PROPOSED REMEDIAL ACTION PLAN

Former Cleanerama
State Superfund Project
Colonie, Albany County
Site No. 401056
February 2015

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. The proposed remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York; (6 NYCRR) Part 375. This document is a summary of the information that can be found in the site-related reports and documents in the document repositories identified below.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the reports and documents, which are available at the following repositories:

William K. Sanford Town Library
629 Albany Shaker Road
Loudonville, NY 12211
Phone: (518) 458-9274

NYSDEC
Attn: Larry Alden

625 Broadway
Albany, NY 12233
Phone: 518-402-9767

A public comment period has been set from:

2/25/2015 to 3/26/2015

A public meeting is scheduled for the following date:

3/11/2015 at 6:00 PM

Public meeting location:

Colonie Town Hall

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP.

Written comments may also be sent through 3/26/2015 to:

Larry Alden
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
larry.alden@dec.ny.gov

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP based on new information or public comments. Therefore, the public is encouraged to review and comment on the proposed remedy identified herein. Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The Former Cleanerama site is the former Osborne Road Plaza property, located at the northeast corner of the intersection of Osborne Road and Albany Shaker Road in Loudonville, Town of Colonie, Albany County.

Site Features: The site is an approximately 0.9-acre former retail-type strip mall. The buildings have since been removed and the site has been re-graded to soil and partial asphalt surface, with a few trees remaining. The property is primarily flat, with a gentle slope from east to west. Sand Creek is approximately 840 feet west of the site.

Current Zoning and Land Use: The site is currently vacant, and is zoned Neighborhood Commercial Office Residential. Nearby parcels are currently used for commercial purposes, with a nursery school in close proximity. The nearest residences are 400-500 feet from the site.

Past Use of the Site: The site is the location of the former Osborne Road Plaza. A one-story building along Osborne Road was reportedly built around 1955 and an attached two-story office building with a partial basement was added to the north in 1962. The one-story building housed various retail businesses, including a dry cleaner called Cleanerama from approximately 1960 to 1995. The dry cleaning business is believed to have used tetrachloroethene (PCE or perc) in their cleaning operations, and apparently discharged PCE to the on-site septic system or systems. (The strip mall was serviced by a single septic tank and the office building had a separate 2,000-gallon septic tank and two drywells.) The strip mall and office building were hooked up to municipal sewer lines around 1968.

PCE contamination in the soil was discovered in 2003 and the Department addressed it under Spill #0305984 by removing the single-story building's septic system and 234 tons of contaminated soil. Post-excavation soil samples were below the Department's unrestricted soil cleanup objectives for VOCs, SVOCs, and metals. In 2005 or 2006, the southeastern portion of the one-story building was demolished.

Additional PCE contamination in soil and groundwater was discovered in 2007 as part of a pre-sale site assessment, and was reported to the Department as Spill #0702543. Soil, soil vapor, and groundwater investigations were performed in 2007 and 2008, with a limited soil removal action undertaken in 2007. In 2008, the owner entered into an Order on Consent with the Department, whereby additional soil and groundwater investigation and remediation would occur after the former retail building was demolished by a pending purchaser. The site was purchased by a national retail company in about 2009, and the on-site buildings were demolished in August 2010. The post-demolition investigative work was performed and a Soil Removal Workplan was approved in May 2011 but never implemented.

Off-site investigations performed by the site owner (2007 and 2008) and the Department (2011) identified soil vapor impacts to an adjacent building, as well as contaminated groundwater migrating from the site. Due to high sub-slab VOC concentrations found at the adjacent building, a sub-slab depressurization system was installed by the property owner in 2012.

In February 2009, the Department and NYSDOH conducted off-site indoor air sampling using passive diffusion sampling badges ('perc badges') in commercial buildings other than the adjacent building. The results showed actions were not necessary to reduce exposure to PCE in air for the sampled buildings. In 2014, the Department took additional samples of sub-slab vapor and indoor air at select commercial buildings in the area. The results showed that no additional actions were needed to address soil vapor intrusion in those buildings.

Site Geology and Hydrogeology: Depth to water ranges from 4-12 feet on-site and 7-26 feet off-site. Depth to bedrock (shale) ranges from 8-19 feet on-site and 15-39 feet off-site. The overburden soil is predominantly sand and silty sand, with a layer of glacial till and weathered bedrock immediately above the shale. Groundwater flows in a westerly-northwesterly direction, toward Sand Creek.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, an alternative which allows for unrestricted use of the site was evaluated.

A comparison of the results of the investigation against unrestricted use standards, criteria and guidance values (SCGs) for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: 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:

OSBORNE ROAD ASSOC LLC

WALGREEN COMPANY

The PRPs for the site declined to implement a remedial program when requested by the Department. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the 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 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

The analytical data collected on this site includes data for:

- air
- groundwater
- soil
- soil vapor
- indoor air
- sub-slab vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to 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.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

TETRACHLOROETHENE (PCE) TRICHLOROETHENE (TCE)

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil vapor intrusion

6.2: 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 issuance of the Record of Decision.

The following IRM(s) has/have been completed at this site based on conditions observed during the RI.

2014 Contaminated Soil Removal

During the RI, the Department removed approximately 100 tons of soil from one location with VOCs above the unrestricted SCO and disposed it off-site. The particular location was adjacent to the 2003 and 2007 soil removals, performed under the Spills program, in the vicinity of the former septic system. Confirmatory samples collected from the sidewalls of the excavation and analyzed for VOCs showed levels of PCE below the unrestricted SCO.

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary.

Nature and Extent of Contamination: Tetrachloroethene (PCE) and its degradation chemicals or daughter products [trichloroethene (TCE), cis-1,2-dichloroethene (DCE), and vinyl chloride (VC)] have been discovered in soil, soil vapor, indoor air, sub-slab vapor, and/or groundwater during subsurface investigation and interim remedial activities since 2003.

Environmental conditions prior to the 2014 RI are indicated below:

Groundwater: The maximum PCE concentration in on-site groundwater was 2,200 ppb and 770 ppb for off-site groundwater. The maximum TCE concentration in on-site groundwater was 77 ppb and 120 ppb for off-site groundwater. The maximum DCE concentration in on-site groundwater was 4.3 ppb and 15 ppb for off-site groundwater. The maximum VC concentration in on-site groundwater was 22 ppb and 2.7 ppb for off-site groundwater.

Soil: The maximum PCE concentration in on-site soil was 8.3 ppm. Analytical results prior to the 2003 soil removal could not be located. Off-site soil did not have contaminant concentrations above the unrestricted SCO.

Soil Vapor: On-site soil vapor had a maximum of 49,000 micrograms per cubic meter (ug/m3) of PCE and 41 ug/m3 of TCE. The maximum indoor air PCE concentration in the on-site building was 3.6 ug/m3. The maximum off-site soil vapor concentrations of PCE, TCE, and DCE were 150,000, 340, and 110 ug/m3, respectively.

Conditions during the 2014 RI are indicated below:

Groundwater: The highest contaminant concentrations in groundwater were found in wells OS-1, OS-10, MW-1, and MW-8 with the highest concentration of PCE found in OS-1, at 140 ppb and TCE at 12.1 ppb in OS-10. These were the only monitoring wells with any VOCs above 20 ppb. Seven other monitoring wells had PCE concentrations between 20 ppb and the groundwater standard of 5 ppb. Groundwater contaminant concentrations were lower for this investigation than previous investigations, likely reflecting a response to previous soil removals. A “grab” sample of water seeping into the soil removal excavation had PCE at a concentration of 970 ppb.

Soil: Confirmatory soil samples collected after the 2014 soil removal had PCE concentrations below the unrestricted soil cleanup objective.

Soil Vapor: Soil vapor concentrations of PCE in off-site locations SG-1 and SG-2, located near the monitoring wells with the highest PCE concentrations, were the highest found during this investigation, with a high of 76,627 ug/m3 in SG-1. The highest TCE and DCE concentrations were 128 and 4.76 ug/m3, respectively, in SG-2.

Soil vapor contaminant concentrations were lower for this investigation than previous investigations, likely reflecting a response to previous soil removals.

Off-site areas across Albany Shaker Road do not require any action based on sub-slab and soil vapor concentrations at those locations.

6.4: <u>Summary of Human Exposure Pathways</u>

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

People are not drinking the contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. The potential exists for the inhalation of site contaminants due to soil vapor intrusion for any future on-site development and occupancy. Off-site sampling identified the potential for people to inhale site contaminants in indoor air due to soil vapor intrusion in an adjacent building and a mitigation system is in place to address that concern. Sampling indicates that soil vapor intrusion is not a concern for other off-site buildings.

6.5: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings on-site and off-site.

SECTION 7: SUMMARY OF THE PROPOSED REMEDY

To be selected, the 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. The remedy must also attain the remedial action objectives identified for the site, which are presented in Section 6.5. Potential remedial alternatives for the Site were identified, screened and evaluated in the FS report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit B. Cost information is presented in the form of present worth, which 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. A summary of the Remedial Alternatives Costs is included as Exhibit C.

The basis for the Department's proposed remedy is set forth at Exhibit D.

The proposed remedy is referred to as the In-Situ Chemical Reduction/Permeable Reactive Barrier remedy.

The estimated present worth cost to implement the remedy is $574,000. The cost to construct the remedy is estimated to be $455,000 and the estimated average annual cost is $21,400 for the first five years and $2,200 for years 6-30.

The elements of the proposed remedy are as follows:

1. Remedial Design
Implement a remedial design program to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Contaminants in groundwater and saturated soil will be treated using a chemical reduction amendment that consists of a combination of controlled-release carbon (electron donor) and particles of zero valent iron (ZVI) or another reduced metal designed to stimulate complete degradation of PCE and its daughter products in groundwater. The chemical reducing agent will be injected into the subsurface via injection wells at on-site locations of known elevated PCE concentrations. Cultures of bacteria which are able to break down the VOCs will be injected after the reducing agent to assist in the biodegradation process. Prior to the full implementation of this technology, laboratory and on-site pilot scale studies will be conducted to more clearly define design parameters. The pilot test area will be monitored and evaluated for a period of six to nine months prior to final design and mobilization for full scale remedial approach.

3. A permeable reactive barrier (PRB) consisting of zero valent iron (ZVI) or another reduced metal will be placed below the water table at the downgradient end of the contaminant plume along the eastern side of Albany Shaker Road.

4. The sub-slab depressurization system (SSDS) at the adjacent building will continue to be operated and maintained.

5. Institutional Control:
Imposition of an institutional control in the form of an environmental easement for the controlled property that:

a. requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);

b. allows the use and development of the controlled property for restricted-residential use, as defined by Part 375-l.8(g), although land use is subject to local zoning laws;

c. restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and

d. requires compliance with the Department-approved Site Management Plan.

6. Site Management Plan:
A Site Management Plan which includes the following:

a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Engineering Controls: The permeable reactive barrier (PRB) and sub-slab depressurization system discussed in Paragraphs 3 and 4, above.

Institutional Controls: The environmental easement discussed in Paragraph 5, above.

This plan includes, but may not be limited to:

i. an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;

ii. descriptions of the provisions of the environmental easement including any land use, and/or groundwater use restrictions;

iii. provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;

iv. provisions for the management and inspection of the identified engineering controls, including confirming with the owner of the adjacent building that the SSDS is operational;

v. maintaining site access controls and Department notification; and

vi. the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- monitoring for vapor intrusion for any buildings developed on the site, as may be required by the Institutional and Engineering Control Plan discussed above
- a schedule of monitoring and frequency of submittals to the Department.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation for all environmental media that were evaluated. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium for which contamination was identified, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in each medium and compare the data with the applicable SCGs for the site. For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 4 and Section 6.1.1 are also presented.

Groundwater

Twenty-one groundwater monitoring wells have been installed on and around the site during previous investigations to assess groundwater conditions on- and off-site. Water samples have been tested for volatile organic contaminants (VOCs), semi-volatile organic compounds, metals, and PCBs. Analytical results from these investigations identified only VOCs above groundwater standards. In combination with the history of the site, this allowed the Department to focus on VOCs. For this Remedial Investigation, four new groundwater monitoring wells were installed. As with the existing wells, all the new monitoring wells are screened in the overburden above bedrock. Some of the old wells have been destroyed and others were not in locations affected by the site, so groundwater samples were collected from only15 monitoring wells.

Historic groundwater concentrations in the existing wells had up to 770 ppb of PCE and 120 ppb of TCE. These concentrations have come down since the soil removal actions.

The current results show that contamination in groundwater at the site exceeds the SCGs for VOCs. Contamination extends from the location of the former septic system and continues to the north and west onto the adjacent property, following the groundwater gradient.

Table 1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
tetrachloroethene	ND - 140	5	11 of 15
trichloroethene	ND – 12.1	5	3 of 15

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface Water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

The primary groundwater contaminants are PCE and TCE. The PCE is associated with operation of the former dry cleaner at the strip mall and the TCE is a breakdown product. Figure 2 shows current and past analytical results from the monitoring wells and Figure 3 shows isocontours of the PCE concentration in groundwater, based on the most recent sampling results. Although the association with the former septic system is not readily apparent from Figure 3, it should be noted that wells OS-7 and OS-8 could not be located for this RI. However, past samples from these two wells (see Figure 2) confirm the connection.

It should be noted that a "grab" sample of water seeping into the most recent excavation had PCE at a concentration of 970 ppb. This sample represents localized shallow groundwater and should not be directly compared with samples from groundwater monitoring wells, which are collected under controlled environmental conditions.

Based on the findings of the RI, the past disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminant that is considered to be the primary contaminant of concern which will drive the remediation of groundwater to be addressed by the remedy selection process is tetrachloroethene.

Soil

Investigations of the site by others identified soil contaminated with PCE and its associated breakdown products (e.g., trichloroethene) in the subsurface in the vicinity of the strip mall's septic system. Soil contaminated with these VOCs above the unrestricted soil cleanup objectives was excavated from the site and disposed at a licensed disposal facility in removal actions in 2003 and 2007. Previous soil sample results indicated that SVOCs and metals were not found at concentrations above residential SCOs. During the RI, soil from one location with VOCs above the unrestricted SCO (identified during work by others in 2010, after the earlier removal actions) was excavated and disposed off-site. Confirmatory samples collected from the sidewalls of the excavation and analyzed for VOCs showed levels of PCE below the unrestricted SCO.

Soil contamination identified during previous site work was addressed during the IRM described in Section 6.2.

Soil Vapor

The evaluation of the potential for soil vapor intrusion resulting from the presence of site related soil or groundwater contamination was evaluated by the sampling of soil vapor, sub-slab soil vapor under off-site structures, air inside structures, and outdoor ambient air. At this site due to the presence of buildings in the impacted area, a full suite of samples were collected to evaluate whether actions were needed to address exposures related to soil vapor intrusion.

Soil vapor samples were collected from the sub-slabs of three nearby commercial properties to assess the potential for soil vapor intrusion. Indoor air and outdoor air samples were also collected at that time. Soil vapor samples were also collected from six permanent vapor sampling points, mostly located around the adjacent property. Figure 4 shows the locations of these sampling points as well as the analytical results.

Based on the concentrations detected, and in comparison with the State's Soil Vapor Intrusion Guidance (NYSDOH 2006), the primary soil vapor contaminant is tetrachloroethylene (PCE), which is associated with the Cleanerama septic system. As noted on Figure 4, the highest soil vapor contamination is found around the adjacent building and is at locations with the highest groundwater concentrations. Soil vapor testing in the other nearby commercial properties did not find any site-related contamination.

From previous work done at the site, the Department of Environmental Conservation and Department of Health concluded that there should be mitigation at the adjacent property. A sub-slab depressurization system was installed at adjacent building in February 2012 by the property owner.

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of soil vapor. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of soil vapor to be addressed by the remedy selection process are TCE and PCE.

Exhibit B

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A.

Alternative 1: No Further Action

The No Further Action Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 6.2. This alternative leaves the site in its present condition and does not provide any additional protection of the environment.

Alternative 2: No Further Action with Site Management

The No Further Action with Site Management Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 6.2 and Site Management and Institutional Controls and Engineering Controls are necessary to confirm the effectiveness of the IRM. This alternative maintains engineering controls which were part of the IRM and includes institutional controls, in the form of an environmental easement and site management plan, necessary to protect public health and the environment from contamination remaining at the site after the IRMs.

Present Worth:..*$54,000*
Capital Cost:..*$39,000*
Annual Costs:..*$1,000*

Alternative 3: Air Sparge/Soil Vapor Extraction, Institutional Controls, and Monitoring

This alternative would include air sparging implemented to address the groundwater plume contaminated with volatile organic compounds (VOCs). VOCs would be physically removed from the groundwater and soil below the water table (saturated soil) by injecting air into the subsurface. As the injected air rises through the groundwater, the VOCs volatilize and transfer from the groundwater and/or soil into the injected air. The VOCs are carried with the injected air into the vadose zone (the area below the ground surface but above the water table) where a soil vapor extraction (SVE) system would be used to remove the injected air. The SVE system applies a vacuum to wells that have been installed into the vadose zone to remove the VOCs along with the air introduced by the sparging process.

At this site, air injection wells would be installed in the portion of the site to be treated as depicted on Figure 5. To capture the volatilized contaminants, the SVE would be installed in the vadose zone at a depth to be determined during remedial design. The air containing VOCs extracted from the SVE wells would be treated by passing the air stream through activated carbon to remove the VOCs prior to discharge to the atmosphere. This alternative would require continued operation and maintenance of the sub-slab depressurization system (SSDS) at the adjacent building to the north.

This alternative would include the development of an environmental easement that requires the site owner to comply with the Site Management Plan (SMP), restricts the use of groundwater without prior NYSDOH or County DOH approval, and requires the site owner to submit periodic certifications to the Department. The easement would also require the evaluation of the potential for soil vapor intrusion should the site property be developed in the future.

The SMP will include measures to be taken to address any residual contamination at the property.

Present Worth:..*$1,180,000*
Capital Cost:..*$838,000*
Annual Costs (Years 1-5):..*$65,800*
Annual Costs (Years 6-30):..*$2,200*

Alternative 4: In-Situ Chemical Reduction, PRB, Institutional Controls, and Monitoring

This alternative would include in-situ chemical reduction (ISCR) to treat contaminants in groundwater and saturated soil. Contaminants in groundwater would be treated using a chemical reduction amendment that consists of a combination of controlled-release carbon (electron donor) and particles of zero valent iron (ZVI) or another reduced metal designed to stimulate complete degradation of PCE, its daughter products, and other chlorinated VOCs in groundwater. A chemical reducing agent would be injected into the subsurface to destroy the contaminants at on-site locations of known elevated PCE concentrations (see Figure 6). The chemical reducing agent would not be placed over the entire plume footprint as it would not be cost effective based on existing data. The treatment would use a pattern of injection wells to inject the amendments to targeted depth intervals. The method and depth of injection would be determined during the remedial design. Cultures of bacteria which are able to break down the VOCs would be injected after the reducing agent to assist in the biodegradation process occurring at each injection location and subsequently downgradient on adjacent properties.

In addition, a permeable reactive barrier (PRB) consisting of zero valent iron (ZVI) or another reduced metal would be placed below the water table at the downgradient end of the contaminant plume along the eastern side of Albany Shaker Road as shown on Figure 6. This barrier would be placed by injection and would react with VOCs in the groundwater that flows through it.

Prior to the full implementation of this technology, laboratory and on-site pilot scale studies would be conducted to more clearly define design parameters. The pilot test area will be monitored and evaluated for a period of six to nine months prior to final design and mobilization for full scale remedial approach. A second injection may be necessary and would be determined based on post-injection groundwater monitoring.

Similar to Alternative 3, Alternative 4 would require an environmental easement and a SMP as detailed above. This alternative would also require continued operation and maintenance of the SSDS at the adjacent building to the north.

Present Worth:..*$574,000*
Capital Cost:..*$455,000*
Annual Costs (Years 1-5):..*$21,400*
Annual Costs (Years 6-30):..*$2,200*

Alternative 5: Bioremediation, Institutional Controls, and Monitoring

This alternative would include in-situ enhanced biodegradation to be employed to treat contaminants in groundwater in the area depicted on Figure 7. The biological breakdown of chlorinated contaminants through anaerobic reductive dechlorination would be enhanced by injecting a source of carbon into the subsurface to promote microbe growth. Cultures of bacteria would also be injected since a natural source of bacteria does not exist at the site. Injections would be made via a network of temporary monitoring wells screened across the water table.

Prior to the full implementation of this technology, laboratory and on-site pilot scale studies would be conducted to more clearly define design parameters. The pilot test area will be monitored and evaluated for a period of six to nine months prior to final design and mobilization for full scale remedial approach. A second injection may be necessary and would be determined based on post-injection groundwater monitoring.

Similar to Alternatives 3 and 4, Alternative 5 would require an environmental easement and a SMP as detailed above. This alternative would also require continued operation and maintenance of the SSDS at the adjacent building to the north.

Present Worth:..*$629,000*
Capital Cost:..*$511,000*
Annual Costs (Years 1-5):..*$21,400*
Annual Costs (Years 6-30):..*$2,200*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs (Years 1-5) ($)	Annual Costs (Years 6-30) ($)	Total Present Worth ($)
1 - No Action	0		0	0
2 - No Further Action with Site Management	39,000	1000	1000	54,000
3 - Air Sparge/Soil Vapor Extraction	838,000	65,800	2,200	1,180,000
4 - In-Situ Chemical Reduction/PRB	455,000	21,400	2,200	574,000
5 - Bioremediation	511,000	21,400	2,200	629,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 4, In-Situ Chemical Reduction/PRB as the remedy for this site. Alternative 4 would achieve the remediation goals for the site by treating shallow groundwater with a chemical reduction amendment to enhance the degradation of PCE in groundwater. The elements of this remedy are described in Section 7 of the PRAP. The proposed remedy is depicted in Figure 6.

Basis for Selection

The proposed remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. 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.

Alternative 1, No Action, provides no additional protection to public health and the environment. Alternative 2 provides institutional controls (deed restrictions, SMP) as a means of minimizing risks to human health, however it provides no additional protection for the environment related to contaminant migration in groundwater. Alternative 3 provides a comprehensive level of protection of both human health and the environment through institutional controls and groundwater remediation (via air sparge and SVE). Similar to Alternative 3, Alternative 4 provides a comprehensive level of protection of both human health and the environment through groundwater remediation (ISCR and a permeable reactive barrier). Alternative 5 provides a lesser level of protection of the environment compared to Alternatives 3 and 4 as it only relies on biodegradation for groundwater remediation. Therefore, based on existing information, Alternatives 3 and 4 are anticipated to provide the highest level of protection of human 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.

Alternatives 1 and 2 would not meet the SCGs and will not be retained for this analysis. Alternative 3, 4 and 5 provide for the treatment of PCE in groundwater where PCE concentrations exceed 20 ppb. Areas where concentrations are relatively low but above drinking water criteria (5 ppb to 20 ppb) are not targeted for active remedial injections and will require natural groundwater distribution of amendments and bacteria and attenuation to complete the remediation process. Therefore, meeting chemical specific groundwater criteria may be difficult to achieve. Alternatives 4 and 5 are anticipated to provide an enhanced level of groundwater treatment over Alternative 3 by their application of groundwater amendments, which are expected to reach areas which will not be influenced by the air sparge/SVE in that alternative. These amendments and their downgradient movement beyond the injection area(s) will provide sustained remediation. Alternatives 3, 4, and 5 are not expected to increase the potential for soil vapor intrusion. Through implementation of a pilot test and additional pre-design investigation data, Alternatives 4 and 5 are anticipated to provide the highest probability of meeting chemical specific SCGs for groundwater in the long term. Alternatives 3, 4, and 5 satisfy the threshold criteria, so the remaining criteria are particularly important in selecting a final remedy for the site.

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

3. 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.

Because Alternatives 3, 4, and 5 rely on direct removal or breakdown of contaminants, they will be effective in the long term for groundwater treatment and reduction of soil vapor concentrations. Alternatives 4 and 5 are anticipated to provide long-term effectiveness beyond the treatment areas in the media of concern, and since these alternatives do not rely on mechanical systems, they will use considerably less energy and produce less greenhouse gas over the life of the project. It is expected Alternatives 3 and 4 will achieve groundwater SCGs in less than 5 years; it may take longer under Alternative 5.

4. 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.

Alternatives 3, 4, and 5 would significantly reduce the toxicity, mobility, and volume of contaminants in groundwater. Alternative 3 would reduce the volume of contaminants and the potential for soil vapor intrusion through direct removal. Alternatives 4 and 5 would reduce the toxicity through breakdown of the contaminants, and once the contaminants are broken down into harmless materials, the potential for soil vapor intrusion will be reduced. Alternative 5 complies with this criterion but to a lesser degree or with lower certainty than the other two alternatives since it relies solely on microbial breakdown. Although all three alternatives would require groundwater use restrictions while they were being implemented, these restrictions could be removed at completion of the remedial action when concentrations go below the SCGs. Alternative 3 and 4 provide the highest level of reduction in toxicity, mobility, and volume.

5. Short-term Impacts and 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.

Alternative 3 would result in short-term noise and traffic impacts during soil excavation associated with installation of AS/SVE systems and installation of wells both on-site and off-site. Alternative 3 would use more energy and produce more greenhouse gas than the other alternatives, which do not rely on mechanical systems. Alternative 4 may have the potential to cause some minor community disturbance with mobilization and operation of equipment during injections, but most of the work will be done on the site proper. Alternative 5 would have more of a short-term impact as it may involve multiple injections both on-site and off-site. For these alternatives, engineering controls would be employed to minimize impacts to the community and to site workers. Alternative 3 would likely achieve the remedial goals the fastest, followed by Alternative 4. Alternative 5 would take the longest time.

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.

Alternatives 3 through 5 can be readily implemented using standard construction means and methods and regionally available resources. Implementation of Alternative 3 and 5 will be the most difficult as each remedial action disturbs larger areas over longer periods of time. Institutional controls for each of these alternatives should not be difficult to put in place.

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 capital cost for Alternative 3 would be the highest of the three viable alternatives (over $380,000 more than Alternative 4), and because Alternative 3 involves significant operation and maintenance costs, it is not as desirable as Alternatives 4 and 5. In addition, the air sparge/SVE system in Alternative 3 would need to be decommissioned after five years. The operating costs for Alternatives 4 and 5 are the same, but the estimated capital cost for Alternative 4 is $56,000 lower. Costs to monitor the effectiveness of the remedies are similar for each alternative.

8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

Each alternative is compatible with the contemplated land use. Potential residual contamination would be controllable with the proposed institutional controls and the associated site management plan.

The final criterion, Community Acceptance, 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.

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

Alternative 4 is being proposed because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.

DRAWING NUMBER	134685-33B1
APPROVED BY	HAF
CHECKED BY	HAF
DRAWN BY	SJW
DESIGNED BY	HAF
DATE	10/06/14
OFFICE	LATHAM, NY

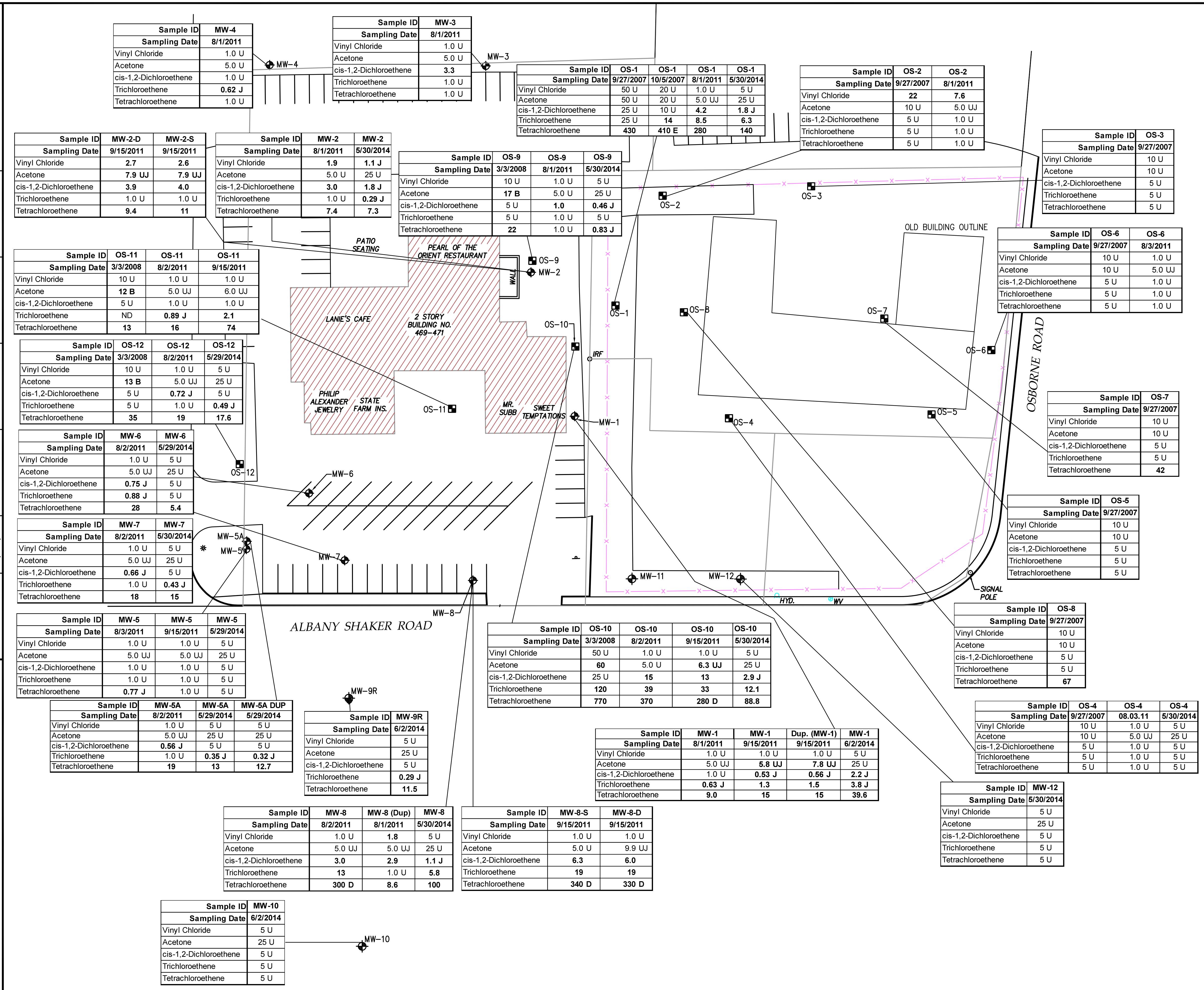
SHAW ENVIRONMENTAL, INC. (A CB&I COMPANY)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORMER CLEANERAMA

FIGURE 1
STUDY AREA BOUNDARIES

LOUDONVILLE, NEW YORK



Sample ID	MW-4
Sampling Date	8/1/2011
Vinyl Chloride	1.0 U
Acetone	5.0 U
cis-1,2-Dichloroethene	1.0 U
Trichloroethene	**0.62 J**
Tetrachloroethene	1.0 U

Sample ID	MW-3
Sampling Date	8/1/2011
Vinyl Chloride	1.0 U
Acetone	5.0 U
cis-1,2-Dichloroethene	**3.3**
Trichloroethene	1.0 U
Tetrachloroethene	1.0 U

Sample ID	OS-1	OS-1	OS-1	OS-1
Sampling Date	9/27/2007	10/5/2007	8/1/2011	5/30/2014
Vinyl Chloride	50 U	20 U	1.0 U	5 U
Acetone	50 U	20 U	5.0 UJ	25 U
cis-1,2-Dichloroethene	25 U	10 U	**4.2**	**1.8 J**
Trichloroethene	25 U	**14**	**8.5**	**6.3**
Tetrachloroethene	**430**	**410 E**	**280**	**140**

Sample ID	OS-2	OS-2
Sampling Date	9/27/2007	8/1/2011
Vinyl Chloride	**22**	**7.6**
Acetone	10 U	5.0 UJ
cis-1,2-Dichloroethene	5 U	1.0 U
Trichloroethene	5 U	1.0 U
Tetrachloroethene	5 U	1.0 U

Sample ID	MW-2-D	MW-2-S
Sampling Date	9/15/2011	9/15/2011
Vinyl Chloride	**2.7**	**2.6**
Acetone	**7.9 UJ**	**7.9 UJ**
cis-1,2-Dichloroethene	**3.9**	**4.0**
Trichloroethene	1.0 U	1.0 U
Tetrachloroethene	**9.4**	**11**

Sample ID	MW-2	MW-2
Sampling Date	8/1/2011	5/30/2014
Vinyl Chloride	**1.9**	**1.1 J**
Acetone	5.0 U	25 U
cis-1,2-Dichloroethene	**3.0**	**1.8 J**
Trichloroethene	1.0 U	**0.29 J**
Tetrachloroethene	**7.4**	**7.3**

Sample ID	OS-9	OS-9	OS-9
Sampling Date	3/3/2008	8/1/2011	5/30/2014
Vinyl Chloride	10 U	1.0 U	5 U
Acetone	**17 B**	5.0 U	25 U
cis-1,2-Dichloroethene	5 U	**1.0**	**0.46 J**
Trichloroethene	5 U	1.0 U	5 U
Tetrachloroethene	**22**	1.0 U	**0.83 J**

Sample ID	OS-3
Sampling Date	9/27/2007
Vinyl Chloride	10 U
Acetone	10 U
cis-1,2-Dichloroethene	5 U
Trichloroethene	5 U
Tetrachloroethene	5 U

Sample ID	OS-11	OS-11	OS-11
Sampling Date	3/3/2008	8/2/2011	9/15/2011
Vinyl Chloride	10 U	1.0 U	1.0 U
Acetone	**12 B**	5.0 UJ	6.0 UJ
cis-1,2-Dichloroethene	5 U	1.0 U	1.0 U
Trichloroethene	ND	**0.89 J**	**2.1**
Tetrachloroethene	**13**	**16**	**74**

Sample ID	OS-6	OS-6
Sampling Date	9/27/2007	8/3/2011
Vinyl Chloride	10 U	1.0 U
Acetone	10 U	5.0 UJ
cis-1,2-Dichloroethene	5 U	1.0 U
Trichloroethene	5 U	1.0 U
Tetrachloroethene	5 U	1.0 U

Sample ID	OS-12	OS-12	OS-12
Sampling Date	3/3/2008	8/2/2011	5/29/2014
Vinyl Chloride	10 U	1.0 U	5 U
Acetone	**13 B**	5.0 UJ	25 U
cis-1,2-Dichloroethene	5 U	**0.72 J**	5 U
Trichloroethene	5 U	1.0 U	**0.49 J**
Tetrachloroethene	**35**	**19**	**17.6**

Sample ID	OS-7
Sampling Date	9/27/2007
Vinyl Chloride	10 U
Acetone	10 U
cis-1,2-Dichloroethene	5 U
Trichloroethene	5 U
Tetrachloroethene	**42**

Sample ID	MW-6	MW-6
Sampling Date	8/2/2011	5/29/2014
Vinyl Chloride	1.0 U	5 U
Acetone	5.0 UJ	25 U
cis-1,2-Dichloroethene	**0.75 J**	5 U
Trichloroethene	**0.88 J**	5 U
Tetrachloroethene	**28**	**5.4**

Sample ID	MW-7	MW-7
Sampling Date	8/2/2011	5/30/2014
Vinyl Chloride	1.0 U	5 U
Acetone	5.0 UJ	25 U
cis-1,2-Dichloroethene	**0.66 J**	5 U
Trichloroethene	1.0 U	**0.43 J**
Tetrachloroethene	**18**	**15**

Sample ID	OS-5
Sampling Date	9/27/2007
Vinyl Chloride	10 U
Acetone	10 U
cis-1,2-Dichloroethene	5 U
Trichloroethene	5 U
Tetrachloroethene	5 U

Sample ID	OS-8
Sampling Date	9/27/2007
Vinyl Chloride	10 U
Acetone	10 U
cis-1,2-Dichloroethene	5 U
Trichloroethene	5 U
Tetrachloroethene	**67**

Sample ID	MW-5	MW-5	MW-5
Sampling Date	8/3/2011	9/15/2011	5/29/2014
Vinyl Chloride	1.0 U	1.0 U	5 U
Acetone	5.0 UJ	5.0 UJ	25 U
cis-1,2-Dichloroethene	1.0 U	1.0 U	5 U
Trichloroethene	1.0 U	1.0 U	5 U
Tetrachloroethene	**0.77 J**	1.0 U	5 U

Sample ID	OS-10	OS-10	OS-10	OS-10
Sampling Date	3/3/2008	8/2/2011	9/15/2011	5/30/2014
Vinyl Chloride	50 U	1.0 U	1.0 U	5 U
Acetone	**60**	5.0 U	**6.3 UJ**	25 U
cis-1,2-Dichloroethene	25 U	**15**	**13**	**2.9 J**
Trichloroethene	**120**	**39**	**33**	**12.1**
Tetrachloroethene	**770**	**370**	**280 D**	**88.8**

Sample ID	MW-5A	MW-5A	MW-5A DUP
Sampling Date	8/2/2011	5/29/2014	5/29/2014
Vinyl Chloride	1.0 U	5 U	5 U
Acetone	5.0 UJ	25 U	25 U
cis-1,2-Dichloroethene	**0.56 J**	5 U	5 U
Trichloroethene	1.0 U	**0.35 J**	**0.32 J**
Tetrachloroethene	**19**	**13**	**12.7**

Sample ID	MW-9R
Sampling Date	6/2/2014
Vinyl Chloride	5 U
Acetone	25 U
cis-1,2-Dichloroethene	5 U
Trichloroethene	**0.29 J**
Tetrachloroethene	**11.5**

Sample ID	MW-1	MW-1	Dup. (MW-1)	MW-1
Sampling Date	8/1/2011	9/15/2011	9/15/2011	6/2/2014
Vinyl Chloride	1.0 U	1.0 U	1.0 U	5 U
Acetone	5.0 UJ	**5.8 UJ**	**7.8 UJ**	25 U
cis-1,2-Dichloroethene	1.0 U	**0.53 J**	**0.56 J**	**2.2 J**
Trichloroethene	**0.63 J**	**1.3**	**1.5**	**3.8 J**
Tetrachloroethene	**9.0**	**15**	**15**	**39.6**

Sample ID	OS-4	OS-4	OS-4
Sampling Date	9/27/2007	08.03.11	5/30/2014
Vinyl Chloride	10 U	1.0 U	5 U
Acetone	10 U	5.0 UJ	25 U
cis-1,2-Dichloroethene	5 U	1.0 U	5 U
Trichloroethene	5 U	1.0 U	5 U
Tetrachloroethene	5 U	1.0 U	5 U

Sample ID	MW-12
Sampling Date	5/30/2014
Vinyl Chloride	5 U
Acetone	25 U
cis-1,2-Dichloroethene	5 U
Trichloroethene	5 U
Tetrachloroethene	5 U

Sample ID	MW-8	MW-8 (Dup)	MW-8
Sampling Date	8/2/2011	8/1/2011	5/30/2014
Vinyl Chloride	1.0 U	**1.8**	5 U
Acetone	5.0 UJ	5.0 UJ	25 U
cis-1,2-Dichloroethene	**3.0**	**2.9**	**1.1 J**
Trichloroethene	**13**	1.0 U	**5.8**
Tetrachloroethene	**300 D**	**8.6**	**100**

Sample ID	MW-8-S	MW-8-D
Sampling Date	9/15/2011	9/15/2011
Vinyl Chloride	1.0 U	1.0 U
Acetone	5.0 U	9.9 UJ
cis-1,2-Dichloroethene	**6.3**	**6.0**
Trichloroethene	**19**	**19**
Tetrachloroethene	**340 D**	**330 D**

Sample ID	MW-10
Sampling Date	6/2/2014
Vinyl Chloride	5 U
Acetone	25 U
cis-1,2-Dichloroethene	5 U
Trichloroethene	5 U
Tetrachloroethene	5 U

1. TOPOGRAPHIC INFORMATION SHOWN HEREON WAS COMPILED FROM AN ACTUAL FIELD SURVEY CONDUCTED DURING THE MONTH OF AUGUST, 2011.
2. PROPERTY LINES AS SHOWN ON THIS MAP ARE SHOWN IN THEIR APPROXIMATE LOCATION BASED ON AVAILABLE TAX MAP INFORMATION, AND ARE NOT INTENDED TO REPRESENT ACTUAL BOUNDARY LOCATIONS.
3. COORDINATES AND ELEVATIONS ARE BASED ON NEW YORK STATE EAST ZONE NAD 83 AND NAVD '88.
4. NEW MONITOR WELLS (MW) BY SHAW ENVIRONMENTAL.
5. MANHOLES AND CATCH BASINS HAVE BEEN PLOTTED BASED ON FIELD SURVEY. NO ATTEMPT HAS BEEN MADE ON THIS MAP TO CONNECT UNDERGROUND UTILITIES.
6. SITE SURVEY INCLUDES WELL LOCATIONS AND THE FORMER BUILDING LAYOUT.
7. ONLY SAMPLED LOCATIONS ARE SHOWN AS SPIDER BOXES.
8. MW-11 AND OS-2 WERE DRY AT TIME OF SAMPLING AND DETAILED IN FIELD NOTES
9. SHADED VALUES INDICATE THAT THE ANALYTE EXCEEDS THE NYSGWQS (SHOWN BELOW).
10. ALL RESULTS ARE MEASURED IN MICROGRAMS PER LITER ($\mu g/L$)

LEGEND:

MONITORING WELL (INSTALLED BY SHAW) — MW
MONITORING WELL — OS

Analyte	NYSDEC Standard or Guidance Value (µg/L)
Vinyl Chloride	2
Acetone	50
cis-1,2-Dichloroethene	5*
Trichloroethene	5*
Tetrachloroethene	5*

SCALE
0 60 120 FEET

SHAW ENVIRONMENTAL, INC. (A CB&I COMPANY)

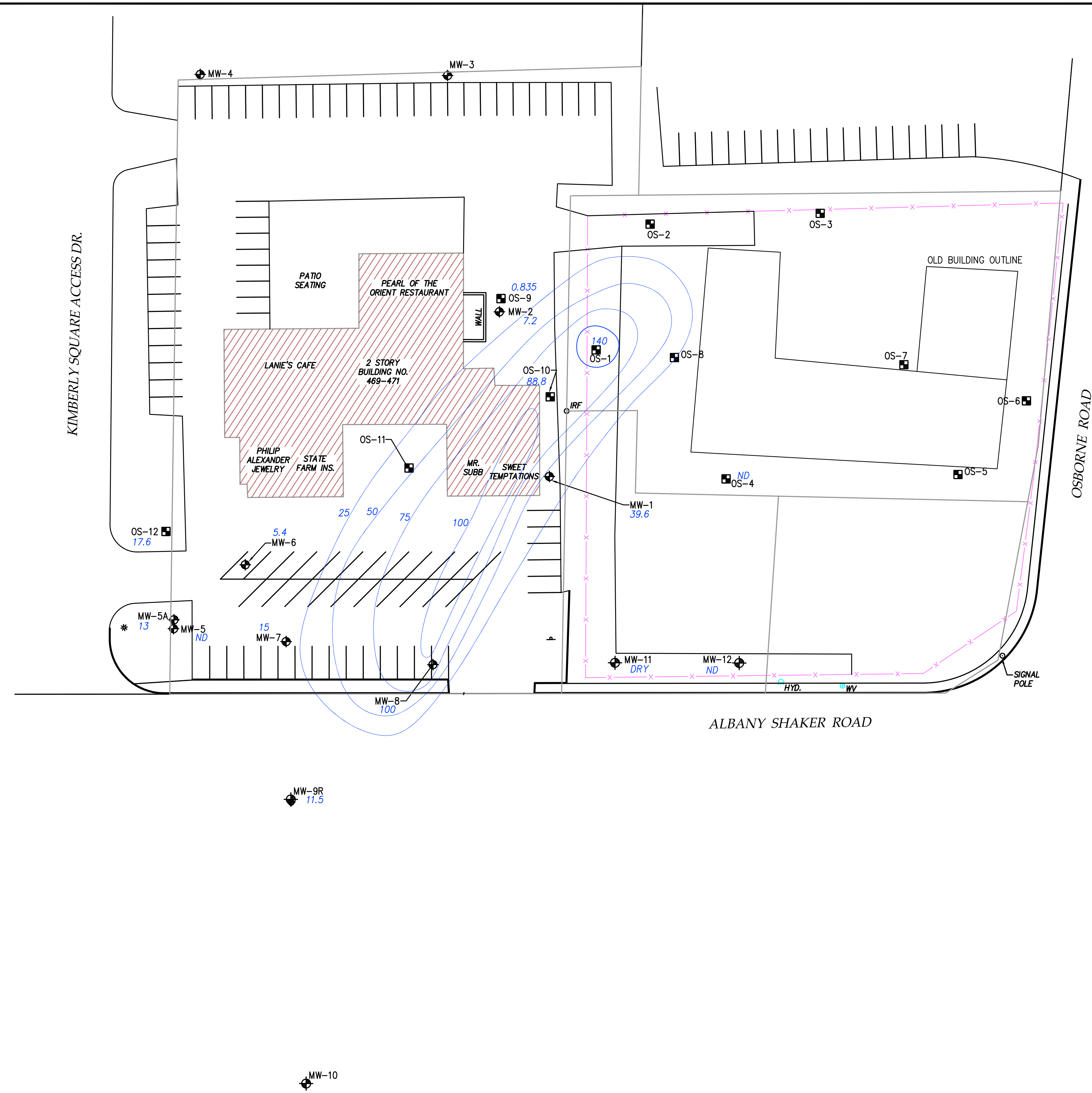
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FORMER CLEANERAMA

FIGURE 2
GROUNDWATER VOC RESULTS

LOUDONVILLE, NY

DRAWING NUMBER 134685-33B4B
APPROVED BY HAF
CHECKED BY HAF
DRAWN BY SJW
DESIGNED BY SJW
DATE 12/30/14
OFFICE LATHAM, NY

File: U:\Project\134685\33\134685-33B4B.dwg Layout: FIG 5A - GW VOC RESULTS User: steven.walsh Feb 12, 2015 - 9:54am



1. TOPOGRAPHIC INFORMATION SHOWN HEREON WAS COMPILED FROM AN ACTUAL FIELD SURVEY CONDUCTED DURING THE MONTH OF AUGUST, 2011.
2. PROPERTY LINES AS SHOWN ON THIS MAP ARE SHOWN IN THEIR APPROXIMATE LOCATION BASED ON AVAILABLE TAX MAP INFORMATION, AND ARE NOT INTENDED TO REPRESENT ACTUAL BOUNDARY LOCATIONS.
3. COORDINATES AND ELEVATIONS ARE BASED ON NEW YORK STATE EAST ZONE NAD 83 AND NAVD '88.
4. NEW MONITOR WELLS (MW) BY SHAW ENVIRONMENTAL.
5. MANHOLES AND CATCH BASINS HAVE BEEN PLOTTED BASED ON FIELD SURVEY. NO ATTEMPT HAS BEEN MADE ON THIS MAP TO CONNECT UNDERGROUND UTILITIES.
6. SITE SURVEY INCLUDES WELL LOCATIONS AND THE FORMER BUILDING LAYOUT.
7. ONLY SAMPLED LOCATIONS SHOW PCE CONCENTRATON.
8. MW-11 AND OS-2 WERE DRY AT TIME OF SAMPLING AND DETAILED IN FIELD NOTES

LEGEND:

MONITORING WELL (INSTALLED BY SHAW)	MW
MONITORING WELL	OS
PCE CONCENTRATION IN ug/L or ppb	39.6
PCE CONCENTRATION CONTOUR	25

SCALE

0 60 120 FEET

SHAW ENVIRONMENTAL, INC. (A CB&I COMPANY)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORMER CLEANERAMA

FIGURE 3

PCE ISCONCENTRATION MAP

LOUDONVILLE, NY

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
LATHAM, NY	12/30/14	SJW	SJW	HAF	HAF	134685-33B5

Xref :
Image : TAXMAP43.3.tif

File: U:\Project\134685\33\134685-33B5.dwg
Plot Date/Time: Feb 12, 2015 - 9:54am
Plotted By: steven.walsh

Site ID	Outdoor Ambient	
Sampling Date	7/13/2011	5/29/2014
Analyte (ug/m3)		
Vinyl Chloride	0.045 U	0.08 U
Carbon Tetrachloride	1.1 U	**0.57 J**
cis-1,2-Dichloroethene	0.14 U	1.98 U
1,1,1-Trichloroethane	0.19 U	0.16 U
Trichloroethene	0.19 U	0.16 UJ
Tetrachloroethene	0.24 U	**0.34 J**

Site ID	SG-3			
		Duplicate		Duplicate
Sampling Date	7/13/2011	7/13/2011	5/29/2014	5/29/2014
Analyte (ug/m3)				
Vinyl Chloride	0.049 U	0.045 U	0.08 U	0.08 U
Carbon Tetrachloride	1.2 U	1.1 U	**0.31 J**	**0.38 J**
cis-1,2-Dichloroethene	0.15 U	0.14 U	1.98 U	1.98 U
1,1,1-Trichloroethane	**2.1**	**2.0**	**0.6**	**0.6**
Trichloroethene	0.20 U	**0.19**	0.16 UJ	**0.54 J**
Tetrachloroethene	**7.9**	**7.5**	**9.49 J**	**8.14 J**

Site ID	SG-2	
Sampling Date	7/13/2011	5/29/2014
Analyte (ug/m3)		
Vinyl Chloride	22 U	0.77 U
Carbon Tetrachloride	55 U	1.89 UJ
cis-1,2-Dichloroethene	**110**	**4.76 J**
1,1,1-Trichloroethane	48 U	1.64 U
Trichloroethene	**340**	**128 J**
Tetrachloroethene	**27,000**	**9493 D**

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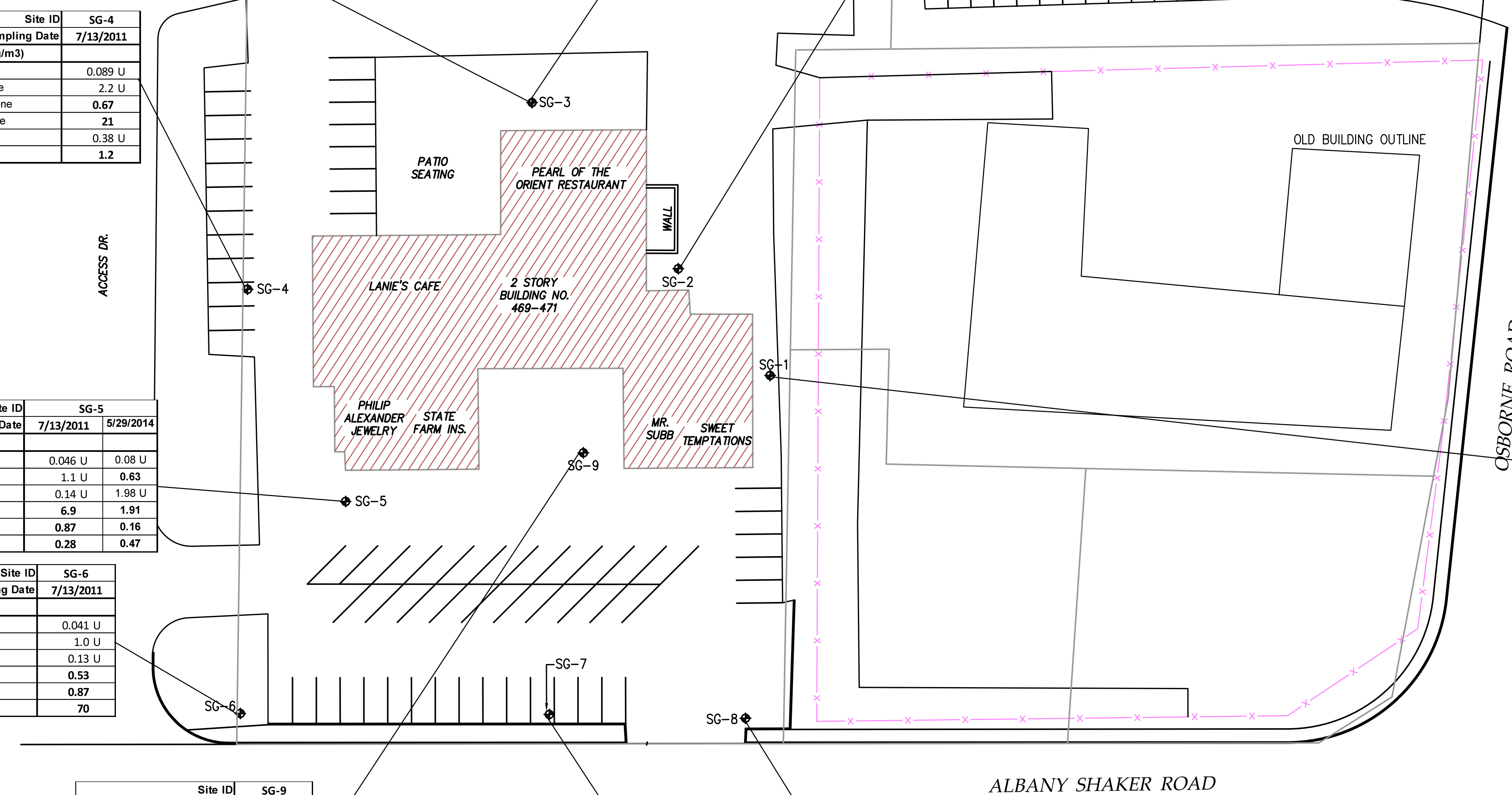
3. COORDINATES AND ELEVATIONS ARE BASED ON NEW YORK STATE EAST ZONE NAD 83 AND NAVD '88.
4. NEW MONITOR WELLS (MW) BY SHAW ENVIRONMENTAL.
5. MANHOLES AND CATCH BASINS HAVE BEEN PLOTTED BASED ON FIELD SURVEY. NO ATTEMPT HAS BEEN MADE ON THIS MAP TO CONNECT UNDERGROUND UTILITIES.
6. SITE SURVEY INCLUDES WELL LOCATIONS AND THE FORMER BUILDING LAYOUT.
7. ONLY SAMPLED LOCATIONS ARE SHOWN AS SPIDER BOXES.
8. ALL RESULTS ARE SHOWN IN MICROGRAMS PER CUBIC METER.

Site ID	SG-4
Sampling Date	7/13/2011
Analyte (ug/m3)	
Vinyl Chloride	0.089 U
Carbon Tetrachloride	2.2 U
cis-1,2-Dichloroethene	**0.67**
1,1,1-Trichloroethane	**21**
Trichloroethene	0.38 U
Tetrachloroethene	**1.2**



LEGEND:

SOIL GAS POINT — SG

Site ID	SG-5	
Sampling Date	7/13/2011	5/29/2014
Analyte (ug/m3)		
Vinyl Chloride	0.046 U	0.08 U
Carbon Tetrachloride	1.1 U	**0.63**
cis-1,2-Dichloroethene	0.14 U	1.98 U
1,1,1-Trichloroethane	**6.9**	**1.91**
Trichloroethene	**0.87**	**0.16**
Tetrachloroethene	**0.28**	**0.47**

Site ID	SG-1	
Sampling Date	7/13/2011	5/29/2014
Analyte (ug/m3)		
Vinyl Chloride	94 U	0.08 U
Carbon Tetrachloride	230 U	**0.19 J**
cis-1,2-Dichloroethene	140 U	**0.2 J**
1,1,1-Trichloroethane	200 U	0.16 U
Trichloroethene	200 U	**44.1 J**
Tetrachloroethene	**150,000**	**76627 D**

Site ID	SG-6
Sampling Date	7/13/2011
Analyte (ug/m3)	
Vinyl Chloride	0.041 U
Carbon Tetrachloride	1.0 U
cis-1,2-Dichloroethene	0.13 U
1,1,1-Trichloroethane	**0.53**
Trichloroethene	**0.87**
Tetrachloroethene	**70**

Site ID	SG-9
Sampling Date	7/13/2011
Analyte (ug/m3)	
Vinyl Chloride	40 U
Carbon Tetrachloride	99 U
cis-1,2-Dichloroethene	63 U
1,1,1-Trichloroethane	86 U
Trichloroethene	**220**
Tetrachloroethene	**80,000**

Site ID	SG-8
Sampling Date	7/13/2011
Analyte (ug/m3)	
Vinyl Chloride	5.5 U
Carbon Tetrachloride	13 U
cis-1,2-Dichloroethene	8.5 U
1,1,1-Trichloroethane	12 U
Trichloroethene	**33**
Tetrachloroethene	**5,400**

SCALE

0 60 120 FEET

Site ID	SG-10
Sampling Date	5/29/2014
Analyte (ug/m3)	
Vinyl Chloride	0.08 U
Carbon Tetrachloride	**0.44 J**
cis-1,2-Dichloroethene	1.98 U
1,1,1-Trichloroethane	**2.89**
Trichloroethene	**0.38 J**
Tetrachloroethene	**1.15 J**

Site ID	SG-7	
Sampling Date	7/13/2011	5/29/2014
Analyte (ug/m3)		
Vinyl Chloride	5.8 U	0.08 U
Carbon Tetrachloride	**14**	**0.57 J**
cis-1,2-Dichloroethene	9.1 U	1.98 U
1,1,1-Trichloroethane	12 U	**0.27**
Trichloroethene	12 U	0.16 UJ
Tetrachloroethene	**4,400**	**154 D**

SHAW ENVIRONMENTAL, INC. (A CB&I COMPANY)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORMER CLEANERAMA

FIGURE 4

SOIL GAS VOC RESULTS

LOUDONVILLE, NY

DRAWING NUMBER 134685-33B6A

APPROVED BY HAF

CHECKED BY HAF

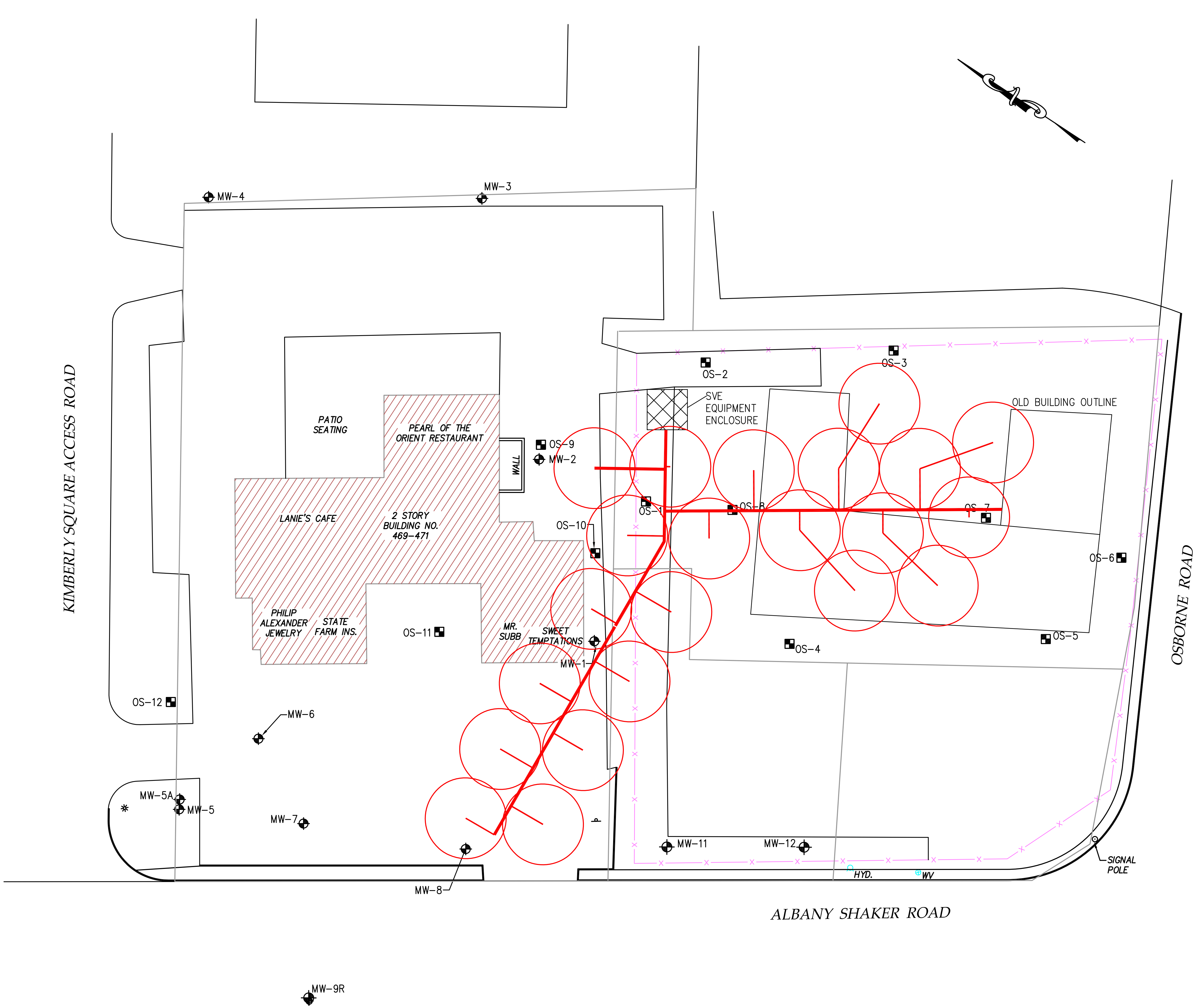
DRAWN BY CD

DESIGNED BY SJW

DATE 12/09/14

OFFICE LATHAM, NY

File: U:\Project\134685\33\134685-33B6a.dwg Layout: FIG 7A – Soil Gas Results User: steven.walsh Feb 12, 2015 – 9:56am



1. TOPOGRAPHIC INFORMATION SHOWN HEREON WAS COMPILED FROM AN ACTUAL FIELD SURVEY CONDUCTED DURING THE MONTH OF AUGUST, 2011.
2. PROPERTY LINES AS SHOWN ON THIS MAP ARE SHOWN IN THEIR APPROXIMATE LOCATION BASED ON AVAILABLE TAX MAP INFORMATION, AND ARE NOT INTENDED TO REPRESENT ACTUAL BOUNDARY LOCATIONS.
3. COORDINATES AND ELEVATIONS ARE BASED ON NEW YORK STATE EAST ZONE NAD 83 AND NAVD '88.
4. NEW MONITOR WELLS (MW) BY SHAW ENVIRONMENTAL.
5. MANHOLES AND CATCH BASINS HAVE BEEN PLOTTED BASED ON FIELD SURVEY. NO ATTEMPT HAS BEEN MADE ON THIS MAP TO CONNECT UNDERGROUND UTILITIES.
6. SITE SURVEY INCLUDES WELL LOCATIONS AND THE FORMER BUILDING LAYOUT.
7. LOCATIONS OF INJECTION POINTS ARE APPROXIMATE.

LEGEND:

MONITORING WELL	MW
MONITORING WELL	OS
SOIL VAPOR AND AIR SPARGE EXTRACTION POINT (20' ROI)	
SVE TRENCHING PIPE NETWORK	

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
LATHAM, NY	12/31/14	SM	SJW	HAF	HAF	134685-33B9

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Plot Date/Time: Jan 30, 2015 – 9:35am
Plotted By: steven.walsh
Xref :
Image : TAXMAP43.3.tif

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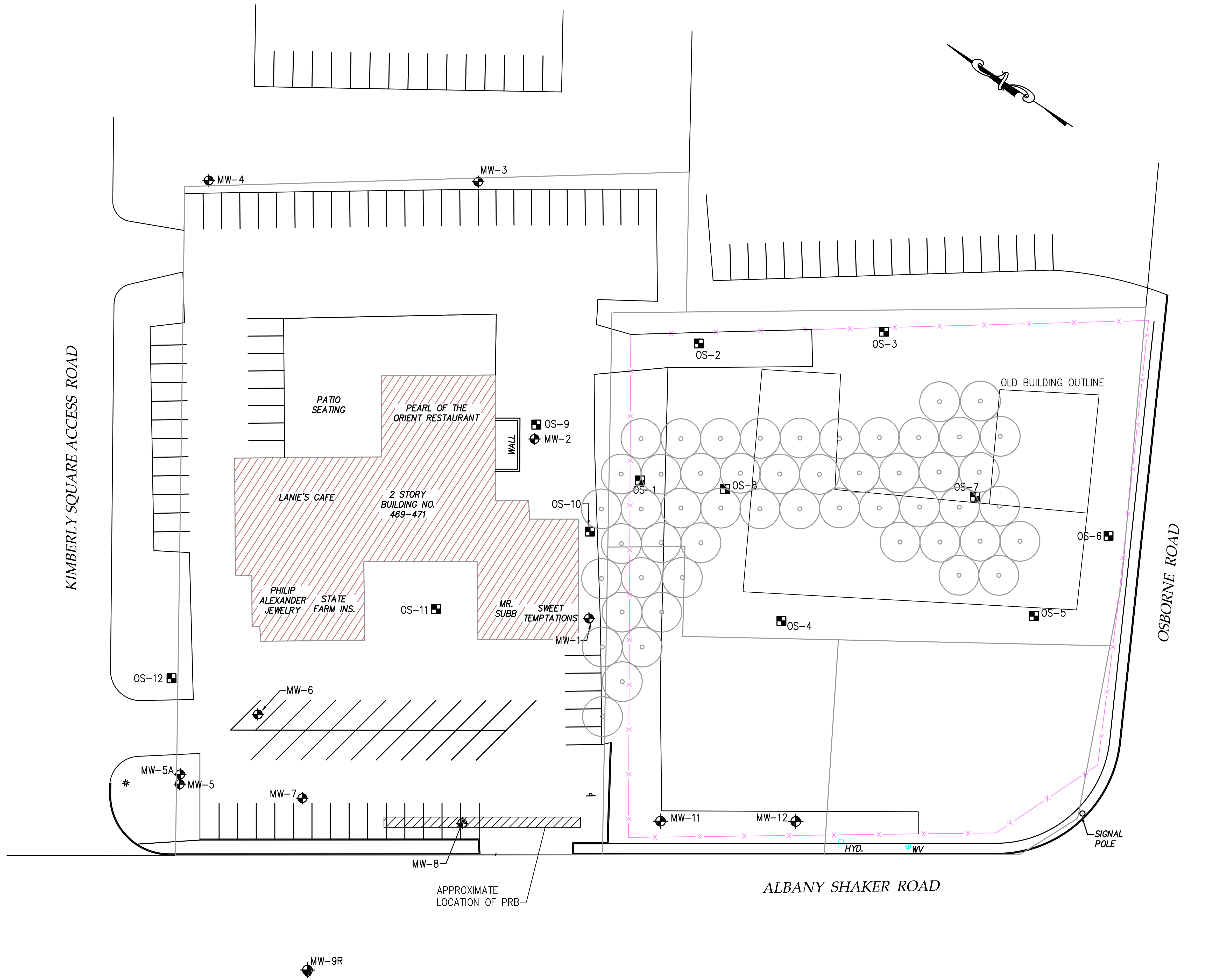
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
FORMER CLEANERAMA

FIGURE 5
ALTERNATIVE 3 - AIR SPARGE/SOIL VAPOR EXTRACTION, INSTITUTION CONTROLS AND MONITORING
LOUDONVILLE, NY



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2. PROPERTY LINES AS SHOWN ON THIS MAP ARE SHOWN IN THEIR APPROXIMATE LOCATION BASED ON AVAILABLE TAX MAP INFORMATION, AND ARE NOT INTENDED TO REPRESENT ACTUAL BOUNDARY LOCATIONS.
3. COORDINATES AND ELEVATIONS ARE BASED ON NEW YORK STATE EAST ZONE NAD 83 AND NAVD '88.
4. NEW MONITOR WELLS (MW) BY SHAW ENVIRONMENTAL.
5. MANHOLES AND CATCH BASINS HAVE BEEN PLOTTED BASED ON FIELD SURVEY. NO ATTEMPT HAS BEEN MADE ON THIS MAP TO CONNECT UNDERGROUND UTILITIES.
6. SITE SURVEY INCLUDES WELL LOCATIONS AND THE FORMER BUILDING LAYOUT.
7. LOCATIONS OF INJECTION POINTS ARE APPROXIMATE.

LEGEND:

MONITORING WELL	MW
MONITORING WELL	OS
IN-SITU CHEMICAL REDUCTION POINT	

SCALE

0 50 100 FEET

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORMER CLEANERAMA

FIGURE 6 - ALTERNATIVE 4 - IN-SITU CHEMICAL REDUCTION, PERMEABLE REACTIVE BARRIER, INSTITUTIONAL CONTROLS AND MONITORING

LOUDONVILLE, NY

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
LATHAM, NY	01/05/15	SM	MJS	HAF	HAF	134685-33B11

Xref :
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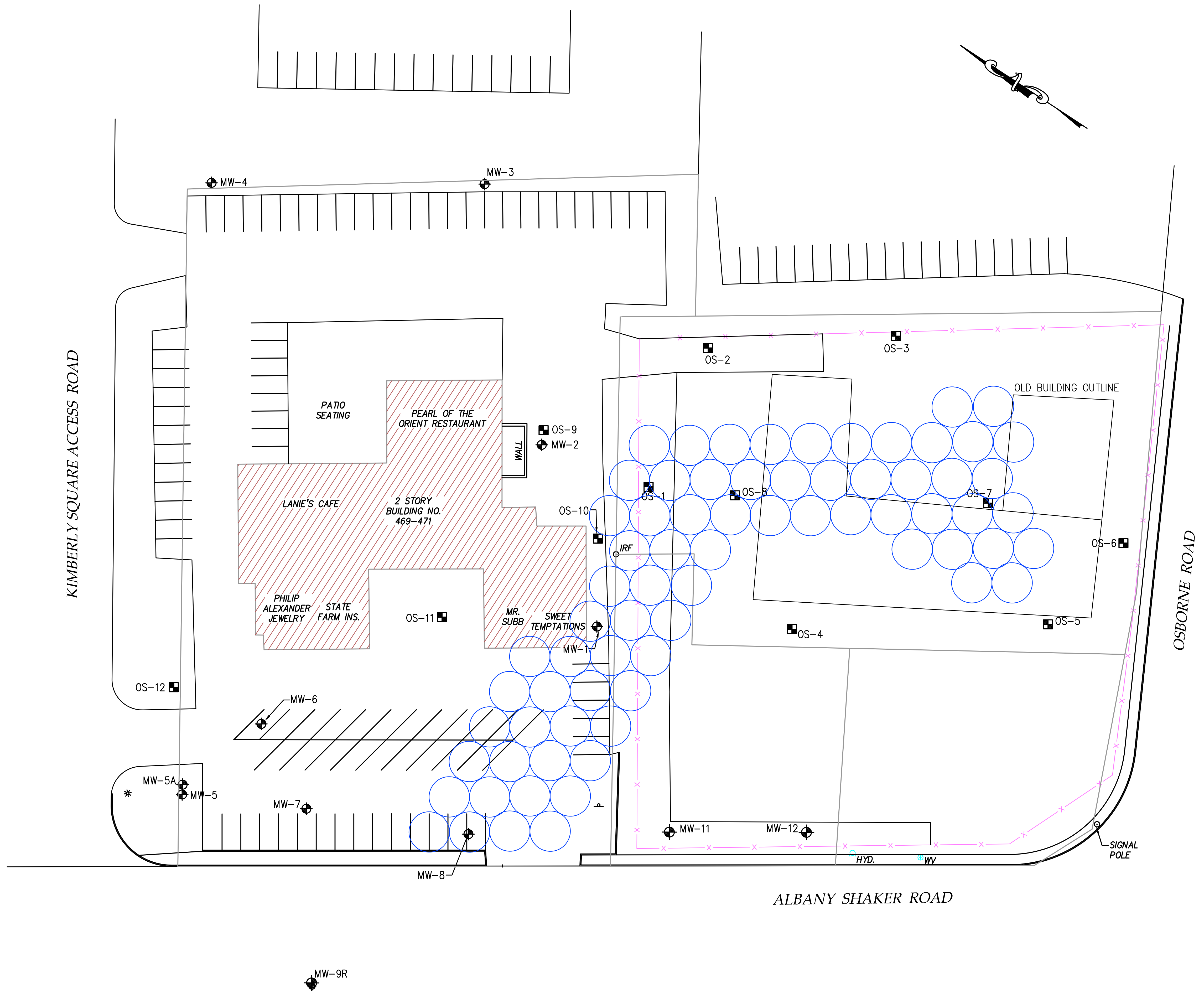
Plot Date/Time: Feb 12, 2015 - 3:59pm
Plotted By: steven.walsh



1. TOPOGRAPHIC INFORMATION SHOWN HEREON WAS COMPILED FROM AN ACTUAL FIELD SURVEY CONDUCTED DURING THE MONTH OF AUGUST, 2011.
2. PROPERTY LINES AS SHOWN ON THIS MAP ARE SHOWN IN THEIR APPROXIMATE LOCATION BASED ON AVAILABLE TAX MAP INFORMATION, AND ARE NOT INTENDED TO REPRESENT ACTUAL BOUNDARY LOCATIONS.
3. COORDINATES AND ELEVATIONS ARE BASED ON NEW YORK STATE EAST ZONE NAD 83 AND NAVD '88.
4. NEW MONITOR WELLS (MW) BY SHAW ENVIRONMENTAL.
5. MANHOLES AND CATCH BASINS HAVE BEEN PLOTTED BASED ON FIELD SURVEY. NO ATTEMPT HAS BEEN MADE ON THIS MAP TO CONNECT UNDERGROUND UTILITIES.
6. SITE SURVEY INCLUDES WELL LOCATIONS AND THE FORMER BUILDING LAYOUT.
7. LOCATIONS OF INJECTION POINTS ARE APPROXIMATE.

LEGEND:

MONITORING WELL	MW
MONITORING WELL	OS
BIOREMEDIATION INJECTION POINT (10' ROI)	

SCALE

0 50 100 FEET

SHAW ENVIRONMENTAL, INC. (A CB&I COMPANY)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FORMER CLEANERAMA

FIGURE 7

ALTERNATIVE 5 - BIOREMEDIATION, INSTITUTIONAL CONTROLS AND MONITORING

LOUDONVILLE, NY

OFFICE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
LATHAM, NY	10/08/14	SJW	SJW	HAF	HAF	134685-33B9

Xref :
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Plot Date/Time: Jan 30, 2015 - 10:03am
Plotted By: steven.walsh