Department of Environmental Conservation

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Division of Environmental Remediation

Record of Decision

100 Oser Avenue Site
Operable Unit No. 2
Smithtown, Suffolk County, New York
Site Number 1-52-162

January 2006

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* DENISE M. SHEEHAN, *Commissioner*

500074

DECLARATION STATEMENT - RECORD OF DECISION

100 Oser Avenue Inactive Hazardous Waste Disposal Site
Operable Unit No. 2
Smithtown, Suffolk County, New York
Site No. 1-52-162

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for Operable Unit 2 of the 100 Oser Avenue site, a Class 2 inactive hazardous waste disposal site. The selected remedial program was chosen in accordance with the New York State Environmental Conservation Law and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for Operable Unit 2 of the 100 Oser Avenue inactive hazardous waste disposal site, and the public's input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened releases of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and/or the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation and Feasibility Study (RI/FS) for the 100 Oser Avenue site and the criteria identified for evaluation of alternatives, the NYSDEC has selected In-situ chemical oxidation for groundwater contamination in the area of the plume as it leaves the 100 Oser Avenue site proper and in the plume directly upgradient of the wetlands area to reduce the highest concentration levels of VOCs in the groundwater that discharges into the wetland and sub-slab depressurization of structures that require them for indoor air. The components of the remedy are as follows:

- In-situ chemical oxidation for the area of the plume as it leaves the 100 Oser Avenue site proper and in the plume directly upgradient of the wetlands area to reduce the highest concentration levels of VOCs in the groundwater that discharges into the wetland. The remedy addresses the threats outlined above by reducing the concentrations of VOCs in the groundwater entering the wetland water and sediment. By lowering the concentrations of VOCs in the groundwater at the beginning of the plume, the threat of soil vapor intrusion would be reduced since the concentrations would decrease after the remedy was implemented.

- Implement a soil vapor monitoring program to provide for the additional characterization of the potential for soil vapor intrusion and, if necessary, installation of subslab depressurization systems.

- Monitored Natural Attenuation of the remainder of the plume using existing wells and additional wells to be installed during the design phase of the project.

- A Remedial Design program to provide the details required to implement the remedial program.

- Since the remedy results in untreated hazardous waste remaining in OU2 of the site, a long term monitoring program will be instituted. Monitoring will include the groundwater, soil gas, indoor air, and the wetlands sediment and surface water. This program will monitor the effectiveness of the in-situ chemical oxidation injection and the indoor air and will be a component of the operation, maintenance, and monitoring for the site. Costs of this monitoring were included in the cost of the selected remedy for Operable Unit 1.

- Development of a site management plan to address residual contamination and any use restrictions to be incorporated into the OU-1 site management plan.

- Imposition of an institutional control in the form of an environmental easement (IC/EC) on the 100 Oser Avenue property that will (a) require compliance with the approved site management plan; (b) limit the use and development of the property to commercial or industrial uses only; (c) restrict the use of groundwater at 100 Oser Avenue as a source of potable or process water without necessary water quality treatment as determined by NYSDOH or SCDOH.

- The 100 Oser Avenue property owner will provide an IC/EC certification, prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC on a periodic basis, until the NYSDEC notifies the property owner in writing that this certification is no longer needed. This submittal will contain certification that the institutional controls and engineering controls are still in place, allow the NYSDEC access to the site, and that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan.

- If, during the evaluation of the monitoring data, the Department determines that additional groundwater remediation is necessary, another appropriate remedy would be implemented.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy selected for this site is protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

JAN 17 2006

Date

Dale A. Desnoyers, Director
Division of Environmental Remediation

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RECORD OF DECISION

100 Oser Avenue Site
Operable Unit No. 2
Smithtown, Suffolk County New York
Site No. 1-52-162
January 2006

SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), has selected this remedy for the 100 Oser Avenue site, Operable Unit No. 2 which is considered the off-site groundwater contamination. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this remedy. As more fully described in Sections 3 and 5 of this document, a textile manufacturer, which operated from the mid-1970's to 1985, used tetrachloroethene (PCE) to dry clean finished textile products and discharged PCE into the subsurface soils via dry wells on the west side of the 100 Oser Avenue building, have resulted in the disposal of hazardous wastes, including Tetrachloroethene (PCE). These wastes have contaminated the soil and groundwater at the site, and have resulted in:

- a significant threat to human health associated with potential exposure to soil vapor, sediments, surface waters and groundwater.

- a significant environmental threat associated with the impacts of contaminants to off-site groundwater contamination which travels approximately one mile down gradient and discharges into a wetland and New Mill Pond.

To eliminate or mitigate these threats, the NYSDEC has selected the following remedy:

- In-situ chemical oxidation for the area of the plume as it leaves the 100 Oser Avenue site proper and in the plume directly upgradient of the wetlands area to reduce the highest concentration levels of VOCs in the groundwater that discharges into the wetland. The remedy addresses the threats outlined above by reducing the concentrations of VOCs in the groundwater entering the wetland water and sediment. By lowering the concentrations of VOCs in the groundwater at the beginning of the plume, the threat of soil vapor intrusion would be reduced since the concentrations would decrease after the remedy was implemented.

- Implement a soil vapor monitoring program to provide for the additional characterization of the potential for soil vapor intrusion and, if necessary, installation of subslab depressurization systems.

- Monitored Natural Attenuation of the remainder of the plume using existing wells and additional wells to be installed during the design phase of the project.

- A Remedial Design program to provide the details required to implement the remedial program.

- Since the remedy results in untreated hazardous waste remaining in OU2 of the site, a long term monitoring program will be instituted. Monitoring will include the groundwater, soil gas, indoor air, and the wetlands sediment and surface water. This program will monitor the effectiveness of the in-situ chemical oxidation injection and the indoor air and will be a component of the operation, maintenance, and monitoring for the site. Costs of this monitoring were included in the cost of the selected remedy for Operable Unit 1.

- Development of a site management plan to address residual contamination and any use restrictions to be incorporated into the OU-1 site management plan.

- Imposition of an institutional control in the form of an environmental easement (IC/EC) on the 100 Oser Avenue property that will (a) require compliance with the approved site management plan; (b) limit the use and development of the property to commercial or industrial uses only; (c) restrict the use of groundwater at 100 Oser Avenue as a source of potable or process water without necessary water quality treatment as determined by NYSDOH or SCDOH.

- The 100 Oser Avenue property owner will provide an IC/EC certification, prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC on a periodic basis, until the NYSDEC notifies the property owner in writing that this certification is no longer needed. This submittal will contain certification that the institutional controls and engineering controls are still in place, allow the NYSDEC access to the site, and that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan.

- If, during the evaluation of the monitoring data, the Department determines that additional groundwater remediation is necessary, another appropriate remedy would be implemented.

The selected remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

SECTION 2: SITE LOCATION AND DESCRIPTION

100 Oser Avenue is a two and one-half acre parcel of land located in the Heartland Industrial Park, in the hamlet of Hauppauge, Town of Smithtown, Suffolk County. The property is developed with a one-story masonry building, approximately 24,000 square feet in size and associated parking areas. The property is bordered to the north by privately owned residential properties along Holiday Park Drive. The east, west and south are bordered by other industrial properties within the industrial park. The site location is shown on Figure 1.

Aerial photographs show that the property was undeveloped and wooded in 1968. The next available photograph in 1976 shows that 100 Oser Avenue had been built and was owned by Vanderbilt Associates who leased the Building to Sands Textile Corporation (Sands). Sands was reportedly a textile manufacturer that used PCE to dry clean finished products from the mid-1970's to 1985. The source of contamination is allegedly related to discharges of PCE to the subsurface on the west side of the 100 Oser Avenue building during the period when Sands was operating on the property. The site layout is shown on Figures 2A and 2B.

Other sites with potential sources of contamination in the area include:

- Glaro, Inc. -735 Old Willets Path, (1 mile southeast) - active remediation (NYS Site No. 1-52-124)
- Computer Circuits - 145 Marcus Blvd., (1,100 feet south-southwest) - active EPA investigation (NYS Site No. 1-52-034)

All of the above-mentioned sites are located in Hauppauge. The distances indicated are approximate.

Operable Unit (OU) No. 2, which is the subject of this document, consists of the off-site groundwater contamination plume. An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination.

The remaining operable unit for this site is Operable Unit 1, which consists of the 100 Oser Avenue property. The site has three active soil vapor extraction systems. The first is used to remediate the PCE contamination source area. There is an SVE system in both 100 and 110 Oser Avenue to remedy the indoor air concentrations of PCE within these buildings. A Potassium Permanganate injection will be used for in-situ chemical oxidation to remedy the groundwater on-site in Summer 2005.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

From 1975 to 1985, Sands Textiles Finishers, Inc. used and disposed PCE at the site. PCE was used to dry clean finished textiles at the facility. Disposal of PCE was likely to have occurred in the storm water drainage system via pipes from the building and the septic system via floor drains or slop sinks. Anecdotal evidence indicates that used PCE was also disposed in the roof drain cleanouts and open pits in the floor.

Two aboveground PCE storage tanks and one underground fuel oil storage tank were formerly located on the site. These tanks may have leaked and caused soil and groundwater contamination. The tanks were removed when the property was sold in 1985.

3.2: Remedial History

In 1998, the NYSDEC listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

An RI for OU1 was conducted from March1999 to October 2000 and the second phase between October 2000 and May 2001. Two reports entitled Remedial Investigation Report, October 2000 and Phase II Remedial Investigation Report, May 2001.

A second operable unit was defined in November 2000 when significant contamination was found off site of the 100 Oser Avenue property during Phase II of the OU1 Remedial Investigation.

An Interim Remedial Measure (IRM) was implemented in April 2000 to remove 11 cubic yards of contaminated soil and water from the septic system and the storm water drainage structures on the 100 Oser Avenue property.

Another IRM consisting of soil vapor extraction (SVE) system was installed in September 2000 in the source area to extract PCE from the western side of 100 Oser Avenue.

A third IRM consisting of the installation of a SVE system below both 100 and 110 Oser Avenue to lower indoor concentrations of PCE became operational in September 2004.

A Record of Decision for OU1 was signed in March 2002. The Remedial Action for OU1, as outlined in the ROD, requires the IRMs to continue to operate plus in-situ chemical oxidation by potassium permanganate injection of the groundwater. This work will be performed in Spring 2005.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include: In 1985, Anwar Chitayat purchased the 100 Oser Avenue property to expand his business from the 110 Oser Avenue property. A consent order was signed by the current site owner to reimburse the NYSDEC for the cost of the investigation and remediation for both OU-1 and OU-2.

The PRPs declined to implement the OU2 RI/FS when requested by the NYSDEC. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the NYSDEC will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the state for recovery of all response costs the state has incurred.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between May 2001 and December 2003. The field activities and findings of the investigation are described in the RI report for OU2.

The following activities were conducted during the RI for OU2:

- Installation of 8 soil borings and 7 monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;
- Sampling of 19 new and existing monitoring wells;
- Collection of 133 discrete groundwater samples using a direct push technique;
- A survey of public and private water supply wells in the area around the site;
- Collection of 27 surface water samples;
- Collection of 6 aquatic sediment samples;
- Collection of 19 soil vapor samples. Collection of 32 indoor air samples.

To determine whether the soil, soil gas and groundwater contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.
- Soil SCGs are based on the NYSDEC "Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels".
- Sediment SCGs are based on the NYSDEC "Technical Guidance for Screening Contaminated Sediments."
- Concentrations of PCE in air were evaluated using the NYSDOH Fact Sheet entitled "Tetrachloroethene (perc) in Indoor and Outdoor Air" dated May 2003 and the NYSDOH working draft "Soil Vapor/Indoor Air Matrix for PCE" dated December 15, 2004.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI report.

5.1.1: Site Geology and Hydrogeology

The topography (ground surface elevation) above the plume (which flows to the northeast and extends for approximately 1.25 miles from the northern edge of the 100 Oser Avenue site property boundary to New Mill Pond on Veterans Memorial Highway) changes from approximately 106 feet above mean sea level (MSL) at Oser Avenue to approximately 30 feet above MSL at New Mill Pond.

Pleistocene Glacial Deposits are present to depths ranging from 120 to 200 feet bgs. These deposits consisted primarily of poorly sorted sand with isolated lenses of silty sands, sandy clays and gravel. The Magothy formation is present beneath the Pleistocene sands. The sediments encountered within the Magothy Formation consisted primarily of silty sands with isolated lenses of clay and organic material. At several locations at the Site, a thin layer of organic clay was noted between the Pleistocene Glacial Deposits and the Magothy Formation.

The depth to groundwater ranges from 70 feet below ground surface at 100 Oser to discharging into wetlands, a stream and New Mill Pond. This stream is one of the three last remaining native brook trout streams on Long Island. Groundwater flows to the northeast from the site.

5.1.2: Nature of Contamination

As described in the RI report, many soil, soil gas, groundwater and sediment samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs),

The VOCs of concern are PCE and its degradation products: trichloroethylene (TCE), trans-1,2-dichloroethylene (DCE), and vinyl chloride. Other compounds that were found include: toluene, 1,1,1-trichloroethane (1,1,1-TCA), methylene chloride, and acetone.

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

Chemical concentrations are reported in parts per billion (ppb) for water, parts per million (ppm) for sediment, and micrograms per cubic meter ($\mu g/m^3$) for air samples. For comparison purposes, where applicable, SCGs are provided for each medium.

Table 1 summarizes the degree of contamination for the contaminants of concern in groundwater, soil gas and sediments and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Groundwater

Depth-discrete groundwater samples collected at the Site contained concentrations of DCE, TCE, PCE, toluene, 1,1,1-TCA, methylene chloride, and acetone in excess of the respective NYSDEC Division of Water – Technical and Operations Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values (TOGS Water Quality Standards). Of these compounds, PCE represented the primary VOC present in the samples. In fact, PCE was detected at concentrations exceeding TOGS Water Quality Standards in more than130 of all samples. Concentrations of PCE ranged from below the laboratory detection limit (not detect) in several samples to 34,000 µg/L. Concentrations of PCE were generally higher in the upper aquifer and decrease with depth. However, concentrations of PCE in excess of TOGS Water Quality Standards are present within the Magothy Formation (deeper aquifer). PCE and its degradation products (TCE, DCE, and vinyl chloride) are considered the primary constituents of concern at the OU2 Site. The groundwater standards are 5 ppb for each compound.

Surface Water

Concentrations of vinyl chloride, trans-DCE, cis-DCE, 1,1,1-TCA, TCE, and PCE were detected in several samples above their respective water quality standards in a wetland area, one mile from the site, next to Veterans Memorial Highway. The compounds found at the highest concentrations were PCE and its degradation products (TCE, DCE, and vinyl chloride). Concentrations range from not detected to 1,800 ppb total VOCs.

This wetland area is located hydraulically downgradient of the 100 Oser Avenue Site and is fed by groundwater discharging into the wetland. The same VOCs were found in the creek leading to New Mill Pond in decreasing concentrations. New Mill Pond is shown on Figure 2B.

Three surface water samples were collected from the southern end of New Mill Pond. These surface water samples were collected using a peristaltic pump from the bottom of the pond (approximately 3 feet beneath the surface of the pond). These samples contained concentrations of PCE, TCE, and benzene above the respective TOGS Water Quality Standards. Benzene is not associated with the Oser Avenue site.

As stated above, PCE, TCE, and cis-DCE in surface water and/or sediment in the wetlands upstream of New Mill Pond exceeded the Tier II values for protection of aquatic life from chronic exposure as did PCE in two of the three surface water samples from New Mill Pond. The surface water standards are 5 ppb for each compound.

Sediments

Sediment samples were collected from the wetland area on the southeast corner of the intersection of Veterans Memorial Highway and Old Willets Path, the creek leading from the wetland into New Mill Pond and New Mill Pond itself. Concentrations of 1,1-DCE, methylene chloride, trans-DCE, cis-DCE, 1,1,1-TCA, TCE, PCE, 1,2,4-trichlorobenzene, acetone, and chloroform were detected above the laboratory detection limit. PCE and its degradation products (TCE and DCE) represent the majority of the VOC mass detected within these samples.

Sediment samples collected from the wetland and creek leading to New Mill Pond ranged from not detect to 26,000 ppb total VOCs. Sediment samples collected from New Mill Pond found no VOCs that could be attributed to the Oser Avenue Site.

Soil Gas/Indoor Air

PCE was detected in 7 of the 32 indoor air samples collected, and it exceeded the typical background range for PCE in three of those. Indoor air concentrations of PCE ranged from nondetect to 32 µg/m3.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

There were no IRMs performed at this site for OU2 during the RI/FS. Two IRMs were performed in conjunction with OU1.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 5 of the OU2 RI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

There are potential exposure pathways associated with groundwater, soil vapor, surface water and sediment contamination from this site.

The area is served by a public water supply, which is frequently tested to ensure that the water distributed to consumers complies with drinking water standards. No private supply wells have been found in the area, which indicates that there are no ongoing exposures to the groundwater contamination. However, if

someone were to install a private supply well and begin using the contaminated water, exposures could potentially occur. There is a public water supply well field nearby, and water from this well field is treated to remove volatile organic compounds like those from the 100 Oser Avenue site.

Because of the volatile nature of the contamination, there may be a potential for soil vapor intrusion to contaminate indoor air in some structures above the groundwater plume. Air samples collected to date do not suggest a significant or widespread soil vapor intrusion problem, but more information is needed to fully assess this potential exposure pathway.

Sediment and surface water samples in the wetlands near Old Willets Path and Veterans Highway contain site-related contaminants. This area is not currently known to be accessible to or used by people, but the potential exists for people to come into contact with the contaminated materials at and near the surface in wetlands.

5.4: Summary of Environmental Impacts

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors. The following environmental exposure pathways and ecological risks have been identified:

- Aquatic organisms, particularly benthic organisms and other invertebrates, could be exposed to levels of VOCs in the sediment that might have an effect from chronic exposure in the wetlands near Old WilletsPath and Veterans Highway. Exposure to fish in this area is not expected to be significant, due to the nature of the wetlands (e.g., they are not ephemeral water bodies). Although the levels of contamination are above the associated guidance value, remediation of the groundwater should lower the concentrations over time.

- Several surface water samples contained PCE, TCE, and/or cis-DCE at concentrations that exceeded the ambient water quality guidance values for protection of aquatic life. Vinyl chloride was also detected above laboratory limits, though no screening value is available for vinyl chloride. Over half the samples between Old Willets Path and Veterans Highway contained PCE above the guidance value. Two of these samples also contained cis-DCE and TCE at concentrations above the guidance value. In New Mill Pond, fish could be exposed to levels of PCE just above the guidance value.

Site contamination has also impacted the groundwater resource in the upper aquifer. Concentrations of PCE in excess of TOGS Water Quality Standards are present within the Magothy Formation (deeper aquifer). PCE and its degradation products (TCE, DCE, and vinyl chloride) are considered the primary constituents of concern at the OU2 Site. This aquifer is a sole source aquifer. There is a public water supply within two miles, side gradient of the plume in the Magothy Formation.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to PCE and its degradation products (TCE, DCE, and vinyl chloride) in soil gas and groundwater.
- environmental exposures of flora or fauna to PCE and its degradation products (TCE, DCE, and vinyl chloride) in sediments and surface water.
- the release of contaminants from soil gas into indoor air through vapor intrusion.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient groundwater quality standards and
- surface water standards.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the 100 Oser Avenue Site were identified, screened and evaluated in the FS report which is available **at the document repositories identified in Section 1.**

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated groundwater and soil gas at the site.

The following groundwater remedial technologies have been retained for the development of remedial alternatives:
• No action.

• Groundwater extraction and treatment.
• In-situ chemical oxidation using permanganate.
• Air Sparging/Soil Vapor Extraction.

The following soil gas/indoor air remedial technologies have been retained for the development of remedial alternatives:
• No Action.
• Subslab Depressurization Systems.

Groundwater Alternatives

Alternative 1: No Action (GW-1)

Present Worth: $395,000
Capital Cost: $0
Annual OM&M:
(Years 1-30): ..... $32,000.

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site's Operable Unit 2 in its present condition and would not provide any additional protection to human health or the environment.

The only cost associated with this alternative would be for periodic groundwater monitoring. Assuming that groundwater monitoring will extend for 30 years, the total net present worth cost for this activity is estimated to be $395,000.

Alternative 2: Groundwater Extraction and Treatment (GW-2)

Present Worth: $10,920,000
Capital Cost: $2,176,000
Annual OM&M:
(Years 1-5): ..... $715,000.
(Years 5-30): ..... $690,000.

Groundwater Remedial Alternative 2 (GW-2) would consist of a groundwater extraction and treatment system to capture and treat existing groundwater contamination at OU2 and prevent the continued migration of contaminated groundwater beyond Old Willets Path into the wetlands and stream of the Smithtown Park Area.

In this remedial alternative, the groundwater treatment system would reduce the concentration of VOCs, and provide hydraulic control and containment. Groundwater would be extracted from the contaminated aquifer at a depth of 20 to 50 feet below ground surface (bgs). The system would pump approximately 60 gallons per minute (gpm) through each of two recovery wells located along Old Willets Path. The treatment system

would consist of an air stripper with granular activated carbon treatment of the off-gas. The treated water would then be discharged to a location to be determined during the design phase of the remedy.

It is anticipated that implementation of this remedial alternative could be completed in approximately 24 to 36 months. It is estimated that this system would need to operate for 30 years.

Alternative **3A: In-situ Chemical Oxidation of Highest VOC Concentrations in groundwater for OU-2 (GW-3A)**

Present Worth: ..... $ 2,649,000.
Capital Cost: ..... $ 2,423,000.
Annual OM&M:
(Years 1-2): ..... $ 54,000.

Groundwater Remedial Alternative 3A (GW-3A) would consist of in-situ chemical oxidation of the highest concentrations of VOCs within the OU2 contaminant plume (defined as the limits of the 10,000 µg/L PCE isoconcentration line) using potassium permanganate. Potassium permanganate would be mixed on-site and injected into the aquifer through the existing injection wells installed at OU1 and through new injection wells yet to be installed. The injection would be at a depth of 70 feet to 100 feet bgs. The number and location of injections would be determined during the Remedial Design.

Post injection performance monitoring would be accomplished using a network of existing and proposed monitoring wells located downgradient of the injection wells. It is anticipated that implementation of this remedial alternative could be completed in approximately 18 to 24 months.

Alternative 3B: In-situ Chemical Oxidation of Highest VOC Concentrations in groundwater for OU-2 and the VOC contamination closest to the Wetlands (GW-3B)

Present Worth: ..... $ 4,443,000.
Capital Cost: ..... $ 4,161,000.
Annual OM&M:
(Years 1-2): ..... $ 54,000.

Groundwater Remedial Alternative 3B (GW-3B) would be the injection of potassium permanganate into the aquifer through the existing injection wells installed at OU1 and through new injection wells to be installed between 100 Oser avenue and the wetlands next to Veterans Memorial Highway. The injection would be at a depth of 70 feet to 100 feet bgs (Alternative 3A). This injection of potassium permanganate would provide in-situ chemical oxidation of the highest concentrations of VOCs within the OU2 contaminant plume (defined as the limits of the 10,000 ppb PCE isoconcentration line shown on Figure 5).

To expedite the reduction in VOC concentrations entering the wetland and stream located within the Smithtown Park area, a second injection location would be selected during the design phase of the project. New wells would need to be installed at the selected location. The number and location of injections would be determined during the Remedial Design.

Post injection performance monitoring would be accomplished using a network of existing and proposed monitoring wells located downgradient of the injection wells.

It is anticipated that implementation of this remedial alternative could be completed in approximately 18 to 24 months.

Alternative 3C: In-situ Chemical Oxidation of all VOC Concentrations in groundwater for OU-2 (GW-3C)

Present Worth: ..... $ 9,569,000.
Capital Cost: ..... $ 9,169,000.
Annual OM&M:
(Years 1-2): ..... $ 54,000.

Groundwater Remedial Alternative 3C (GW-3C) would consist of in-situ chemical oxidation of the entire OU2 contaminant plume (defined as the limits of the 1,000 ppb PCE isoconcentration line shown on Figure 5) using potassium permanganate. Potassium permanganate would be mixed on-site and injected into the aquifer through the existing injection wells installed at OU1 and through new injection wells to be installed in such a way to include the entire plume greater than 1,000 ppb between 100 Oser Avenue and the wetlands.

Post injection performance monitoring would be accomplished using a network of existing and proposed monitoring wells located downgradient of the injection wells. The number and location of injections would be determined during the Remedial Design.

It is anticipated that implementation of this remedial alternative could be completed in approximately 24 to 48 months.

Alternative 4: Air Sparging/Soil Vapor Extraction (GW-4)

Present Worth: ..... $4,894,000.
Capital Cost: ..... $ 1,426,000.
Annual OM&M:
(Years 1-10): ..... $300,000.
(Years 5-30): ..... $248,000.

Groundwater Remedial Alternative 4 (GW-4) would consist of an air sparging/soil vapor extraction (AS/SVE) system to treat existing groundwater contamination at OU2 and prevent the continued migration of contaminated groundwater beyond Old Willets Path into the wetlands and stream of the Smithtown Park Area.

In this remedial alternative, the AS/SVE system would use air sparging wells to bubble air into the groundwater to strip VOCs from the groundwater, capture the VOCs through the soil vapor extraction wells and treat off-gas by capturing the VOCS in a granular activated carbon unit. The AS/SVE system would be installed along Old Willets Path with the treatment plant located nearby.

It is anticipated that implementation of this remedial alternative could be completed in approximately 18 to 24 months.

Soil Gas Alternatives

Alternative 1: No Action (SG-1)

Present Worth: ..... $ 495,000.
Capital Cost: ..... $ 0.
Annual OM&M:
(Years 1-5): ..... $ 55,000.

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site's Operable Unit 2 in its present condition and would not provide any additional protection to human health or the environment.

The only cost associated with this alternative would be for monitoring of indoor air from selected structures above the contaminated groundwater plume. Assuming that soil gas monitoring will extend for 15 years because of the source removal on 100 Oser Avenue, the total net present worth cost for this activity is estimated to be $495,000.

Alternative 2: Subslab Depressurization System (SG-2)

Present Worth: ..... $ 73,000.
Capital Cost: ..... $ 73,000.
Annual OM&M:
(Years 1-5): ..... $ 0.

Soil Gas/Indoor Air Remedial Alternative 2 (SG-2), would be for the installation of soil gas monitoring wells at the 100 Oser Avenue site boundary, indoor air sampling of structures above the contaminated groundwater plume and soil gas sampling of the new and existing soil gas sampling points. Should it be determined during the course of soil gas and indoor air sampling that indoor air mitigation is needed at a structure within OU2, a sub-slab depressurization system would be installed at the structure.

A sub-slab depressurization system prevents vapors beneath a slab from entering a building. A low amount of suction is applied below the foundation of the building and vapors are vented to the outside.. These vapors are either vented directly to the atmosphere or processed through a vapor abatement system thus limiting humans to exposure of VOC concentrations in indoor air.

The cost for this option was generated based on the installation of 10 systems with related engineering and administrative costs.

It is anticipated that implementation of this remedial alternative could be completed in approximately 6 to 12 months.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYSDEC has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectivness. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP have been evaluated. A responsiveness summary (Appendix A) presents the public comments received and the manner in which the NYSDEC addressed the concerns raised.

In general, the public comments received were supportive of the selected remedy. Several comments were received, however, pertaining to the groundwater contamination remaining after the implementation of the remedy. Therefore, monitored natural attenuation was added as part of the remedy.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

The NYSDEC is selecting Alternative SG-2 and GW-3B as the remedy for this site. The elements of this remedy are described at the end of this section.

The selected remedy is based on the results of the RI and the evaluation of alternatives presented in the FS.

Alternatives SG-2 and GW-3B are being selected because, as described below, they satisfy the threshold criteria and provide the best balance of the primary balancing criteria described in Section 7.2. They will achieve the remediation goals for the site by removing the highest concentrations of VOCs that create the most significant threat to public health (through monitoring and remediation of indoor air contamination, if necessary) and the environment (by removing the greatest mass of VOCs heading into the wetlands), they would greatly reduce the VOC contamination in groundwater, and will create the conditions needed to restore groundwater quality to the extent practicable. If, after a period of 5 years, it is determined that alternative GW-3B was not effective in protecting the wetlands and/or the Department determines that additional groundwater remediation is necessary, air sparging or other appropriate remedy will then be implemented.

Alternatives SG-1 and GW-1 would not comply with the threshold selection criteria since both would leave continuing threats to the public health and the environment. SG-2, GW-2, GW-3A, GW-3C and GW-4 would comply with the threshold selection criteria

Soil Gas Alternative Discussion:

Alternative SG-1 would not comply with the threshold selection criteria since it could leave continuing threats to the public health.

Alternative SG-2 is the only soil gas alternative that satisfies the threshold criteria. The five balancing criteria are discussed above for SG-2.

The short-term impacts for SG-2 will be minimized to the extent possible by closely monitoring the soil gas plume. It is believed that the soil gas concentrations will decrease because of the on-site activities to remediate the source of the contamination that is contributing to the soil gas contamination. In conjunction with GW-3B, the source area on-site and the groundwater concentrations under the area where soil gas concentrations are highest will be remediated. If a subslab depressurization system were to be installed, each installation would take only 2-3 days.

Achieving long-term effectiveness is best accomplished by alternative SG-2. The monitoring of the soil gas will continue until the soil gas would not pose a human health threat. Subslab depressurization systems, if necessary, will operate until it was deemed unnecessary for protection of human health.

SG-2 is readily implementable since subslab depressurization systems have been proven effective in eliminating indoor air concentrations of VOCs at other sites in New York State.

Alternative SG-2 will reduce the mobility of contaminants to the receptors that create the greatest human threat but would not reduce the toxicity of contaminants unless by chemical/physical treatment of the off-gas is implemented.

The cost of Alternative SG-2 is less expensive that SG-1 but it meets the threshold criteria. It is also cost effective since it allows flexibility in the installation of the subslab depressurization systems and would allow a period of time to determine if the removal of the source of VOCs would have a lasting effect on the soil gas.

Alternative SG-2 is very favorable because it is a remedy that will eliminate the direct threat from migration of soil gas into indoor air in buildings near the 100 Oser site.

Groundwater Alternative Discussion:

Alternative GW-1 would not comply with the threshold selection criteria since it would leave continuing threats to the environment.

Because Alternatives GW-2, GW-3A, GW-3B, GW-3C and GW-4 satisfy the threshold criteria over time by removing the source on-site and reducing the contamination of this operable unit, the five balancing criteria are particularly important in selecting a final remedy for this operable unit.

Alternative GW-3A (in-situ chemical oxidation of highest VOCs), would have the least short term impacts because the injection wells are already in place. Alternatives GW-2 (groundwater pump and treatment) and GW-4 (Air Sparging/Soil Vapor Extraction) would require either a permanent easement or the purchase of land to site the treatment structures. Alternatives GW-3B (in-situ chemical oxidation of highest VOCs and selected areas of the plume), GW-3C (in-situ chemical oxidation of VOCs greater than 1 ppm) would have short-term impacts which could easily be controlled.

The time needed to achieve the remediation goals would be longest for Alternative GW-2 and GW-4 since it requires constant operation of the systems to continue to meet the remedial goal. The shortest time needed to achieve the remedial goals would be selecting alternative GW-3C. Alternative GW-3A and GW-3B fall somewhere in between alternatives GW-2, GW-4 and GW-3C.

Alternative GW-3A is favorable in that it is readily implementable with existing equipment and property. Alternative GW-2 would require locating a site to place the treatment plant and also a location to discharge the treated water. Alternatives GW-3B and GW-3C would require building a mobile plant to mix chemicals that would be used for the in-situ chemical oxidation making them harder to implement. Alternative GW-4 would require locating a site to place the treatment plant.

Achieving long-term effectiveness is best accomplished by chemical oxidation of the whole plume (Alternative GW-3C). GW-3B is also favorable because it would remediate about 75% of the groundwater. As the contaminated groundwater moves through the aquifer, it would decrease in concentration. Therefore, under alternative GW-3B, by removing a high percentage of the concentrations of contaminants from the plume, the long term effectiveness of the discharge into the wetlands would be achieved from this selection. Alternative GW-3A is less favorable because it would result in the removal of approximately 50% of the VOCs from the groundwater which would require a longer time to reduce the discharge of contamination into the wetlands.

Under GW-3B, by removing the highest concentrations of contaminants from the plume and also lowering concentrations of contaminants in the more distant part of the plume, the long term effectiveness of the discharge into the wetlands will be achieved sooner from this selection.

Alternatives GW-2 and GW-4 would require long term operation and maintenance of the treatment system and long-term monitoring of the groundwater. It would take longer to achieve the goal of protection of the wetlands from contaminated groundwater discharging into the wetland since each system would require continuous to meet the remedial goal.

GW-3B will remediate about 75% of the groundwater contamination when the on-site remediation work is taken into account. Alternative GW-3A would reduce the VOCs in the contaminated groundwater under the site by about 50%. Alternatives GW-2 and GW-4 would eliminate a large percentage of contamination under the site but this reduction is dependent upon the long-term operation and maintenance of the treatment system. GW-3C would eliminate all contamination greater than 1 ppm.

The cost of the alternatives varies significantly. Alternative GW-3A is the least expensive alternative. However, it does not eliminate the portion of the groundwater contamination closest to the point where it discharges into the wetland. GW-3B is 50 % more expensive than GW-3A. It is favorable because this alternative will destroy most of the groundwater contamination under the site and it will eliminate or greatly reduce the portion of the groundwater contamination closest to the point where it discharges into the wetland. Alternative GW-2 is the most expensive, requires a land transaction and is dependent upon the long-term operation and maintenance of the treatment system. GW-3C is the next most expensive, more than double the cost of GW-3A but would eliminate all contamination under the site. Alternative GW-4 is less expensive to construct but requires a land transaction and due to the long-term operation and maintenance of the treatment system, the present worth cost for GW-4 is more expensive than the cost of GW-3A. For the cost comparison of each alternative, see Table 2.

Designing the remedy, mobilizing the equipment, preparing the site, and construction management are substantial costs associated with each alternative. For GW-3A, GW-3B, GW-3C, these costs would be similar. The cost for GW-2 and GW-4 must include these costs plus costs associated with some type of land purchase or easement, including all the incidental costs associated with such a land transaction.

The estimated present worth cost to implement the selected remedy (GW-3B and SG-2) is $4,516,000. The cost to construct the remedy is estimated to be $4,234,000. and the estimated average annual operation, maintenance, and monitoring costs for the first 2 years is $54,000.

The elements of the selected remedy are as follows:

- In-situ chemical oxidation for the area of the plume as it leaves the 100 Oser Avenue site proper and in the plume directly upgradient of the wetlands area to reduce the highest concentration levels of VOCs in the groundwater that discharges into the wetland. The remedy addresses the threats outlined above by reducing the concentrations of VOCs in the groundwater entering the wetland water and sediment. By lowering the concentrations of VOCs in the groundwater at the beginning of the plume, the threat of soil vapor intrusion will be reduced.

- Implement a soil vapor monitoring program to provide for the additional characterization of the potential for soil vapor intrusion and, if necessary, installation of subslab depressurization systems.

- Monitored Natural Attenuation of the remainder of the plume using existing wells and additional wells to be installed during the design phase of the project.

- A Remedial Design program to provide the details required to implement the remedial program.

- Since the remedy results in untreated hazardous waste remaining in OU2 of the site, a long term monitoring program will be instituted. Monitoring will include the groundwater, soil gas, indoor air, and the wetlands sediment and surface water. This program will monitor the effectiveness of the in-situ chemical oxidation injection and the indoor air and will be a component of the operation, maintenance, and monitoring for the site. Costs of this monitoring were included in the cost of the selected remedy for Operable Unit 1.

- Development of a site management plan to address residual contamination and any use restrictions to be incorporated into the OU-1 site management plan.

- Imposition of an institutional control in the form of an environmental easement (IC/EC) on the 100 Oser Avenue property that will (a) require compliance with the approved site management plan; (b) limit the use and development of the property to commercial or industrial uses only; (c) restrict the use of groundwater at 100 Oser Avenue as a source of potable or process water without necessary water quality treatment as determined by NYSDOH or SCDOH.

- The 100 Oser Avenue property owner will provide an IC/EC certification, prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC on a periodic basis, until the NYSDEC notifies the property owner in writing that this certification is no longer needed. This submittal will contain certification that the institutional controls and engineering controls are still in place, allow the NYSDEC access to the site, and that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan.

- If, during the evaluation of the monitoring data, the Department determines that additional groundwater remediation is necessary, another appropriate remedy would be implemented.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken to inform the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- Repositories for documents pertaining to the site were established.
- A public contact list, which included nearby property owners, elected officials, local media and other interested parties was established.
- Public meetings were held in July 1999, December 1999, November 2000 and presented several aspects of remedial work performed for OU1. A public meeting was held in March 2002 to present and receive comments on the PRAP for OU-1. A Record of Decision for OU-1 was signed in March 2002.
- A public meeting was held on April 14, 2005 to present and receive comment on the PRAP for OU2.

A Responsiveness Summary (Appendix A) was prepared to address the comments received during the public comment period for the OU-2 PRAP.

Table 1
Nature and Extent of Contamination
Analytical Results From October 1999 to December 2004

SEDIMENTS	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Tetrachloroethene	0.47D - 26D	17	3 of 6
	Trichloroethene	0.079 - 0.81E	67	3 of 6

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	1,1-Dichloroethene	0.9J - 7.0J	5	1 of 49
	1,2-Dichloroethene	1.0J - 130	5	12 of 49
	Tetrachloroethene	1.0J - 28,000D	5	39 of 49
	Trichloroethene	1.0J - 100	5	13 of 49

SURFACE WATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Tetrachloroethene	2.0J - 890E	5	19 of 33
	Trichloroethene	2.0 - 240D	5	12 of 33
	1,2-Dichloroethene	1.0J - 910D	5	14 of 33

INDOOR AIR	Contaminants of Concern	Concentration Range Detected ($\mu g/m^3$)[a]	SCG[b] ($\mu g/m^3$)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds	Tetrachloroethene	5.5-32.0	100	3 of 32

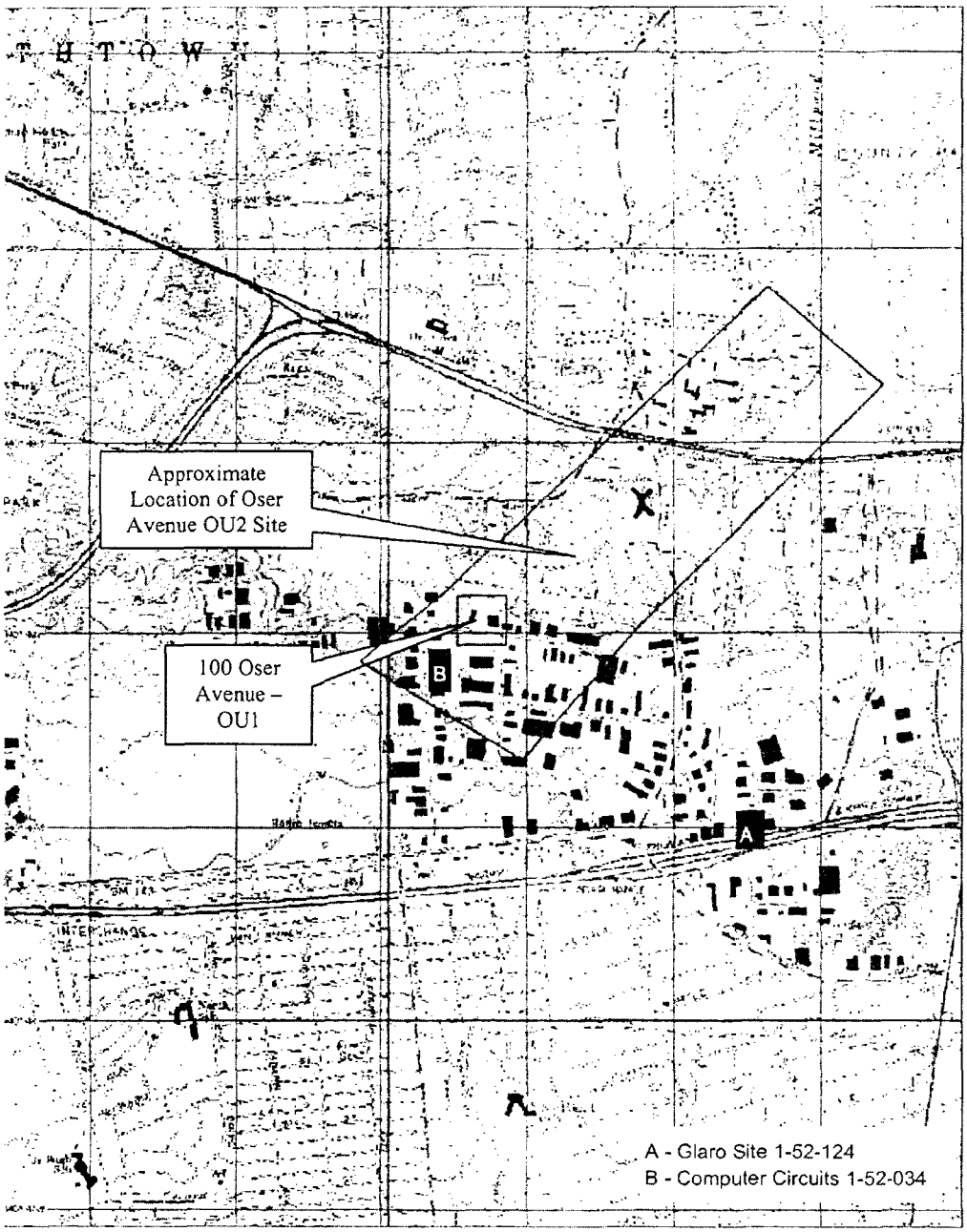
[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
ug/m^3 = micrograms per cubic meter

[b] SCG = standards, criteria, and guidance values; **Sediment and Surface waters**: Screening values for sediment were developed based on an equilibrium partitioning model using applicable surface water screening values. NYS Division of Fish, Wildlife, and Marine Resources provide Tier II values for VOCs in surface waters. The Tier II values were developed by NYSDEC in accordance with the procedures described in 6NYCRR Part 706.1.; **Groundwater**: NYSDEC Drinking Water Standards; **Indoor Air**: The NYSDOH's October 1997 Tetrachloroethene Ambient Air Criteria Document, which provides the basis for the 100 µg/m3 guideline.

D = indicates that the sample was diluted
E = indicates results above calibration range
J = indicates an estimated value

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
GW-1 No Action	$ 0.	$31,800.	$ 395,000.
GW2- Groundwater Pump & Treat	$ 2,176,000.	$715,000.	$10,920,000
GW-3A In-situ Chemical Oxidation of highest VOC concentrations in groundwater	$2,423,000.	$54,000.	$2,649,000.
GW-3B In-situ Chemical Oxidation of highest VOC concentrations in groundwater & VOC contamiantion closest to wetlands	$4,161,000.	$54,000.	$4,443,000.
GW-3C In-situ Chemical Oxidation of all VOC concentrations in groundwater	$9,169,000.	$54,000.	$9,569,000.
GW-4 Air Sparging/Soil Vapor Extraction	$ 1,426,000.	$300,000.	$4,894,000.
SG-1 No Action	$ 0.	$ 54,000.	$ 495,000.
SG-2 Subslab Depressurization	$ 73,000.	$ 0.	$ 73,000.
Selected Remedy (GW-3B & SG-2)	$4,234,000	$54,000.	$4,516,000.



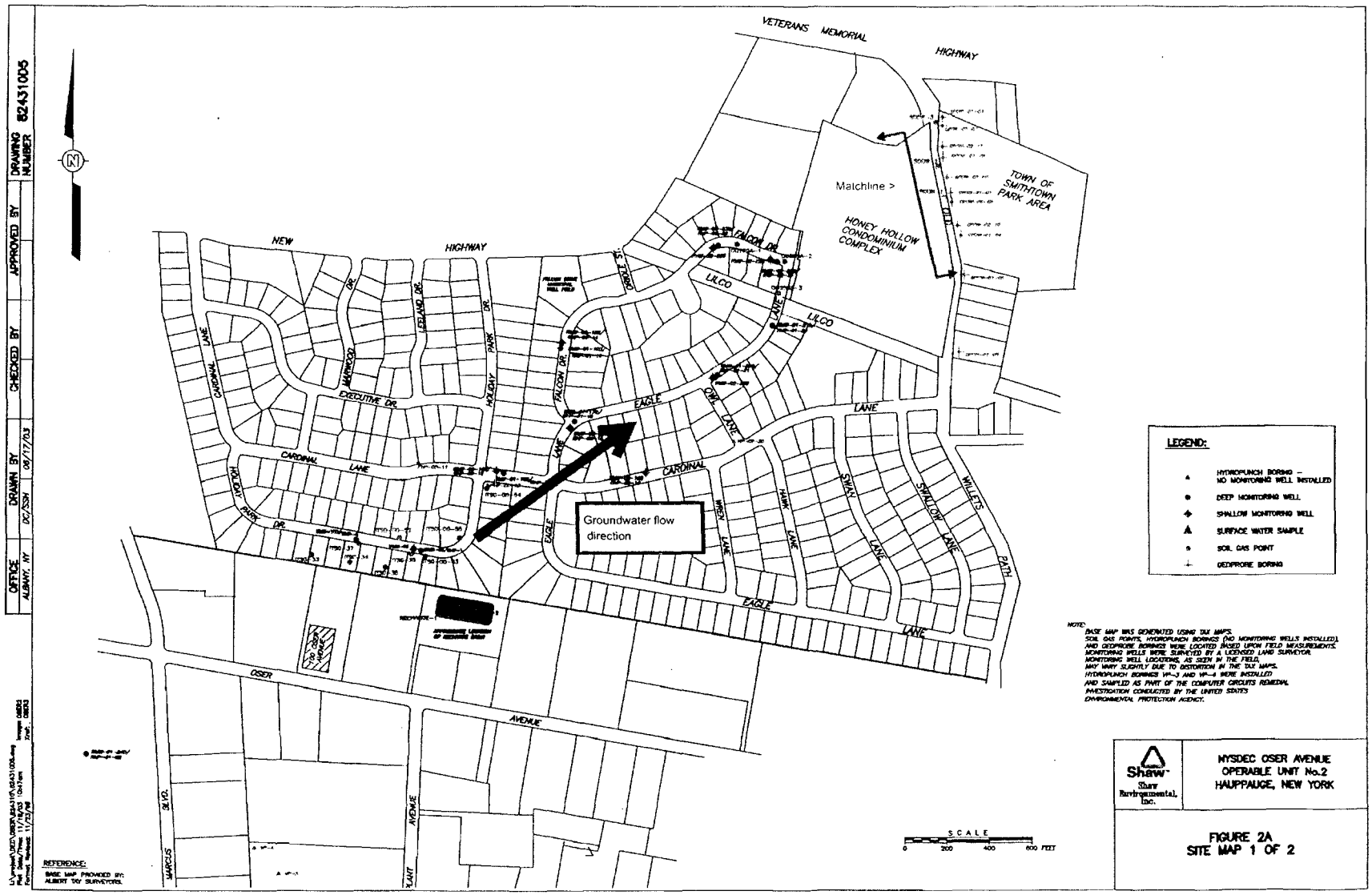
Scale: 1:24,000

Reference:
DeLorme 3-D Topo Quads, 1999
Yarmouth, Me.
Datum WGS84

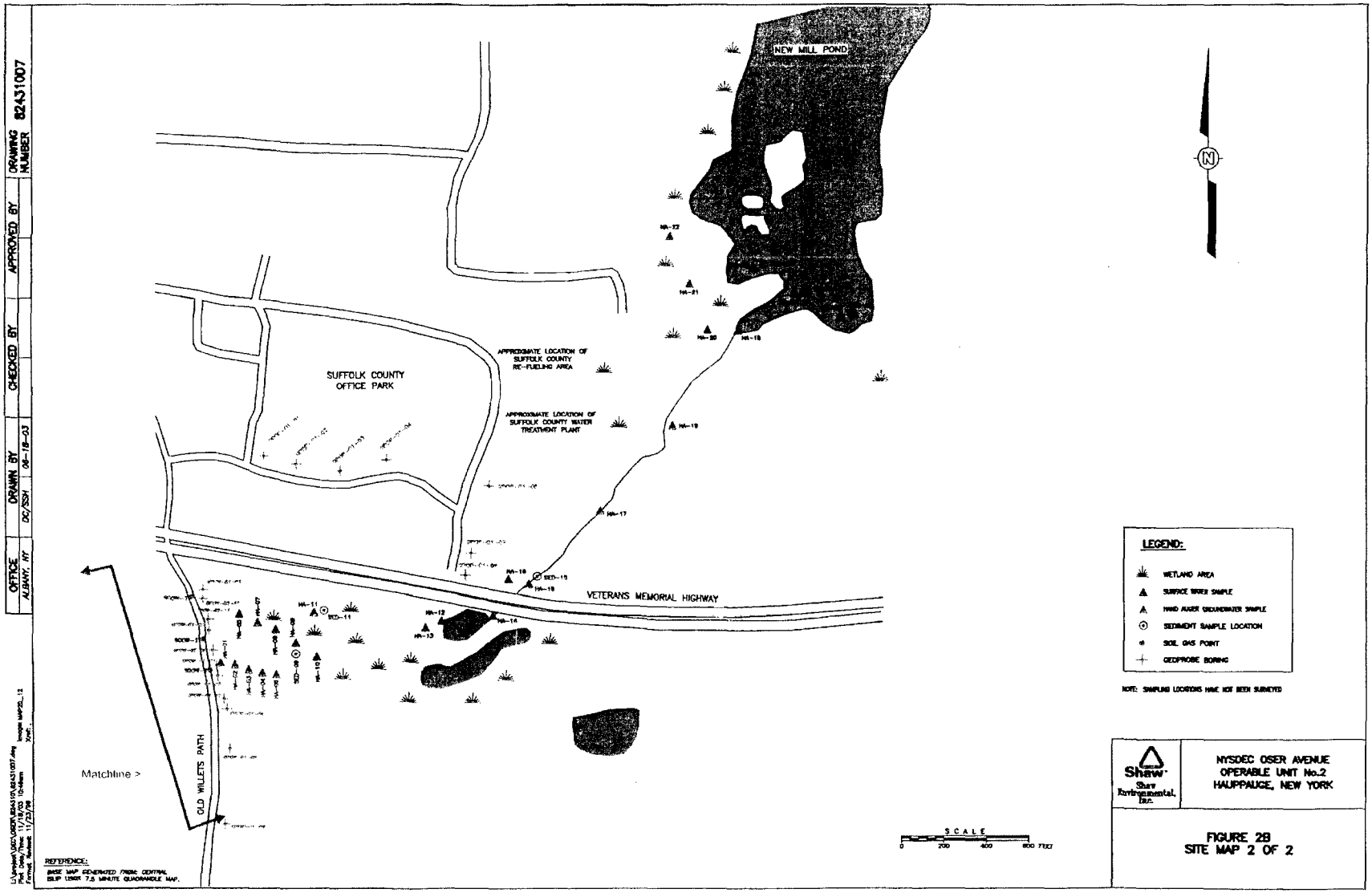
Shaw

NYSDEC

Figure 1
Site Location Map
NYSDEC Oser Avenue – OU2


VETERANS MEMORIAL HIGHWAY
NEW HIGHWAY
Matchline >
HONEY HOLLOW CONDOMINIUM COMPLEX
TOWN OF SMITHTOWN PARK AREA
Groundwater flow direction
EXECUTIVE DR.
CARDINAL LANE
HOLIDAY PARK DR.
EAGLE LANE
FALCON DR.
LILCO LANE
WILLETS PATH
SHALLOW LANE
SWAN LANE
HAWK LANE
WREN LANE
OSER AVENUE
SCALE
0 200 400 600 FEET
LEGEND:
HYDROPUNCH BORING – NO MONITORING WELL INSTALLED
DEEP MONITORING WELL
SHALLOW MONITORING WELL
SURFACE WATER SAMPLE
SOIL GAS POINT
GEOPROBE BORING
NOTE:
BASE MAP WAS GENERATED USING TAX MAPS.
SOIL GAS POINTS, HYDROPUNCH BORINGS (NO MONITORING WELLS INSTALLED) AND GEOPROBE BORINGS WERE LOCATED BASED UPON FIELD MEASUREMENTS.
MONITORING WELLS WERE SURVEYED BY A LICENSED LAND SURVEYOR.
MONITORING WELL LOCATIONS, AS SEEN IN THE FIELD, MAY VARY SLIGHTLY DUE TO DISTORTION IN THE TAX MAPS.
HYDROPUNCH BORINGS VP-3 AND VP-4 WERE INSTALLED AND SAMPLED AS PART OF THE COMPUTER CIRCUITS REMEDIAL INVESTIGATION CONDUCTED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.
REFERENCE:
BASE MAP PROVIDED BY: ALBERT TAX SURVEYORS
Shaw Environmental, Inc.
NYSDEC OSER AVENUE OPERABLE UNIT No.2
HAUPPAUGE, NEW YORK
FIGURE 2A
SITE MAP 1 OF 2
OFFICE ALBANY, NY
DRAWN BY DC/JSN 06/17/03
CHECKED BY
APPROVED BY
DRAWING NUMBER 62431005

500102


NEW MILL POND
SUFFOLK COUNTY OFFICE PARK
APPROXIMATE LOCATION OF SUFFOLK COUNTY RE-FUELING AREA
APPROXIMATE LOCATION OF SUFFOLK COUNTY WATER TREATMENT PLANT
VETERANS MEMORIAL HIGHWAY
OLD WILLETS PATH
Matchline >
HA-22
HA-21
HA-20
HA-18
HA-19
HA-17
HA-16
HA-15
SED-15
HA-11
SED-11
HA-12
HA-13
HA-14
SED-14
N
LEGEND:
WETLAND AREA
SURFACE WATER SAMPLE
HAND AUGER GROUNDWATER SAMPLE
SEDIMENT SAMPLE LOCATION
SOIL GAS POINT
GEOPROBE BORING
NOTE: SAMPLING LOCATIONS HAVE NOT BEEN SURVEYED
SCALE
0 200 400 800 FEET
REFERENCE:
BASE MAP GENERATED FROM CENTRAL ISLIP USGS 7.5 MINUTE QUADRANGLE MAP.
Shaw Stuart Environmental, Inc.
NYSDEC OSER AVENUE OPERABLE UNIT No.2 HAUPPAUGE, NEW YORK
FIGURE 2B SITE MAP 2 OF 2
OFFICE ALBANY, NY
DRAWN BY DC/SSH 06-18-03
CHECKED BY
APPROVED BY
DRAWING NUMBER 82431007

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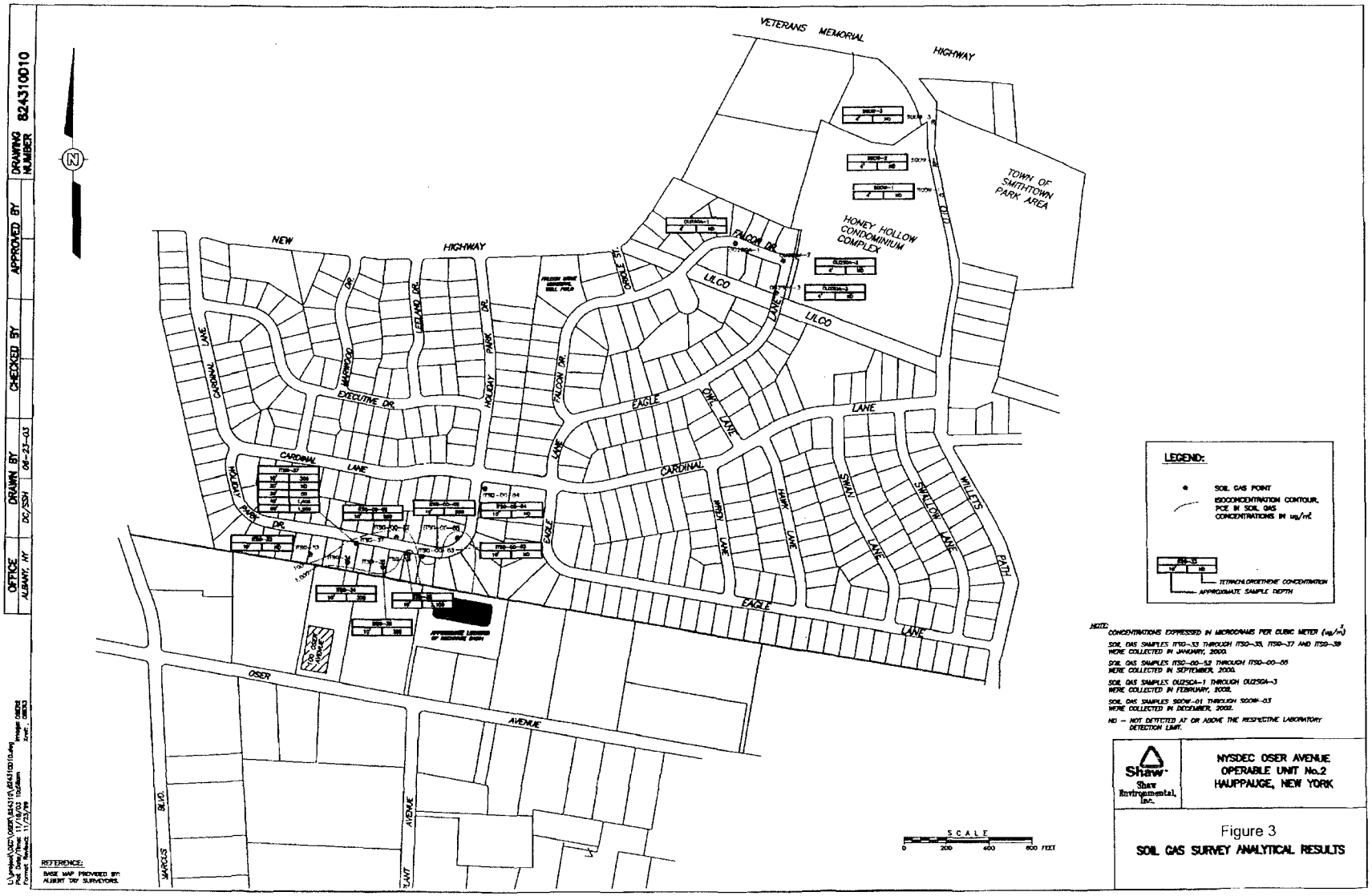
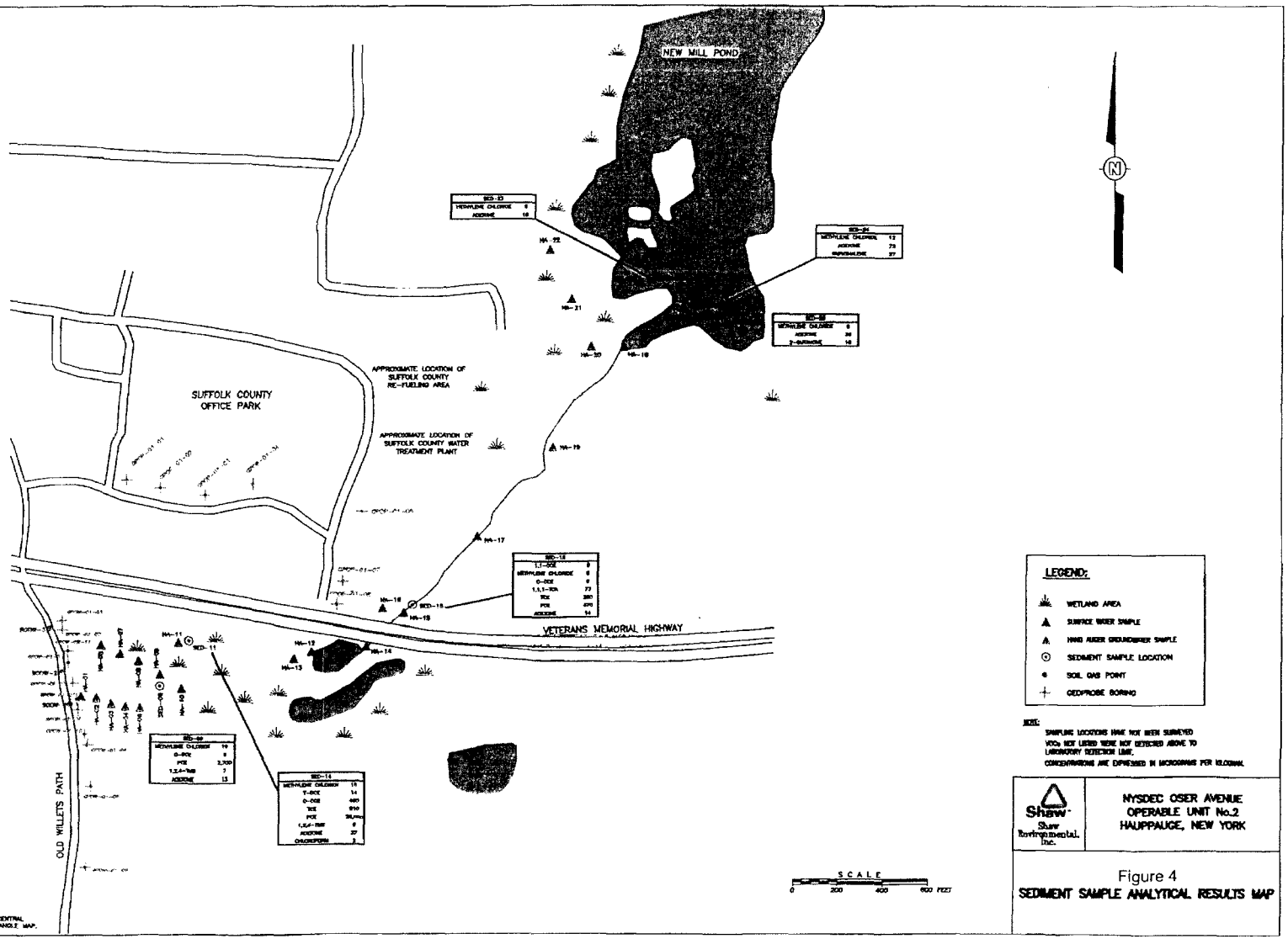
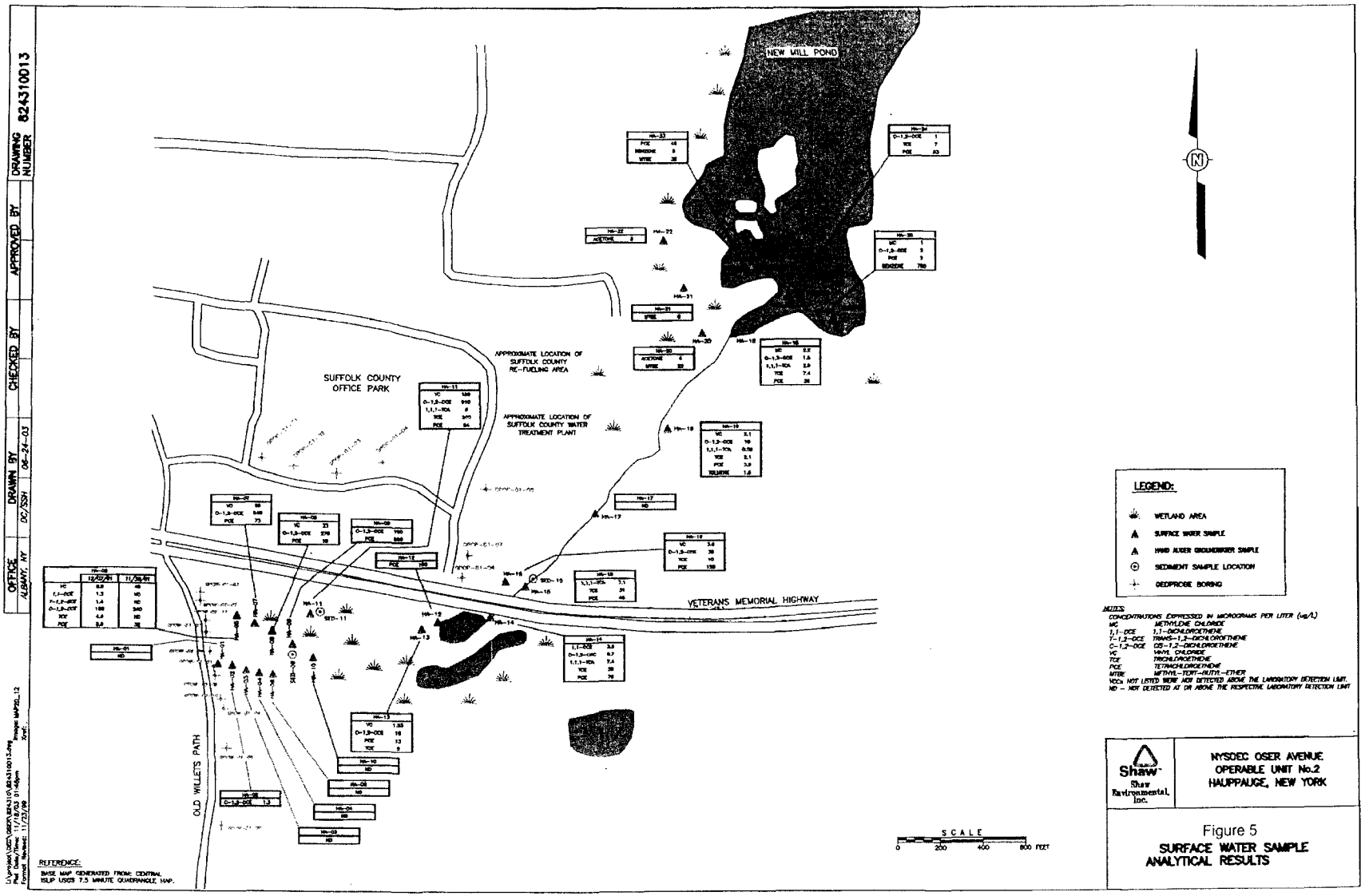

VETERANS MEMORIAL HIGHWAY
NEW HIGHWAY
TOWN OF SMITHTOWN PARK AREA
HONEY HOLLOW CONDOMINIUM COMPLEX
FALCON DR.
LILCO LANE
LILCO
EXECUTIVE DR.
CARDINAL LANE
HOLIDAY PARK DR.
EAGLE LANE
OWL LANE
WREN LANE
HAWK LANE
SWAN LANE
SWALLOW LANE
WILLETS PATH
OSER AVENUE
SMITHTOWN BLVD.
TOB OSER AVENUE
LEGEND:
SOIL GAS POINT
ISOCONCENTRATION CONTOUR, PCE IN SOIL GAS CONCENTRATIONS IN ug/m3
TETRACHLOROETHENE CONCENTRATION
APPROXIMATE SAMPLE DEPTH
NOTE:
CONCENTRATIONS EXPRESSED IN MICROGRAMS PER CUBIC METER (ug/m3)
SOIL GAS SAMPLES ITSD-33 THROUGH ITSD-35, ITSD-37 AND ITSD-39 WERE COLLECTED IN JANUARY, 2000.
SOIL GAS SAMPLES ITSD-00-53 THROUGH ITSD-00-65 WERE COLLECTED IN SEPTEMBER, 2000.
SOIL GAS SAMPLES OU2SGA-1 THROUGH OU2SGA-3 WERE COLLECTED IN FEBRUARY, 2002.
SOIL GAS SAMPLES SGDW-01 THROUGH SGDW-03 WERE COLLECTED IN DECEMBER, 2002.
ND - NOT DETECTED AT OR ABOVE THE RESPECTIVE LABORATORY DETECTION LIMIT.
SCALE
0 200 400 800 FEET
REFERENCE:
BASE MAP PROVIDED BY: ALBERT TAY SURVEYORS.
Shaw Environmental, Inc.
NYSDEC OSER AVENUE OPERABLE UNIT No.2 HAUPPAUGE, NEW YORK
Figure 3
SOIL GAS SURVEY ANALYTICAL RESULTS
OFFICE ALBANY, NY
DRAWN BY DC/SSH 06-23-03
CHECKED BY
APPROVED BY
DRAWING NUMBER 824310010

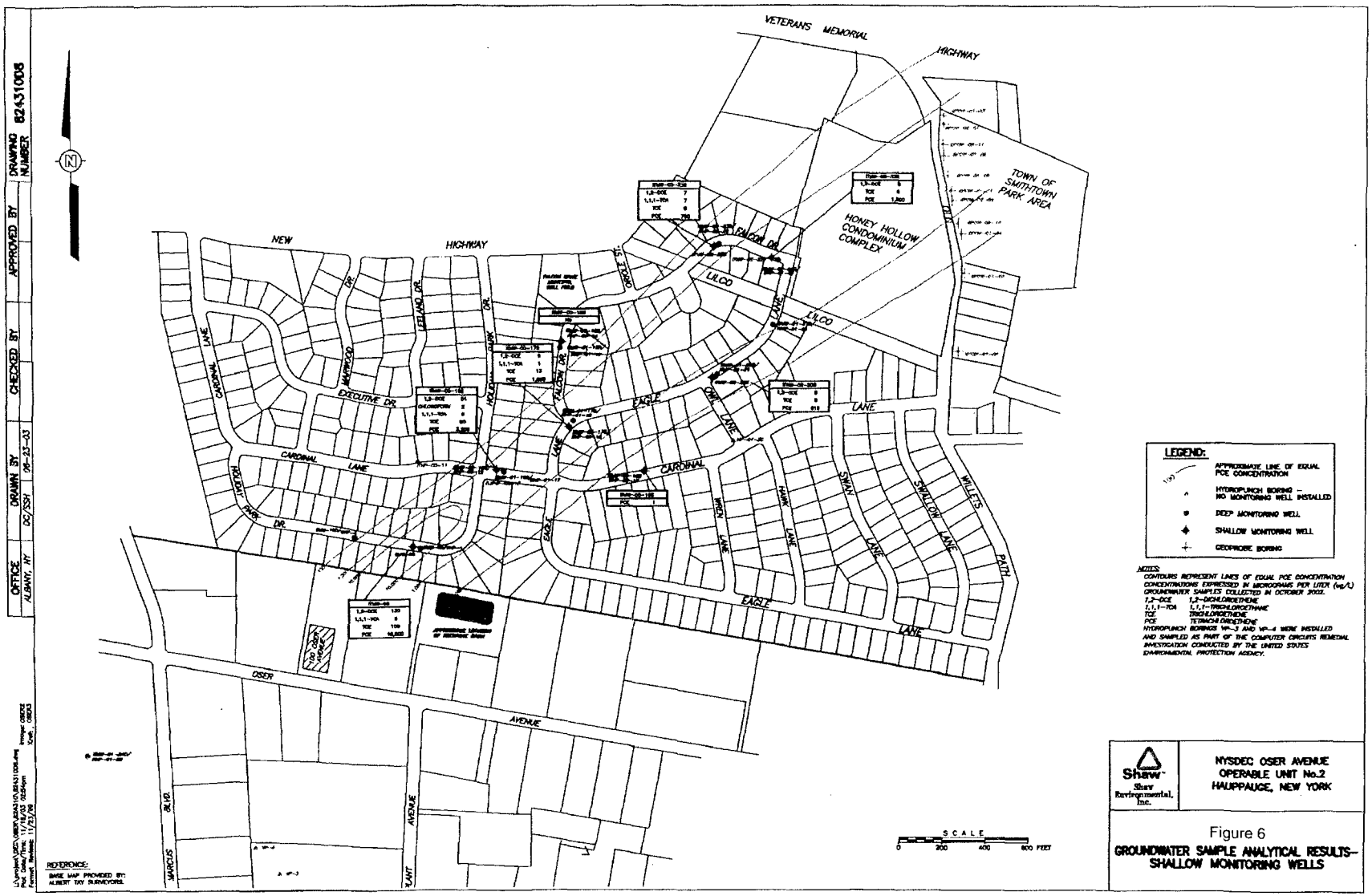
500104


NEW MILL POND
SUFFOLK COUNTY OFFICE PARK
APPROXIMATE LOCATION OF SUFFOLK COUNTY RE-FUELING AREA
APPROXIMATE LOCATION OF SUFFOLK COUNTY WATER TREATMENT PLANT
VETERANS MEMORIAL HIGHWAY
OLD WILLETS PATH
SCD-23
METHYLENE CHLORIDE 6
ACETONE 18
SCD-24
METHYLENE CHLORIDE 12
ACETONE 73
ISOPROPYLENE 37
SCD-22
METHYLENE CHLORIDE 6
ACETONE 30
2-BUTANONE 16
SCD-18
1,1-DCE 8
METHYLENE CHLORIDE 6
C-DCE 6
1,1,1-TCA 73
TCE 201
PCE 670
ACETONE 14
SCD-10
METHYLENE CHLORIDE 19
C-DCE 4
PCE 3,700
1,2,4-TMB 7
ACETONE 13
SCD-14
METHYLENE CHLORIDE 19
T-DCE 14
C-DCE 460
TCE 910
PCE 36,000
1,2,4-TMB 6
ACETONE 37
CHLOROFORM 3
HA-22
HA-21
HA-20
HA-10
HA-19
HA-17
HA-18
HA-15
SCD-15
HA-11
SCD-11
HA-12
HA-13
HA-14
N
LEGEND:
WETLAND AREA
SURFACE WATER SAMPLE
HAND AUGER GROUNDWATER SAMPLE
SEDIMENT SAMPLE LOCATION
SOIL GAS POINT
GEOPROBE BORING
NOTE:
SAMPLING LOCATIONS HAVE NOT BEEN SURVEYED
VOCs NOT LISTED WERE NOT DETECTED ABOVE TO LABORATORY DETECTION LIMIT.
CONCENTRATIONS ARE EXPRESSED IN MICROGRAMS PER KILOGRAM.
SCALE
0 200 400 800 FEET
REFERENCE:
BASE MAP GENERATED FROM: CENTRAL ISLIP 1967 7.5 MINUTE QUADRANGLE MAP.
Shaw Environmental, Inc.
NYSDEC OSER AVENUE OPERABLE UNIT No.2
HAUPPAUGE, NEW YORK
Figure 4
SEDIMENT SAMPLE ANALYTICAL RESULTS MAP
OFFICE ALBANY, NY
DRAWN BY DC/SSH 07-02-03
CHECKED BY
APPROVED BY
DRAWING NUMBER 824310016

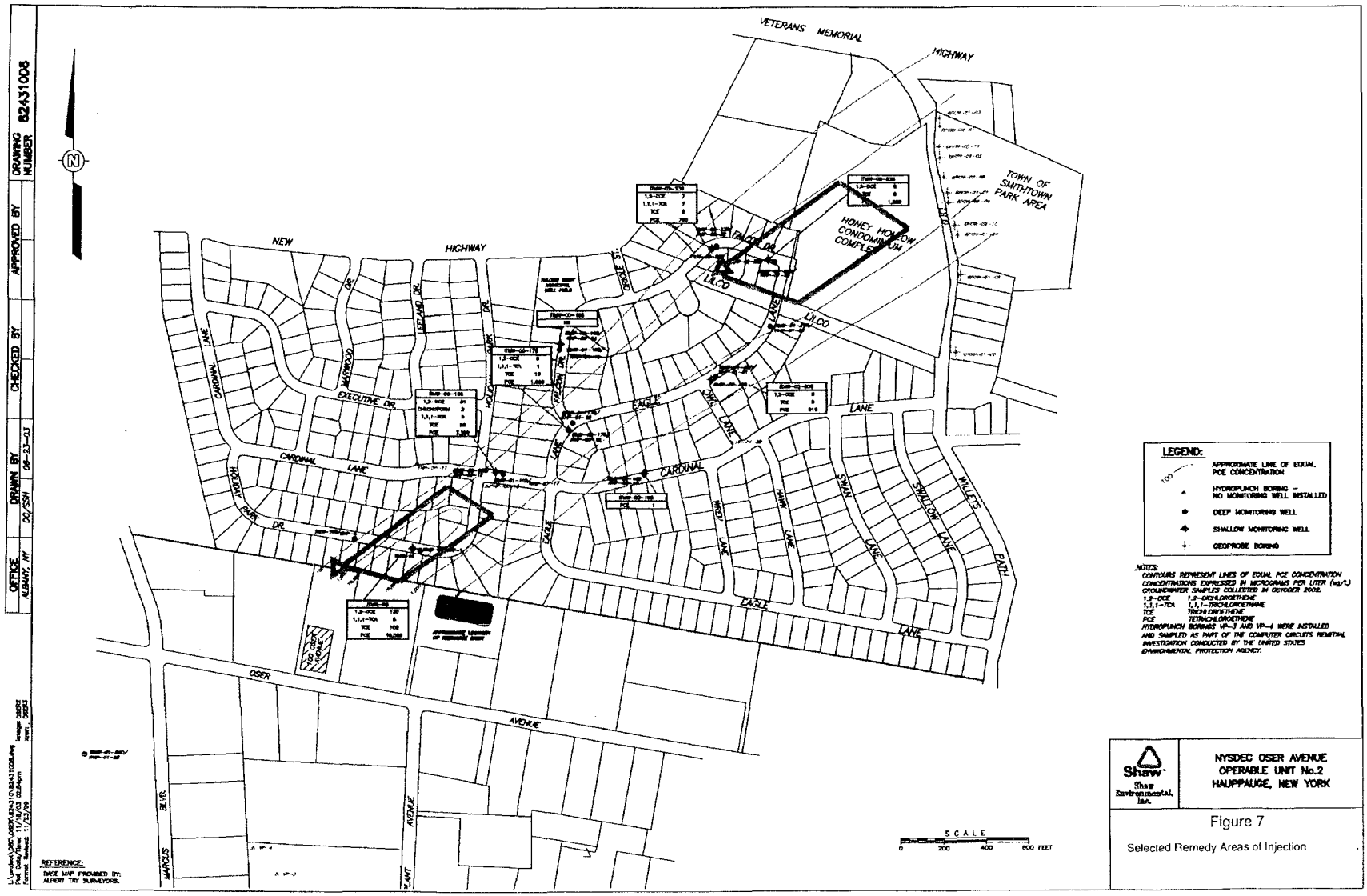
500105


NEW MILL POND
SUFFOLK COUNTY OFFICE PARK
APPROXIMATE LOCATION OF SUFFOLK COUNTY RE-FUELING AREA
APPROXIMATE LOCATION OF SUFFOLK COUNTY WATER TREATMENT PLANT
VETERANS MEMORIAL HIGHWAY
OLD WILLETS PATH
LEGEND:
WETLAND AREA
SURFACE WATER SAMPLE
HAND AUGER GROUNDWATER SAMPLE
SEDIMENT SAMPLE LOCATION
GEOPROBE BORING
NOTES:
CONCENTRATIONS EXPRESSED IN MICROGRAMS PER LITER (ug/L)
MC METHYLENE CHLORIDE
1,1-DCE 1,1-DICHLOROETHENE
T-1,2-DCE TRANS-1,2-DICHLOROETHENE
C-1,2-DCE CIS-1,2-DICHLOROETHENE
VC VINYL CHLORIDE
TCE TRICHLOROETHENE
PCE TETRACHLOROETHENE
MTBE METHYL-TERT-BUTYL-ETHER
VOCs NOT LISTED WERE NOT DETECTED ABOVE THE LABORATORY DETECTION LIMIT.
ND - NOT DETECTED AT OR ABOVE THE RESPECTIVE LABORATORY DETECTION LIMIT
REFERENCE:
BASE MAP GENERATED FROM CENTRAL ISLIP USGS 7.5 MINUTE QUADRANGLE MAP.
SCALE
0 200 400 800 FEET
Shaw
Shaw Environmental, Inc.
NYSDEC OSER AVENUE OPERABLE UNIT No.2
HAUPPAUGE, NEW YORK
Figure 5
SURFACE WATER SAMPLE ANALYTICAL RESULTS
OFFICE ALBANY, NY
DRAWN BY DC/SSH 06-24-03
CHECKED BY
APPROVED BY
DRAWING NUMBER 824310013

500106


VETERANS MEMORIAL
HIGHWAY
TOWN OF SMITHTOWN PARK AREA
HONEY HOLLOW CONDOMINIUM COMPLEX
NEW
HIGHWAY
FALCON DR.
LILCO
LILCO
EXECUTIVE DR.
CARDINAL
LANE
CARDINAL
EAGLE
LANE
EAGLE
LANE
EAGLE
LANE
OSER
AVENUE
MARCUS
BLVD.
TAHIT
AVENUE
SWAN
LANE
SWALLOW
LANE
WILLETS
PATH
LEGEND:
APPROXIMATE LINE OF EQUAL PCE CONCENTRATION
HYDROPUNCH BORING – NO MONITORING WELL INSTALLED
DEEP MONITORING WELL
SHALLOW MONITORING WELL
GEOPROBE BORING
NOTES:
CONTOURS REPRESENT LINES OF EQUAL PCE CONCENTRATION
CONCENTRATIONS EXPRESSED IN MICROGRAMS PER LITER (ug/L)
GROUNDWATER SAMPLES COLLECTED IN OCTOBER 2002.
1,2-DCE 1,2-DICHLOROETHENE
1,1,1-TCA 1,1,1-TRICHLOROETHANE
TCE TRICHLOROETHENE
PCE TETRACHLOROETHENE
HYDROPUNCH BORINGS VP-3 AND VP-4 WERE INSTALLED AND SAMPLED AS PART OF THE COMPUTER CIRCUITS REMEDIAL INVESTIGATION CONDUCTED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.
SCALE
0 200 400 800 FEET
REFERENCE:
BASE MAP PROVIDED BY: ALBERT TAY SURVEYORS.
Shaw
Shaw Environmental, Inc.
NYSDEC OSER AVENUE OPERABLE UNIT No.2 HAUPPAUGE, NEW YORK
Figure 6
GROUNDWATER SAMPLE ANALYTICAL RESULTS– SHALLOW MONITORING WELLS
OFFICE ALBANY, NY
DRAWN BY DC/SSH 06-23-03
CHECKED BY
APPROVED BY
DRAWING NUMBER 82431008

500107


VETERANS MEMORIAL
HIGHWAY
TOWN OF SMITHTOWN PARK AREA
HONEY HOLLOW CONDOMINIUM COMPLEX
NEW
HIGHWAY
FALCON DR.
LILCO
EXECUTIVE DR.
CARDINAL LANE
HOLIDAY PARK DR.
EAGLE
OWL LANE
LANE
WILLETS PATH
SWALLOW LANE
SWAN LANE
HAWK LANE
WREN LANE
OSER AVENUE
MARCUS BLVD.
PLANT AVENUE
SCALE
0 200 400 600 FEET
LEGEND:
APPROXIMATE LINE OF EQUAL PCE CONCENTRATION
HYDROPUNCH BORING – NO MONITORING WELL INSTALLED
DEEP MONITORING WELL
SHALLOW MONITORING WELL
GEOPROBE BORING
NOTES:
CONTOURS REPRESENT LINES OF EQUAL PCE CONCENTRATION
CONCENTRATIONS EXPRESSED IN MICROGRAMS PER LITER (ug/L)
GROUNDWATER SAMPLES COLLECTED IN OCTOBER 2002.
1,2-DCE 1,2-DICHLOROETHENE
1,1,1-TCA 1,1,1-TRICHLOROETHANE
TCE TRICHLOROETHENE
PCE TETRACHLOROETHENE
HYDROPUNCH BORINGS VP-3 AND VP-4 WERE INSTALLED AND SAMPLED AS PART OF THE COMPUTER CIRCUITS REMITIAL INVESTIGATION CONDUCTED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.
REFERENCE:
BASE MAP PROVIDED BY: ALBERT TRY SURVEYORS.
Shaw Environmental, Inc.
NYSDEC OSER AVENUE OPERABLE UNIT No.2 HAUPPAUGE, NEW YORK
Figure 7
Selected Remedy Areas of Injection
OFFICE ALBANY, NY
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APPROVED BY
DRAWING NUMBER 824310DB

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APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

100 Oser Avenue
Operable Unit No. 2
Smithtown, Suffolk County, New York
Site No. 1-52-162

The Proposed Remedial Action Plan (PRAP) for the 100 Oser Avenue site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 18, 2005. The PRAP outlined the remedial measure proposed for the contaminated groundwater, soil vapor surface water and sediments at the 100 Oser Avenue site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on April 14, 2005, which included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period was to have ended on March 21, 2005. However, it was extended to April 29, 2005 when a meeting scheduled for March 8, 2005 was rescheduled to April 14, 2005 due to inclement weather.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the NYSDEC's responses:

COMMENT 1: There is an awful amount of breast cancer and nearly one out of every two or three women who live here have it or had it. Is this amount of cancer related to the site?

RESPONSE 1: When investigating the possibility of a link between health effects and environmental contamination, the nature and magnitude of exposure (if any) to the contaminants must be evaluated. In order for a substance to potentially affect a person's health there must be direct contact with the substance either through inhalation, ingestion, or direct skin contact. Without any such exposure, the contaminants cannot affect public health.

At this time, our review of the environmental data indicate that exposure to site-related contaminants is limited. Concentrations historically found in water supply wells were below state guidelines, and indoor air concentrations in the OU2 area are generally within the typical background levels for the chemicals identified. Therefore, it is unlikely that the perceived excess of breast cancer is due to exposure to site-related contaminants.

NYSDOH has always placed a high priority on cancer surveillance, research, and prevention. An important tool in this effort is the New York State Cancer Registry, a program that maintains information on all persons diagnosed with cancer in New York State. Information from this registry is used to track cancers and to investigate their causes and how they may be prevented. For example, in 2000 NYSDOH began publishing statewide maps showing the incidence of cancers of the lung, colon and rectum, prostate, and female breast by zip code from the registry data, and has used these maps to identify areas of the state where the incidence is elevated compared to statewide averages. You can access these maps via the internet by visiting www.health.state.ny.us and clicking on "Cancer Mapping Information." The 1993-1997 breast cancer incidence map for ZIP Code 11788, the ZIP Code in which 100 Oser Ave site is located, shows that breast cancer incidence is within 15% of the expected incidence. This means that the number of breast cancers observed in this ZIP code is about what we would expect given the size and age of the population.

One in two men and one in three women will be diagnosed with cancer at some time during their life. In New York, nearly one in four deaths is due to cancer. Cancer is not one disease, but a group of diseases. Cancers develop in people of all ages but most often in the middle-aged and the elderly. The number of cancer cases has risen dramatically over the past 40 years, but much of this increase is a reflection of the increase in the population, particularly in older age groups. Breast, lung and colon cancer are the most common cancers among adult females. Scientists do not know what exactly causes breast cancer, but we do know that certain personal characteristics increase a woman's chance of developing breast cancer. These risk factors include increasing age, family history of breast cancer, breast cancer genes, personal history of breast cancer, history of benign breast disease, and hormonal factors such as delayed childbearing or starting menopause at a late age.

COMMENT 2: Has anybody made any efforts to contact past residents who went to school where the condo complex is now located to see what type of health impacts they have had? Has anybody gone knocking on doors to see what happened to people who lived here in the past. What health impacts they have?

RESPONSE 2: To our knowledge, no door-to-door health survey has occurred. The NYSDOH does not routinely suggest door-to-door health surveys to learn about health outcomes in a community because these types of surveys have many limitations that prevent them from producing conclusive findings. In order to include former residents in such a survey, as mentioned in the question, one would have to have sources of information identifying former residents and their current addresses in order to follow-up on them. The primary limitation of door-to-door, mail, or telephone health surveys is that response rates are typically very low. People refuse to participate in health surveys for a variety of reasons, and high refusal rates make it very difficult to interpret the information gathered from a small proportion of the community. As noted in the response to comment 1, the limited exposure potential did not warrant this type of investigation.

COMMENT 3: What kind of cancers are associated with PCE?

RESPONSE 3: Most of what we know about the human health effects of exposure to PCE comes from occupational studies where workers are exposed to high levels of the chemical for long durations. Some studies show a slightly increased risk of some types of cancer among workers, including dry-cleaning workers, exposed to PCE and other chemicals. Cancers associated with

exposures include cancers of the esophagus, bladder, and non-Hodgkin's lymphoma. Cancers less clearly associated with exposures include cancers of the cervix, tongue, and lung. Because all of these studies have limitations, the data only suggest, but do not prove, that the effects were caused by PCE and not by some other factor or factors. We do not know if the effects observed in these studies are due to PCE or some other possible factor (for example, exposure to other chemicals, smoking, alcohol consumption, socioeconomic status, lifestyle choices).

COMMENT 4: What is this chemical you are talking about (i.e. PCE)?

RESPONSE 4: The chemical tetrachloroethylene is also known as perchlorothylene (PCE). It is considered a chlorinated solvent and is used in the dry cleaning industry. At this site, it was used to dry clean cloth before the cloth material left the facility.

COMMENT 5: What is the remediation process? What does it do? How long will the remediation process go on?

RESPONSE 5: The remediation process is the way that the Department uses to clean-up an inactive hazardous waste disposal site. The remedial process has several phases. This Record of Decision will conclude the Remedial Investigation Phase. Once a Record of Decision is signed, the Remedial Design Phase will begin. The Remedial Design Phase of a project is where a design document is created that details all construction work necessary to fulfill the requirements of the ROD. The Remedial Design Phase ends with the approval of the Final Design document. The Remedial Action Phase begins at the start of construction and ends upon the completion of construction work. The length of time for the whole remedial process varies from site to site. The Remedial Design and Action Phases for this project are expected to last for a minimum 5 years.

COMMENT 6: How deep are public water supply wells at Suffolk County Water Authority's Falcon Drive wellfield?

RESPONSE 6: There are two public water supply wells at the Falcon Drive well field. Falcon Drive well No. 1 (S-14326) is 225 feet deep and Falcon Drive well No. 2 is 293 feet deep. The wells draw water from these depths.

COMMENT 7: How does the Suffolk County Water Authority take it (PCE) out of the impacted water that reaches its wells?

RESPONSE 7: There are Granular Activated Carbon (GAC) treatment filters on the Falcon Drive wells. GAC removes chemicals from water by adsorbing the chemical onto the activated carbon. The water that passes through the GAC is thus free of the chemicals.

COMMENT 8: Is there contamination from this site east of Old Willets Path?

RESPONSE 8: No.

COMMENT 9: How long will it take for the impacts of your injections at OU-1 to reach the entire plume?

RESPONSE 9: OU-1 is addressing the source on-site. OU-2 (the subject of this ROD) will address the remainder of the plume. It is estimated that from the time of injection, it will take approximately one year to treat the area that is targeted for treatment. With the area of highest concentration removed from the plume, the overall plume would be greatly improved within 5 years.

COMMENT 10: Would a really good home water purification system help eliminate contamination that reaches residents?

RESPONSE 10: Since the SCWA removes the PCE from the drinking water with a large GAC unit, and monitors frequently to ensure there is no contamination leaving the Falcon Drive plant, adding a home system would have a minimal effect on the water arriving at the home.

COMMENT 11: Just because it meets drinking water standards, doesn't that mean that a little bit of contamination is still in the water. Wouldn't a home system reduce this contamination a little more?

RESPONSE 11: Water going into the distribution system is typically non-detect for PCE (not just below standard). A typical faucet mount filter or whole house system would have a minimal effect on drinking water contaminants which are already within drinking water standards.

COMMENT 12: Have you decided what course of action you are going to take to clean up this contamination?

RESPONSE 12: The DEC has selected Alternatives SG-2 and GW-3B. Please refer to Section 8, page 16, for a description of the selected remedy.

COMMENT 13: Have you made an estimate of how long it will take for the groundwater to reach standards?

RESPONSE 13: Based on the hydrogeology of the formation, it is estimated that the groundwater area affected will reach drinking water standards by the year 2035.

COMMENT 14: Is the company that caused this problem being held responsible?

RESPONSE 14: The company that caused the problem is no longer in existence.

COMMENT 15: What is the time frame for natural attenuation to work with regard to this contamination?

RESPONSE 15: See Response 13.

COMMENT 16: The breakdown components of PCE are as equally toxic as PCE. How does this relate to the natural attenuation process?

RESPONSE 16: Under some circumstances, PCE can break down in the environment into other compounds (such as trichloroethene, dichloroethene, and vinyl chloride), some of which are as toxic or more toxic than PCE. However, there appears to be very little degradation occurring in this particular groundwater plume. Breakdown products have been detected in some samples, but they appear at much lower concentrations than PCE and, therefore, PCE is the primary contaminant of concern. Potassium permanganate is also effective at treating these breakdown products, so their presence is not expected to affect the performance of the remedy.

Conditions in the contaminated area do not generally appear to be conducive to the breakdown of PCE into these other chemicals. Therefore, once the chemical oxidation has run its course, the additional attenuation that is expected will be primarily the result of dilution, not of degradation of PCE.

COMMENT 17: You mentioned other sites in the industrial park. Have you investigated to see if there are other sources?

RESPONSE 17: . Other sites have been or are being investigated. A direct contributor to this groundwater plume, other than 100 Oser Avenue, has not been identified. However, there is some low level contamination migrating from upgradient of 100 Oser Avenue.

COMMENT 18: How did this process start? How did DEC become involved with this site?

RESPONSE 18: In 1989, a soil and groundwater investigation on a neighboring parcel of land led to the discovery of elevated concentrations of PCE at 100 Oser Avenue.

COMMENT 19: What is the pumping depth of the Falcon Avenue well? Have they always pumped at this depth?

RESPONSE 19: See answer to question No. 6. The water from the wells have always been pumped from these depths.

COMMENT 20: What are you doing about other businesses, especially cleaners?

RESPONSE 20: The NYSDEC attempts to investigate all known releases past and present through its remediation and spills programs. Dry cleaners are regulated by the NYSDEC under the NYCRR Part 232. It establishes criteria for facility operations and equipment. It is a DEC requirement that every dry cleaner is inspected by NYSDEC-approved Part 232 Registered Compliance Inspector. Facility inspection reports are reviewed by regional NYSDEC engineering staff for compliance and enforcement purposes. Part 232 requires that NYSDEC provide public access to these annual inspection reports

COMMENT 21: Have you looked into other areas as potential sites to place treatment systems. If an area like the LIPA right-of-way is good enough for the potassium permanganate, why would it not be a good enough location for a pump and treat system?

RESPONSE 21: The square footage necessary to build a groundwater pump and treat system is much greater that the square footage necessary to install injection wells. During the Remedial Design, the NYSDEC will consider and evaluate all available suitable locations for siting the treatment facility. The final location of the treatment facility will be decided during the design.

COMMENT 22: In the middle range between the two locations where you are injecting potassium permanganate you are relying on natural attenuation, and you still have a large amount of contamination?

RESPONSE 22: By the removal of the source on-site and destruction of the 10 parts per million area of PCE contamination off-site, it is expected that the remaining contamination will immediately begin to decrease. It would be like turning off the faucet of contamination to the aquifer. The resulting decreases in concentrations will be significant.

COMMENT 23: Is the remedy that you chose being used because it will reduce impacts to the parks and recreation area? It does not appear to be doing anything for people who live in the sub-division area.

RESPONSE 23: The routes of exposure to residents are addressed. The main potential routes of exposure are from soil gas and by contact in the contaminated wetlands. By destroying the highest levels of PCE in the groundwater at the head of the plume and nearest the wetlands, it will decrease the possibility of human contact through either of these potential pathways.

COMMENT 24: It says in your own documents that a pump and treat system will remove more contamination tha a potassium permanganate system will. Why not use that system?

RESPONSE 24: The groundwater pump and treat system needs the most time to achieve the remediation goals. It would require constant operation of the system to continue to meet the remedial goal. It would be located at Old Willetts Path so all the contamination would continue to flow under the residential development. It would be the most expensive alternative, would require a land transaction and, as stated above, be dependent upon the long-term operation and maintenance of the treatment system. The Potassium Permanganate would have an immediate effect by lowering the concentrations of PCE in the groundwater under the residential homes. See Section 8 for a full discussion.

COMMENT 25: You have said that the treatment system you would require would be extremely large, yet the one being used to treat the Exxon- Mobil MTBE spill near here is trailer based.

RESPONSE 25: The spill at the Exxon-Mobil site is new and the spill area relatively small and localized. Since the spill was found and clean-up started quickly, the size of treatment system is small. The disposal of PCE occurred over 30 years ago and continued for 10 more years. The PCE plume is quite large with high levels of PCE contamination, thus the treatment system required for remediation would be quite large.

COMMENT 26: From a science and a removal aspect it seems like you are only dealing with two areas (one near 100 Oser, and the other by the wetlands). You are not dealing with the contamination that is between these two areas?

RESPONSE 26: True, the remedy attempts to remove the exposure pathways. See Response 22.

COMMENT 27: You plan on starting work in May for OU1. On what date will numbers be available for us to look at? Give me a date on the calendar, which shows we sampled and it is working.

RESPONSE 27: The Remedial Construction for OU-1 began in May 2005. The time frame that the NYSDEC expects to have data to evaluate and determine if the injection performing as expected is estimated to be May 2006.

COMMENT 28: What exactly is involved with the injection site? How many injection sites will be required to take care of the southern zone or the onsite contamination? What is the schedule?

RESPONSE 28: These questions will be answered during the Remedial Design. For the on-site remedial action, 19 wells were installed. Each well has a shallow and deep component to it. Each injection requires 40 days to inject the necessary amount of Potassium Permanganate that is estimated to destroy the PCE under the 100 Oser Avenue site itself.

COMMENT 29 : Are you going to wait for results from the OU-1 area before you start injecting near Old Willets Path?

RESPONSE 29: There was a pilot test for OU-1. The Remedial Action for OU-1 is currently underway. The Department will begin the Remedial Design shortly after the signing of the ROD. The results attained during the OU-1 remedial work will be used during the design for OU-2. These results will be available before the Department would be prepared to begin work along Old Willets Path.

COMMENT 30 : In general, rather than dealing with just two zones, why not place a series of injection points between the two areas (OU-1 and Old Willets)?

RESPONSE 30 : In order to have a significant impact on the plume, a row of injection wells need to be placed across the full width of the plume (perpendicular to the path). A series of injections wells along the centerline of the plume, as suggested in the comment, would not be practical in destroying the contaminant plume since an extremely large quantity of potassium permanganate would be needed. Since the potential environmental and health impacts of the groundwater contamination have been identified as the high concentrations of contamination at the head of the plume and the discharge of the plume into the wetlands, the NYSDEC believes that the best approach is to lower concentrations of contaminants in these locations.

COMMENT 31: What sort of time frame do you envision? Are you talking 2 years, 5 years or how many years before you re-evaluate the remedy to see if another method should be used to clean this contamination.

RESPONSE 31: The remedy evaluation will be an ongoing process. If it is believed that the remediation is not progressing consistent with expectations, alternative remedial measures would be re-evaluated. Effectiveness of the treatment will be evaluated within two to five years after the injection has been completed.

COMMENT 32: Are you finding that the plume is still expanding down gradient? How far does it go down gradient?

RESPONSE 32: It is believed that the plume is actually discharging into the wetlands/New Mill Pond area and does not go further down gradient. However, groundwater monitoring wells will be installed downgradient of New Mill Pond to evaluate if a suitable location can be established.

COMMENT 33: Will additional monitoring wells be placed beyond what is outlined in this plan?

RESPONSE 33: The Record of Decision includes additional monitoring wells beyond what was outlined in the Proposed Remedial Action Plan. Deep monitoring wells will be placed near the Falcon Drive well field as outpost wells. Additional deep wells will be placed further downgradient from New Mill Pond, if a suitable location can be found.

COMMENT 34: The time frame for this project, is it based on science or on the availability of the consultants?

RESPONSE 34: The time frame is based on how long it will take to develop and implement the Potassium Permanganate remedial alternative.

COMMENT 35: What has been the past results of this technology at other locations?

RESPONSE 35: This is a proven, effective remedial technology used to destroy Volatile Organic Compuond concentrations in groundwater.

COMMENT 36: Do you plan to publicize your results?

RESPONSE 36: Yes. A notice will be sent to residents when all parameters and results have been evaluated.

COMMENT 37: Does potassium permanganate move at the regular rate that groundwater moves? Does it retard, or slow down, the rate at which perc moves?

RESPONSE 37: The rate that potassium permanganate moves through groundwater is about the same rate that groundwater moves. It does not affect the rate that PCE moves in the groundwater.

The Suffolk County Department of Health in a letter prepared by Sy Robbins (dated April 18, 2005) included the following comments:

COMMENT 38: Impacts on Public Water Supplies – It is not clear whether the proposed remedial action will be adequate to protect the Suffolk County Water Authority's Falcon Drive wells from site-related contamination. Although these wells have apparently not been impacted by the worst site-related contamination, and groundwater modeling shows that the contributing areas for these wells (as previously operated) lie just beyond the apparent boundaries of the present plume, this does not assure that significant impacts will not occur in the future, particularly if operating conditions at the well field change. Such a change could occur if Suffolk experiences a long dry spell during the summer, and the Falcon Drive wells are heavily pumped to meet the increased demands. The PRAP should include contingency measures to address potential increased wellhead treatment needs at Falcon Drive, as well as at least one outpost well to give SCWA sufficient lead time to modify its operations if needed.

RESPONSE 38: An outpost well has been added to the Record of Decision. At this time, a contingency plan for additional well head treatment will not be added. Historically, severe dry spells have occurred, most recently in 2000-2002, and the existing treatment system was able to function properly.

COMMENT 39: Remediation of Groundwater Contamination at Depth – The vertical profile wells indicate significant PCE contamination at depth (at least 250 feet below grade). Some of this contamination may have originated upgradient of the site, some may have migrated vertically due to density (DNAPL) flow, and some may have been drawn downward due to the influence of the Falcon Drive wells. Regardless of the source(s) or mechanism(s), it is not clear that the proposed remedial action will have any effect on this deeper contamination, and its ultimate fate is not discussed. Additional monitoring wells are needed to define the downgradient extent of the plume, and to document any natural attenuation.

RESPONSE 39: Additional deep monitoring wells will be added to monitor the deep aquifer water quality and to further characterize the extent of the plume.

COMMENT 40: Performance Monitoring- The location of wells to be used to monitor the effectiveness of the permanganate treatments need to be specified, as do their sampling frequency. Also, a time frame for the determination of treatment sufficiency needs to be established.

RESPONSE 40: The location of wells will be decided during the Remedial Design. Effectiveness of the treatment will be evaluated within two to five years after the injection has been completed.

COMMENT 41: Institutional Controls – Institutional controls to prevent inadvertent human exposures to contaminated groundwater pumped by irrigation, process water, cooling water, and other non-potable wells, need to be imposed by the NYSDEC. The SCDHS is not in a position to regulate wells that are not specifically installed for water supply purposes.

RESPONSE 41: An environmental easement will be imposed on the 100 Oser Avenue property itself. This will restrict the use of groundwater at 100 Oser Avenue as a source of potable or process water without necessary water quality treatment as determined by NYSDOH or SCDHS without prior approval by the NYSDEC. The entire area over the plume is serviced by public water minimizing the need for installing water wells. The installation in Suffolk County of water wells drawing 45 gpm or greater requires NYSDEC approval. NYSDEC does not have authority over the installation of other water wells. When the remedy is implemented, NYSDEC will review groundwater monitoring data to evaluate the effectiveness of the remedy. If significant groundwater contamination remains, and does not appear to be attenuating as expected, the state will evaluate the need to inform area residents of the plume's continued existence.

David Thompson of the New York State Council, Trouts Unlimited submitted a letter (dated April 26, 2005) which included the following comments:

COMMENT 42: According to EPA guidance, the chemical oxidation reaction creates considerable heat. Brook trout require cold water. This stream is one of the three last remaining native brook trout streams on Long Island. Heating the groundwater near Hauppauge Springs could be detrimental.

RESPONSE 42: The increase of groundwater temperature will be included as a parameter that needs to be evaluated during the location of the injection wells. Also, language was added to the Record of Decision identifying the stream as one of the last natural brook trout streams on Long Island.

COMMENT 43: In Section 5-3 "Summary of Human Exposure Pathways," the last paragraph states that "... this area is not currently known to be accessible or used by people." A well-worn path leads to a bridge crossing the stream just east of the sewage treatment plant and follows along the east side of the stream, which is all part of Blydenburgh Park.

RESPONSE 43: This statement was used when describing the area on the south side of Veterans Memorial Highway outside the park. The sentence continues and states that humans could come in contact with the sediments and water in this area. Therefore, it was identified as a potential exposure pathway.

COMMENT 44: Section 5-4 "Summary of Environmental Exposure Pathways" states that "...aquatic organisms, particularly benthic organisms and other invertebrates, could be exposed to levels of VOCs..." and might be affected by chronic exposure. It also states that "...exposure to fish in this area is not expected to be significant." Wild brook trout, especially fry, depend on benthic organisms an other invertebrates to survive. A decline in aquatic insects could affect the brook trout population. It might be useful to start a bio- monitoring program in the springs and stream to see if the groundwater pollution is affecting the aquatic insect communities

RESPONSE 44: Unfortunately, it would be nearly impossible to determine the affects of this contamination on the aquatic insect population. There would be no control group or stream to compare to. By the very fact that there are trout fry and other invertebrates in the stream indicates that there is sufficient food for the fry and minimal impacts to insects from PCE. PCE does not generally bio-accumulate in insects or fish.

COMMENT 45: New York State Council, Trouts Unlimited urges you to take the greatest caution not to further damage a habitat which has a high value in itself

RESPONSE 45: Caution will be taken when dealing with the wetlands contamination.

Neil Ram of Roux Associates, Inc. submitted a letter dated April 29, 2005. This letter from Roux Associates did not identify a client for whom they were working. A number of the items in this letter are specific design questions which cannot be addressed until the project has actually entered the Remedial Design phase. Items dealing with design issues are not being addresses in this responsiveness summary. The letter included the following comments on the PRAP:

COMMENT 46: In-well Air Stripping was not evaluated fully in the FS. It should be.

RESPONSE 46: Although In-well Air Stripping can be a viable remedial alternative, the extent of the plume at 100 Oser Avenue would not make it a viable alternative at this site. The number of wells, the lack of land to install the wells and the number of years of operation required for in-well air stripping were reasons that it was not fully evaluated in the FS.

COMMENT 47: How was the percentage of VOCs removed calculated?

RESPONSE 47: It was estimated that the remediation of the source area, the groundwater on-site (PCE concentrations in the 10 to 100 ppm range (OU-1 ROD)) and the area of 10 parts per million combined would remove the PCE mass loading in the ground equal about 50 percent PCE mass loading of the plume.

COMMENT 48: What is the justification of the 2 year monitoring program?

RESPONSE 48: The two year monitoring program will be used to evaluate the effectiveness of the potassium Permanganate injection. A long term monitoring program may be necessary to monitor the groundwater quality and evaluate the effectiveness of the remediation.

APPENDIX B

Administrative Record

Administrative Record

100 Oser Avenue
Operable Unit No. 2
Smithtown, Suffolk County, New York
Site No. 1-52-162

1. Proposed Remedial Action Plan for the 100 Oser Avenue site, Operable Unit No.2, dated February 2005 prepared by the NYSDEC.

2. Remedial Investigation Feasability Study (RI/FS) Work Plan for the 100 Oser Avenue Site - Operable Unit No. 2, Hauppauge, New York, NYS DEC Site No. 1-52-162, dated May 23, 2001

3. Remedial Investigation Report,100 Oser Avenue Site - Operable Unit No. 2, Hauppauge, New York, dated December 2003

4. Feasability Study Report, 100 Oser Avenue Site - Operable Unit No. 2, Hauppauge, New York, dated February 11, 2005

5. Oser Avenue OU-1 Pilot Study Technology Report, dated March 16, 2004

6. NYSDEC Remediation Sites 100 &110 Oser Avenue, IRM #2 100% Final Design Report, dated February 12, 2003

7. NYSDEC 100 Oser Avenue Site - Operable Unit No. 1, Hauppauge, New York Contract Documents D004647, IRM #2, dated July 21, 2003 - Soil Vapor Extraction

8. Permanganate Injection 100% Design Report, dated August 20, 2004

9. NYSDEC 100 Oser Avenue Site - Operable Unit No. 1, Hauppauge, New York Contract Documents D005386, dated September 27, 2004 - Potassium Permanganate Injection

10. 100 Oser Avenue Site - Operable Unit No. 1, Hauppauge, New York Citizen Participation Plan, dated June 1999

11. Fact Sheet and Public Notice for the Proposed Remedial Action Work Plan, dated March 8, 2005

12. Letter dated April 26, 2005 from David Thompson of the New York State Council, Trouts Unlimited

13. Letter dated April 18, 2005 from Sy Robbins of the Suffolk County Department of Health

14. Letter dated April 29, 2005 from Neil Ram of Roux Associates, Inc.