listing, the Respondents indicated there was uncertainty as to whether the United States Environmental Protection Agency (EPA) would assume responsibility for the work at the Frost Street Sites. As detailed below, this issue is settled.

The Respondents executed the Orders regarding the Frost Street Sites with the Department, effective January 23, 2003, for the development and implementation of a remedial program for Operable Unit 2 (OU2), which comprises the combined groundwater contamination for the Frost Street Sites.

In April 2009, the Department and the Respondents executed a Stipulation Agreement with respect to a proceeding pursuant to Article 78 of the CPLR. Pursuant to the Stipulation, Respondents agreed to "...comply with all of their obligations to remediate contaminated groundwater in OU2 of the Frost Street Sites to a depth of 150 feet below ground surface..." and the Department agreed "...not to seek to enforce any obligations the Petitioners may have pursuant to the Orders on Consent to remediate contaminated groundwater in OU2 at the Frost Street Sites that is deeper than 150 feet below ground surface...."

Mr. John J. Privitera, Esq., on behalf of the Respondents, in letters dated September 23,

R2-0012752

2010 and November 24, 2010 to the Department, indicated that the Respondents' work under the Frost Street Orders was suspended due to alleged uncertainty surrounding the proposed listing of the New Cassel/Hicksville Ground Water Contamination site on the NPL.

In September 2011, the New Cassel/Hicksville Ground Water Contamination Site was listed on the NPL. The EPA recently issued a Superfund Proposed Plan for the New Cassel/Hicksville Ground Water Contamination Site (the "Site"), dated July 2013, "...to address a portion of the contaminated groundwater downgradient of the New Cassel Industrial Area (NCIA), which comprises Operable Unit 1 (OU1) of...(the Site)..." It is stated in the Superfund Proposed Plan, under Scope and Role of Action, in plain and unequivocal language, that:

> "...Individual facilities within the NCIA are considered to be among the sources of groundwater contamination for OU1. Those facilities continue to be addressed under NYSDEC's Superfund program. The on-going State authorized response actions to address source areas at the NCIA facilities are not the focus of this Proposed Plan, although successful completion (i.e., source control or remediation) of the source area(s) at the individual NCIA facilities, under NYSDEC oversight, are essential to the full realization of the objectives of the preferred remedial alternative in this Proposed Plan...."

You may view the Superfund Proposed Plan at the following website: http://www.epa.gov/region02/superfund/npl/newcassel/pdf/NCHGW%20PRAP%20OU1.pdf.

Consequently, it is clear that the EPA expects the State to manage the remediation of the sites in the New Cassel Industrial Area, including the Frost Street Sites. Within 30 days of receipt of this letter, the Department directs the Respondents to:

- Provide an updated schedule for constructing the in-well vapor stripping systems at the Frost Street Sites. The schedule must include, but not be limited to: constructing and starting-up the in-well vapor stripping systems, submitting a Site Management Plan, submitting a deed restriction for Department approval, filing the approved deed restriction, and submitting a Final Engineering Report. The schedule must show completion of the work at an equal or faster pace than the schedule included in the approved design.
- Submit all data and reports for the Frost Street Sites required by the Orders and the "Final Engineering Report and Operation, Maintenance and Monitoring Plan for Soil Vapor Extraction/Air Sparging Remedial System and Soil Remediation Measures" that have not been previously submitted to the Department. All data must be submitted as Electronic Data Deliverables according to the procedures on the Department's website: http://www.dec.ny.gov/chemical/62440.html.

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- Confirm the Department's access to the Frost Street Sites so it may proceed to remediate the groundwater contamination in the 150-250 foot deep interval.

Sincerely,

Jeffrey L. Dyber, P.E.
Environmental Engineer 2
Remedial Section A

cc: H. Scenizer, Spiegel Associates
J. Heaney, Walden Associates
K. Maldonado, Bellavia Gentile & Associates
J. Privitera, McNamee, Lochner, Titus & Williams, P.C.

ec: G. Bobersky
W. Parish
A. Tamuno
J. Nealon
J. LaPoma, EPA

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McNamee, Lochner, Titus & Williams, P.C.

ATTORNEYS AT LAW

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August 30, 2013

Commissioner Joseph Martens
NYS Department of Environmental Conservation
625 Broadway
Albany, New York 12233-6500

Re: PENDING APPEAL BY THE FROST STREET PARTIES
New Cassel Industrial Area – Aquifer Remediation
Town of North Hempstead, Nassau County, New York

Dear Commissioner Martens:

Please accept this letter in supplementation of the pending appeal by the Frost Street Parties to you on November 20, 2010, as previously supplemented on January 19, 2011. We ask that the appeal remain in abeyance until the record is complete.

We ask that the record on this appeal remain open, to include the United States Environmental Protection Agency's ("EPA") full administrative record and technical input including the Agency's proposed Plan and forthcoming Record of Decision ("ROD") for the New Cassel/Hicksville Groundwater Contamination Federal Superfund National Priorities List Site ("NPL").

EPA has issued a Proposed Remedial Action Plan ("PRAP") and the public comment period remains open at this time. The PRAP treats the contaminated groundwater downgradient of the New Cassel Industrial Area ("NCIA") as one operable unit ("EPA OU1") and proposes a preferred remedy that includes a combination of three different technologies, recognizing the strengths, limitations and synergies of each of these approaches.

We anticipate meetings with EPA to review the technical and legal issues raised by the EPA OU1 PRAP.

At this point, it appears that EPA sees no cost effectiveness in directing a separate DEC-sponsored remedy for the aquifer at the Frost Street sites to a depth at 150 feet below ground surface. Moreover, as the administrative record already establishes, there is no Record of Decision at the Federal or State level supporting a separate remedial approach, using New York State superfund money, for the groundwater contamination in the 150-250 foot deep interval within the EPA OU1.

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On August 9, 2013, Jeffrey L. Dyber, an environmental engineer in Remedial Section A of the Department, mailed a directive to Fred Werfel of the Frost Street Parties that does not acknowledge the pending appeal, fails to indicate any new technical findings with respect to the aquifer or available technologies, and indicates an intention to spend State Superfund monies on aquifer remediation at this NPL site without a ROD in support of the public expenditure. This issue is part of the pending appeal.

Therefore, we appreciate your efforts to hold the pending appeal in abeyance and the administrative record open, as we review technical and legal issues with EPA concerning this National Priorities List site, so that the Department, EPA and the Frost Street Parties may move ahead consistent with the National Contingency Plan as required. It is important that we ensure coordination between federal and state work to achieve cost-effectiveness.

We will submit all data and reports concerning the Frost Street sites to EPA and the Department in a timely manner, as requested by Mr. Dyber in his August 9 letter.

We look forward to reviewing the technical issues with the Department and EPA supported by the Frost Street Parties' full team of experts.

Our pending appeal and submissions are without prejudice to our overall position that the New Cassel/Hicksville groundwater contamination is already being addressed by a final remedy.

Sincerely,

John J. Privitera

JJP/klh

cc: Fred Werfel
J. Dyber
G. Bobersky
W. Parish
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J. Nealon
J. LaPoma, EPA

R2-0012756

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COMMENT TO PROPOSED REMEDIAL PLAN OF THE
NEW CASSEL GROUNDWATER CONTAMINATION SITE

This Comment is submitted by the New Cassel Business Association, (the "NCBA"), a not-for-profit organization originally formed in 1981 as the New Cassel Industrial Association, to assist business and property owners. The NCBA is made up of businesses operating in the commercial zone of New Cassel and works for the common good of all its members.

We strongly object to the USEPA proposed Remediation Plan for the New Cassel Groundwater Contamination Site, ("Proposed Plan"), because it is unsound, unnecessary and unjust. To begin with, the Proposed Plan relies on corrupt data and does not take into consideration a true comprehension of contamination at the New Cassel Industrial Area (the "NCIA") site. In addition, the Proposed Plan is excessive and places an overwhelming unfair burden on businesses and property owners who have already been saddled with clean up costs and negative stigma for over three decades as a result of the past actions of New York State Department of Environmental Conservation, ("NYSDEC"). Moreover, the Proposed Plan is redundant and does not take into consideration the extensive remedial measures which have been paid for and made by business and property owners, as well as the ongoing existing treatment which addresses any remaining contamination. Property owners and business have already spent millions of dollars to satisfy the issues, to start all over is counterproductive and unnecessary.

The Proposed Plan will kill any hope of economic recovery for property owners and businesses. The Proposed Plan simply is not cost effective and places more harm than good on business and property. Just when there seemed a glimmer of a recovery, the USEPA Proposed Plan throws a trap over any hope. Real estate values are at an all time low and the Proposed Plan will push values down even further, plummeting not only value but hope. Property owners and business will have greater financing burdens as the cloud of being designated a Superfund Site looms over the area. Attracting new business will be impaired, in complete contrast the designation of the NCIA as an Empire Zone was designed to promote. Keeping businesses in the NCIA will be even more difficult and attracting new business will become impossible and unrealistic. Instead of encouraging development and economic growth, the Proposed Plan will further strain an already troubled area. The mobilization, construction, along with noise factor of the Proposed Plan is enough in itself to scare business and banks away. The Proposed Plan is anything but environmentally friendly in complete contrast to its intended, although unproven and unconfirmed, benefit. Stated simply- the cure will be worse than the disease.

The business and property owners are hard working middle class people who cannot afford another set-back and the Proposed Plan. For all the reasons stated above and all the scientific reasons stated in submissions by others, the NCBA strenuously objects to the USEPA Proposed Plan.

Respectfully submitted,

Anthony Chiofalo
Secretary

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VIA ELECTRONIC MAIL AND FEDERAL EXPRESS

September 24, 2013

Jennifer L. LaPoma
Remedial Project Manager
Western New York Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866

Re: Comments on the July 2013 Proposed Remedial Action Plan for Operable Unit 1 of the New Cassel/Hicksville Groundwater Contamination Superfund Site, Nassau County, New York

Dear Ms. LaPoma:

On behalf of our client, Vishay GSI, Inc. (VGSI), WSP USA Corp. is submitting this letter to provide comments on the U.S. Environmental Protection Agency's (EPA's) July 2013 Proposed Remedial Action Plan (PRAP) for Operable Unit 1 (OU1) of the New Cassel/Hicksville Groundwater Contamination (NCHGW) Superfund Site (Site) located in Nassau County, New York. OU1 is defined as contaminated groundwater immediately downgradient of the New Cassel Industrial Area (NCIA) and is only one portion of the Site. The PRAP is an interim remedy to be implemented while EPA evaluates additional remedies for additional OUs at the Site.

For many years, VGSI has been conducting environmental investigation and remediation associated with the former General Instrument Corporation (GIC) site located at 600 West John Street in Hicksville, New York. While the proposed OU1 treatment area does not address any contaminants in groundwater associated with the former GIC site, VGSI believes the interim remedy needs further evaluation and reconsideration. In addition, VGSI has considerable familiarity with the various challenges presented by the in-well stripping technology proposed as part of the OU1 remedy, all of which were detailed in technical reports submitted to NYSDEC. It is apparent that the unique operation and maintenance issues associated with implementing in-well stripping in this section of the aquifer were not considered by EPA. As such, VGSI believes that submittal of the comments presented in this letter is both appropriate and necessary.

Background & History

The Site consists of 6.5 square miles of groundwater contamination within the towns of Hempstead, North Hempstead, and Oyster Bay in Nassau County, New York. The NCIA portion of the Site includes approximately 170 acres of land that was developed for industrial use from the 1950s through the 1970s. Onsite leach pools and/or dry wells were generally used for disposal of wastewater until sewers were installed in the 1980s. The area within OU1 encompasses approximately 211 acres and includes residential and commercial/light industrial properties[1].

[1] EPA. Superfund Proposed Plan, New Cassel/Hicksville Groundwater Contamination Superfund Site, Nassau County, New York. July 2013.

The Site is underlain by glacial outwash and morainal deposits known as the Upper Glacial Aquifer (UGA), the underlying Magothy Formation and Matawan Group (Magothy), and the Raritan Formation. The UGA is approximately 40 to 65 feet thick and consists of coarse-grained sands and gravel. The Magothy formation sediments are estimated to be 600 feet thick and are characterized by sand and silty sand with discontinuous clay and silt layers. Unconfined groundwater is generally found at 40 to 65 feet below ground surface (bgs) near the estimated boundary between the UGA and Magothy formations. Groundwater flow is generally to the south-southwest and may be influenced by operation of the downgradient Bowling Green public water supply wells.

In 1986, extensive groundwater contamination was identified throughout the NCIA. Volatile organic compounds (VOCs) were identified in the Bowling Green public water supply wells located approximately 1,000 feet downgradient of the NCIA. Subsequent investigations identified releases of VOCs such as trichloroethene (TCE), tetrachloroethene (PCE), and 1,1,1-trichloroethane (1,1,1-TCA) from the NCIA. The PRAP characterizes the groundwater contamination in OU1 as three separate plumes (referred to as the eastern, central, and western plumes). In 1990, a treatment system consisting of granular activated carbon (GAC) was installed at the Bowling Green water supply wellheads to remove VOCs from the groundwater. Five years later, the treatment system was supplemented with an air stripper. This system is still in operation today and is effective at removing the VOCs to concentrations below applicable drinking water standards.

In October 2003, the New York State Department of Environmental Conservation (NYSDEC), under its Statute authorities, selected in-well vapor stripping/localized vapor treatment as a remedy to address the contaminants in the upper and deep portion of the aquifer (to 225 feet bgs). *Ex situ* extraction and treatment was retained as a contingency if pilot testing determined in-well stripping to be technically or economically infeasible. In 2009, NYSDEC completed a pre-design investigation that determined the Magothy formation to be anisotropic and, as a result, concluded that in-well vapor stripping may not be an effective technology for this site. A subsequent pre-design investigation for the contingent conventional pump and treat system was completed in 2011. However, while this pre-design investigation was underway, the NYSDEC requested that the Site be added to the National Priorities List (NPL) and the design was never completed or implemented. The Site was added to the NPL in September 2011.

Objection to the Proposed Remedial Action Plan

The EPA's PRAP for OU1, while not the final remedy for the Site, needs further evaluation and reconsideration. The selected alternative in the PRAP, Alternative 5, includes installation of 20 in-well vapor stripping wells, 6 conventional extraction wells, *ex situ* treatment of groundwater and vapor at a centralized treatment building, and the potential for *in situ* chemical oxidation (ISCO) to treat areas with VOCs concentrations in groundwater greater than 10,000 micrograms per liter (µg/l). The conceptual design for the interim remedy includes more than 18,000 linear feet of air transfer piping and 8,000 linear feet of water transfer piping through public rights-of-way in predominantly residential areas. The majority of the wells in the conceptual design are to be located in residential areas.

VGSI's principal objection to the PRAP is that the remedial alternatives evaluated by EPA were developed to mitigate unsubstantiated future risks. The Baseline Human Health Risk Assessment (BHHRA) prepared by HDR in May 2013, evaluates risks to future residents and commercial and industrial workers under a future land use scenario in which they use (untreated) Site groundwater for potable purposes. The BHHRA acknowledges that no private potable wells are currently used in the

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vicinity of the Site, but hypothetically assumes that future residents and commercial/industrial workers could potentially be exposed to OU1 contamination via drinking water if engineering controls at the Bowling Green public water supply facility were not maintained. This fundamental assumption is without basis. Groundwater in this area of Nassau County has been the subject of countless studies and publications over many years. Regional groundwater contamination has been very well documented and publicized. Wells, even for non-potable purposes, cannot be dug without appropriate permits and approvals. Therefore, it is unreasonable to assume that untested or untreated groundwater would be used for drinking water purposes under any future land use scenario. Because of this unjustified assumption, the development of remedial action alternatives excluded viable and practical technologies such as wellhead treatment. EPA should revisit the feasibility study for OU1 to incorporate wellhead treatment into the remedial alternatives development.

As described above, VGSI objects to the foundational basis for the remedial alternatives developed by EPA. In addition, it is impossible to reconcile EPA's evaluation of the remedial alternatives against the nine evaluation criteria both because the proposed alternatives ignore the ongoing wellhead treatment as a readily available and viable technology and because EPA's evaluation of proposed technologies includes critical errors and oversights. The nine criteria for selecting a remedy that EPA is required to evaluate in accordance with the National Contingency Plan (NCP) are as follows:

Threshold Criteria
- Overall Protection of Human Health and the Environment.
- Compliance with Applicable or Relevant and Appropriate Requirements.

Balancing Criteria
- Long-Term Effectiveness and Permanence
- Reduction in Toxicity, Mobility or Volume through Treatment
- Short Term Effectiveness
- Implementability
- Cost

Modifying Criteria
- State Acceptance
- Community Acceptance

EPA's analysis of the first threshold criteria overlooks the fact that Alternative 5 actually creates new exposure risks to human health and the environment compared to existing conditions. The exclusion of wellhead treatment from the development of remedial alternatives ignores the fact that the technology has a demonstrated record of long-term effectiveness and permanence at other Superfund sites. EPA's evaluation of implementability does not account for the unwarranted complexity of Alternative 5, and EPA's cost evaluation significantly underestimates the operations and maintenance (O&M) costs for in-well stripping wells. Finally, the PRAP references EPA Region 2's "Clean & Green" Policy, the goal of which is to "enhance the environmental benefits of federal cleanup programs by promoting technologies and practices that are sustainable"[2]. Alternative 5 is not the most sustainable alternative available.

Each of these concerns is addressed in more detail below.

[2] www.epa.gov/region02/superfund/green_remediation/policy.html

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New Exposure Risks to Human Health and the Environment

As shown by the data collected during the vapor intrusion investigations completed by NYSDEC, there is no risk of exposure to contaminated vapors by the residents in the area at this time. However, installing 20 in-well stripping wells that transfer VOC-laden air through 9,000 feet of linear piping through predominantly residential areas will increase that risk. VOCs will be stripped at the wellheads in below grade vaults in residential areas, and while the system may be designed such that there is a vacuum applied at the wellhead, there will be downtime due to equipment malfunctions or electrical service disruptions, and VOC-laden air could seep out of the vaults or cracks and leaks in piping that are likely to develop over 30 years of operation.

Direct contact exposure to contaminated groundwater is also not an issue at this time as the groundwater table is significantly below the residential areas. However, when the water is brought to the surface and transferred via 8,000 feet of piping to the treatment building, there is the potential for risk of exposure. There is greater potential for utility workers to be exposed to contaminated water through accidents, and the transfer piping itself could fail or develop leaks, resulting in discharges of contaminated groundwater to the ground surface or shallow subsurface. Finally, there is the potential for undetected leakage of the underground transfer piping, thereby impacting uncontaminated shallow groundwater.

None of the potential risks identified above currently exist. Yet, they are all far more likely to occur if Alternative 5 is implemented than the hypothetical future use of contaminated groundwater for potable purposes.

Well Head Treatment has Demonstrated Long Term Effectiveness and Permanence

Wellhead treatment, while not thoroughly evaluated in the PRAP as a remedial alternative, is the most applicable sustainable technology for this Site and has been approved by the EPA for the final or interim remedies at several NPL sites where large-scale public water supply systems have been affected by VOCs. It also has a documented history of long-term effectiveness and permanence.

EPA Region 9 has accepted wellhead treatment as a final remedy at several NPL sites, including the San Gabriel Valley (Area 2) Baldwin Park and the San Fernando Valley Superfund sites in Los Angeles County, California. At the Baldwin Park site, commingled plumes of groundwater containing VOCs encompass an area over one mile wide by eight miles in length. Groundwater from the aquifer serves as the drinking water source to over 90 percent of the local community of over 150,000 residents and businesses. VOCs present in the groundwater are similar to the Site and consist of TCE, PCE, carbon tetrachloride, perchlorate, N-nitrosodimethylamine, 1,4-dioxane, and 1,2,3-trichloropropane. In March 1994, after considerable investigation and public involvement, the EPA selected wellhead treatment, consisting of four separate systems capable of treating over 26,000 gpm of contaminated groundwater, as the final remedy for the site. The wellhead treatment systems began operating between 2000 and 2007, using a variety of technologies such as ion exchange, ultraviolet (UV) light and hydrogen peroxide, air stripping, and/or GAC, to remove the targeted compounds from the groundwater. EPA's Five-Year Reviews of the project in 2007 and 2012 concluded that the remedy continues to meet the

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goals of limiting the further spread of contaminated groundwater, removing contaminants from the groundwater, and ensuring all drinking water standards are met[3].

At the San Fernando Valley (Area 2) Glendale site, contaminated groundwater containing TCE, PCE, and hexavalent chromium encompasses an area of 6,680 acres in a heavily populated area. Prior to the discovery of the VOCs in the groundwater, the aquifer supplied drinking water to over 800,000 residents. Approximately 3 million people live within 3 miles of the site. Impacted drinking water supply wells were shut off in the 1980s until an interim remedy consisting of wellhead treatment could be implemented in 2000. Contaminated groundwater from eight supply wells is treated at a rate of 5,000 gpm at a centrally-located plant to remove the contaminants while the investigation into the location and extent of chromium contamination and evaluation of applicable treatment technologies continues. The system has been protective of human health and the environment because all exposure pathways are currently being controlled[4].

At the Site, the infrastructure for groundwater treatment is already in place at the Bowling Green wellheads, and has been in place since 1990. The equipment was upgraded in 1995 and continues to operate, removing contaminants from the groundwater prior to distribution. The air-stripping and carbon technology employed at Bowling Green have a long history of effectiveness (i.e., removing contaminants down to levels such that the groundwater meets drinking water criteria), and have further demonstrated the ability to be a permanent remedial alternative both at Bowling Green, and at other Superfund sites. Of course, wellhead treatment systems could also be expanded or modified as necessary in the future to meet the needs of the public water supply system.

Implementability – Unwarranted Complexity and High Capital Costs

Alternative 5 in the PRAP includes separate groundwater extraction and treatment systems for each of the eastern, central, and western plumes. In the eastern plume, groundwater would be extracted from 3 conventional pumping wells to address higher concentrations of VOCs that cannot be effectively removed with in-well stripping, while in the central plume groundwater would be treated in 8 in-well vapor stripping wells. For the western plume, groundwater would be treated with a combination of 3 conventional pumping wells and 12 in-well vapor stripping wells. ISCO will be further evaluated for implementation in areas of high VOC concentrations. The PRAP includes one centralized groundwater treatment plant placed in the vicinity of Nassau County Recharge Basin #51.

On page 20 of the PRAP, it is stated that selection of Alternative 4, which includes installation of 11 groundwater extraction wells, treatment at a centralized location, and re-injection to infiltration wells or discharge to a publicly-owned treatment works (POTW),

> ”*increases the volume of extracted groundwater that would require ex-situ treatment and handling, thereby increasing both the capital costs and annual operations and maintenance costs without providing a significant reduction of TMV [Toxicity, Mobility, or Volume] of contaminants relative to Alternative 5…Utilizing both in-well vapor stripping and extraction and treatment would additionally provide cost saving measures by reducing capital costs associated with installing independent remedial systems*”.

[3] EPA. EPA Completes “Five-Year Review of Azusa/Baldwin Park Groundwater Cleanup”. Superfund Site Fact Sheet, January 2012.
[4] EPA. First Five-Year Review Report for San Fernando Valley Area 2 Superfund Site, Los Angeles County, California. September 2008.

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However, this statement is directly contradicted by the estimated capital costs shown on page 18 of the PRAP. The estimated capital cost for Alternative 4 ($8,862,000) is the lowest of all of the active remedial alternatives proposed, compared to $11,728,000 and $10,044,000 for remedial Alternatives 3 and 5, respectively.

The PRAP also states "Access to install the in-well vapor stripping wells and the extraction wells under the preferred remedy, Alternative 5, though still complicated, is more manageable". While it is true that there would only be 20 in-well vapor stripping wells for Alternative 5 compared to 72 under Alternative 3, the amount of trenching needed to implement Alternative 5 for piping installation (approximately 13,000 linear feet), and therefore disruption to traffic flow, is actually more than Alternative 4 (estimated 11,000 linear feet). In addition, having three types of piping to maintain (air sparging, stripped vapors, and extracted groundwater) is more complicated than if one technology were selected. While there are less in-well stripping wells included under Alternative 5 than 3, there will still be significant disruption to residential areas for more than 25 percent of the year when equipment is brought in for routine cleaning of the in-well stripping wells (see Underestimated O&M Costs section below).

Finally, as pointed out in the PRAP, there may also be practical limitations on delivering compressed air to the in-well vapor strippers. While air compressors could be located in the residential neighborhoods near the wellheads, this would require additional electrical systems to install and maintain and may present a noise nuisance to nearby residents. Placing compressors at the central treatment location that could consistently deliver enough pressure to overcome the requisite hydraulic head across 5,000 feet of linear piping to the furthest well may not be technically practical.

Underestimated O&M Costs

VGSI has first-hand knowledge and experience with the type of groundwater circulation treatment system proposed for OU1, having installed, operated, and maintained a similar system associated with the former General Instrument Corporation (GIC) site located at 600 West John Street in Hicksville, New York, from 2003 to 2009.

In 2003, available data indicated that a plume of VOCs potentially attributable to the former GIC site had migrated offsite. Based on an engineering evaluation of available groundwater remediation technologies, groundwater circulation well technology was proposed for an offsite interim remedial measure (IRM)[5]. The purpose of the system was to control the rate of VOC migration further downgradient and reduce the VOC mass at the leading edge of the plume as identified at the time.

A successful pilot test of circulation well technology utilizing Unterdruck-Verdampfer-Brunnen (UVB) style wells was implemented in 2003 with the installation of well UVB-1. Well UVB-1 was installed to 380 feet bgs and consisted of three 30 to 40-foot screens separated by inflatable packers. Water was extracted from the middle screen at a design rate of 60 gallons per minute (gpm), treated in a below-grade air stripper to remove VOCs, and then discharged to both the upper and lower screens of the well. Vapors from the stripper were passed through GAC to remove the VOCs, and the GAC was sent offsite for disposal. The results of the pilot test indicated that the technology was effective at removing the

[5] ESC Engineering of New York, P.C. Letter to Mr. Kevin Carpenter of the NYSDEC from Mr. John P. Black, P.E., regarding Engineering Evaluation and Rationale for Selection of Interim Remedial Measures, Former General Instrument Corporation Site, Hicksville, New York. October 11, 2002.

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VOC mass from the groundwater, and a full-scale system including two additional UVB wells with dual air-stripping trays was installed in 2004.

During the pilot test and post-pilot operating period before the full-scale system was installed, well UVB-1 functioned with minimal operational downtime. After approximately 10 months of operation, the first sign of biological fouling of the wells screens in UVB-1 was observed. In late 2004, well UVB-1 was mechanically cleaned with acid to remove iron scale and sediment, a time-consuming process due to removal, cleaning, and replacement of all of the downwell piping and equipment. The overall IRM system operational efficiency for the first calendar year of operation was 54 percent, at a cost of approximately $60,000 per well.

Fouling of the well screens in UVB-1 began again in late January 2005, just months after acid cleaning the well. At around the same time, performance data also indicated fouling of the UVB-2 well screens. Because the acid cleaning of UVB-1 demonstrated limited success, the Aqua Freed® process[6] was implemented in May 2005, after less than one year of full-scale system operation, for rehabilitating all three wells. To reduce long-term O&M costs related to cleaning the wells, Aqua Gard® equipment was installed in each of the wells in August 2005 to enable periodic cleaning without removing the downwell equipment, and a suction flow control device was also installed in well UVB-3 in an attempt to control the flow of very fine sand that was being pulled into this well. The planned schedule for Aqua Gard® cleaning events was initially every six months. While some sand was still pulled into the middle screened interval of well UVB-3, the suction flow control device was somewhat successful at controlling the rate of sand generation. Due to downtime associated with the installation of the Aqua Gard® equipment and other routine O&M activities, the overall operational efficiency of the IRM system decreased to 37 percent and at a cost of approximately $118,000 per well.

The wells were cleaned as a preventative maintenance measure using the Aqua Gard® system in March 2006, and then again five months later due to fouling of the well screens. During the next four months, wells UVB-1 and UVB-3 became fouled in a shorter period of time than previously encountered. Despite the fouling of the well screens, the overall operational efficiency of the IRM system increased to 72 percent in 2006, primarily due to the more efficient well cleanings after the Aqua Gard® equipment was installed. Notwithstanding the increase in efficiency, the O&M costs were still approximately $60,000 per well.

Upon removal of the downwell equipment in January 2007 (while replacing a pump), significant pitting and corrosion was observed on the Aqua Gard® piping used to deliver carbon dioxide in well UVB-3. Therefore, the recharge piping on all three wells was replaced with stainless steel piping, and the system was restarted in March 2007. Within days of restarting the system, well UVB-1 automatically shut down as a result of a blockage in the recharge line to the lower screened interval caused by fine-grained material entering the middle screened interval of the well during operation. After the material was removed using air-lift techniques, the well operated for only weeks before shutting down again due to fine sand infiltration.

The wells were again cleaned in August 2007; however, it was noted that sand was still being generated in well UVB-1, causing the submersible pump to seize and sand to be pumped into the lower screened

[6] A controlled injection of gaseous and liquefied carbon dioxide to dislodge mineral encrustation (iron, manganese and calcium), physical plugging (silts, clays and fine sands), and biological fouling (iron bacteria, sulfate reducing bacteria and slime forming bacteria).

interval of the well. A suction flow control device was installed in well UVB-1 as an attempt to prevent the flow of sand into the well under normal operating conditions. Upon restarting the system, and despite restarting well UVB-1 at a lower extraction rate as a precautionary measure, fine sand was still being pulled into well UVB-1, and the well only operated for a short period of time before the well required cleaning again in the spring of 2008. The operational efficiency of the IRM system was reduced to 28 percent in 2007 after only 3 years of operation, and annual costs increased once again to approximately $114,000 per well.

The final well cleaning event was completed in March 2008. Despite the cleaning, well UVB-1 continued to experience frequent shut downs, and when in operation, extracted water could only be recharged to the upper screened interval due to blockage by sand in the lower screened interval. This well was rendered completely inoperable due to very fine sand infiltration in June 2008, after less than five years of operation. Wells UVB-2 and UVB-3 continued to operate during the rest of 2008 with an overall operational efficiency of 52 percent and at a cost of approximately $75,000 per well.

Wells UVB-2 and UVB-3 continued to operate in 2009 until the blower for well UVB-3 failed and the well was turned off. Based on the increasing O&M costs and the results of additional remedial investigations, well UVB-2 was also manually turned off in May 2009.

The PRAP includes O&M for in-well stripping wells over 30 years. While the conceptual in-well vapor stripping system is a slightly different design than the UVB wells installed at the former GIC site, it is our experience that the continued cycling of oxygenated water below grade causes considerable routine maintenance problems. Similar maintenance problems, such as biofouling in the wells, corrosion of downwell piping, and siltation within the wells, have also been encountered in groundwater circulation well systems at Brookhaven National Labs site in Upton, New York. During operation of the IRM for the GIC site, WSP staff conferred with staff at the Brookhaven National Labs site responsible for system O&M. While the Supplemental Feasibility Study Technical Memorandum for OU1[7] addresses the risk of chemical iron fouling (concluding that the risk is low due to iron concentrations in area groundwater generally less than 1 milligram per liter), the memorandum does not address the risk of iron-related biofouling, which was the cause of the fouling realized at the recirculation well system for the former GIC site.

The PRAP significantly underestimates the costs associated with ongoing maintenance of these types of systems (approximately $26,000 per well annually)[8], as well as the logistics of maintaining numerous wells within residential areas. Mechanically cleaning a well will take several days due to removal and replacement of the downwell equipment, and there is significant heavy equipment such as pump rigs, frac tanks, and support vehicles involved. Even conservatively assuming each well would only be cleaned semi-annually and that it takes two days to clean each well, this equipment would be present in residential neighborhoods for more than 25 percent of the year.

At the beginning of operation of the full-scale IRM system for the former GIC site, annual O&M costs were approximately $60,000, however, that rapidly increased to an average O&M cost of $288,000, or approximately $96,000 per well, which is significantly greater than the $26,000 per well included in the

[7] Supplemental Feasibility Study Technical Memorandum for Operable Unit 1 for the New Cassel/Hicksville Groundwater Contamination Superfund Site Nassau County, New York, HDR/O'Brien & Gere Joint Venture, July 2013.
[8] $680,000 annual O&M cost divided by 26 total wells (20 in-well stripping wells and 6 conventional extraction wells).

R2-0012766

PRAP. Based on our experience, this estimated O&M cost per well is significantly less than what is likely to be incurred and should be further evaluated.

Alternative 5 is Not the Most Sustainable Alternative Available

At the Site, the infrastructure for groundwater treatment is already in place at the wellheads, requiring significantly less impact on the environment compared to Alternative 5. No additional energy is required to transfer the contaminated water from the ground surface to the point of treatment because the water is already being extracted for drinking water use. Wellhead treatment systems could be expanded or modified as necessary in the future to meet the needs of the public water supply system.

Conclusion

For the reasons presented in this letter, the EPA's selection and evaluation of remedial alternatives for OU1 includes significant flaws that warrant additional consideration and reevaluation. All of the remedial alternatives considered by EPA were developed to mitigate future risks that are unsubstantiated, and as a result, other viable and practical technologies were excluded from consideration. EPA's preferred Alternative 5 actually creates new exposure risks to human health and the environment compared to existing conditions. Alternative 5 is also unnecessarily complex and costly to install, and local experience indicates that Alternative 5 will be considerably more expensive to operate and maintain than assumed. Finally, a more sustainable remedial alternative with a documented record of long-term effectiveness and permanence is available that has not been included in EPA's evaluation, namely wellhead treatment at existing and future public supply wells. As such, the feasibility study for OU1 should be revisited to consider wellhead treatment as an alternative and the evaluation of alternatives should be revised to account for the flaws highlighted herein.

Sincerely yours,

James A. Sobieraj, P.E.
Senior Project Director

JS:cda
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cc: Vishay GSI, Inc.
Todd M. Hooker, Esq., Laddey, Clark & Ryan LLP

R2-0012767

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September 20, 2013

Ms. Jennifer LaPoma, Remedial Project Manager
United States EPA
290 Broadway, 20th Floor
New York, NY 10007-1866

Re: New Cassel/Hicksville Ground Water Contamination Superfund Site

Dear Ms. LaPoma,

The Hicksville Water District (herein referred to as the "District") has been at the forefront of VOC treatment in New York since the 1980s as a result of the industrial activities conducted near and within the capture zones of its supply wells. The District was planning the construction of some of the first VOC treatment systems in the region capable of treating to below 2 ppb more than 5 years prior to the promulgation of EPA's SDWA Amendment in 1987 which established the first MCLs for VOCs in drinking water. Since then, the District has proceeded to improve its VOC treatment capabilities and has instituted a policy of treating VOCs to non-detect to provide drinking water of the highest quality to its customers. When the District was notified about this proposed remediation plan, it authorized its Engineer, Holzmacher, McClendon & Murrell, P.C. (herein referred to as "H2M"), to review the plan to protect consumers' interests. It is imperative to the District that any remediation plan do not adversely impact the water quality near the capture zones of its wells or any land within its service area where future supply wells may be constructed.

On behalf of the District, H2M has reviewed the New Cassel/Hicksville Ground Water Contamination Superfund Site Proposed Plan, issued July 2013. Based on our review we have the following comments:

1. The Proposed Plan indicates that a goal of OU1 will be to minimize the migration of groundwater above the MCL. As part of the long-term monitoring program for OU1, how often will each treatment system be sampled to confirm it is meeting performance standards? How often will these results be published for public review? Does the EPA have any information demonstrating that the two existing monitoring well clusters are in the appropriate locations and depths to determine that the performance standards are being achieved? Will additional monitoring wells be installed to confirm that contamination is not migrating out of the remediation zone?
2. While the Proposed Plan states that a part of the performance standards is to reduce contamination within the aquifer to the federal and state drinking water standards, it does not indicate whether OU1 will be designed for lower cVOC drinking water standards. We assume that this plan will incorporate a contingency for a lower cVOC MCL.

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3. The Proposed Plan states that in-situ chemical oxidation will be part of the recommended Alternative No. 5. What chemicals will be used to oxidize the VOCs? Will the chemicals themselves introduce additional contamination into the aquifer (i.e., heavy metal impurities in Potassium Permanganate)? What information does the EPA have that can demonstrate that no other water quality issues will come as a result of chemical oxidant injection into the aquifer? Can the EPA confirm that the injection of chemical oxidants into the aquifer will not mobilize inorganic contamination into the groundwater? How will the EPA determine complete mineralization of the VOC contamination since the by-products of the parent products TCE, PCE and TCA are more difficult for water suppliers to treat with conventional technology as they move down their degradation pathways?

4. Since incomplete oxidation by-products are more difficult to treat with conventional treatment such as air stripping and GAC, wouldn't this adversely impact the other treatment systems proposed which rely on the mass transfer between air and water to remove contamination? Additionally, is it prudent to target the highest concentrations of contamination with ISCO, which would theoretically produce higher by-product concentrations?

5. The Proposed Plan indicates that ISCO converts contaminants into non-toxic by-products. What are the non-toxic by-products that would be produced from the treatment of the contamination with ISCO at this site? The only acceptable by-products to the District are those from complete mineralization (chlorine, carbon dioxide and water).

6. The Proposed Plan does not address whether or not the groundwater plume was analyzed for solvent stablizers, particularly 1,4 – Dioxane. This contaminant is part of the third Contaminant Candidate List and is currently regulated in other states. Has the EPA sampled for 1,4 – Dioxane at this site? Will this plan evaluate the presence of 1,4 – Dioxane and incorporate a contingency if it becomes regulated?

7. The Proposed Plan indicates that additional OUs will be evaluated in the future. This plan specifically mentions a second OU in the far field area down gradient of the portion of the plume addressed by OU1. Does the EPA have a schedule for these other OUs?

8. Hicksville Well Nos. 9-1 and 9-2 should be identified within this plan as they have also been impacted by VOC contamination. Well No. 9-1 has been impacted by contamination exceeding the MCL in the past and is currently impacted by low level contamination. Well No. 9-2 has historically been impacted by low level contamination. If the EPA follows through with lower cVOC standards, it is possible that contamination in both wells could exceed the new standards.

The District and H2M appreciate the opportunity to review and comment on the EPA's plan, and we are fully supportive of the EPA taking the appropriate steps to address area groundwater contamination that can and will have negative effects on public supply wells. The District considers itself a partner in any effort to remediate area groundwater and will work closely with the EPA to help ensure overall program success.

Should you have any questions or comments, please contact this office.

Very truly yours,

HOLZMACHER, McLENDON & MURRELL, P.C.

Richard W. Humann, P.E.

cc: Board of Commissioners
Supt. Anthony Iannone
Joseph Frank, Esq.

LaPoma, Jennifer

From: Echols, Cecilia
Sent: Thursday, August 22, 2013 10:10 AM
To: LaPoma, Jennifer
Subject: FW: question about the New Cassel Superfund site

Hi Jennifer,

Please provide me with language regarding the first two questions below. I would like to respond to Renee shortly. Thanks

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From: Renee Holmes [mailto:renee45241@yahoo.com]
Sent: Wednesday, August 21, 2013 7:04 PM
To: Echols, Cecilia
Subject: question about the New Cassel Superfund site

Hi Ms. Echols

Is this the same site as the COE Sylvania site? If it is not the same, what is the coordination that Region 2 and the COE are doing for the two sites?Where is the local repository for documents? No need to simplify the language in your response, I previously worked as a Region 6 Superfund attorney. Thank you so much.

Renee Holmes

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