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**Division of Environmental Remediation**

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**Record of Decision**  
**Modock Road Springs/DLS Sand and**  
**Gravel, Inc. Site**  
**Town of Victor, Ontario County, New York**  
**Site Number 8-35-013**

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**January 2010**

# **DECLARATION STATEMENT - RECORD OF DECISION**

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## **Modock Road Springs/DLS Sand and Gravel, Inc. Inactive Hazardous Waste Disposal Site Town of Victor, Ontario County, New York Site No. 8-35-013**

### Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Modock Road Springs/DLS Sand and Gravel, Inc. 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 (the Department) for the Modock Road Springs/DLS Sand and Gravel, Inc. inactive hazardous waste disposal site, and the public's input to the Proposed Remedial Action Plan (PRAP) presented by the Department. 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 Modock Road Springs/DLS Sand and Gravel, Inc. site and the criteria identified for evaluation of alternatives, the Department has selected a long-term plume management monitoring program to ensure plume stability and the natural reduction of the chlorinated volatile organic compound (CVOC) contamination over time with a contingency for zero valent iron (ZVI) injection to reduce the contaminant mass in the more concentrated plume area should natural reduction prove to be less effective than expected as the remedy for the Modock Road Springs/DLS Sand and Gravel, Inc. site.

The elements of the selected remedy are as follows:

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. To evaluate CVOC groundwater concentrations over time and determine the necessity for ZVI injection, a long-term plume management monitoring program will be instituted. The ZVI injection will be contingent on the plume management monitoring showing that groundwater CVOC concentrations are not continuing to decline. The long-term plume management monitoring will include the collection of groundwater samples from within the groundwater plume (both on the Syracuse Sand and Gravel, Inc. property and off-site to the north), surface water samples from the Modock Road Springs, and soil vapor samples from areas over the groundwater plume for volatile organic compound analysis. The long-term monitoring will also include continued maintenance of 12 subslab depressurization systems (six (6) Department-installed systems and six (6) systems installed where monitoring was the VI sampling outcome), annual notification at the four (4) pre-existing system locations with possible VI sampling to determine whether continued operation is necessary to address site-related contaminants, along with implementation of a monitoring program for two (2) locations where monitoring was the VI sampling outcome.
3. If the long-term plume management monitoring indicates that enhanced contaminant reduction is necessary, then the ZVI injection contingency will be implemented. If the ZVI injection is necessary, then the northern portion of the Syracuse Sand and Gravel, Inc. property, in the area of highest CVOC concentrations in underlying groundwater, will be cleared and grubbed to provide access for ZVI injection equipment. Over an approximately 400-foot width of the CVOC plume and using multiple direct-push borings, ZVI will be injected into the saturated zone above the low permeability clay unit. Since this remedy requires no permanent above ground structures, the treatment area and surrounding area will be restored in cooperation with the property owner.
4. Imposition of an institutional control in the form of an environmental easement at the Syracuse Sand and Gravel, Inc. property that will require (a) compliance with the approved site management plan; (b) restricting the use of groundwater as a source of potable water, without necessary water quality treatment as determined by NYSDOH; and (c) the property owner to complete and submit to the Department a periodic certification of institutional controls.
5. Development of a site management plan, including periodic reviews (nominally five years), which will include the following institutional controls: (a) continued evaluation of the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (b) monitoring of site groundwater, surface water, and soil vapor and following collection, the placement of the analytical results into the document repositories; (c) public disclosure of the plume management monitoring results and the evaluation of long-term trends in the analytical data; (d) identification of any use restrictions on the site; and (e) provisions for the continued proper operation and maintenance of the components of the remedy.
6. The property owner for the site will provide a periodic certification of institutional controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner for the site in writing that this certification is no longer needed. This submittal will: (a) contain certification that the institutional controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that will 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 unless otherwise approved by the Department.

7. The operation of the components of the remedy will continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.
8. Since the remedy results in untreated hazardous waste remaining at the site, the long-term plume management monitoring program will be continued. This program will be implemented to determine the need for an initial ZVI injection, to evaluate the effectiveness of the ZVI injection, to allow for the consideration of subsequent ZVI injections, and will be a component of the long-term management for the site. The long-term plume management monitoring will include the collection of groundwater samples from within the groundwater plume, surface water samples from the Modock Road Springs, and soil vapor samples from areas over the groundwater plume for volatile organic compound analysis. The long-term monitoring will also include the continued maintenance of 12 subslab depressurization systems (six (6) Department-installed systems and six (6) systems installed where monitoring was the VI sampling outcome), annual notification at the four (4) pre-existing system locations with possible VI sampling to determine whether continued operation is necessary to address site-related contaminants, and implementation of a monitoring program for two (2) locations where monitoring was the VI sampling outcome.

#### **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 15 2010**

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Date



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Dale A. Desnoyers, Director  
Division of Environmental Remediation

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## **RECORD OF DECISION**

**Modock Road Springs/DLS Sand and Gravel, Inc. Site  
Town of Victor, Monroe County, New York  
Site No. 8-35-013  
January 2010**

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### **SECTION 1: SUMMARY OF THE RECORD OF DECISION**

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the Modock Road Springs/DLS Sand and Gravel, Inc. site. 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, past operations or activities on the site have resulted in the disposal of hazardous wastes, including chlorinated volatile organic compounds (CVOCs). These wastes have contaminated the groundwater, surface water, and soil vapor at the site, and have resulted in:

- a significant threat to human health associated with potential exposure to groundwater, surface water, and soil vapor; and
- a significant environmental threat associated with the current and potential impacts of contaminants to groundwater, surface water, and soil vapor.

To eliminate or mitigate these threats, the Department has selected a long-term plume management monitoring program to ensure plume stability and the natural reduction of the CVOC contamination over time with a contingency for zero valent iron injection to reduce the contaminant mass in the more concentrated plume area should natural reduction prove to be less effective than expected as the remedy for the Modock Road Springs/DLS Sand and Gravel, Inc. site.

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**

The Modock Road Springs/DLS Sand and Gravel, Inc. site is located in a rural/suburban area in the Town of Victor, Ontario County, New York. As shown on Figure 1, the actual site is the 173-acre Syracuse Sand and Gravel, Inc. property located on the east side of Malone Road and approximately 1,000 feet south of Dryer Road. Based on the results of groundwater sampling at wells located at and downgradient of the site, dissolved-phase CVOC groundwater contamination extends from the Syracuse Sand and Gravel, Inc. property approximately 5,000 feet off-site to the north where groundwater discharges to surface water via a series of springs to the south of Modock Road (Figures 1 and 2).

Land use is agricultural and residential adjacent to and north of the Syracuse Sand and Gravel, Inc. property, in the area of the dissolved-phase CVOC contamination. Farther to the north, between Dryer Road and Modock Road (shown on Figure 2), land use is rural/suburban with some recent home construction. Sand and gravel mines are located to the east and west of the Syracuse Sand and Gravel, Inc. property. The topography in the area of the dissolved-phase CVOC contamination generally slopes downward to the north, but consists of rolling hills with elevations varying from approximately 620 feet above mean sea level (AMSL) near the Modock Road Springs to approximately 900 feet AMSL near the Syracuse Sand and Gravel, Inc. property.

The Syracuse Sand and Gravel, Inc. mine, along with nearby aggregate mining operations along the crest of this kame moraine complex, have exposed thick sequences of stratified sands, gravels, and occasional silt and clay layers which underlie the region's hummocky topography. The central and southern portion of the Syracuse Sand and Gravel, Inc. site consists of lacustrine sand while outwash sand and gravel is present from the northern portion of the site to Dryer Road. Lacustrine sand is present from Dryer Road to the Modock Road Springs and outwash sand and gravel is generally present north of Modock Road. The permeable soils of this moraine complex provide significant groundwater recharge. At distinct changes in topography (e.g., toe of slope) and stratigraphy (e.g., clay layers), groundwater may discharge to the surface as springs and wetlands. These conditions exist south of Modock Road and produce the Modock Road Springs.

The depth to groundwater varies from less than ten (10) feet beneath ground surface near the springs to approximately 80 feet below ground surface along the north-side of the site. A low permeability clay layer underlies the uppermost zone of saturated sand and gravel and appears to be continuous over the entire area of the dissolved-phase CVOC groundwater plume. A zone of high permeability gravel and sand is present in the western portion of the dissolved-phase CVOC plume at Dryer Road (at MW-24S/D on Figure 2). The arch-like groundwater flow pattern from south to north, along with contaminant distribution, is influenced by this high permeability zone. Bedrock was not encountered in soil borings drilled during the remedial investigation, but information from residential wells indicates that the top of bedrock (Bertie Formation/Onondaga Limestone) is approximately 150 to 200 feet below ground surface (bgs).

## **SECTION 3: SITE HISTORY**

### **3.1: Operational/Disposal History**

The 173-acre parcel was acquired by Syracuse in 1953. Prior to Syracuse ownership and the mining operations, the property was used for agricultural purposes. The excavation of sand and gravel likely began shortly after the property acquisition in approximately 1954. The property operated under the name of D.L.S. Sand and Gravel until 1973 when the corporate name was changed to Syracuse Sand and Gravel. From 1966 to 1971, a portion of the property was leased to Rochester Block, Inc.

Data collected during the RI did not provide information on when and for what duration solvent disposal actually occurred at the site. The data does generally show that the solvents, including trichloroethene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), and 1,1-dichloroethene (1,1-DCE), were released on the property and have contributed to both on-site and off-site solvent contamination.

### **3.2: Remedial History**

In 2001, the Department 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.

The CVOC contamination, including TCE, 1,1,1-TCA, and 1,1-DCE, was initially discovered in the Modock Road Springs in February 1990 during a NYSDOH initiative to sample small community water supplies across New York State. This initiative included the sampling of the Village of Victor community water system which had relied on the Modock Road Springs (Figure 2) as a source of supply since approximately 1925. Both TCE and 1,1,1-TCA were detected in the spring water at concentrations (11 and 35 ug/L, respectively) greater than the NYSDOH maximum contaminant level (MCL) of 5 ug/L. As a result, the use of the springs as a public water supply ceased and the Village of Victor connected to the Monroe County Water Authority as a source of drinking water. Earlier sampling of the Modock Road Springs drinking water source in 1980 did not reveal the presence of the solvent contamination.

Immediate investigation activities by the Town of Victor suggested that the contamination appeared to be localized and in a direction southeast of the Modock Road Springs (Engineering-Science, 1990). Following discovery of the CVOC contamination in the Modock Road Springs, the sampling of nearby private water supply wells was immediately started to determine if surrounding domestic water supplies were impacted, the Village of Victor connected to the Monroe County Water Authority municipal water supply, public water lines were extended to the area, and a series of investigations were completed by the Department and NYSDOH to identify a source for the CVOC contamination. Given the rural/suburban nature of the community upgradient of the springs, there were no obvious suspect source areas.

During the Department's investigation activities, approximately 100 domestic water supply wells in the vicinity of the Modock Road Springs were sampled for laboratory analysis. The sampling showed that the contaminants were also present in three (3) residential wells at concentrations

exceeding the drinking water standards. These three homes were subsequently connected to municipal water as part of an interim remedial measure (IRM).

Between 1995 and 2000, the Department completed a series of sequential investigations upgradient of the Modock Road Springs to delineate the dissolved-phase CVOC groundwater plume and determine the potential source of the groundwater contamination. Based on these groundwater sample results, along with groundwater flow directions, the data suggested that the TCE, 1,1,1-TCA, and 1,1-DCE detected in the Modock Road Springs and groundwater upgradient of the springs was originating from the Syracuse Sand and Gravel, Inc. property. Figure 3 shows the approximate CVOC plume boundary combined with groundwater contours and flow directions.

Based on the Department's findings, Syracuse Sand and Gravel, Inc. installed 11 monitoring wells (SS&G MW-1 through SS&G MW-11 on Figure 2) in 2001 (Leader Professional Services, 2002). The majority of these wells were installed on Syracuse Sand and Gravel, Inc. property. Groundwater samples collected for laboratory analysis from these wells confirmed the presence of TCE, 1,1,1-TCA, and 1,1-DCE in the central and northern portions of the Syracuse Sand and Gravel, Inc. property.

The investigation data led to the listing of the Syracuse Sand and Gravel, Inc. site as a Class 2 Inactive Hazardous Waste Disposal Site in 2001, the subsequent completion of the Modock Road Springs/DLS Sand and Gravel, Inc. Site RI/FS, and the development of the PRAP and this ROD.

#### **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: Syracuse Sand & Gravel, Inc.

The PRPs declined to implement the RI/FS at the site when requested by the Department. With completion of the ROD, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the Department 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 January 2007 and December 2008. The field activities and findings of the investigation are described in the RI report.

The RI included the following activities:

- Environmental samples were collected from the following media and submitted for laboratory analysis: soil vapor, indoor air, outdoor air, surface soil, subsurface soil, groundwater, and surface water;
- Direct push/Geoprobe<sup>®</sup> drilling program where 56 shallow soil borings were advanced;
- Installation of 15 groundwater monitoring wells;
- Excavation of eleven (11) test pits/trenches;
- Permeability testing of 24 of the existing and newly installed monitoring wells;
- Review of aerial photographs; and
- Site survey.

### **5.1.1: Standards, Criteria, and Guidance (SCGs)**

To determine whether the soil vapor, indoor air, outdoor air, surface soil, subsurface soil, groundwater, and surface water 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 the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.
- Soil SCGs are based on the Department's Cleanup Objectives included in 6 NYCRR Subpart 375-6 - Remedial Program Soil Cleanup Objectives.
- Concentrations of VOCs in air were evaluated using the air guidelines provided in the NYSDOH guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006. Specifically, the slab and indoor air data were compared to Soil Vapor/Indoor Air Matrix 1 for TCE and Soil Vapor/Indoor Air Matrix 2 for 1,1-DCE, and 1,1,1-TCA.

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 in Section 5.1.2. A more complete discussion of this information can be found in the RI report.

### **5.1.2: Nature and Extent of Contamination**

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

As described in the RI report, many soil vapor, indoor air, outdoor air, surface soil, subsurface soil, groundwater, and surface water samples were collected to characterize the nature and extent of contamination. As seen in Figures 4, 5, and 6 and summarized in Table 1, the main categories of contaminants that exceed their SCGs are chlorinated volatile organic compounds (CVOCs). For comparison purposes, where applicable, SCGs are provided for each medium.

Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for soil. Air samples are reported in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).

Figures 4, 5, and 6 and Table 1 summarize the degree of contamination for the contaminants of concern in soil vapor, indoor air, shallow soil, subsurface soil, groundwater, and surface water and compare 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.

#### **Shallow Soil** (approximately 0-1 foot)

No site-related shallow soil contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for surface soil.

#### **Subsurface Soil** (greater than 1 foot below ground surface)

To better understand the nature and extent of contamination and to identify a possible disposal area/areas, a total of 89 subsurface soil samples were collected for laboratory analysis during the RI. The locations selected for subsurface soil sampling were based on the results of a passive soil gas sampling program along with known dimensions of the groundwater plume and where anecdotal information suggested past disposal may have occurred. A total of 42 subsurface soil samples were collected during a direct-push drilling program, 17 subsurface soil samples were collected during a test pit/trench excavation program, 23 subsurface soil samples were collected when soil borings were advanced prior to the installation of groundwater monitoring wells, and seven (7) subsurface soil samples were collected from the active mining face and floor. Figure 4 illustrates the locations where subsurface soil samples were collected as part of RI source characterization efforts and locations where TCE was detected in subsurface soil samples.

As summarized in Table 1, TCE was the site contaminant most frequently detected in subsurface soil samples collected during the RI. Specifically, TCE was detected in a total of 26 of the 89 subsurface soil samples. Of these 26 locations, TCE was only detected above the unrestricted SCG of 0.470 ppm in two (2) of the subsurface soil samples. As shown on Figure 4, TCE was detected at a concentration of 0.99 ppm in subsurface soil collected at the monitoring well MW-17S location and at a concentration of 0.70 ppm in subsurface soil collected at the monitoring well MW-17D location. At both these locations (MW-17S and MW-17D), the subsurface soil samples were collected from the saturated zone, at a depth of 65 to 67 feet below ground surface and in the center of the groundwater plume where groundwater TCE concentrations range from approximately 1,000 ppb to 2,300 ppb.

1,1,1-TCA and 1,1-DCE were detected in a total of eight (8) and six (6) subsurface soil samples respectively, but not at concentrations exceeding the unrestricted SCGs of 0.68 ppm for 1,1,1-TCA and 0.33 ppm for 1,1-DCE. 1,1,1-TCA was detected at a maximum concentration of 0.1 ppm and 1,1-DCE was detected at a maximum concentration of 0.018 ppm. These 1,1,1-TCA and 1,1-DCE concentrations were from a saturated soil sample collected from a depth of 65 to 67 feet bgs at the MW-17D location within the approximate center of the groundwater plume (Figure 4).

The results of the subsurface soil sampling indicate that a highly contaminated subsurface soil source may no longer exist in unsaturated zone subsurface soil. Instead, the consistent presence and distribution of low concentrations (below the respective SCGs) of the site contaminants indicate that

past releases occurred at the site, but that the contaminants have been transported downward to the saturated zone. No site-related subsurface soil contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for subsurface soil.

## **Groundwater**

As summarized in Table 1, a total of 91 groundwater samples were collected during two separate sampling events from a network of existing monitoring wells installed during earlier investigation work and from monitoring wells installed as part of the Modock Road Springs/DLS Sand & Gravel, Inc. RI. Figure 5 illustrates the CVOC groundwater sampling results from the August 2008 sampling event.

Three CVOCs, including TCE, 1,1,1-TCA, and 1,1-DCE were detected at concentrations exceeding their respective SCGs and TCE was the CVOC detected at the highest concentration in groundwater. Specifically, TCE was detected in 36 of the 91 groundwater samples at concentrations exceeding the SCG and at a maximum concentration of 2,300 ppb in groundwater from monitoring well MW-17S.

1,1,1-TCA and 1,1-DCE were detected in 30 and 15 of the 91 groundwater samples respectively at concentrations exceeding the respective SCGs.

During the August 2008 sampling event, TCE, 1,1,1-TCA, and 1,1-DCE were detected at concentrations exceeding the SCGs in groundwater samples collected from 18 of the monitoring wells. As shown on Figure 5, the highest TCE, 1,1,1-TCA, and 1,1-DCE concentrations were detected in groundwater samples collected from monitoring wells installed along the north-side of the Syracuse Sand & Gravel, Inc. property. The groundwater contamination extends approximately 2,000 feet further upgradient from this area and onto the south-central portion of the Syracuse Sand & Gravel, Inc. property near monitoring well SS&G MW-5 (Figure 5). Monitoring well SS&G MW-5 is located approximately 7,500 feet upgradient of the Modock Road Springs. During the RI, monitoring well SS&G MW-5 contained TCE at a maximum concentration of 450 ppb and the most downgradient well (Test Well on Figure 5), prior to groundwater discharge to the Modock Springs, contained TCE at a maximum concentration of 120 ppb.

To evaluate the potential for downward migration of site contaminants, a well pair (MW-17S (shallow) and MW-17D (deep)) was installed adjacent to the north-central portion of the Syracuse Sand & Gravel, Inc. property. The shallow well was installed to a depth of 68 feet below grade and the deep well was installed to a depth of approximately 95 feet below grade. Monitoring well MW-17D was screened in a low permeability silty clay and monitoring well MW-17S was installed in a permeable sand. During the August 2008 sampling event, the highest TCE, 1,1,1-TCA, and 1,1-DCE concentrations were detected in a groundwater sample collected from shallow monitoring well MW-17S and TCE, 1,1,1-TCA, and 1,1-DCE were not detected in the groundwater sample collected from MW-17D. The groundwater quality data, combined with groundwater elevation data and the presence of the underlying clay layer, indicate that site contaminants are not migrating downward through the low permeable clay layer.

During the RI, a total of 73 groundwater samples were collected from domestic water supply wells. The majority of the private wells sampled were within a one-mile radius to the west, north, and east of the site. No CVOCs were detected in domestic wells at concentrations exceeding the SCGs.

As shown on Figure 5, the groundwater sampling data shows a well defined, long and narrow dissolved phase CVOC groundwater plume. The plume boundaries are defined by the consistent collection of groundwater samples from 21 monitoring wells that have either contained very low CVOC concentrations or no CVOCs. Based on this sampling, the average width of the groundwater plume is approximately 1,200 to 1,300 feet. The groundwater sampling data, combined with hydrogeologic data, indicate that the highest CVOC groundwater concentrations (410 - 2,300 ppb in the MW-14 and MW-17S area and 84 - 120 ppb further downgradient in the Test Well and MW-4 area) are mostly restricted to a narrow high permeability zone that on average is approximately 800 feet in width and does not extend downward beneath the low permeability clay layer.

Review of CVOC groundwater data since the earliest sampling in 1995 suggests that groundwater CVOC concentrations are declining. Groundwater samples collected from monitoring wells throughout the entire length of the plume have shown approximate percent reductions ranging from 26% to 96%. The highest percent reductions in CVOC groundwater concentrations have occurred in monitoring wells within the area of residual contamination. Specifically, at the monitoring well MW-14 area, the total CVOC concentrations detected in 2000 and 2001 were 16,200 ppb and 4,300 ppb respectively. The total CVOC concentrations in MW-14 in June 2008 and May 2009 declined to 550 ppb and 570 ppb respectively.

In addition to the collection of groundwater samples for VOC analysis, a series of groundwater samples were collected and analyzed for inorganic compounds, pesticides, PCBs, and semi-volatile organic compounds from four (4) locations. Based on these analyses, no pesticides, PCBs, and SVOCs were detected in site groundwater at concentrations exceeding SCGs. Two (2) metals, including iron and sodium were detected in a groundwater sample collected from monitoring well MW-26 and magnesium was detected in a groundwater sample collected from monitoring well SS&G MW-15 at concentrations exceeding the respective SCGs. These three (3) inorganic compounds commonly occur naturally and are not associated with disposal at the site.

Groundwater contamination identified during the RI/FS will be addressed in the remedy selection process.

### **Surface Water**

During the RI, a total of 19 surface water samples were collected from the Modock Road Springs and the small un-named tributary to Irondequoit Creek. The CVOC groundwater contamination discussed above discharges at the Modock Road Springs (Figure 5). To assess the discharge of the CVOC groundwater plume to the springs, surface water samples were collected from five (5) locations at the actual Modock Road Springs and from three locations along the un-named surface water stream that the springs drain into. In addition, one (1) surface water sample was collected from a small pond located in the central portion of the Syracuse Sand & Gravel, Inc. property.

At the Modock Road Springs, the highest TCE, 1,1,1-TCA, and 1,1-DCE concentrations were detected in surface water samples collected at the SC-1 sampling location. The SC-1 sampling location is on private property and immediately downstream from the eastern springs collection system formerly used for the water supply. Specifically, TCE, 1,1,1-TCA, and 1,1-DCE were

detected at maximum concentrations of 110 ppb, 42 ppb, and 10 ppb respectively. As summarized in Table 1, TCE was the only CVOC detected at a concentration in surface water above the SCGs (40 ppb for TCE). During the RI, a total of six (6) surface water samples were collected from the SC-1 location and TCE was detected at concentrations ranging from 77 ppb to 110 ppb.

At a distance of approximately 500 feet downstream of the Modock Road Springs and at a location where the un-named surface water stream flows beneath Modock Road, the TCE concentrations decrease to below the NYSDEC Class C Surface Water Standard of 40 ppb. During three RI sampling events of the un-named stream, TCE surface water concentrations ranged from 25 ppb to 32 ppb at the sampling location 500 feet from the Modock Road Springs. Further downstream from the Modock Road Springs, the TCE concentrations decrease to a maximum concentration of 13 ppb at a distance of 1,100 feet and 1.8 ppb at distance of 2,500 feet.

A surface water sample was also collected from a small man-made pond located in the central portion of the Syracuse Sand & Gravel, Inc. property. Based on the depth to groundwater and the depth of the pond, the surface water in the pond is thought to represent an outcrop of the water table.

A surface water sample collected from the man-made pond contained TCE at a lab estimated value of 2.1 ppb. 1,1,1-TCA and 1,1-DCE were not detected in this surface water sample. The presence of low concentrations of TCE in this surface water (exposed groundwater) is consistent with the presence of TCE in groundwater collected from surrounding monitoring wells.

No site-related surface water contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for surface water.

### **Soil Vapor/Subslab Vapor/Air**

During the RI, vapor intrusion (VI) sampling was completed at 73 structures in the vicinity of the dissolved phase groundwater plume (Figure 6). The VI sampling included the collection of subslab soil vapor, indoor air, and outdoor air samples to evaluate the potential for exposures via soil vapor intrusion (SVI). Soil vapor intrusion refers to the process by which volatile chemicals move from a subsurface source into the indoor air of overlying buildings. Based on the VI sampling, TCE was the only VOC detected in indoor air samples at concentrations above the SCG of 5  $\mu\text{g}/\text{m}^3$ . Specifically, TCE was detected in six (6) of the 169 indoor air samples at concentrations above the SCG of 5  $\mu\text{g}/\text{m}^3$ . The VI sampling locations are shown on Figure 6 and a summary of the VOCs detected in subslab vapor and indoor air samples is provided in Table 1.

The following summarizes the evaluation of the vapor intrusion samples relative to Soil Vapor/Indoor Air Matrix 1 and 2 included in the Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006:

- Mitigation was necessary at six (6) residential properties due to the presence of TCE and 1,1,1-TCA at elevated concentrations in subslab and indoor air samples. Following the vapor intrusion sampling, subslab depressurization systems were installed by the Department at the six (6) locations.
- Monitoring was necessary at eight (8) residential properties to evaluate whether concentrations change over time and if mitigation is necessary at these locations.

- No Further Action was considered appropriate at 59 of the 73 properties. At these locations, detected CVOC concentrations are considered to be associated with indoor and/or outdoor sources rather than vapor intrusion given the concentration detected in the subslab samples.

Other VOCs detected in the vapor intrusion samples mainly included petroleum and refrigerant compounds, many of which were detected in each of the subslab, basement air, and first floor air samples. The presence and concentrations of these compounds is consistent with typical background levels of VOCs in indoor and outdoor air.

Soil vapor and indoor air contamination identified during the RI/FS was addressed during the IRM where six (6) subslab depressurization systems were installed by the Department between June and August 2007 and as described in Section 5.2.

### **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.

Mitigation measures, including the installation of subslab depressurization systems (SSDs), were taken at six (6) locations between June and August 2007 to address current and potential human exposures (via inhalation) to volatile organic compounds associated with soil vapor intrusion.

Following the identification of CVOC contamination above the drinking water standards in domestic water supply wells during earlier investigation activities at the site, three residences were connected to the Town of Victor municipal water supply system as part of IRMs between 1995 and 2000.

Between September 2009 and November 2009 and during the development of the PRAP, approximately 2,200 feet of water line was installed for the purpose of connecting eleven (11) homes, historically relying on domestic water supply wells, to the Town of Victor municipal water supply. The water connections eliminated the need for continued routine sampling for laboratory analysis of domestic water supply wells within or along the margins of the groundwater contamination.

### **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 6-1 of the 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.

The primary routes of exposure to site-related contaminants are through drinking contaminated surface water or private well water and breathing contaminated air due to soil vapor intrusion. As discussed in Section 3.2, surface water is no longer being used as a source of drinking water. Houses with private drinking water containing site-related contaminants above applicable standards used for public drinking water supplies have been connected to the public water supply. Where necessary, exposures related to soil vapor intrusion are being addressed through the installation and operation of sub-slab depressurization systems within homes or through the implementation of an air-monitoring program.

#### **5.4: Summary of Environmental Assessment**

This section summarizes the assessment of 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:

The investigation results indicate that the groundwater CVOC plume discharges at the eastern Modock Road Springs and to a small surface water stream (Figure 2). The RI report Fish and Wildlife Impact Analysis along with the NYSDEC Division of Fish and Wildlife Hazardous Waste Site Evaluation Unit concluded that the site contaminants do not represent a significant threat to fish and wildlife.

Site contamination has impacted the groundwater resources in the shallow overburden unit comprised of a mixture of sand and gravel. As described in Section 2, the groundwater contamination originates on the Syracuse Sand & Gravel, Inc. property and extends approximately one (1) mile off-site to the north where groundwater discharges at the Modock Road Springs.

### **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. 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 CVOCs in soil and groundwater;
- the release of contaminants from groundwater beneath basements into indoor air through soil vapor intrusion; and
- the release of CVOCs from the area of residual contamination into groundwater that may result in CVOC groundwater concentrations no longer declining.

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

- ambient groundwater quality standards; and
- the air guidelines provided in the Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

## **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 Modock Road Springs/DLS Sand and Gravel, Inc. Site were identified, screened and evaluated in the FS report which is available at the document repositories established for this site.

A summary of the remedial alternatives that were considered for this site is 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, soil vapor, and air at the site. Throughout the RI/FS process, which began in January 2007 for this site, the Victor Community, including residents, elected officials, and a citizens advisory committee (CAC), has actively participated in the remedial process.

With the exception of Alternative 1 (No Further Action), the following common remedial actions would be included as elements of Alternatives 2 through 7:

- Long-term groundwater, surface water, and soil vapor monitoring program (plume management monitoring). Following sampling events, the laboratory analytical results will be placed in the document repositories;
- An environmental easement to restrict the use of groundwater at the site;

- Responsibility for maintenance of subslab depressurization systems at six (6) Department-installed locations and six (6) locations where monitoring was the VI sampling outcome;
- Annual notification at four (4) pre-existing subslab depressurization system locations in the area overlying the groundwater plume. Should the pre-existing systems require service, Department staff would assess the need for VI sampling to determine what, if any, actions are appropriate. The Department could, in lieu of sampling, opt to repair or replace the pre-existing system;
- Implementation of a monitoring program for two (2) locations where monitoring was the VI sampling outcome; and
- Periodic reviews (nominally five years) to evaluate the proposed remedy. The periodic reviews will include public disclosure of the plume management monitoring results along with the evaluation of long-term trends in the analytical data.

**Alternative 1: No Further Action**

The no further action alternative recognizes remediation of the site conducted under previously completed IRMs. The no further action alternative would include no further work, no long-term monitoring, and no institutional controls. Since Alternative 1 includes no further actions, there would be no costs associated with this alternative.

This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

**Alternative 2: Plume Management Monitoring**

Alternative 2 would rely on the long-term plume management monitoring program to ensure plume stability and the natural reduction of the CVOC contamination over time. The plume management monitoring alternative would include each of the common remedial actions described above. The long-term plume management monitoring alternative would include the collection and laboratory analysis of groundwater, surface water, and soil vapor samples for VOC analysis. The groundwater samples would be collected throughout the plume from the existing monitoring well network and surface water samples would be collected from established sampling points near the Modock Road Springs. The plume management monitoring alternative would also include the installation of soil vapor monitoring points within the study area to allow for the periodic collection of soil vapor samples.

The components of Alternative 2 are readily implementable. Costs are based on the routine, long-term groundwater, surface water, and soil vapor quality monitoring along with the operation and maintenance of the six (6) Department installed mitigation systems.

<i>Present Worth:</i> .....	<i>\$280,000</i>
<i>Capital Cost:</i> .....	<i>\$45,000</i>
<i>Annual Costs:</i>	
<i>(Years 0-30):</i> .....	<i>\$11,000</i>

**Alternative 3: Zero Valent Iron Treatment Injection in the Area of Highest Groundwater CVOC Concentrations combined with Plume Management Monitoring**

Alternative 3 would rely on the injection of zero valent iron (ZVI) to reduce the contaminant mass in the more concentrated plume area. As shown on Figure 7, the ZVI injection would occur in an approximate 400 foot width area where the CVOC groundwater concentrations are the highest. This alternative would inject zero valent iron as a colloidal suspension, or an equivalent material, that would persist in the saturated portion of the subsurface for approximately five (5) years. During this five (5) year period, the majority of changes in groundwater quality would be observed in the area of treatment. The ZVI would gradually break down over this five (5) year period and would not adversely affect the quality of groundwater. The ZVI, or equivalent material, would be introduced into the subsurface at depths ranging from approximately 50 to 80 feet below ground surface using a pneumatic injection technique. The introduction of ZVI or equivalent is not expected to reduce the overall permeability of the groundwater system and hence alter the groundwater flow patterns since the quantity of ZVI injected would equate to approximately 0.3% to 0.5% of the treatment zone soil mass.

The zero valent iron, or equivalent material, would create reducing groundwater conditions that would facilitate degradation of the CVOC contamination in the treatment area. It is expected that the ZVI would reduce the time required to create the necessary subsurface conditions needed to dechlorinate the CVOCs. Although Alternative 3 includes an initial ZVI injection, the collection of groundwater quality data as part of a long-term plume management monitoring program would also allow for the consideration of subsequent ZVI injection for added treatment, if necessary. It is expected that it would take approximately one (1) year to design and implement the remedy. Since Alternative 3 focuses on treatment within the area of highest groundwater CVOC concentrations and because of the persistent nature of the contaminants and the length of the groundwater plume, it is not expected that Alternative 3 would achieve the groundwater SCGs within the near future.

The components of Alternative 3 are readily implementable technologies. The success of ZVI injection would be highly dependent on the ability to effectively distribute the ZVI into the treatment area. Costs are based on design of the ZVI injection program, the pneumatic injection method, ZVI material, long-term groundwater, surface water, and soil vapor quality monitoring along with the operation and maintenance of the six (6) Department installed mitigation systems.

<i>Present Worth:</i> .....	<i>\$1,300,000</i>
<i>Capital Cost:</i> .....	<i>\$1,000,000</i>
<i>Annual Costs:</i>	
<i>(Years 0-30):</i> .....	<i>\$11,000</i>

**Alternative 4: Groundwater Extraction in the Area of Highest Groundwater CVOC Concentrations Combined with Plume Management Monitoring**

Alternative 4 would consist of a series of recovery wells piped to an ex-situ treatment system. Under Alternative 4, the extraction wells would be installed within the area of highest CVOC groundwater concentrations, over an approximately 400 foot width of the plume in the vicinity of monitoring wells MW-13, MW-14 and MW-17S. The extracted water would be pumped to the

south approximately 600 feet to the north-face of the Syracuse Sand and Gravel, Inc. property where the water would be released to the atmosphere through a series of misting nozzles. This is a form of spray aeration and involves the mass transfer of CVOCs from water to air. During this process, CVOCs are partitioned from extracted groundwater by increasing the surface area of the water containing CVOCs exposed to air. It is expected that operation of the groundwater extraction system would have to be suspended for a short duration during the winter months because of issues relating to potential freezing during the aeration process. Under Alternative 4, the groundwater extraction and treatment system would be operated for five (5) years.

It is expected that it would take approximately one (1) year to design and one (1) year to fully implement the groundwater extraction remedy. Since Alternative 4 focuses on treatment within the area of highest groundwater CVOC concentrations and because of the persistent nature of the contaminants and the length of the groundwater plume it is not expected that Alternative 4 would achieve the groundwater SCGs within the near future.

As with Alternative 3, the remedial technologies outlined in Alternative 4 are reliable and implementable. Costs are based on installation and operation of the groundwater extraction and treatment system for a five (5) year period, long-term groundwater, surface water, and soil vapor quality monitoring along with the operation and maintenance of the six (6) Department installed mitigation systems.

<i>Present Worth:</i> .....	<i>\$1,200,000</i>
<i>Capital Cost:</i> .....	<i>\$730,000</i>
<i>Annual Costs:</i>	
<i>(Years 0-5):</i> .....	<i>\$85,000</i>
<i>(Years 5-30):</i> .....	<i>\$11,000</i>

**Alternative 5: Permeable Reactive Barrier combined with Plume Management Monitoring**

As part of Alternative 5, a zero-valent iron permeable reactive barrier (PRB) would be installed by direct-injection in the center of the dissolved-phase CVOC plume. The direct-injection PRB would be constructed using a series of injection wells or boreholes oriented generally perpendicular to groundwater flow and downgradient of monitoring wells MW-14 and MW-17S. The PRB would extend vertically from approximately 60 feet bgs (average depth of the water table) to an approximate average depth of 100 feet bgs (average depth to the underlying silty clay confining unit). It is expected that the PRB would be approximately 400 feet in length and would contain approximately 350 to 600 tons of iron, depending on the barrier thickness. Groundwater monitoring both upgradient and downgradient of the PRB would be required to evaluate the effectiveness of the PRB at reducing contaminant concentrations and protecting downgradient areas from further dissolved-phase CVOC plume migration.

The PRB would treat the dissolved-phase CVOC plume as the groundwater containing the highest CVOC concentrations flows through the treatment area. The placement of the PRB in this area of the groundwater plume would limit migration of the dissolved-phase CVOC plume from the residual contamination area. Areas of the dissolved-phase CVOC plume downgradient and along the eastern

and western margins of the PRB would continue to migrate to the north toward the Modock Road Springs.

It is expected that it would take approximately one (1) year to design and one (1) year to fully implement the permeable reactive barrier remedy. Since Alternative 5 focuses on treatment within the residual contamination area and because of the persistent nature of the contaminants and the length of the groundwater plume it is not expected that Alternative 5 would achieve the groundwater SCGs within the near future.

The components of Alternative 5 are readily implementable and reliable technologies. Costs are based on design and installation of the PRB, long-term groundwater, surface water, and soil vapor quality monitoring along with the operation and maintenance of the six (6) Department installed mitigation systems.

<i>Present Worth:</i> .....	\$3,300,000
<i>Capital Cost:</i> .....	\$3,100,000
<i>Annual Costs:</i>	
<i>(Years 0-30):</i> .....	\$11,000

**Alternative 6: Air Sparging with Soil Vapor Extraction combined with Plume Management Monitoring**

Air sparging with soil vapor extraction (SVE) would be the primary component of Alternative 6 to reduce the dissolved phase CVOC groundwater concentrations. Specifically, air sparging wells would be installed with an orientation that is generally perpendicular to groundwater flow and downgradient of monitoring wells MW-14 and MW-17S. Soil vapor extraction wells would be installed in the unsaturated zone in the vicinity of the air sparging wells. Air would be injected from approximately 60 feet bgs (average depth of the water table) to an approximate average depth of 100 feet bgs (average depth to the underlying silty clay confining unit), although the majority of air would be injected in the lower 20 feet of this interval. Soil vapor extraction wells would be installed to within 10 feet above the water table. To prevent fugitive emissions, it is expected that the volume of extracted soil vapor would be two (2) to three (3) times more than the volume of air injected into the aquifer.

To support the air sparging and SVE system, electrical lines would be run to an above-ground treatment shed, which would contain a series of blowers and a control system. The air sparging and soil vapor extraction PVC piping would be buried to an appropriate depth to prevent freezing during the winter months. Periodic on-site monitoring of the system would be conducted to evaluate the system effectiveness and perform system maintenance. Groundwater monitoring both upgradient and downgradient of the air sparging injection area would be required to evaluate the effectiveness of the air sparging and SVE system at reducing CVOC concentrations and from protecting further dissolved-phase CVOC groundwater plume migration.

It is expected that it would take approximately one (1) year to design and one (1) year to fully implement the air sparging with SVE remedy. Similar to Alternatives 3 through 5, since Alternative

6 focuses on treatment within the residual groundwater contamination area and because of the persistent nature of the contaminants and the length of the groundwater plume it is not expected that Alternative 6 would achieve the groundwater SCGs within the near future.

The remedial technologies outlined in Alternative 6 are reliable and implementable. Costs are based on installation and operation of the air sparging with SVE system for a 30-year period, long-term groundwater, surface water, and soil vapor quality monitoring along with the operation and maintenance of the six (6) Department installed mitigation systems.

*Present Worth:* .....\$2,800,000  
*Capital Cost:* .....\$1,400,000  
*Annual Costs:*  
*(Years 0-30):* .....\$90,000

**Alternative 7: Permeable Reactive Barriers for Restoration to Achieve Pre-Disposal Conditions**

Similar to Alternative 5, Alternative 7 relies on zero-valent iron permeable reactive barrier (PRB) technology to reduce the CVOC concentrations in groundwater. Under Alternative 7 however, a total of four (4) PRBs would be installed perpendicular to the groundwater flow direction and over the length of the entire groundwater plume. It is expected that PRBs would be installed in the area of MW-14 and MW-17S, along the south-side of Dryer Road, and two PRBs in the residential area between Dryer Road to the south and the Modock Road Springs to the north. Each of the PRBs would be installed by direct-injection across the entire width of the dissolved-phase CVOC plume for a total of 4,000 linear feet of PRB. Since the depth to groundwater and the underlying silty clay confining unit varies considerably with location along the length of the groundwater plume, the PRBs would extend vertically from approximately 20 feet bgs (shortest depth of the water table closest to the Modock Road Springs) to an approximate depth of 100 feet bgs (greatest depth to the underlying silty clay confining unit in the area of MW-14 and MW-17S). It is expected that each of the PRBs would be approximately 1,000 feet in length so that very little if any contaminated groundwater would flow around the margins of the PRBs.

The installation of four (4) PRBs would treat the majority of the dissolved-phase CVOC plume as the groundwater flows through each of the treatment areas over an approximate 5,000 foot length of the plume. Groundwater monitoring both upgradient and downgradient of the PRB would be required to evaluate the effectiveness of the PRBs at reducing contaminant concentrations and protecting downgradient areas from further dissolved-phase CVOC plume migration.

It is expected that it would take approximately one (1) year to design and two (2) years to fully implement the multiple permeable reactive barrier remedy. With the installation of four PRBs to treat the entire CVOC groundwater plume, it is expected that this alternative would achieve the groundwater SCGs within the near future.

The components of Alternative 7 are readily implementable and reliable technologies; although the installation of two (2) of the four (4) PRBs in the residential areas would be relatively difficult to implement. Costs are based on design and installation of the PRBs, long-term groundwater, surface

water, and soil vapor quality monitoring along with the operation and maintenance of the six (6) Department installed mitigation systems.

<i>Present Worth:</i> .....	\$26,000,000
<i>Capital Cost:</i> .....	\$25,000,000
<i>Annual Costs:</i>	
<i>(Years 0-30):</i> .....	\$11,000

## **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. 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 Department 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-Effectiveness. Capital costs and annual 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. The responsiveness summary (Appendix A) presents the public comments received and the manner in which the Department addressed the concerns raised.

In general, the public comments received were supportive of the selected remedy. Several comments were received, however, pertaining to the long-term plume management monitoring program included as part of the selected remedy, what conditions would initiate the zero valent iron contingency, and how the long-term monitoring data would be shared with the community.

During the public meeting, and as summarized in the responsiveness summary, additional information on the long-term plume management monitoring program was provided. Specifically, it was described that the plume monitoring program would include the routine collection of groundwater, surface water, and soil vapor to assess plume stability and the continued natural reduction of the CVOC contamination over time. The decision to implement the ZVI contingency would not be based on a single data set, but instead would be based on the compilation of multiple data sets and the evaluation of overall trends in the plume management monitoring data.

In response to concerns that there was no discussion on how the long-term plume management monitoring data would be shared with the community, the Department will be placing long-term monitoring data in hardcopy in the document repositories and provided electronically to the Town of Victor who may place the documents on the Town website. Additionally, the periodic reviews will include public disclosure of the plume management monitoring results along with the evaluation of long-term trends in the analytical data

## **SECTION 8: SUMMARY OF THE SELECTED REMEDY**

Based on the Administrative Record (Appendix B) and the discussion presented below, the Department has selected Alternative 2, plume management monitoring, with a contingency for implementing Alternative 3 (Zero Valent Iron Treatment Injection) in the area of highest groundwater CVOC concentrations as the remedy for this site. The elements of this remedy are described at the end of this section. As described in Section 7.1, Alternative 2 includes the long-term collection and laboratory analysis of groundwater, surface water, and soil vapor samples for VOC analysis to assess plume stability and the natural reduction of the CVOC contamination over time. The Alternative 3 (Zero Valent Iron Treatment Injection) contingency will be implemented

should the results of plume management monitoring demonstrate that the CVOC groundwater concentrations do not continue to decline.

The selected remedy is based on the results of the RI and the evaluation of alternatives presented in the FS. The selected remedy will include a long-term plume management monitoring program to assess trends in the CVOC groundwater and soil vapor concentrations over the entire length of the groundwater plume and surface water at the Modock Road Springs. The injection of zero valent iron as outlined in Alternative 3, to reduce the mass of residual CVOC contamination in the central portion of the groundwater plume (Figure 7) will occur if the plume management monitoring shows that CVOC groundwater concentrations do not continue to decline. Should plume management monitoring indicate that enhanced contaminant reduction is necessary, the selected alternative will inject a micro zero valent iron as a colloidal suspension that would persist for approximately five (5) years in the subsurface. During this five (5) year period, the majority of changes in groundwater quality would be observed in the area of treatment. The ZVI would gradually break down over this five (5) year period and would not adversely affect the quality of groundwater. The zero valent iron, or equivalent material, would create reducing groundwater conditions that would degrade the CVOC contamination in the treatment area. The selected remedy will also include the remaining common remedial actions outlined in Section 7.1 (Description of Remedial Alternatives). Specifically, this includes continued maintenance of 12 subslab depressurization systems (six (6) Department-installed systems and six (6) systems installed where monitoring was the VI sampling outcome), annual notification at the four (4) pre-existing system locations with possible VI sampling to determine whether continued operation is necessary to address site-related contaminants, and implementation of a monitoring program for two (2) locations where monitoring was the VI sampling outcome. If the ZVI injection is necessary, the long-term plume management monitoring program will be continued afterwards to evaluate the effectiveness of the remedy and to monitor variations in the CVOC groundwater and soil vapor concentrations over the entire length of the groundwater plume and surface water at the Modock Road Springs.

Alternative 2, with the contingency for Alternative 3, is being selected because, as described below, it satisfies the threshold criteria and provides an optimum balance of the five (5) primary balancing criteria described in Section 7.2. With the exception of Alternative 1 (No Further Action), each of the alternatives outlined in Section 7.0 provide protection to human health and the environment through the common remedial actions outlined in Section 7.1 (Description of Remedial Alternatives). Specifically, through the continued maintenance of 12 subslab depressurization systems (six (6) Department-installed systems and six (6) systems installed where monitoring was the VI sampling outcome), annual notification at the four (4) pre-existing system locations with possible VI sampling to determine whether continued operation is necessary to address site-related contaminants, implementation of a monitoring program for two (2) locations where monitoring was the VI sampling outcome, and the use of an environmental easement. Alternative 1 (No Further Action) would not be protective of human health since it would not include the common remedial actions. Alternative 2 (Plume Management Monitoring) will provide more protection than Alternative 1 because this alternative does include the common remedial actions (continued maintenance of 12 subslab depressurization systems (6 Department-installed systems and 6 systems installed where monitoring was the VI sampling outcome), annual notification at the four (4) pre-existing system locations with possible VI sampling to determine whether continued operation is necessary to address site-related contaminants, implementation of a monitoring program for two (2)

locations where monitoring was the VI sampling outcome, and the use of an environmental easement).

Alternatives 3 through 7 would provide more protection than Alternatives 1 and 2, because they include components for specific remedial actions to reduce CVOC groundwater concentrations. Since Alternatives 5 (Single PRB), 6 (Air Sparging and SVE), and 7 (Multiple PRBs) would actively treat the groundwater plume for 30 years, these alternatives would be slightly more protective of human health and the environment than Alternatives 3 (Zero Valent Iron Treatment Injection) and 4 (Groundwater Extraction). However, with the availability of public water, the continued maintenance of 12 subslab depressurization systems (six (6) Department-installed systems and six (6) systems installed where monitoring was the VI sampling outcome), annual notification at the four (4) pre-existing system locations with possible VI sampling to determine whether continued operation is necessary to address site-related contaminants, implementation of a monitoring program for two (2) locations where monitoring was the VI sampling outcome, there is only a slight increase in the overall protectiveness to human health and the environment provided by Alternatives 5, 6, and 7.

Alternatives 1 and 2 would rely on the existing natural processes for CVOC contaminant reduction and to achieve groundwater SCGs with no option for an active remedy to reduce CVOC contamination. It is expected that Alternatives 1 and 2 would not achieve the NYS Class GA Groundwater Standards in the foreseeable future. Alternatives 3 through 7 would rely on active remedial approaches combined with long-term plume monitoring to achieve groundwater SCGs. Since Alternatives 5 (Single PRB), 6 (Air Sparging and SVE), and 7 (Multiple PRBs) would treat the groundwater plume for 30 years, these alternatives are expected to achieve the SCGs more quickly than Alternatives 1 through 4. It should be noted however, that based on the persistent nature of the contaminants and the length of the groundwater plume, it is not expected that Alternatives 1 through 6 would necessarily achieve the groundwater SCGs within the near future (approximately 20 years). Alternative 7, including the installation of multiple PRBs over the length of the groundwater plume, would be the only alternative that would be expected to achieve the SCGs in the near future (approximately 20 years). The indoor air SCGs would be achieved for off-site properties influenced by vapor intrusion through the continued maintenance of the 12 subslab depressurization systems (six (6) Department-installed systems and six (6) systems installed where monitoring was the VI sampling outcome), annual notification at the four (4) pre-existing system locations with possible VI sampling to determine whether continued operation is necessary to address site-related contaminants, along with the implementation of a monitoring program for two (2) locations where monitoring was the VI sampling outcome.

Because Alternatives 2 through 7 satisfy the threshold criteria, the five (5) balancing criteria are particularly important in selecting a final remedy for the Modock Road Springs/DLS Sand and Gravel, Inc. site. With the exception of Alternative 1, long-term plume management monitoring, continued maintenance of 12 subslab depressurization systems (six (6) Department-installed systems and six (6) systems installed where monitoring was the VI sampling outcome), annual notification at the four (4) pre-existing system locations with possible VI sampling to determine whether continued operation is necessary to address site-related contaminants, implementation of a monitoring program for two (2) locations where monitoring was the VI sampling outcome, and the environmental easement, are common elements of each alternative. The difference between these six (6)

alternatives is the method used to address residual CVOCs in site groundwater. Since each of the alternatives include established technologies that have been applied during cleanup programs, possible short-term impacts on the community, workers, and the environment can easily be controlled using standard work practices and engineering controls during implementation. Since Alternative 7 would involve the installation of four (4) PRBs perpendicular to the groundwater plume, two (2) of which would be located in the residential area, this alternative would have the greatest short-term impact on the local community. Alternatives 3 through 5 however, would be implemented on a currently undeveloped parcel and would not have significant short-term community impacts. Alternative 1, and possibly Alternative 2, if the long-term plume monitoring demonstrates that CVOC groundwater concentrations continue to decline and the contingency for ZVI injection is not necessary, would not involve an active remedial approach and would therefore not have any short-term impacts on the community.

Alternatives 3 (Zero Valent Iron Treatment Injection), 4 (Groundwater Extraction), 5 (Single PRB), and 6 (Air Sparging and SVE) would be effective in the short-term at reducing groundwater CVOC concentrations within the treatment area but would have minimal short-term effects on groundwater CVOC concentrations outside of the treatment area. With four separate treatment areas, Alternative 7 (Multiple PRBs) would be the most effective alternative in reducing the CVOC concentrations within the entire groundwater plume during the short-term. Alternatives 1 and 2 would be the least effective alternative in the short-term.

The single and multiple PRB alternatives (Alternative 5 and 7 respectively) and air sparging with SVE alternative (Alternative 6) are considered to be more effective in the long-term because groundwater treatment would occur during a 30-year period. The ZVI injection (Alternative 3) and groundwater extraction (Alternative 4) would not be as effective in the long-term because they would not include continued injection of ZVI or long-term operation of a groundwater extraction system during the entire 30-year period.

To be effective for the full 30-year period, the air sparge and SVE system (Alternative 6) would need to be maintained and operated continuously. With an unsaturated zone that is nearly 60 feet thick, there is the potential for incomplete capture and/or treatment of contaminants if heterogeneities or stratified soils are present or if the area of influence of the air sparging wells do not overlap. The potential for incomplete contaminant degradation would need to be evaluated using available data, including those from pilot studies.

The PRB alternatives (Alternative 5 and 7) are more effective and permanent than the air sparging alternative because the integrity of the PRB can be confirmed and a PRB will remain effective longer than other alternatives with no need for additional injections or maintenance of remedial equipment. Bench scale studies indicate that a PRB can remain effective for approximately 30 years. It is, however, extremely difficult to make adjustments to the orientation of a PRB once installed.

Alternatives 3 through 6 rely on remedial approaches focusing on reducing the toxicity, mobility, and volume of contaminants from the area of highest groundwater CVOC concentrations (Figure 7). The overall toxicity, mobility, and volume of the dissolved-phase CVOC groundwater plume outside of the treatment area for alternatives 3 through 6 would be gradually reduced as a result of natural processes and a decreased flux from the residual contamination area. Only Alternative 7

(multiple PRBs) would significantly reduce the toxicity, mobility, and volume within the entire CVOC groundwater plume. Alternatives 1 and 2 would be the least effective in reducing the toxicity, mobility, and volume of the site contaminants.

As previously mentioned, each of the technologies considered is technically feasible. With the exception of Alternative 1 and 2, each alternative includes pre-design studies and/or pilot tests prior to remedy implementation to fully evaluate the feasibility of the selected remedial alternative and to finalize remedy design. Alternatives 3 through 7 are readily implemented using standard construction means and methods. It is expected that Alternative 7 (Multiple PRBs) would be the most difficult alternative to implement because it would involve installation of two (2) of the four (4) PRBs to depths approaching 80 to 100 feet beneath the ground surface and in a residential area. In contrast, Alternatives 3 through 6 would be easier to implement because they would occur on undeveloped property.

The single PRB (Alternative 5) and ZVI injection (Alternative 3) alternatives are less difficult to implement because they are outside of the residential area and capable of reducing groundwater CVOC concentrations while eliminating the need for ex-situ treatment facilities and minimizing disposal issues. The PRB and ZVI injection alternatives do not generate significant waste, so treatment and disposal considerations are negligible. There would be minimal disruptions to site activities during implementation of the PRB and ZVI injection alternatives because no surface structures, other than possibly injection wells, are needed.

In contrast to the PRB and ZVI injection alternatives, the air sparging with SVE and groundwater extraction alternatives would require above-ground structures, ongoing operations, maintenance and monitoring (OM&M), and ex-situ treatment (of extracted groundwater or vapor). As a result of the substantial OM&M efforts required, the groundwater extraction (Alternative 4) and air sparging with SVE (Alternative 6) alternatives would be more difficult than the single PRB or ZVI injection to implement. The air sparging and groundwater extraction alternatives would also require a permanent power supply for the remedial equipment where the PRB and ZVI injection alternatives would not require a sustainable power supply. The groundwater extraction alternative is not preferred because it requires extensive capital costs and infrastructure, may not fully operate during winter months, and is relatively difficult to implement considering the extraction system would only be operated for up to five years.

The multiple PRB alternative (Alternative 7) has the highest capital cost (\$25,000,000) but a significantly larger percentage of the dissolved-phase CVOC plume would be remediated if this alternative is implemented relative to the other alternatives. The plume management monitoring (Alternative 2) with contingency for ZVI injection (Alternative 3) is favorable because it has only a slightly higher estimated cost than the groundwater extraction alternative (Alternative 4), but includes a contingency for ZVI injection that will continue to treat the dissolved phase CVOC groundwater plume for approximately five (5) years and that does not require an extensive OM&M program. Other than Alternative 1 which includes no further actions and no costs, Alternative 2 is the least expensive alternative to implement because it does not include an option for an active remedy to reduce CVOC concentrations. The OM&M costs for air sparging with soil vapor extraction (Alternative 6) are significant, but this alternative has a lower estimated cost than the single or multiple PRB alternatives (Alternatives 5 and 7 respectively). Although the PRB

alternatives would have the highest capital costs, there are no OM&M costs other than long-term plume management monitoring. Over a 30-year time period, the single PRB alternative (Alternative 5) is only slightly more expensive than the air sparging with SVE alternative (Alternative 6) but is significantly less expensive than the multiple PRB alternative (Alternative 7) designed to achieve pre-disposal groundwater conditions.

Alternative 2 with a contingency for ZVI injection (Alternative 3) was selected because it will be implemented quickly and should plume management monitoring indicate that an active remedy is necessary, the ZVI injection will be an effective approach in treating the CVOC groundwater plume for five (5) years. Even with the implementation of an immediate active remedy, as outlined in Alternatives 3 through 6, the CVOC groundwater contamination will persist for an extended period of time because the CVOC groundwater plume currently extends over a length of nearly 7,500 feet. Because of the length of the groundwater plume and since groundwater quality data demonstrate that the CVOC concentrations have been declining under current conditions, the plume management monitoring alternative (Alternative 2) with contingency for zero valent iron injection (Alternative 3) is the selected alternative.

Protection to human health and the environment is provided under Alternative 2 through the continued maintenance of 12 subslab depressurization systems (six (6) Department-installed systems and six (6) systems installed where monitoring was the VI sampling outcome), annual notification at the four (4) pre-existing system locations with possible VI sampling to determine whether continued operation is necessary to address site-related contaminants, implementation of a monitoring program for two (2) locations where monitoring was the VI sampling outcome, and the use of an environmental easement. Alternative 2 has a lower cost to implement and with the exception of long-term groundwater monitoring, this alternative does not have OM&M elements common to the groundwater extraction and air sparge and SVE alternatives. Lastly, should plume management monitoring demonstrate that CVOC concentrations are not continuing to decline, the ZVI injection will not require above-ground structures and will not be intrusive to the surrounding rural residential setting of the community. The estimated present worth cost to implement the remedy is \$280,000. The capital cost for the first year to implement Alternative 2 is estimated to be \$45,000. The estimated average annual costs for 30 years is \$11,000.

The elements of the selected remedy are as follows:

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.
2. To evaluate CVOC groundwater concentrations over time and determine the necessity for ZVI injection, a long-term plume management monitoring program will be instituted. The ZVI injection will be contingent on the plume management monitoring showing that groundwater CVOC concentrations are not continuing to decline. The long-term plume management monitoring will include the collection of groundwater samples from within the groundwater plume (both on the Syracuse Sand and Gravel, Inc. property and off-site to the north), surface water samples from the Modock Road Springs, and soil vapor samples from areas over the groundwater plume for volatile organic compound analysis. The long-term monitoring will also include continued maintenance of 12 subslab depressurization systems (six (6) Department-

installed systems and six (6) systems installed where monitoring was the VI sampling outcome), annual notification at the four (4) pre-existing system locations with possible VI sampling to determine whether continued operation is necessary to address site-related contaminants, along with implementation of a monitoring program for two (2) locations where monitoring was the VI sampling outcome.

3. If the long-term plume management monitoring indicates that enhanced contaminant reduction is necessary, then the ZVI injection contingency will be implemented. If the ZVI injection is necessary, then the northern portion of the Syracuse Sand and Gravel, Inc. property, in the area of highest CVOC concentrations in underlying groundwater, will be cleared and grubbed to provide access for ZVI injection equipment. Over an approximately 400-foot width of the CVOC plume and using multiple direct-push borings, ZVI will be injected into the saturated zone above the low permeability clay unit. Since this remedy requires no permanent above ground structures, the treatment area and surrounding area will be restored in cooperation with the property owner.
4. Imposition of an institutional control in the form of an environmental easement at the Syracuse Sand and Gravel, Inc. property that will require: (a) compliance with the approved site management plan; (b) restricting the use of groundwater as a source of potable water, without necessary water quality treatment as determined by NYSDOH; and (c) the property owner to complete and submit to the Department a periodic certification of institutional controls.
5. Development of a site management plan, including periodic reviews (nominally five years), which will include the following institutional controls: (a) continued evaluation of the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (b) monitoring of site groundwater, surface water, and soil vapor and following collection, the placement of the analytical results into the document repositories; (c) public disclosure of the plume management monitoring results and the evaluation of long-term trends in the analytical data; (d) identification of any use restrictions on the site; and (e); provisions for the continued proper operation and maintenance of the components of the remedy.
6. The property owner for the site will provide a periodic certification of institutional controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner for the site in writing that this certification is no longer needed. This submittal will: (a) contain certification that the institutional controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that will 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 unless otherwise approved by the Department.
7. The operation of the components of the remedy will continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.
8. Since the remedy results in untreated hazardous waste remaining at the site, the long-term plume management monitoring program will be continued. This program will be implemented to determine the need for an initial ZVI injection, to evaluate the effectiveness of the ZVI injection, to allow for the consideration of subsequent ZVI injections, and will be a component of the long-term management for the site. The long-term plume management monitoring will include the

collection of groundwater samples from within the groundwater plume, surface water samples from the Modock Road Springs, and soil vapor samples from areas over the groundwater plume for volatile organic compound analysis. The long-term monitoring will also include the continued maintenance of 12 subslab depressurization systems (six (6) Department-installed systems and six (6) systems installed where monitoring was the VI sampling outcome), annual notification at the four (4) pre-existing system locations with possible VI sampling to determine whether continued operation is necessary to address site-related contaminants, and implementation of a monitoring program for two (2) locations where monitoring was the VI sampling outcome.

## **SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION**

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken to inform and educate 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;
- A fact sheet was distributed to local residents in January 2007 prior to the start of the RIFS;
- At the request of the Town of Victor and in response to considerable project interest and media coverage, Department staff participated in Town Board meetings on March 26, 2007 and April 2, 2007;
- At the request of Senator Nozzolio, Department staff and NYSDOH staff participated in a public update meeting on April 26, 2007;
- A fact sheet was distributed to local residents in June 2007 announcing a June 26, 2007 remedial investigation update public meeting;
- Availability sessions and a remedial investigation update public meeting were held on June 26 and June 27, 2007;
- Between September 2007 and December 2008 Department staff provided bi-monthly remedial investigation update letters to the Town of Victor;
- A postcard notice was distributed to local residents in November 2007 announcing availability sessions on November 28, 2007;
- Availability sessions were held on November 28, 2007 to review investigation activities, discuss test results, and answer questions;
- Availability sessions were held on December 17 and 18, 2008 to present the results of the final remedial investigation;

- At the request of Town of Victor Citizen's Advisory Committee (CAC), Department staff participated in a CAC public meeting on December 17, 2008 to summarize the major conclusions of the remedial investigation;
- A fact sheet along with a public meeting announcement was distributed to local residents in October 2009 outlining the results of the remedial investigation, summarizing the proposed remedy, and announcing the October 27, 2009 public meeting;
- A public meeting was held on October 27, 2009 to present and receive comments on the PRAP; and
- A responsiveness summary (Appendix A) was prepared to address the comments received during the public comment period for the PRAP.

**TABLE 1**  
**Nature and Extent of Contamination**  
February 2007 - February 2009

<b>SHALLOW SOIL</b>	<b>Contaminants of Concern</b>	<b>Concentration Range Detected (ppm)<sup>a</sup></b>	<b>SCG<sup>b</sup> (ppm)<sup>a</sup></b>	<b>Frequency of Exceeding SCG</b>
<b>Volatile Organic Compounds (VOCs)</b>	Trichloroethene	nd	0.47	0 of 15
	1,1,1-Trichloroethane	nd	0.68	0 of 15
	1,1-Dichloroethene	nd	0.33	0 of 15
<b>SUBSURFACE SOIL</b>	<b>Contaminants of Concern</b>	<b>Concentration Range Detected (ppm)<sup>a</sup></b>	<b>SCG<sup>b</sup> (ppm)<sup>a</sup></b>	<b>Frequency of Exceeding SCG</b>
<b>Volatile Organic Compounds (VOCs)</b>	Trichloroethene	nd - 0.990	0.470	2 of 89
	1,1,1-Trichloroethane	nd - 0.100	0.680	0 of 89
	1,1-Dichloroethene	nd - 0.018	0.330	0 of 89
<b>GROUNDWATER</b>	<b>Contaminants of Concern</b>	<b>Concentration Range Detected (ppb)<sup>a</sup></b>	<b>SCG<sup>b</sup> (ppb)<sup>a</sup></b>	<b>Frequency of Exceeding SCG</b>
<b>Volatile Organic Compounds (VOCs)</b>	Trichloroethene	nd - 2,300	5	36 of 91
	1,1,1-Trichloroethane	nd - 330	5	30 of 91
	1,1-Dichloroethene	nd - 55	5	15 of 91
	1,1-Dichloroethane	nd - 11j	5	1 of 91
	1,1,2-Trichloroethane	nd - 8j	1	1 of 91
	Tetrachloroethene	nd - 7j	5	2 of 91
<b>Inorganic Compounds</b>	Iron	76.2 - 200	300	1 of 4
	Magnesium	4,700 - 35,400	20,000	1 of 4
	Sodium	2,200 - 94,600	20,000	1 of 4

**TABLE 1 (Continued)**  
**Nature and Extent of Contamination**  
 February 2007 - February 2009

<b>SURFACE WATER</b>	<b>Contaminants of Concern</b>	<b>Concentration Range Detected (ppb)<sup>a</sup></b>	<b>SCG<sup>b</sup> (ppb)<sup>a</sup></b>	<b>Frequency of Exceeding SCG</b>
<b>Volatile Organic Compounds (VOCs)</b>	Trichloroethene	nd - 110	40	6 of 19
	1,1,1-Trichloroethane	nd - 42	NS	NA
	1,1-Dichloroethene	nd - 10	NS	NA

<b>SOIL VAPOR</b>	<b>Contaminants of Concern</b>	<b>Concentration Range Detected (µg/m<sup>3</sup>)<sup>a</sup></b>	<b>SCG<sup>b</sup> (µg/m<sup>3</sup>)<sup>a</sup></b>	<b>Frequency of Exceeding SCG</b>
<b>Volatile Organic Compounds (VOCs)</b>	Trichloroethene	nd - 1,700	NS	NA
	1,1,1-Trichloroethane	nd - 5,900	NS	NA
	1,1-Dichloroethene	nd - 1,100	NS	NA

<b>AIR</b>	<b>Contaminants of Concern</b>	<b>Concentration Range Detected (µg/m<sup>3</sup>)<sup>a</sup></b>	<b>SCG<sup>b</sup> (µg/m<sup>3</sup>)<sup>a</sup></b>	<b>Frequency of Exceeding SCG</b>
<b>Volatile Organic Compounds (VOCs)</b>	Trichloroethene	nd - 12	5	6 of 169
	1,1,1-Trichloroethane	nd - 74	NS	NA
	1,1-Dichloroethene	nd - 14	NS	NA

<sup>a</sup> ppb = parts per billion, which is equivalent to micrograms per liter, µg/L, in water;  
 ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;  
 µg/m<sup>3</sup> = micrograms per cubic meter

<sup>b</sup> SCG = standards, criteria, and guidance values;

1. Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.
2. Soil SCGs are based on the Department's Cleanup Objectives ("Technical and Administrative Guidance Memorandum [TAGM] 4046; Determination of Soil Cleanup Objectives and Cleanup Levels.") and 6 NYCRR Subpart 375-6 - Remedial Program Soil Cleanup Objectives.
3. Concentrations of VOCs in air were evaluated using the air guidelines provided in the NYSDOH guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006. Specifically, the subslab soil vapor and indoor air data were compared to Soil Vapor/Indoor Air Matrix 1 for TCE, carbon tetrachloride, and vinyl chloride and Soil Vapor/Indoor Air Matrix 2 for PCE, 1,1-dichloroethene, cis-1,2-DCE, and 1,1,1-trichloroethane.

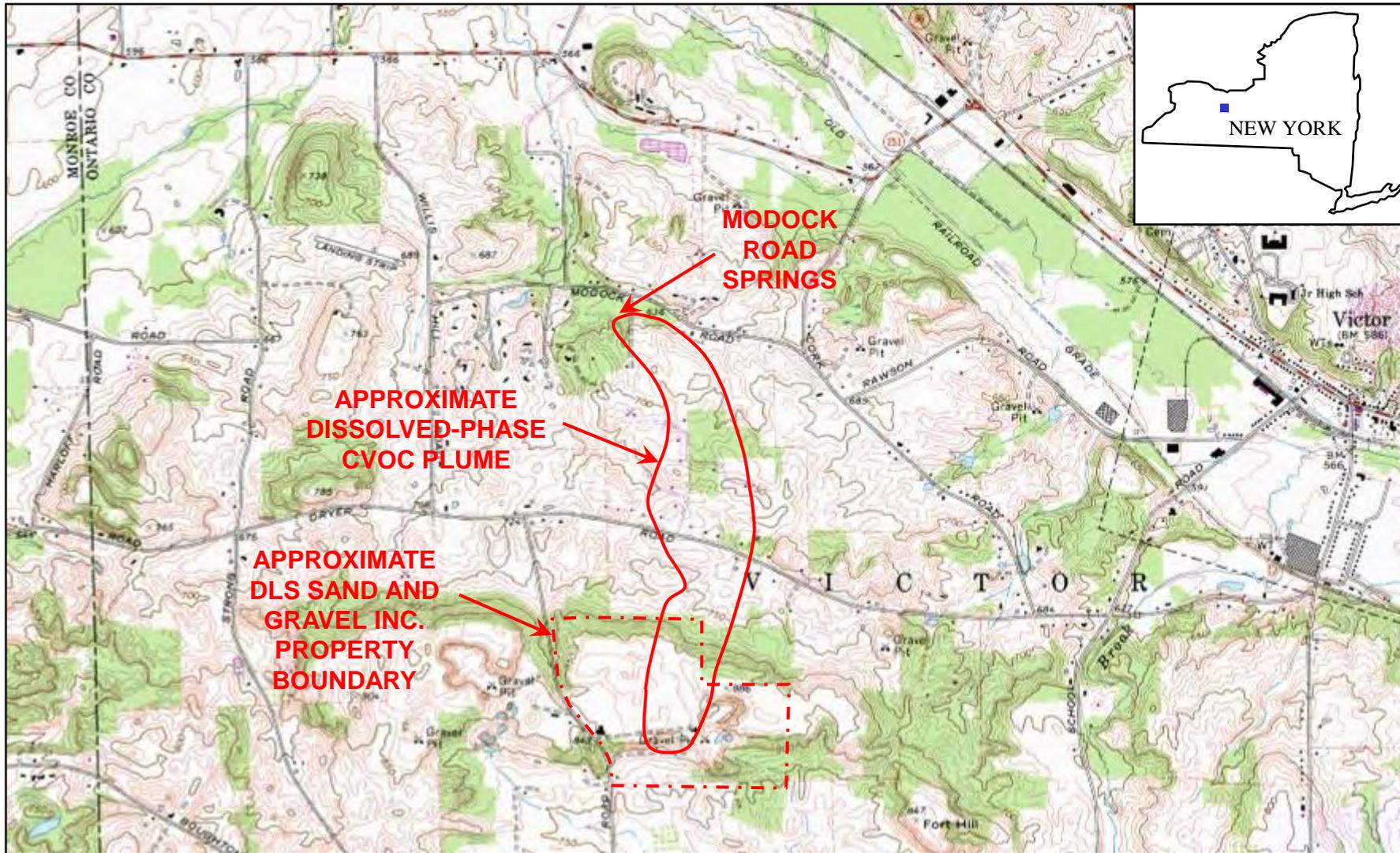
ND = Compound Not Detected  
 NS = SCG Not Specified for this compound  
 NA = Not Applicable  
 SB = Site Background

**Table 2**

### Remedial Alternative Costs

Remedial Alternative	Capital Cost (\$)	Annual Costs (\$)	Total Present Worth (\$)
<b>Alternative 1 - No Further Action</b>	\$0	\$0	\$0
<b>Alternative 2 - Plume Management Monitoring</b>	\$45,000	\$11,000	\$280,000
<b>Alternative 3 - Zero Valent Iron Treatment Injection in the Area of Highest Groundwater CVOC Concentrations combined with Plume Management Monitoring</b>	\$1,000,000	\$11,000	\$1,300,000
<b>Alternative 4 - Groundwater Extraction in the Area of Highest Groundwater CVOC Concentrations Combined with Plume Management Monitoring</b>	\$730,000	\$85,000 (years 0 - 5)	\$1,200,000
<b>Alternative 5 - Permeable Reactive Barrier combined with Plume Management Monitoring</b>	\$3,100,000	\$11,000	\$3,300,000
<b>Alternative 6 - Air Sparging with Soil Vapor Extraction combined with Plume Management Monitoring</b>	\$1,400,000	\$90,000	\$2,800,000
<b>Alternative 7 - Permeable Reactive Barriers for Restoration to Achieve Pre-Disposal Conditions</b>	\$25,000,000	\$11,000	\$26,000,000

# FIGURES



MAP SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC SERIES, VICTOR QUADRANGLE (PHOTOREVISED 1978)

APPROXIMATE SCALE IN FEET



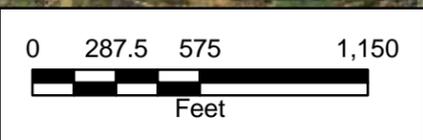
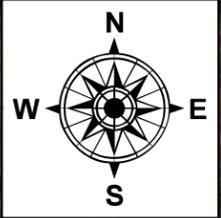
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
DIVISION OF ENVIRONMENTAL REMEDIATION

RECORD OF DECISION

MODOCK ROAD SPRINGS/DLS SAND AND GRAVEL, INC. SITE (HW 8-35-013)  
VICTOR, NEW YORK

**FIGURE 1**  
**SITE MAP**

**MALCOLM**  
**PIRNIE**



**Legend**

- Abandoned Monitoring Well
- Monitoring Well
- Spring Piezometer
- Approximate Site Boundary

Aerial Source: April 2005 30cm Resolution, Natural Color, North American Datum 1983, UTM Zone 18N

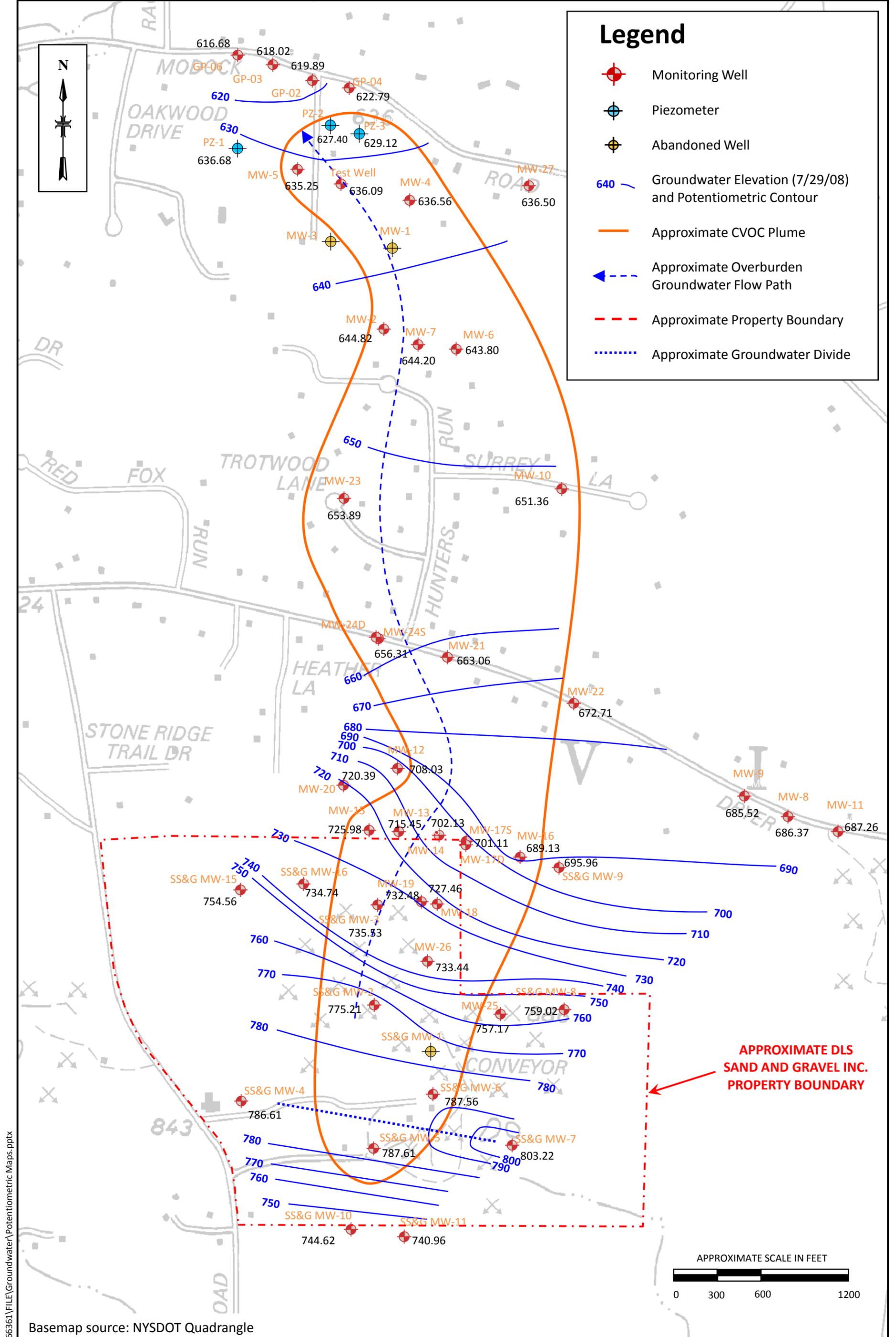
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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
DIVISION OF ENVIRONMENTAL REMEDIATION  
**REMEDIAL INVESTIGATION/FEASIBILITY STUDY**  
WORK ASSIGNMENT # D-004439-9

MODOCK ROAD SPRINGS/DLS SAND AND GRAVEL, INC. SITE (HW 8-35-013)  
TOWN OF VICTOR, ONTARIO COUNTY, NEW YORK  
**FIGURE 2**  
**SITE AND MONITORING WELL LOCATIONS**





Basemap source: NYSDOT Quadrangle

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New York State  
Department of Environmental Conservation  
Division of Environmental Remediation

### Map Details

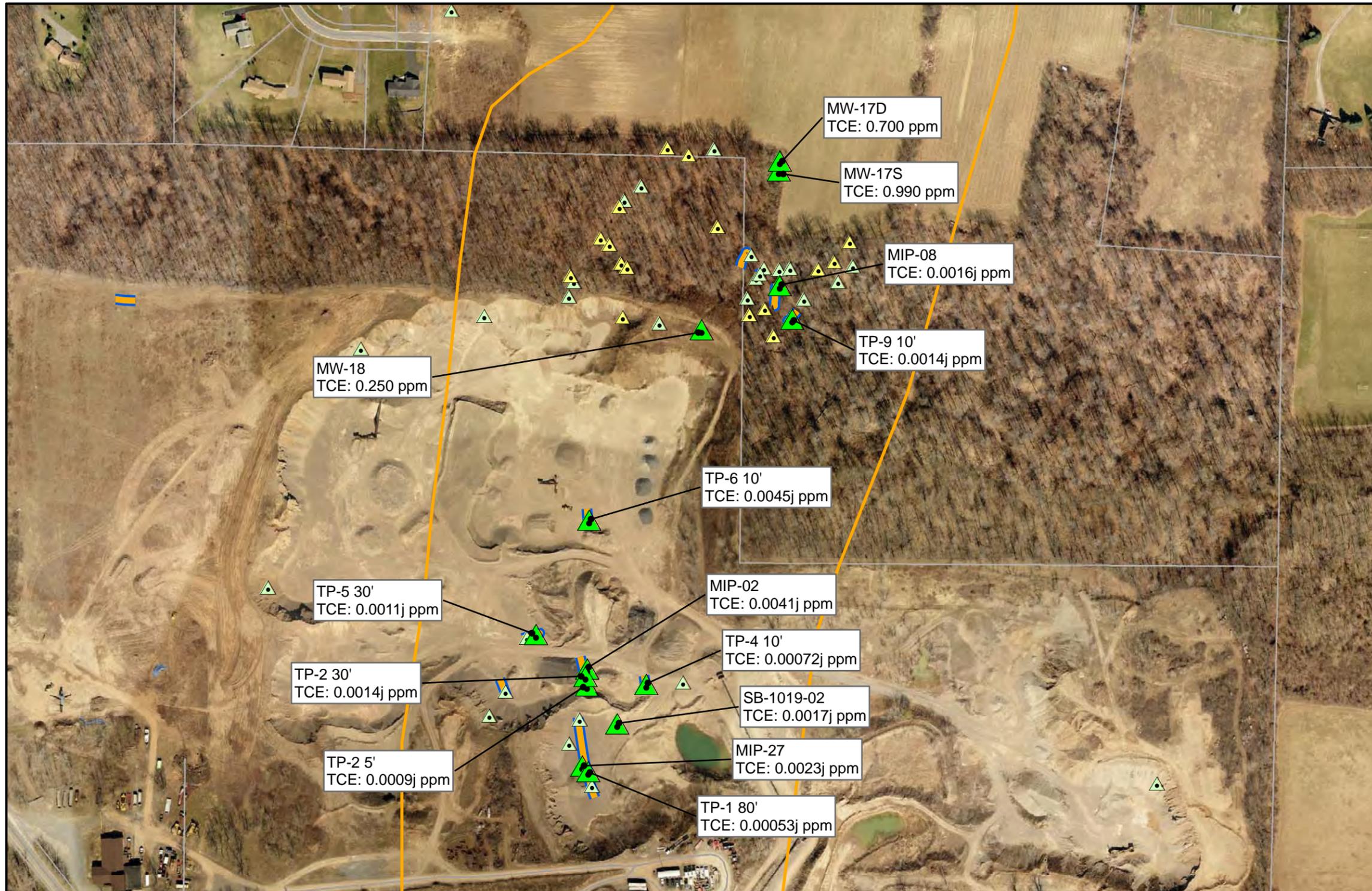
Created in ArcGIS 9.0  
Created by J. Pelton  
Date of Last Revision: 5/14/2009

April 2003 Aerial Photography

UNAUTHORIZED DUPLICATION  
IS A VIOLATION OF APPLICABLE LAWS

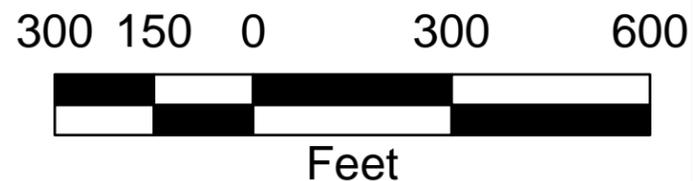
### Legend

- Subsurface Soil with TCE Detections
- Subsurface Soil with no TCE Detections
- Membrane Interface Probe Locations
- Test Pit/Trench Locations
- Approximate Plume Boundaries
- Town of Victor Parcels
- Local Streets



North American Datum 1983  
UTM Zone 18N

## FIGURE 4 Subsurface Soil Sampling Locations & TCE Detections

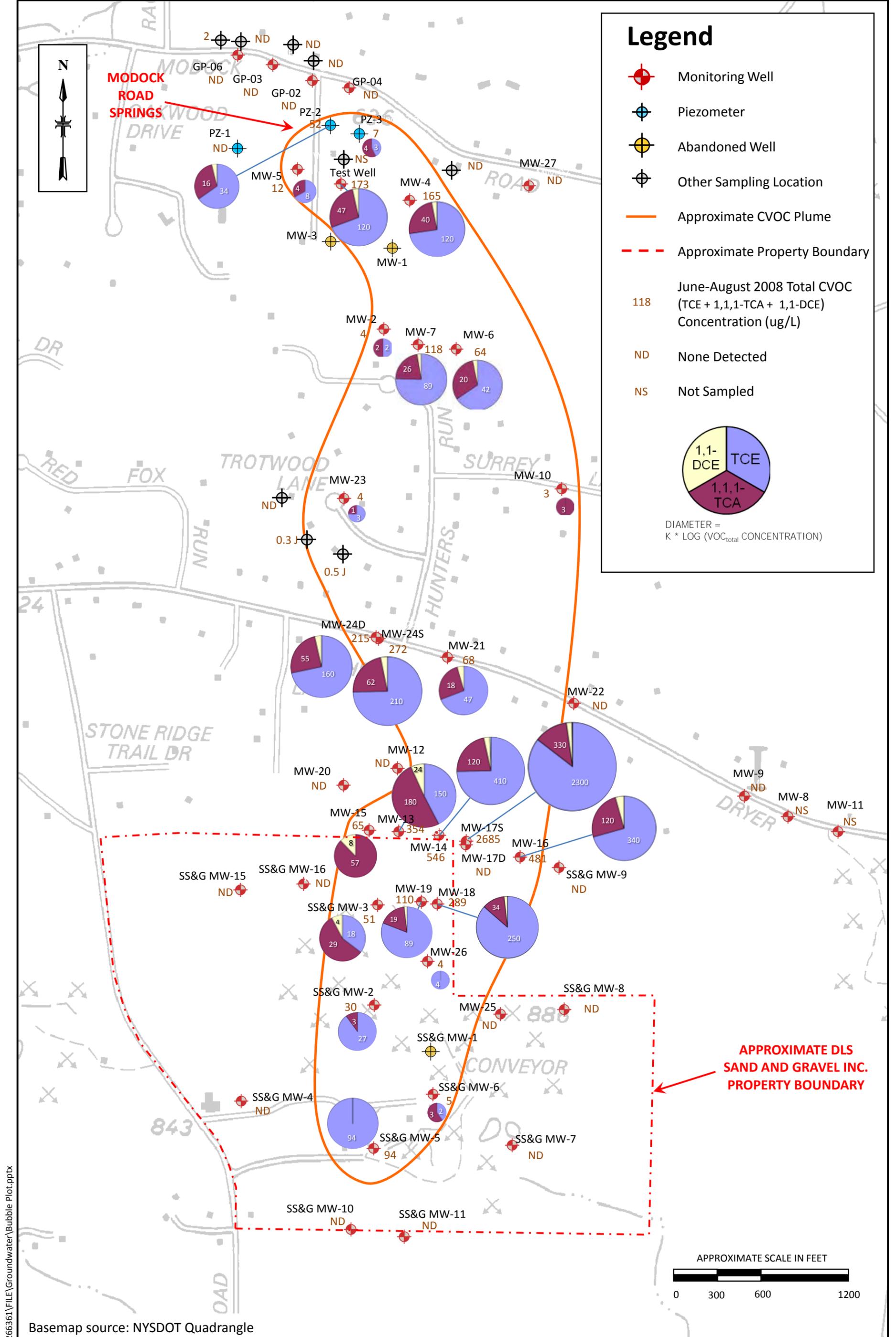


Modock Road Springs/DLS  
Sand & Gravel, Inc. Site  
Project ID #: 8-35-013

Ontario County  
Town of Victor

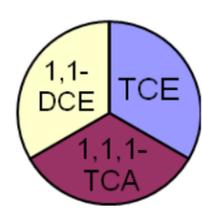
### Record of Decision

Figure illustrating source  
characterization sampling locations  
and TCE detection locations.



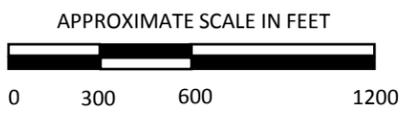
### Legend

- Monitoring Well
  - Piezometer
  - Abandoned Well
  - Other Sampling Location
  - Approximate CVOC Plume
  - Approximate Property Boundary
- June-August 2008 Total CVOC  
(TCE + 1,1,1-TCA + 1,1-DCE)  
Concentration (ug/L)
- 118
- ND None Detected
- NS Not Sampled



DIAMETER =  
 $K * \text{LOG}(\text{VOC}_{\text{total}} \text{ CONCENTRATION})$

Basemap source: NYSDOT Quadrangle



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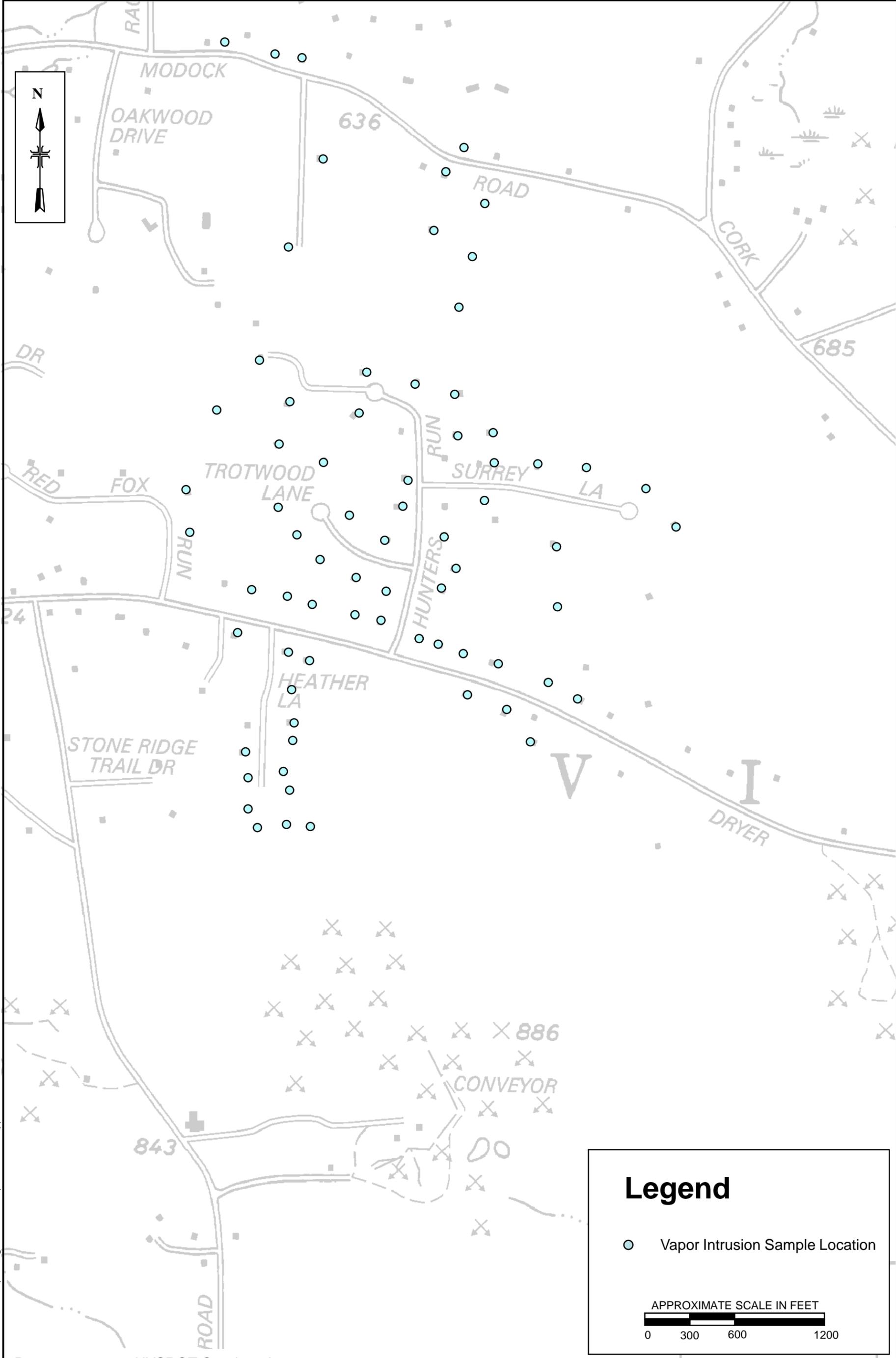


NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
DIVISION OF ENVIRONMENTAL REMEDIATION  
**RECORD OF DECISION**  
WORK ASSIGNMENT # D-004439 - 9

MODOCK ROAD SPRINGS/DLS SAND AND GRAVEL, INC. SITE (HW 8-35-013)  
TOWN OF VICTOR, ONTARIO COUNTY, NEW YORK  
**FIGURE 5**  
JUNE-AUGUST 2008 GROUNDWATER TOTAL VOC CONCENTRATIONS



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Basemap source: NYSDOT Quadrangle



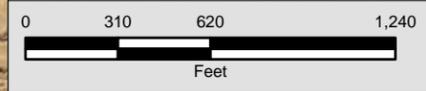
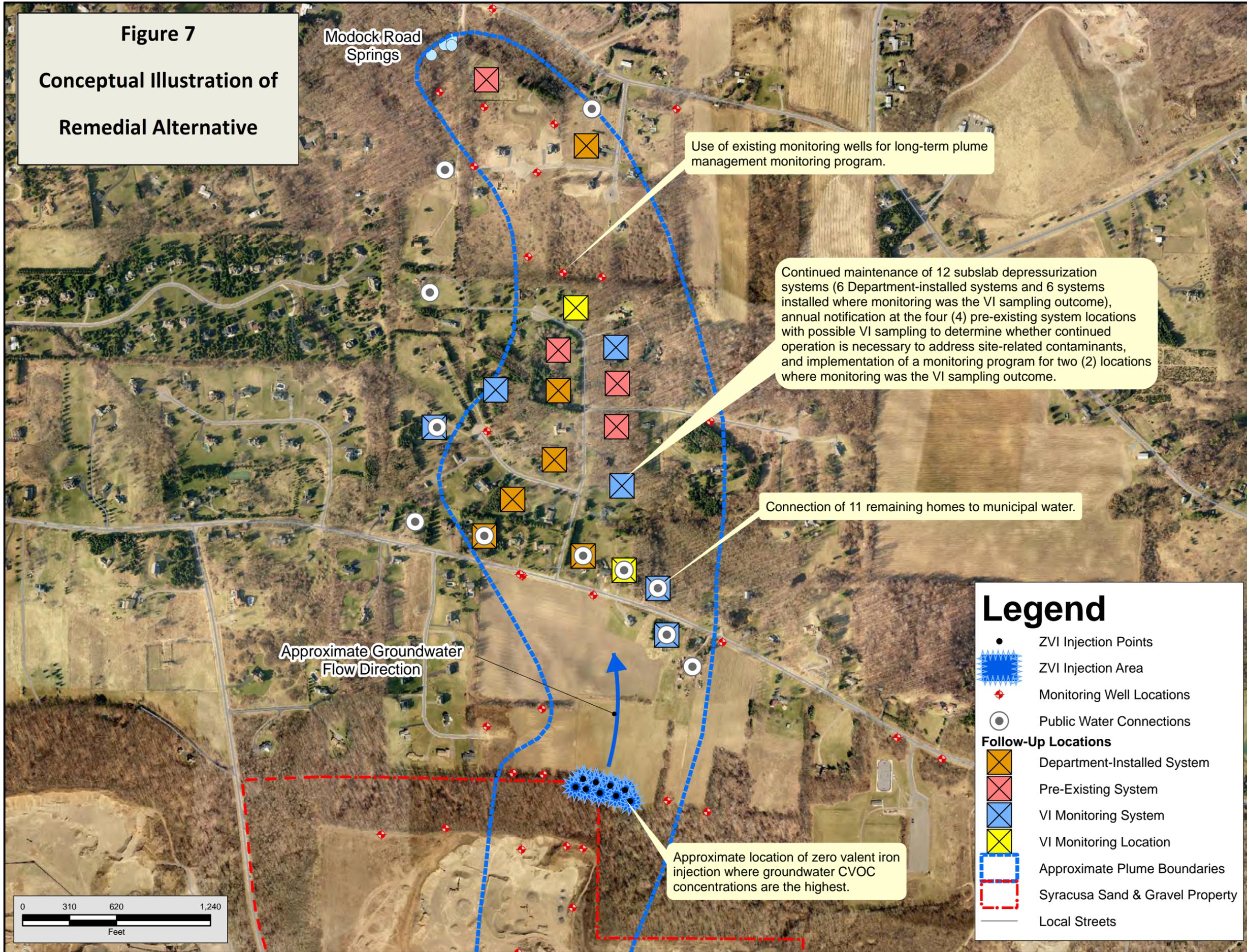
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
 DIVISION OF ENVIRONMENTAL REMEDIATION  
**RECORD OF DECISION**  
 WORK ASSIGNMENT # D-004439 - 9

MODOCK ROAD SPRINGS/DLS SAND AND GRAVEL, INC. SITE (HW 8-35-013)  
 TOWN OF VICTOR, ONTARIO COUNTY, NEW YORK

**FIGURE 6**  
 VAPOR INTRUSION SAMPLING LOCATIONS



**Figure 7**  
**Conceptual Illustration of**  
**Remedial Alternative**



### Legend

- ZVI Injection Points
- ★ ZVI Injection Area
- ◆ Monitoring Well Locations
- Public Water Connections
- Follow-Up Locations**
- Department-Installed System
- Pre-Existing System
- VI Monitoring System
- VI Monitoring Location
- Approximate Plume Boundaries
- - - Syracuse Sand & Gravel Property
- Local Streets



New York State  
 Department of Environmental Conservation  
 Division of Environmental Remediation

### Map Details

Created in ArcGIS 9.1  
 Created by J. Pelton  
 Date of Last Revision: 9/18/2009  
 UNAUTHORIZED DUPLICATION  
 IS A VIOLATION OF APPLICABLE LAWS

Modock Road Springs/  
 DLS Sand & Gravel, Inc.  
 Site  
 Site # 8-35-013

Ontario County  
 Town of Victor

DEC Contact:  
 J. Pelton

DOH Contact:  
 K. Anders

Spring 2003  
 Aerial Photography



North American Datum 1983  
 UTM Zone 18N

# **APPENDIX A**

## **Responsiveness Summary**

# RESPONSIVENESS SUMMARY

## Modock Road Springs/DLS Sand and Gravel, Inc. Site Town of Victor, Monroe County, New York Site No. 8-35-013

The Proposed Remedial Action Plan (PRAP) for the Modock Road Springs/DLS Sand and Gravel, Inc., site, was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on October 15, 2009. The PRAP outlined the remedial measure proposed for the contaminated soil vapor, indoor air, subsurface soil, groundwater, and surface water at the Modock Road Springs/DLS Sand and Gravel, Inc., 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 October 27, 2009, 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 for the PRAP ended on November 16, 2009.

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

Comments 1 through 34 were received during the PRAP public meeting held on October 27, 2009.

**COMMENT 1:** In 1995, were the spring surface water concentrations at 750 ppb? Where is the 40% decrease as shown on your slide? It says it was at 1,500 ppb.

**RESPONSE 1:** The Modock Road Spring surface water total volatile organic compound (VOC) concentration in 1995 ranged from approximately 160 to 191 ppb and was recently (September 2009) measured at 118 ppb. The 40% decrease is based on a comparison of the 1995 and 2008 Modock Road Springs surface water data. The 1,500 ppb is not related to the surface water at the springs, but rather to total VOC concentrations detected in 2007 in groundwater from monitoring well MW-14 located in the area where the groundwater contaminant concentrations are the highest.

**COMMENT 2:** Please describe where the actual Class 2 site is?

**RESPONSE 2:** The Class 2 site is the 173-acre Syracuse Sand and Gravel, Inc. property located on the east side of Malone Road and approximately 1,000 feet south of Dryer Road.

**COMMENT 3:** We don't understand why some of the eleven (11) connections to public water are outside of the plume area. There are four connections outside and to the west of the plume area. Are there groundwater monitoring points outside of the plume area? Were wells in the Oakwood Drive area tested?

**RESPONSE 3:** The eleven (11) homes selected for connection to public water in the PRAP were locations where the residences relied on domestic water supply wells and were within or along the margins of the groundwater contamination. If these eleven (11) residential wells were not connected to public water, they would have been included in a long-term domestic water supply well sampling program. There are 28 additional groundwater monitoring points outside and along the margins of the plume that have been routinely sampled to define the limits of the groundwater contamination. Based on this groundwater sampling, the boundaries of the groundwater contamination have been defined and the contamination does not extend to the Oakwood Drive area. Eight (8) private water supply wells located on Oakwood Drive were sampled as part of site investigation activities between 2000 and 2007 and this data also shows that the groundwater plume does not extend to the Oakwood Drive area.

**COMMENT 4:** Are your tests on private wells outside the plume done through 2009?

**RESPONSE 4:** No. As part of the remedial investigation, the majority of the domestic water supply wells were sampled for laboratory analysis in 2007. Sixteen (16) additional domestic water supply well samples were collected for laboratory analysis between 2008 and 2009.

**COMMENT 5:** How much is it to hook up to public water?

**RESPONSE 5:** The cost to connect to public water will vary depending on the distance from the water main located in the right-of-way to the home. As part of our engineer's estimate to connect the eleven (11) homes to public water in the PRAP, the average cost was estimated at \$7,700 per connection.

**COMMENT 6:** Our home is located at 1114 Oakwood Drive and has been on a private well since the 1960's and we used to have perfectly clear, good tasting water. How do you explain the change in water taste and smell from 1990 when the contamination was discovered? Over the past ten years our water stinks and dissolves things. Our water is bad. We have a five year old tub that you can't clean; it now has an orange color. If you run bath water in it, then run a towel in the water, the towel comes out orange. Our well depth is 112 feet. Our water has been tested and we have lost the report. Our parents lived there 43 years and both were diagnosed with pancreatic cancer, so we are concerned. There are seven houses on our street, and behind us is a new subdivision. Most homes in the area were connected to public water, but Oakwood Drive was not connected.

**RESPONSE 6:** Based on sampling of groundwater monitoring wells, private water supply wells, and surface water samples, the groundwater contamination does not extend over to the Oakwood Drive area. The private well at 1114 Oakwood Drive is located over 1,500 feet west of the groundwater plume. No site contaminants were detected in a drinking water sample collected at 1114 Oakwood Drive by the Department in May 2007. A copy of the letter report summarizing the May 2007 drinking water sampling results from the private well at 1114 Oakwood Drive will be provided.

**COMMENT 7:** The remedy appears passive. This contamination has been there a long time, approximately 20 years, and a lot of investigation work has been done. Why is the remedy a passive attempt for the cleanup?

**RESPONSE 7:** The elements of the remedy outlined in the PRAP are part of the overall response to the contamination identified in the Modock Road Springs area since the contamination was first discovered. The entire response includes activities that have already been completed including the discontinuance of the springs as part of a public water supply and the connection to the Monroe County Water Authority, connection of three (3) homes to public water following the identification of CVOC contamination above the drinking water standards, and the installation of subslab depressurization systems at six (6) locations based on vapor intrusion sampling. Eleven (11) additional homes within or along the margins of the groundwater contamination were connected to public water as the PRAP was being prepared.

One of the primary components of the remedy is a long-term plume monitoring program that will include the collection and laboratory analysis of groundwater, surface water, and soil vapor samples for VOC analysis to assess plume stability and the continued natural reduction of the CVOC contamination over time. Should this monitoring indicate that the contaminant concentrations are not continuing to decline then the remedy includes a more active contingency (injection of zero valent iron) to enhance the reduction of site contaminants. Even with the implementation of an immediate active remedy to address the groundwater contamination, the CVOC contaminants would continue to persist for an extended period of time because the CVOC groundwater plume currently extends over a length of nearly 7,500 feet and because of the persistent nature of the site contaminants.

**COMMENT 8:** Is public water going to be offered on Oakwood Drive? We were offered it once, and residents voted against it, because the plume situation was not presented to us, but now we are aware of the site and groundwater contamination. If we knew of the contaminant plume, and if this was presented to us differently, we would have voted differently.

**RESPONSE 8:** The remedy does not include a requirement to extend the public water supply to the Oakwood Drive area. However, the Department understands that the Town of Victor is currently evaluating extending the municipal water supply to the Oakwood Drive area. This is separate from the remedial program for this site. Follow up on this issue should be with the Town of Victor.

**COMMENT 9:** What happens to people who want to sell their homes in this area?

**RESPONSE 9:** Topics related to the sale of property are outside the scope of this ROD. However, it is noted generally that prospective purchasers, realtors, and sellers can contact the Department project manager and/or the NYSDOH project manager to discuss the site status or to discuss specific contamination questions. Mr. Paul Lytle, the environmental consultant for the Town of Victor, can also be contacted for site investigation and cleanup information.

**COMMENT 10:** What does long-term monitoring refer to?

**RESPONSE 10:** Long-term monitoring refers to the component of the remedy including a long-term plume monitoring program that will include the collection and laboratory analysis of groundwater, surface water, and soil vapor samples for VOC analysis to assess plume stability and the continued natural reduction of the CVOC contamination over time. To evaluate overall trends in contamination over time, the long-term monitoring program will include the collection of data on a semi-annual basis (2 sampling events per year) for the first 3 years and then every fifth quarter thereafter.

**COMMENT 11:** As we go forward, will the results of the monitoring be forwarded to the residents as well as the town? How will you do this? I have concerns that the State will ride off into the sunset and people will get fearful in the future. I don't want to wait five years for an update, it would be nice to have a semi-annual or annual update on your website or documentation available somewhere where we can access it?

**RESPONSE 11:** The results of the long-term plume management monitoring will be placed in hardcopy in the document repositories and submitted electronically to the Town of Victor. The Town may post the results to the Town website. Public disclosure of the plume management monitoring results and the evaluation of long-term trends in the analytical data will also occur during the periodic reviews (nominally five years). See also response to Comment #10.

**COMMENT 12:** The slide with the extent of the contamination shows there was not thousands upon thousands of gallons of contamination. In the beginning of this investigation, we read in the paper, and we were told, that there were thousands of barrels dumped here. The numbers are not as bad as we thought, and I believe only 250 gallons were released here in the 1980's. This plume has shrunk over time. You can see the level of decreases by looking at the numbers. All the data continues to state that the problem is not as bad as it was reported to be. The Town of Victor Citizen's Advisory Committee (CAC) is pleased with the data and the numbers which shows the problem is not as bad as we once thought. Only three homes had well water contamination. There was zero contamination in shallow soil and only six air mitigation systems were needed out of the 73 homes included in the vapor intrusion sampling.

**RESPONSE 12:** No response necessary.

**COMMENT 13:** What is the toxicity difference between TCE and radon coming into the home?

**RESPONSE 13:** The risk of cancer for an individual depends upon many factors, including the potency of a substance to cause cancer, the amount, duration and frequency of exposure, and the characteristics of the exposed individual (e.g., age, sex, diet, family traits, lifestyle, genetic background, the presence of other chemicals in their body (e.g., alcohol, prescription drugs), and state of health). Due to differences between the types of cancer that might result from exposure to each compound, the risk factors (i.e., something that's likely to increase a person's chances of developing a disease) for these types of cancers, and the differences in the units used to describe each compound's potency to cause cancer, a direct comparison of the toxicity values is not provided. Rather, for information about risks associated with exposures to radon, the reader is referred to the NYSDOH's fact sheet on radon (included at the following website: [http://www.nyhealth.gov/environmental/indoors/vapor\\_intrusion/fact\\_sheets/](http://www.nyhealth.gov/environmental/indoors/vapor_intrusion/fact_sheets/)) and USEPA's website on radon (<http://www.epa.gov/radon/pubs/citguide.html#risk>). For information on risks associated with exposures to TCE, the reader is referred to the NYSDOH's Trichloroethene Air

Criteria Document, which is available on the NYSDOH's website at:  
<http://www.health.state.ny.us/environmental/chemicals/trichloroethene/>.

**COMMENT 14:** You can still get air mitigation systems through the town, if you live in the affected area. These mitigation systems are also the remedy for addressing naturally occurring radon. Radon is 4,000 times more toxic than the site contaminants.

**RESPONSE 14:** No response necessary.

**COMMENT 15:** Is there a geological explanation as to why the plume is within a narrow area or path?

**RESPONSE 15:** Subsurface drilling showed a coarse sand and gravel deposit in the saturated zone extending from the site, through the monitoring well MW-24 area, and extending to the Modock Road Springs. This highly permeable zone is bounded to the sides and underneath by a lower permeability silt and fine sand. Groundwater, and hence the contamination originating from the Syracuse property, seeks the path of least resistance and primarily travels in this narrow high permeability zone of sand and gravel. This narrow zone is similar to an underground drain and discharges at the Modock Road Springs.

**COMMENT 16:** What happens when contamination gets to the Modock Springs and does the contamination volatilize?

**RESPONSE 16:** The contaminated groundwater discharges into surface water at the Modock Road Springs. The groundwater is discharged through a culvert into a wetland area on private property. At the culvert, the surface water contains site contaminants above the NYSDEC Class C Surface Water Standard of 40 ppb. At a distance of approximately 500 feet downstream of the Modock Road Springs and at a location where the un-named surface water stream flows beneath Modock Road, the TCE concentrations decrease to below the NYSDEC Class C Surface Water Standard of 40 ppb. Since the site contaminants are volatile, as the surface water discharges through the culvert and flows through the wetlands, the contaminants volatilize to the atmosphere.

**COMMENT 17:** With alternative two, what criteria will be used to trigger the zero valent iron contingency?

**RESPONSE 17:** Data collected during the long-term plume monitoring program will be used to assess plume stability and the continued natural reduction of the CVOC contamination over time. A decision to implement the contingency will not be based on a single data set. Instead, data collected during the long-term plume management monitoring program will be compiled, trends evaluated, and the need for enhanced contaminant reduction assessed through the zero valent iron contingency. See also response to Comment #10.

**COMMENT 18:** How much contamination in gallons is left in the ground in the area of the plume?

**RESPONSE 18:** Approximately 70 – 75 gallons of contamination is dissolved in the groundwater plume.

**COMMENT 19:** Every time it rains and snows the contaminant concentrations in the plume decrease, the contaminants get discharged or removed from the plume through the springs.

**RESPONSE 19:** No response necessary.

**COMMENT 20:** I have been watching the TCE levels at the springs since 1990. It was 95 ppb then rose to over 230 ppb or 20% from 1990-1993. The Democrat & Chronicle then published “the danger below” article. The chemicals have decreased by 40%. There were two chemicals, TCE which causes health problems, and TCA which causes environmental problems. I agree with the DEC, it’s hard to commit to a hard number five years from now to predict how the cleanup will go. We don’t have enough hard data from the last 2-3 years to predict. The DEC is giving itself latitude stating that in five years they’ll look at the data again, and perhaps involve the community again. There is too much variability in the data right now. This is a natural occurring process and the numbers change plus or minus 20%. There’s not much difference between 100 ppb or 120 ppb, the concentrations bounce around like that. Hopefully the numbers will continue to decrease within 3-4 years to 50 ppb or so. I am comfortable with the DEC’s plan basing cleanup on the trends and data, and sharing this data with the town and residents yearly.

**RESPONSE 20:** No response necessary.

**COMMENT 21:** What do you mean by maintaining the mitigation systems, how do you maintain a system? Will all the houses that have mitigation systems be maintained or will only the houses that have mitigation systems installed by the DEC be maintained?

**RESPONSE 21:** Systems maintained in the State-wide operation, maintenance and monitoring plan will involve annual notification letters being sent to homeowners with mitigation systems installed by the Department at the six (6) mitigate locations, six (6) monitor locations based on earlier vapor intrusion sampling, and four (4) locations with pre-existing mitigation systems. The notification letters will remind homeowners that the systems should be operating, will provide information on how to determine if the system is operating correctly, and will provide information on who the homeowner should contact if the system is not operating correctly. Each of the subslab depressurization systems included in the plan will have labels on the system piping with Department contact information. Subslab depressurization systems typically require very little maintenance and proper operation is easy to check. Should a system that the Department installed be found to not be operating correctly, the Department will evaluate the system and make necessary repairs and/or adjustments as needed as part of the maintenance program. Should the pre-existing systems require service, Department staff would assess the need for VI sampling to determine what, if any, actions are appropriate. The Department could, in lieu of sampling, opt to repair or replace the pre-existing system.

**COMMENT 22:** What should people do if the mitigation system fan fails? Should they open a window? What if the power fails?

**RESPONSE 22:** As summarized in Response #21, the mitigation systems included in the State-wide operation, maintenance and monitoring plan will have labels with Department contact information on the system piping. Should the system stop operating, the homeowner should contact the Department staff. The subslab depressurization systems were installed to address long-term exposures to the site contaminants. Any power outages or fan failure would be for a

short duration and because of this, there would be no concerns. See also response to Comment #21.

**COMMENT 23:** Can you expand on what information was used in preparing the trend graphs that you showed during the presentation and how come accelerated decreases have occurred in the monitoring wells? You show sampling that occurred around 1995. I thought the wells were just installed over the past two years? How deep are the wells that you installed and periodically sample?

**RESPONSE 23:** The data used in preparing the trend graphs was from recently collected data and also historic spring and surface water sampling. The Department installed 14 groundwater monitoring wells between 1994 and 2001. Eleven (11) additional monitoring wells were installed by Syracuse Sand & Gravel, Inc. in 2001. During the remedial investigation completed between February 2007 and September 2008, an additional 15 groundwater monitoring wells were installed. Most of the wells are approximately 50 to 80 feet deep. Groundwater and surface water quality data collected over the approximate 18-year period was used to prepare the trend graphs used in the PRAP presentation. The graphs were prepared using data collected from the Modock Road Springs surface water along with groundwater quality data from near the springs, from the area where groundwater concentrations have been the highest, and from the upgradient portion of the plume. The consistent downward trend in contaminant concentrations indicates that the contaminants are decreasing under naturally occurring conditions over time.

**COMMENT 24:** Can you say if there was one specific time that the contaminants were disposed of?

**RESPONSE 24:** This is very difficult to estimate. The contamination was first detected in the Modock Road Springs surface water in 1990. Earlier spring sampling in 1980 did not detect the site contaminants. Estimates suggest likely disposal occurring in the 1960's or 1970's.

**COMMENT 25:** Is there an example of the zero valent iron method in New York State? Are there any downsides to it? Is it introduced into the subsurface with trenches?

**RESPONSE 25:** Zero valent iron has been used to address groundwater contaminated with the same contaminants at other site in New York State. Reactive iron was used at the Seneca Army Depot in Romulus, NY, the Watervliet Arsenal in Colonie, NY and the Farrand Controls site in Valhalla, NY. The site conditions at these sites however, have allowed the iron to be added using trenching technology instead of through subsurface injection. At the site, if the zero valent iron contingency is necessary, the iron will be injected as a slurry into the subsurface. The key to successful treatment is getting the zero valent iron into contact with the contaminants. Any changes in subsurface conditions would be localized and restricted to the area around the treatment zone.

**COMMENT 26:** It helps to use practical methods. If you went out to the site with a tablespoon, could you find a tablespoon of the contamination anywhere?

**RESPONSE 26:** No. During the remedial investigation, many different techniques were employed to determine if a mass of residual contamination exists in the shallow soil. An excavator was used to completely open up the ground during a test pitting program. Some of the test pits were over 200 feet in length and 20 feet deep. The test pitting program, combined with

multiple subsurface drilling programs and groundwater sampling events suggest that a source for the contamination does not exist in the shallow soil.

**COMMENT 27:** Why are you so confident that the contamination is confined to the upper aquifer and not the deeper aquifer?

**RESPONSE 27:** During the remedial investigation, soil borings identified a silt and clay layer that underlies the groundwater contamination. This low permeability layer separates, and acts as a barrier between groundwater in the shallow soil, and deeper groundwater present in bedrock. This is supported by data collected from both shallow monitoring wells and domestic water supply wells relative to groundwater samples collected from deeper bedrock wells. Site contaminants have not been detected in deep, bedrock wells at any time during the investigation activities completed between 1990 and 2009.

**COMMENT 28:** Compared to other sites, this contamination is not so bad. In the beginning we were so mad and there was lots of yelling and finger pointing and blame given to the DEC. The sky was falling and we were looking for guns. We all wanted to know how the DEC could know about this and let this happen. We were aggressive and took an offensive position after reading the newspaper articles. We thought this was so bad, that we were drinking bad water or breathing bad air, but no one was exposed. Can you talk about vapor intrusion, did you know about it in the 1980's?

**RESPONSE 28:** Vapor intrusion is most commonly caused by contaminated vapors migrating through the soil directly into basements or foundation slabs. Although the Department historically has evaluated soil gas pathways, improvements in analytical techniques and the knowledge gained from remedial sites in New York and other states has increased our understanding of how vapor intrusion occurs.

Historically, it was thought that vapor intrusion was only an issue where the source of the contaminants was very shallow and the magnitude of the contamination was very great. We now know that our previous assumptions about the mechanisms that could lead to exposure to vapor intrusion were not complete. The result was that additional work was required to investigate or remediate sites that were in the operational or monitoring phase, or that were already closed.

**COMMENT 29:** We are on the cusp of new technology for testing for vapor intrusion. Seventy-three (73) homes were tested and only fifty-nine homes were in the plume area. So they went outside the plume area to test. Out of all those homes tested, only six homes in the center of the plume required mitigation systems. You did a lot of extra testing and it's a very finite area where soil vapors are entering homes.

**RESPONSE 29:** No response necessary.

**COMMENT 30:** In one house, was a system installed for radon and for the contamination from this site and if so, will this system be maintained like the Department-installed systems?

**RESPONSE 30:** Based on radon testing completed by homeowners, radon mitigation systems were installed by homeowners at several locations prior to and during our remedial investigation. At one location, near the Modock Road Springs, a mitigation system was installed because of both elevated radon levels and because of site contaminants being detected in a basement indoor

air sample. This location is one (1) of the four (4) pre-existing mitigation systems that will be included in the State-wide operation, maintenance, and monitoring plan. See also response to Comment #21.

**COMMENT 31:** You threw a lot of resources at this site; did you exhaust the lines of evidence?

**RESPONSE 31:** The remedial investigation expanded on work that had already been completed and included a series of sequential steps to characterize the nature and extent of contamination, to identify a possible disposal area, and to assess possible exposures to site contaminants. This included the collection and analysis of 180 passive soil gas samples, 89 subsurface soil samples, 91 groundwater samples from monitoring wells and nearly 200 groundwater samples from private wells, 19 surface water samples, and soil vapor intrusion samples at 73 homes. This level of effort did exhaust the lines of evidence and allowed the Department to characterize the nature and extent of contamination, determine that a source area does not exist, and to assess possible exposures to site contaminants.

**COMMENT 32:** Is there a greater risk of radon here than the contamination? As a town, should we look at radon exposures?

**RESPONSE 32:** As indicated in the NYSDOH's fact sheet on radon (included on the following website: [http://www.nyhealth.gov/environmental/indoors/vapor\\_intrusion/fact\\_sheets/](http://www.nyhealth.gov/environmental/indoors/vapor_intrusion/fact_sheets/)), Ontario County has been designated by the USEPA and New York State as a "high radon risk area." As such, homeowners are encouraged to have radon testing completed at their home. The NYSDOH has information on radon at the following website: <http://www.health.state.ny.us/environmental/radiological/radon/radon.htm>

**COMMENT 33:** The bottom line is we still have to live here, so is it safe here?

**RESPONSE 33:** The Department and NYSDOH have concurred that the remedy is protective of human health and the environment.

**COMMENT 34:** You guys (NYSDEC and NYSDOH) did a great job. It started out adversarial but you did believable work and you are good communicators. Thank you.

**RESPONSE 34:** No response necessary.

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Representing Syracuse Sand & Gravel, Inc., Mr. Thomas Walsh with Hiscock & Barclay submitted a letter (dated November 13, 2009) which included the following comments (Comments 35 to 41):

**COMMENT 35:** The PRAP appropriately preferences the long-term Plume Management Monitoring remedial alternative, Alternative 2. Long-term Plume Management Monitoring is a relevant and appropriate response where: (i) all exposures have been eliminated through the installation of soil vapor intrusion abatement systems and hookups to public water [see PRAP, pg. 10]; (ii) the source is no longer present (no dense non-aqueous phase liquids/no grossly contaminated soils) [see PRAP, pg. 6]; (iii) the plume boundaries are consistent over time and the concentrations of chlorinated volatile organic contaminants ("CVOCs") have been declining since 1995 [see PRAP, pg. 7]; and (iv) concentrations of CVOCs in the un-named surface water

stream decrease below NYSDEC Class C Surface Water Standards within 500 feet [see PRAP, pg. 8].

**RESPONSE 35:** Under the facts of this site, the selected remedy is appropriate.

**COMMENT 36:** The data indicates that, with the exposures having been mitigated, the hazardous substances at the Site no longer constitute a significant threat to public health and the environment. The PRAP, therefore, unnecessarily includes in the preferred remedy a contingency directed at simply removing a mass of the contaminant (Alternative 3) should the level of CVOCs fail to continue to decline

**RESPONSE 36:** The alternative was selected based on an evaluation of seven (7) different alternatives relative to eight (8) criteria. The zero valent iron injection was included as a contingency partly because the groundwater quality data demonstrate that the CVOC concentrations have been declining under current conditions, but also because even with an immediate active remedy, the groundwater contamination would persist for an extended period of time. Should the long-term evaluation of groundwater, surface water, and soil vapor as part of the plume management monitoring indicate that the contaminant concentrations are not continuing to decline, then the need for implementing the contingency will be evaluated.

**COMMENT 37:** The trigger for implementing the contaminant mass removal contingency currently stated in the PRAP is the "results of plume management monitoring demonstrating that the CVOC groundwater concentrations do not continue to decline." There are two foreseeable problems with this description of the trigger. First, groundwater concentrations can be expected to fluctuate up and down over time and the seasons. The current language of the trigger could be misinterpreted by some as a promise by the Department that Alternative 3 will be implemented even if there is a single, temporary failure of CVOC levels to decline. That of course would not make sense. SS&G asks the Department to consider revising the PRAP to clearly state that it is the overall trend in groundwater concentrations that matters, not temporary increases. Second, the rate of decline in the levels of CVOCs in the groundwater at this Site, like that at most other sites, will eventually level off and reach asymptotic conditions where the CVOC levels will not perceptibly continue to decline from quarter to quarter. The failure to decline past asymptotic conditions should not be a triggering event if the levels attained no longer pose a threat

**RESPONSE 37:** It is understood that contaminant concentrations may fluctuate over time and that the rate of contaminant decline may level off or slow down. As summarized in Response 17, the long-term plume monitoring program was designed to assess plume stability and the continued natural reduction of the CVOC contamination over the long term. To evaluate the overall contaminant trends over time, the long-term monitoring program will include the collection of data on a semi-annual basis (2 sampling events per year) for the first 3 years and then every fifth quarter thereafter and not on a quarterly basis as summarized in Comment #37. A decision to implement the contingency will not be based on a single data set, but instead the data will be compiled so that trends can be evaluated and the need for enhanced contaminant reduction through the zero valent iron contingency effectively assessed. The long-term monitoring data showing that low level asymptotic conditions have been achieved would be more of an indication than an active remedy, such as the ZVI injection, would not be necessary, than an indicator that a ZVI injection would be necessary.

**COMMENT 38:** If the PRAP is to include an Alternative 3 contingency, SS&G requests the Department revise the trigger for implementing it in a manner not inconsistent with the following: "the results of the plume management monitoring show a rising trend of CVOC levels in groundwater which pose a threat to public health or the environment."

**RESPONSE 38:** As described in Response 37, the long-term plume monitoring program was designed to assess plume stability and the continued natural reduction of the CVOC contamination. A decision to implement the contingency will be based on an evaluation of multiple data sets.

**COMMENT 39:** Moreover, if there is to be an injection of an amendment to address reduction of contaminant mass in groundwater, it should not be done downgradient of the DLS property line [PRAP pg. 12] on the Zuhlsdorf property where the depth to groundwater can be up to 60'-80'. Such an injection point would not allow the amendment to address groundwater quality upgradient of the point of injection. As the PRAP states at page 4, the DLS property is the location of the upgradient portion of the dissolved phase CVOC plume and that plume is within 10' of the surface at SS&G MW-5 [Focused Feasibility Study, section 1.1.2.2, pg. 1-2]. The DLS property is the logical and absolutely lowest cost place to implement an injection remedial measure which can flow along with the groundwater to enhance the naturally occurring bioremediation and address all of the groundwater impacted with contaminants.

**RESPONSE 39:** The zero valent iron would be injected in an area to maximize contact with the contamination. Since the highest contaminant concentrations occur along the north-central portion of the site, this is the area where the zero valent iron would be injected.

**COMMENT 40:** Given the fact that all exposures have been mitigated, the PRAP appropriately concludes that the incremental increase in overall protectiveness of the remedy that might be obtained from the installation of one or more permeable reactive barriers across the plume and/or air sparging does not warrant the increase in costs associated with those remedial alternatives (Alternatives 5, 6 and 7).

**RESPONSE 40:** Comment noted.

**COMMENT 41:** As you can imagine, the potential responsible parties have been devastated by the impact caused by the apparent third-party dumping at the DLS Property. They have been searching for ways to help address the impact and restore the DLS property while saving the SS&G business. Therefore, should the Department actually decide to inject zero valent iron on the Zuhlsdorf property (rather than the DLS property), SS&G would very much like the opportunity to mine the location of the zero valent iron injections in advance of their installation. This could certainly lower the cost of the injections and provide some economic benefit to SS&G to offset such a remedy failing to address contaminant levels on the DLS property.

**RESPONSE 41:** The Department will not comment on the assertion that the PRPs have been "devastated" by the impact caused by the "apparent third-party dumping" as this ROD is not the place to discuss liability under state and federal law. The Department will offer the PRPs an opportunity enter into an Order on Consent and implement the ROD. Issues relative to mining are also beyond the scope of this ROD.



# **APPENDIX B**

## **Administrative Record**

# Administrative Record

## Modock Road Springs/DLS Sand and Gravel, Inc. Site Site No. 835013

1. “Final Immediate Investigation Work Assignment Letter Report”, dated September 7, 1995, prepared by Parsons Engineering Science, Inc. for the Department.
2. Monitoring Well Installation Field Notes, dated October 12, 1999, prepared by the Department.
3. Fact Sheet dated January 2000 providing an update on investigation activities at the Modock Road Springs/DLS Sand and Gravel, Inc. Site, prepared by the Department.
4. Monitoring Well Installation Field Notes, dated March 26, 2001, prepared by IT Corp for the Department.
5. “Groundwater Investigation Summary Report”, dated November 2002, prepared by Leader Professional Services, Inc. for Syracuse Sand & Gravel, Inc.
6. Referral Memorandum dated August 14, 2006 for a remedial investigation/feasibility study for the Modock Road Springs/DLS Sand and Gravel, Inc. site.
7. Fact Sheet dated February 2007 for start of Remedial Investigation/Feasibility Study at Modock Road Springs/DLS Sand and Gravel, Inc. Site, prepared by the Department.
8. “Immediate Investigation Work Plan”, dated February 2007, prepared by Malcolm Pirnie, Inc. for the Department.
9. Fact Sheet dated June 2007 announcing public meeting and availability sessions for the Modock Road Springs/DLS Sand and Gravel, Inc. Site, prepared by the Department.
10. “Modock Road Springs Site Project Management Work Plan and Remedial Investigation/Feasibility Study Work Plan”, dated August 2007, prepared by Malcolm Pirnie, Inc. for the Department.
11. Postcard Notice dated November 8, 2007 announcing availability sessions for the Modock Road Springs/DLS Sand and Gravel, Inc. Site on November 28 and 29, 2007, prepared by the Department.
12. “Final Immediate Investigation Work Assignment Report”, dated February 2008, prepared by Malcolm Pirnie, Inc. for the Department.
13. “Focused Feasibility Study for Groundwater Interim Remedial Measure”, dated May 2008, prepared by Malcolm Pirnie, Inc. for the Department.

14. “Remedial Investigation Report Modock Road Springs/DLS Sand and Gravel, Inc. Site”, dated August 2008, prepared by Malcolm Pirnie, Inc. for the Department.
15. “Technical Memorandum regarding Estimate of VOC Mass”, dated August 12, 2008, prepared by Malcolm Pirnie, Inc. for the Department.
16. Postcard Notice dated December 8, 2008 announcing availability sessions for the Modock Road Springs/DLS Sand and Gravel, Inc. Site on November 28 and 29, 2007 to review the recently completed remedial investigation, prepared by the Department.
17. 53 Town of Victor Resident Petitions, dated January 8, 2009, prepared by the Town of Victor Citizen’s Advisory Committee.
18. “Feasibility Study Report Modock Road Springs/DLS Sand and Gravel, Inc. Site”, dated August 2009, prepared by Malcolm Pirnie, Inc. for the Department.
19. Fact Sheet dated October 13, 2009 for Remedial Action Proposed for the Modock Road Springs/DLS Sand and Gravel, Inc., site, prepared by the Department.
20. Proposed Remedial Action Plan for the Modock Road Springs/DLS Sand and Gravel, Inc. site, dated October 2009, prepared by the Department.
21. Letter dated November 13, 2009 from Thomas F. Walsh with Hiscock & Barclay representing Syracuse Sand & Gravel, Inc.