RECORD OF DECISION

68 West First Street
Operable Unit Number 02: Off-site Groundwater and Soil Vapor Plumes
Environmental Restoration Project
Oswego, Oswego County
Site No. E738040
November 2013

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

DECLARATION STATEMENT - RECORD OF DECISION

68 West First Street
Operable Unit Number: 02
Environmental Restoration Project
Oswego, Oswego County
Site No. E738040
November 2013

Statement of Purpose and Basis

This document presents the remedy for Operable Unit Number: 02: Off-site Groundwater and Soil Vapor Plumes of the 68 West First Street site, an environmental restoration site. The remedial program was chosen in accordance with the 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 decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for Operable Unit Number: 02 of the 68 West First Street site and the public's input to the proposed remedy 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.

Description of Selected Remedy

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented 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. In-Situ Chemical Treatment

In-situ chemical treatment (ISCT) will be implemented to treat the chlorinated volatile organic compounds in groundwater. Injections will be conducted into the subsurface to destroy the contaminants. The approximate area which is anticipated to require injections is indicated on Figure 4. Injections will be conducted into bedrock. If necessary, injections will also be conducted in overburden. The method and depth of injection will be determined during the remedial design. The exact area to be treated will also be determined during the remedial design.

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 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.

3. Natural Attenuation

Groundwater contamination remaining after active remediation will be addressed through natural attenuation. Groundwater will be monitored for site-related contamination and other indicators which will provide an understanding of the mechanisms attenuating the contamination (e.g., biological activity, dispersion, etc.). It is anticipated that contamination will decrease by an order of magnitude within 5 years and two orders of magnitude within 10 years. Reports of the attenuation will be provided at 5 and 10 years, and active remediation will be proposed if it appears that natural processes alone will not address the contamination. The contingency remedial action will depend on the information collected, but it is currently anticipated that in-situ chemical oxidation would be the expected contingency remedial action.

4. Soil Vapor Intrusion Evaluation

An evaluation of the potential for soil vapor intrusion will be conducted for any buildings located in areas potentially impacted by site-related contamination. Based on that evaluation, any actions recommended to address exposures related to soil vapor intrusion will be implemented.

5. Institutional Control

The area is served by public water and local groundwater use restrictions are in place.

6. Site Management Plan

A Site Management Plan is required, which includes the following:

a. an Engineering Control Plan that identifies all engineering controls for this operable unit and details the steps and media-specific requirements necessary to ensure the following engineering controls remain in place and effective:

Engineering Controls: The ISCT system discussed in remedy element 2.

This plan includes, but may not be limited to:

- a provision for evaluation of the potential for soil vapor intrusion for any buildings located or constructed in areas potentially impacted by site-related contamination, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- provisions for the management and inspection of the identified engineering controls; and
- the steps necessary for the periodic reviews and certification of the 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 of groundwater to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department; and
- monitoring for vapor intrusion for any buildings potentially impacted by site-related contamination, as may be required by the Engineering Control Plan discussed above.

c. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy.

The plan includes, but is not limited to:

- compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- providing the Department access to the site and O&M records.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy 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.

November 27, 2013

Date

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

RECORD OF DECISION

68 West First Street
Oswego, Oswego County
Site No. E738040
November 2013

SECTION 1: SUMMARY AND PURPOSE

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 above referenced site. The disposal of contaminants at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of contaminants at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum. The remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This Record of Decision (ROD) identifies the selected remedy, summarizes the other alternatives considered, and discusses the reasons for selecting the remedy.

The 1996 Clean Water/ Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Brownfields are abandoned, idled, or under-used properties where redevelopment is complicated by real or perceived environmental contamination. They typically are former industrial or commercial properties where operations may have resulted in environmental contamination. Brownfields often pose not only environmental, but legal and financial burdens on communities. Under the Environmental Restoration Program, the state provides grants to municipalities to reimburse up to 90 percent of eligible costs for site investigation and remediation activities. Once remediated, the property can then be reused.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repositories:

City of Oswego
Attn: Mary Vanouse
20 West Oneida Street, 3rd Floor
Oswego, NY 13126
Phone: 315-343-3795

NYSDEC
Attn: Joshua Cook
615 Erie Blvd West
Syracuse, NY 13204
Phone: 315-426-7411

Oswego Public Library
Attn: Edward Elsner
120 East Second Street
Oswego, NY 13126
Phone: 315-341-5867

A public meeting was also conducted. At the meeting, the findings of the remedial investigation (RI) were presented along with a summary of the alternatives considered and the proposed remedy. After the presentation, a question-and-answer period was held, during which verbal or written comments were accepted on the proposed remedy.

Comments on the remedy received during the comment period are summarized and addressed in the responsiveness summary section of the ROD.

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 68 West First Street site is located in an urban area of the City of Oswego, Oswego County. It covers approximately 1.8 acres and consists of the block bounded by West First Street to the east, West Second Street to the west, West Schuyler Street to the south, and a grassy area and West Van Buren street to the north. The site is owned by the City of Oswego and is also referred to as the former Flexo Wire site.

Site Features: The northwestern portion of the site is covered by a one-story concrete slab-ongrade, steel-framed masonry building which covers approximately 20,900 square feet. There is also a one-story building that connects to, and extends east from, the northeastern corner of the main building. This smaller building covers approximately 780 square feet. The rest of the site is paved with the exception of a small grassy area on the northeastern corner of the site, which measures approximately 2000 square feet.

There are two former sumps located in the buildings which were filled with concrete prior to the site entering a remedial program. There was formerly a 15,000-gallon underground storage tank located in the northeastern portion of the site. The tank was removed in September 2009. The tank was connected to at least one of the sumps by sub-surface utility lines which are still present.

Current Zoning and Land Use: The site is currently utilized by the City of Oswego Department of Public Works (DPW), which operates a metal fabricating workshop, a woodworking shop and an automobile maintenance shop at the site. The DPW also utilizes the site for seasonal storage of equipment, trucks and supplies.

The site is currently zoned for commercial use (B2 – Central Business); however, the proposed reuse of the site includes apartments or condominiums, which would be a restricted residential use.

The Oswego River is located approximately 390 feet to the east of the site, and flows north into Lake Ontario, which, at its nearest point, is located approximately 250 feet north of the site. The area to the west of the site is primarily residential. The area to the south contains a mixture of residential and commercial properties, and to the north there is a municipal parking area, a boat launch, a marina, a United States Coast Guard facility, and a marine museum located on property owned by the Oswego Port Authority. To the east and northeast are industrial properties, including a major oil storage facility, the City of Oswego West Side Excess Flow Management facility and a cement shipping terminal.

Past Use of the Site: The site has been used for industrial purposes since at least 1880. Past industrial operations at the site include a tinware manufacturing facility, lumberyards, a planing mill, Oswego Casket Company, Global Match Company, machine shops and a wire manufacturing facility, which was owned and/or operated by the Flexo Wire Company in 1960 and the Copperweld Steel Company, Flexo Wire Division in 1972. Prior uses that appear to have led to site contamination include solvent usage and disposal, reportedly associated with the wire drawing operations; coal storage, usage and coal ash disposal; and metal working operations, including machining and annealing.

Operable Units: The site was divided into two operable units. An operable unit represents a portion of a remedial program for a site that for technical or administrative reasons can be addressed separately to investigate, eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. Operable Unit (OU) 1 is the on-site area. OU 2 is the off-site groundwater plume and off-site soil vapor contamination.

Site Geology and Hydrogeology: Soil at the site consists of historic fill, which consists of a mixture of sand, silt, ash, wood, brick and other debris. Fill was present below the paving or concrete down to the top of bedrock. Bedrock was very shallow on the western side of the site (zero to two feet below the ground surface), and somewhat deeper on the east side of the site (four to ten feet below the ground surface). It was encountered at depths ranging from directly below the building slab, to a depth of approximately ten feet in the northeast corner of the site. The ground surface and bedrock surface slope down to the east-northeast.

Groundwater was generally not encountered in the overburden. Groundwater flow is to the east-northeast towards the Oswego River in both the shallow bedrock groundwater and deeper bedrock groundwater. The shallow bedrock groundwater is located directly below the top of bedrock, up to fifteen feet below the bedrock surface, which is at a maximum of 18.5 feet below the ground surface. The deeper bedrock groundwater was monitored from approximately 30 to 35 feet below the ground surface.

Operable Unit (OU) Number 02 is the subject of this document.

A Record of Decision will be issued for OU 01 concurrent with the OU 02 decision.

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.

A comparison of the results of the RI to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use 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.

No PRPs have been documented to date.

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, legal action may be initiated at a future date by the state to recover state response costs should PRPs be identified. City of Oswego will assist the state in its efforts by providing all information to the state which identifies PRPs. City of Oswego will also not enter into any agreement regarding response costs without the approval of the Department.

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:

- groundwater
- soil 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 contaminant 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 for this Operable Unit at this site is/are:

TETRACHLOROETHYLENE (PCE)   TRICHLOROETHENE (TCE)

ETHENE, 1,2, Cis-Dichloro	DICHLOROETHYLENE
ETHENE, TRANS- 1,2-DICHLORO-	VINYL CHLORIDE

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

- groundwater

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.

There were no IRMs performed at this site during the RI.

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 for OU 02.

For OU 1: On-site Area

The primary contaminants of concern (COCs) for OU 1 include several chlorinated volatile organic compounds (VOCs); specifically tetrachloroethene (PCE) and trichloroethene (TCE) and their degradation products, which include 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride (VC). Other COCs include several metals, including lead, mercury and others, as well as polycyclic organic hydrocarbons (PAHs).

Soil – PAHs and metals are present in soil across the site at concentrations greater than soil cleanup objectives (SCOs) for the protection of public health for restricted residential use. In general, the levels were only slightly greater than SCOs; however, a few isolated locations contained higher levels.

Lead was detected in one location at 38,800 parts per million (ppm), compared to its restricted residential SCO for the protection of public health of 400 ppm; however, samples collected near this location had much lower levels of lead (maximum of 319 ppm), and the next highest lead concentration detected was 875 ppm. Mercury was detected at a maximum concentration of 52 ppm in one location, compared to its restricted residential SCO for the protection of public health of 0.81 ppm. Samples collected near this location had much lower levels of mercury, and the next highest level of mercury detected during the investigation was 4.5 ppm.

Benzo(a)pyrene (a PAH) was detected at a maximum concentration of 4.9 ppm, compared to its restricted residential SCO of 1 ppm, and it exceeded 1 ppm in 7 out of 23 samples collected from OU 1.

PCE, TCE and their degradation products in general were detected in soil at relatively low concentrations, but in some instances at concentrations which exceed the SCOs for the protection of groundwater. The highest concentrations of VOCs were detected in samples collected to the east of the southern half of the on-site building, which is also east of the utility lines connecting the former sump and the former 15,000-gallon underground storage tank. Of the VOCs, TCE was present at the most significant concentrations; up to 1 ppm, compared to its SCO for the protection of groundwater of 0.47 ppm. cis-1,2-DCE was detected at concentrations up to 0.49 ppm, compared to its SCO for the protection of groundwater of 0.25 ppm. Other degradation products were detected at lower concentrations or not at all in soil. PCE was detected less frequently than TCE, at a maximum concentration of 0.022 ppm, compared to its SCO for the protection of groundwater of 1.3 ppm.

Groundwater – TCE was detected at concentrations exceeding its groundwater standard in every on-site well which yielded water; however, concentrations were much lower on the west and south side of the site than in wells located to the east of the building. Degradation products were present in all on-site wells at concentrations exceeding groundwater standards, except for the westernmost (upgradient) well. The highest concentrations of TCE detected on-site were in samples collected from monitoring wells east of the southern sump. This suggests the primary source of groundwater contamination is located in or near the southern portion of the building, most likely the southern sump, and the groundwater contamination extends east from that area.

TCE and cis-1,2-DCE were present the most often and at the highest concentrations. When the other degradation products were detected, they were present at lower concentrations. When PCE was detected, it was present at concentrations orders of magnitudes lower than TCE. Total VOC contamination was higher in the deep bedrock well in OU 1, when compared to the adjacent shallow bedrock well. PCE was also detected in groundwater in OU 1; however, at concentrations less than its groundwater standard.

Soil Vapor – PCE, TCE and their degradation products were detected at elevated concentrations in soil vapor and sub-slab vapor in OU 1. TCE and PCE were detected in soil vapor and sub-slab vapor samples at concentrations up to 34,000 micrograms per cubic meter (ug/m3) and 590 ug/m3, respectively. Indoor air samples were not collected during the investigation, because the building is currently planned to be demolished.

For OU 2: Off-site Groundwater and Soil Vapor Plumes

The COCs for OU 2 are PCE, TCE and their degradation products, including the following: cis-1,2-DCE; trans-1,2-DCE; 1,1-DCE; and VC.

Groundwater – The COCs were detected in a groundwater plume to the east of the site at concentrations significantly greater than their groundwater standard. The COCs were detected at higher concentrations in the deeper bedrock wells, when compared to adjacent shallow bedrock wells, and were detected at higher concentrations in OU 2 than OU 1. The maximum concentrations of TCE and cis-1,2-DCE detected in groundwater in OU 2 were 10,000 parts per billion (ppb) for each. PCE was detected in groundwater to the east of the site at concentrations up to 180 ppb. Groundwater standards were exceeded in wells located approximately 190 feet east of the site. The Oswego River is located approximately 410 feet east of the site.

Soil Vapor – PCE was detected in soil vapor samples collected to the west of the site at concentrations up to 410 ug/m3; however, re-sampling at that location indicated a lower concentrations of PCE (21 ug/m3). TCE and its degradation products were not detected in those samples. TCE was detected in one soil vapor sample to the east of the site at a concentration of 220 ug/m3. PCE and TCE were detected in soil vapor samples to the north and northwest of the site at concentrations up to 5 ug/m3 and 23 ug/m3, respectively. Access could not be obtained during the remedial investigation to conduct indoor air sampling at off-site locations.

6.4: Summary of Human Exposure Pathways

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 contaminated groundwater associated with the site because the area is served by a public water supply that obtains its water from a different source not affected by this contamination and private water supply wells are not permitted within the City of Oswego. People are not expected to come into contact with contaminated soil or groundwater unless they dig below the existing building or pavement that covers the site. 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 on-site building is currently vacant; therefore, inhalation of site-related contaminants resulting from soil vapor intrusion is not a concern given the buildings current use. However, sampling indicates that exposures related to soil vapor intrusion would be a concern if the on-site building were to be occupied or if the site were to be redeveloped. Sampling also indicates that soil vapor intrusion may be a concern for off-site properties as well.

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.
- Prevent the discharge of contaminants to surface water.

Soil Vapor

RAOs for Public Health Protection

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

SECTION 7: SUMMARY OF THE SELECTED 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.

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 remedy is set forth at Exhibit D.

The selected remedy is referred to as the In-Situ Chemical Treatment and Natural Attenuation remedy.

The estimated present worth cost to implement the remedy is $5,310,000. The cost to construct the remedy is estimated to be $4,880,000 and the estimated average annual cost is $27,700.

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented 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. In-Situ Chemical Treatment

In-situ chemical treatment (ISCT) will be implemented to treat the chlorinated volatile organic compounds in groundwater. Injections will be conducted into the subsurface to destroy the contaminants. The approximate area which is anticipated to require injections is indicated on Figure 4. Injections will be conducted into bedrock. If necessary, injections will also be conducted in overburden. The method and depth of injection will be determined during the remedial design. The exact area to be treated will also be determined during the remedial design.

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 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.

3. Natural Attenuation

Groundwater contamination remaining after active remediation will be addressed through natural attenuation. Groundwater will be monitored for site-related contamination and other indicators which will provide an understanding of the mechanisms attenuating the contamination (e.g., biological activity, dispersion, etc.). It is anticipated that contamination will decrease by an order of magnitude within 5 years and two orders of magnitude within 10 years. Reports of the attenuation will be provided at 5 and 10 years, and active remediation will be proposed if it appears that natural processes alone will not address the contamination. The contingency remedial action will depend on the information collected, but it is currently anticipated that in-situ chemical oxidation would be the expected contingency remedial action.

4. Soil Vapor Intrusion Evaluation

An evaluation of the potential for soil vapor intrusion will be conducted for any buildings located in areas potentially impacted by site-related contamination. Based on that evaluation, any actions recommended to address exposures related to soil vapor intrusion will be implemented.

5. Institutional Control

The area is served by public water and local groundwater use restrictions are in place.

6. Site Management Plan

A Site Management Plan is required, which includes the following:

a. an Engineering Control Plan that identifies all engineering controls for this operable unit and details the steps and media-specific requirements necessary to ensure the following engineering controls remain in place and effective:

Engineering Controls: The ISCT system discussed in remedy element 2.

This plan includes, but may not be limited to:

- a provision for evaluation of the potential for soil vapor intrusion for any buildings located or constructed in areas potentially impacted by site-related contamination, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- provisions for the management and inspection of the identified engineering controls; and
- the steps necessary for the periodic reviews and certification of the 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 of groundwater to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department; and
- monitoring for vapor intrusion for any buildings potentially impacted by site-related contamination, as may be required by the Engineering Control Plan discussed above.

c. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy.

The plan includes, but is not limited to:

- compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
- providing the Department access to the site and O&M records.

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 the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into one category; volatile organic compounds (VOCs). 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 6.1.1 are also presented.

Groundwater

Groundwater monitoring wells were installed in off-site areas (Operable Unit (OU) 2) in shallow bedrock and deeper bedrock.

Groundwater samples were collected from the monitoring wells to assess groundwater conditions and determine if contamination had migrated from the site. The results of the groundwater sampling indicate that certain VOCs are present at concentrations that exceed SCGs. Table 1, below, summarizes the exceedances of groundwater SCGs for site-related contaminants of concern. Only those contaminants present in OU 2 groundwater at concentrations exceeding their SCG which were also considered to be site-related contaminants of concern for the on-site area (OU 1) are included.

Table 1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
Tetrachloroethene	ND – 180	5	3 / 6
Trichloroethene	5 – 10,000	5	5 / 6
cis-1,2-Dichloroethene	ND – 10,000	5	5 / 6
trans-1,2-Dichloroethene	ND - 62	5	3 / 6
1,1-Dichloroethene	ND – 21	5	2 / 6
Vinyl chloride	ND – 140	2	5 / 6

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).
ND – not detected

The primary groundwater contaminants are the chlorinated VOCs tetrachloroethene (PCE) and trichloroethene (TCE), and their degradation products; cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), 1,1-dichloroethene (1,1-DCE) and vinyl chloride (VC), with TCE and cis-1,2-DCE being the most prevalent. The degradation of PCE and TCE proceeds from PCE to TCE, to the three forms of DCE, to VC, with the majority of TCE usually degrading to cis-1,2-DCE. The VOCs are present in groundwater on-site (OU 1) and off-site (OU 2).

The results of the remedial investigation indicate that the chlorinated VOCs listed above are present in OU 1. The source of chlorinated VOCs in OU 2 appears to be the site. The total concentration of chlorinated VOCs was higher in deeper bedrock wells than in the adjacent shallow bedrock wells. However, the deeper bedrock groundwater generally exhibited more degradation than the shallower groundwater. With one exception (MW-11D), the deep bedrock wells had much higher concentrations of cis-1,2-DCE than TCE, while the shallower bedrock groundwater contained higher or similar concentrations of TCE when compared to cis-1,2-DCE. In MW-11D, both TCE and cis-1,2-DCE were present at 10,000 ppb, again showing significant degradation. Also, vinyl chloride was detected at higher concentrations in the deep wells, when compared to the adjacent shallow well. The total concentration of chlorinated VOCs was higher in off-site monitoring wells than in on-site wells. It is possible this could be due in part to a separate, off-site source; however, lack of contamination in the off-site overburden and the significant degradation noted in the off-site wells suggests the levels are due to migration of the plume away from the original release point through bedrock. Figure 2 summarizes the results of the groundwater sampling.

Based on the findings of the RI, the past disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE and vinyl chloride.

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. Attempts were made to collect indoor air samples from the residences to the west of the site; however, access could not be obtained. Soil vapor sampling locations and a summary of the most pertinent results are depicted on Figure 3.

Ten soil vapor samples were collected from nine off-site locations to evaluate the potential for soil vapor intrusion. One location (SV-10) located west of the site was sampled twice. Five samples were collected from four locations in front of the residences to the west of the site. PCE was detected at three of those locations (four samples). It was not detected in the southernmost location. TCE and its degradation products were not detected in the samples to the west of the site directly in front of the residences; however, TCE was detected in a sample to the northwest of the site, along with PCE. PCE was detected at somewhat higher concentrations than TCE in the nearest on-site soil vapor sample (SV-04), collected on the west (rear) side of the on-site building; however, PCE was detected at higher concentrations in three off-site samples (two locations) than it was at SV-04.

Three soil vapor samples were collected from a grassy area to the north of the site and two were collected from a grassy area to the east of the site. TCE was detected in one sample to the east of the site. PCE and TCE were detected in one sample to the north of the site. In each instance they were detected at concentrations much lower than the nearest on-site soil vapor sample.

Based on the concentration detected, and in comparison with New York State's Soil Vapor Intrusion Guidance (NYSDOH 2006), there may be need for mitigation in off-site buildings as a result of on-site releases, but additional data will need to be gathered.

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 Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative 2: In-Situ Chemical Treatment and Natural Attenuation

This alternative includes chemical treatment of the groundwater plume followed by monitoring the natural attenuation of the remaining groundwater contamination. This alternative also includes evaluation of the potential for soil vapor intrusion in off-site structures, and, as necessary, implementing actions recommended to address exposures. A Site Management Plan will be developed under this alternative which will identify and implement the engineering controls required for the off-site area, as well as any necessary monitoring and/or operation and maintenance of the remedy. The intent of this alternative is to achieve the applicable groundwater SCGs, and it is anticipated that soil vapor contamination will be significantly reduced once the source of the soil vapor contamination, which is the groundwater contamination plume, is eliminated.

Prior to implementing the groundwater treatment a remedial design program will be implemented to provide the details necessary for the *in-situ* chemical treatment (ISCT). The ISCT will involve placement/injection of chemicals into the subsurface which will react with site contaminants and degrade them to less toxic or non-toxic byproducts. Chemicals commonly utilized for ISCT include oxidants (such as potassium permanganate, calcium peroxide, ozone, hydrogen peroxide and others) or reducing agents (such as zero valent iron). The natural biodegradation of chlorinated ethenes occurs under reducing conditions, and the results of field data show that reducing conditions are present at several of the wells. The fact that degradation is already occurring is further evidence that reducing conditions are present. Therefore, use of a reducing agent may be more appropriate, especially since the intent is to rely on natural attenuation of residual contamination following active treatment. However, delivery of reducing agents away from the initial injection site (*i.e.*, injection well) may be difficult and therefore use of an oxidant may be more appropriate in order to ensure adequate contact of contaminants with the treatment chemicals. Based on the depth to which the ISCT will be necessary, it will be conducted, at least in part, through wells drilled into bedrock. It is possible this could be supplemented by injection/placement through horizontal wells installed in trenches to the top of bedrock or excavated a short distance into bedrock. The configuration of the chemical placement/injection infrastructure will be determined during the design phase.

The ISCT remedial design program will include a pre-design investigation which will include installation of several bedrock monitoring/injection wells and collection of groundwater samples to better define the area requiring active treatment; determine the appropriate chemical agent to be used for the treatment; and determine the appropriate dosage rates. It is likely the design phase will include injection of the treatment chemical(s) over a limited area as a pilot test to determine the efficacy. It is estimated the ISCT design will take approximately one year to eighteen months (including the pre-design investigation and pilot scale injection).

Following completion of the remedial design, a full-scale ISCT application will be implemented. It is assumed additional wells will need to be installed for the full-scale ISCT. As noted previously, the parameters of the ISCT will be determined during the remedial design phase; however, in order to generate a cost estimate, and based on data currently available, it was assumed that the ISCT will utilize potassium permanganate as the treatment chemical and that the area to be treated actively will measure 450 feet by 200 feet by 50 feet deep. It is estimated that implementation of the full-scale ISCT will require an additional six to eight weeks for well installation, followed by injections to be conducted periodically over several months or a few years.

It is anticipated the active groundwater treatment will be followed by a program to monitor the natural attenuation of residual contamination. The design parameters for the ISCT will include goals to be attained prior to transitioning to reliance on natural attenuation. The remedial program will also include goals that should be achieved through natural attenuation. A contingency remedial program will be implemented if natural attenuation is insufficient. It is anticipated the contingency plan would include additional chemical injections or injections which would be designed to enhance biodegradation of the contaminants.

Since contamination will remain in the subsurface for the long-term and since engineering controls will be employed (the groundwater treatment system and, if necessary, soil vapor mitigation systems) a Site Management Plan will be required. The Site Management Plan will include, but not necessarily be limited to, the following: provisions for evaluation of the potential for soil vapor intrusion for any buildings potentially impacted by site-related contamination, including provisions for implementing actions recommended to address exposures related to soil vapor intrusion; a requirement for the remedial party to complete and submit to the Department a periodic certification of engineering controls in accordance with Part 375-1.8 (h)(3); a monitoring plan; and an Operation and Maintenance (O&M) plan. The monitoring plan will include details on groundwater monitoring including the necessary monitoring to determine if natural attenuation is sufficiently protective of public health and the environment. The O&M plan will include the details necessary to ensure the continued operation, maintenance, optimization, monitoring, and inspection of the ISCT system and any soil vapor mitigation systems as well as reporting frequency and protocol. The ISCT O&M plan will include the following: details on system layout (*e.g.*, well construction details, storage tank information (if applicable), pump information (if applicable), etc.); troubleshooting; maintenance protocols; description of the chemical agent(s) to be used, along with safety data sheets for those chemicals; information pertinent to the storage of the chemicals, if applicable; copies of any pertinent permits (*e.g.*, underground injection control (UIC) permit); emergency contacts; other contacts; and any other pertinent information.

The capital cost to implement this alternative includes the costs to: (a) design and implement the ISCT (b) conduct further evaluation of the potential for soil vapor intrusion; and (c) develop the Site Management Plan. Annual costs under this alternative include the cost to collect and analyze groundwater samples, report the results and provide periodic certifications. The annual costs also include some cost to operate the groundwater treatment system (conduct additional injections) for several years, conservatively estimated at five years. The estimated cost of Alternative 2 is as follows:

Present Worth:..$ 5,310,000
Capital Cost:...$ 4,880,000
Annual Costs:...$ 27,700

Alternative 3: Groundwater Extraction & Treatment and Natural Attenuation

This alternative includes extraction and subsequent treatment of contaminated groundwater followed by monitoring the natural attenuation of the remaining groundwater contamination. This alternative also includes evaluation of the potential for soil vapor intrusion in off-site structures, and, as necessary, implementing actions recommended to address exposures. A Site Management Plan will be developed under this alternative which will identify and implement the engineering controls required for the off-site area, as well as any necessary monitoring and/or operation and maintenance of the remedy. The intent of this alternative is to achieve the applicable groundwater SCGs, and it is anticipated that soil vapor contamination will be significantly reduced once the source of the soil vapor contamination, which is the groundwater contamination plume, is eliminated.

Prior to initiating full-scale groundwater extraction and treatment (often referred to as pump-and-treat), a remedial design program will be implemented to provide the details for the system. The pump-and-treat system will extract contaminated groundwater from bedrock, and if necessary from the overburden, from a series of wells. The extracted groundwater will be subjected to treatment prior to discharge. Treated groundwater will be discharged to an approved location, which could include a publicly owned treatment works, where it would be subjected to further treatment, surface water, or back into the subsurface. There are several technologies which could be utilized to treat the extracted groundwater, including, but not limited to, air stripping or liquid phase adsorption using granulated activated carbon (GAC). For liquid phase adsorption, extracted groundwater is pumped through a series of vessels containing a sorbent, most commonly GAC, to which dissolved contaminants are adsorbed. Contaminants are not destroyed, but are physically separated from the contaminated water and transferred to the sorbent. When the concentration of contaminants in the effluent from the bed exceeds a certain level (*i.e.*, once the sorbent's contaminant-removal efficiency has diminished to certain extent), the sorbent will need to be replaced or regenerated. Activated carbon is an excellent sorbent due to its large surface area, which generally ranges from 500 - 2,000 square meters per gram. Activated carbon can be regenerated in place; removed and regenerated at an off-site facility; or removed and disposed of. An air stripper removes contaminants from water by contacting the contaminated liquid stream with an air stream to volatilize the contaminants into the air. Similarly to liquid phase adsorption, contaminants are not destroyed, but are physically separated from the contaminated water and transferred to the air. The air stream may then require treatment prior to discharge to the atmosphere. Sometimes, a GAC unit is necessary for the liquid stream following treatment using an air stripper in order to meet discharge criteria. The configuration of the extraction wells and the most effective treatment method will be determined during the design phase. The treatment system equipment, including controls, will be housed in a small building, which will need to be constructed as part of the remedial program.

The remedial design program will include a pre-design investigation which will include installation of several bedrock monitoring and extraction wells and collection of groundwater samples to better define the area requiring active treatment and determine appropriate groundwater extraction rates. It is likely the design phase will include groundwater extraction over a limited area as a pilot test to determine the radius of influence of the extraction wells and the efficacy of treatment methods. It is estimated the design will take approximately one year to eighteen months (including the pre-design investigation and pilot test).

Following completion of the remedial design, the full-scale pump-and-treat system will be constructed. It is assumed additional wells will need to be installed for the full-scale system. As noted previously, the exact parameters of the pump-and-treat system will be determined during the remedial design phase; however, in order to generate a cost estimate, and based on data currently available, it was assumed that the system will utilize an air stripper for treatment and that the treated water will discharge to the Oswego River via a storm sewer. It was assumed that the air stream from the stripper will require treatment prior to discharge to the atmosphere due to the presence of vinyl chloride. It is assumed the necessary capture area for the system will measure approximately 450 feet in breadth by 50 feet deep. If the air stream requires treatment prior to discharge to the atmosphere, that will result in an increase in capital costs and annual costs. If additional treatment of the water stream is required (which would likely be conducted using GAC placed in the treatment chain after the air stripper), that will also result in greater capital and annual costs than estimated. It is estimated that construction of the full-scale pump-and-treat system will require an additional 12 to 16 weeks for well installation and construction of the treatment system, including the treatment building.

It is anticipated the active groundwater treatment will be followed by a program to monitor the natural attenuation of residual contamination. The design parameters for the pump-and-treat system and/or the Site Management Plan (SMP) will include goals to be attained prior to transitioning to reliance on natural attenuation. The SMP will also include goals that should be achieved through natural attenuation. A contingency remedial program will be implemented if natural attenuation is insufficient. It is anticipated the contingency plan would include re-starting the pump-and-treat system. It is expected the pump-and-treat system will need to operate for at least 30 years.

Since contamination will remain in the subsurface for the long-term and since engineering controls will be employed (the groundwater treatment system and, if necessary, soil vapor mitigation systems) a Site Management Plan will be required. The SMP will include, but not necessarily be limited to, the following: provisions for evaluation of the potential for soil vapor intrusion for any buildings potentially impacted by site-related contamination, including provisions for implementing actions recommended to address exposures related to soil vapor intrusion; a requirement for the remedial party to complete and submit to the Department a periodic certification of engineering controls in accordance with Part 375-1.8 (h)(3); a monitoring plan; and an Operation and Maintenance (O&M) plan. The monitoring plan will include details on groundwater monitoring including the necessary monitoring to determine if natural attenuation is sufficiently protective of public health and the environment. The O&M plan will include the details necessary to ensure the continued operation, maintenance, optimization, monitoring, and inspection of the pump-and-treat system and any soil vapor mitigation systems as well as reporting frequency and protocol. The pump-and-treat O&M plan will include the following: details on system layout (*e.g.*, well construction details, storage tank information (if applicable), pump information, treatment system construction details, etc.); troubleshooting; maintenance protocols; description of any chemical agent(s) to be used, along with safety data sheets for those chemicals; information pertinent to the storage of the chemicals, if applicable; copies of any pertinent permits; emergency contacts; other contacts; and any other pertinent information.

The capital cost to implement this alternative includes the costs to: (a) design and construct the pump-and-treat system (b) conduct further evaluation of the potential for soil vapor intrusion; and (c) develop the Site Management Plan. Annual costs under this alternative include the cost to operate the pump-and-treat system, collect and analyze groundwater samples, report the results, and provide periodic certifications. The estimated cost of Alternative 3 is as follows:

Present Worth:..*$ 5,400,000*
Capital Cost:..*$ 2,250,000*
Annual Costs:..*$ 205,000*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Alternative 1: No Action	0	0	0
Alternative 2: In-Situ Chemical Treatment and Natural Attenuation	4,880,000	27,700	5,310,000
Alternative 3: Groundwater Extraction & Treatment and Natural Attenuation	2,250,000	205,000	5,400,000

Exhibit D

SUMMARY OF THE SELECTED REMEDY

The Department has selected Alternative 2, In-Situ Chemical Treatment and Natural Attenuation as the remedy for this site. Alternative 2 will achieve the remediation goals for the site by reducing the concentration of groundwater contaminants through the chemical treatment, which will set up the conditions necessary to allow for natural attenuation of the remaining contamination and will reduce or eliminate the source of off-site soil vapor contamination. The elements of this remedy are described in Section 7. The selected remedy is depicted in Figure 4.

Basis for Selection

The selected 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.

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.

The selected remedy (Alternative 2: In-Situ Chemical Treatment and Natural Attenuation) will satisfy this criterion by treating the contaminated groundwater in-situ and preventing exposure to contaminants through soil vapor intrusion mitigation systems, if necessary. It should be noted that this area is served by a public water supply and potable, private water supply wells are not permitted within the City of Oswego. The groundwater treatment will create the conditions to allow for the natural attenuation of any remaining contamination. Alternative 3 protects of human health and the environment by preventing discharge of contaminated groundwater to surface waters and preventing exposure to site contaminants through soil vapor intrusion mitigation systems, if necessary. Alternative 1 (No Action) does not provide any protection to public health and the environment and will not be evaluated further.

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 2 and 3 comply with SCGs to the extent practicable; though it is expected that Alternative 2 will achieve groundwater SCGs more quickly. Both address the groundwater plume which will also significantly reduce the potential for soil vapor intrusion in off-site areas. Since groundwater contamination is expected to remain at higher concentrations for a longer period of time under Alternative 3, the potential for soil vapor intrusion will remain higher under Alternative 3 than Alternative 2

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.

Both Alternative 2 and 3 will be effective in the long-term, since they will restore the groundwater aquifer to pre-disposal conditions to the extent practicable. This will, in turn, reduce the potential for soil vapor intrusion. Since this remedy addresses off-site areas, it is not anticipated that institutional controls will be able to be placed on the properties overlying the contamination. Lack of institutional controls may limit the effectiveness of the remedy, which is why active treatment is necessary, in order to reduce the groundwater contamination to the extent practicable in as short a time span as feasible. As stated previously, it is expected that Alternative 2 will achieve remedial goals more quickly than Alternative 3.

Alternative 3 will require the construction of a small building where the treatment system equipment will be housed. This building will be needed as long as the pump-and-treat system is operating, which is expected to be at least 30 years. This will require the party implementing the remedy to either own property in the vicinity where the building could be placed or for the party to obtain a long-term easement for the building area.

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.

Alternative 2 will permanently reduce the toxicity, mobility and volume of contaminants by use of chemical treatment. Alternative 3 will reduce the volume of contaminated groundwater over time, and it will reduce the mobility of the contamination by containing and extracting the contaminated groundwater plume.

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.

Both Alternative 2 and 3 will create short-term impacts during installation of the wells and associated treatment system equipment. The drilling will create some noise; however, it is not expected to create a significant impact to the community. It may be necessary to close a lane of some of the area roadways while certain wells are being installed and, for Alternative 2, while injections are occurring in those wells; however, based on the somewhat limited traffic of the area, and the very limited length of roadway that will be closed at any given time, it is not expected to create a significant adverse impact. Alternative 3 will require construction of a treatment building which will create additional noise and traffic. The short-term impacts will be monitored and managed through engineering controls.

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.

Both Alternative 2 and 3 are implementable. The groundwater treatment program under Alternative 2 requires somewhat specialized personnel with specialized expertise, but it is an established technology, and is implementable. The City of Oswego owns a large area within the expected treatment zone, which will simplify access under both alternatives. Public right-of-ways will also provide additional areas with reasonably unfettered access. There are industrial facilities further east and northeast, which may be more difficult to obtain access to for remedial activities; however, access to these properties directly may not be necessary. Alternative 3 will require acquisition of property or an easement in order to install the treatment building.

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 estimated present worth cost of Alternative 2 ($ 5,310,000) is lower than the estimated present worth cost of Alternative 3 ($ 5,400,000). It should be noted there is a higher level of uncertainty in the cost estimate for Alternative 3 than for Alternative 2, particularly for the annual costs, which are highly dependent on the number of extraction wells and the treatment system ultimately installed.

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.

Groundwater flow is towards the east, so the most significant off-site impacts are located to the east of the site. Land use to the east of the site is predominantly industrial and the area is serviced by a municipal water supply.

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 has been prepared that describes public comments received and the manner in which the Department will address the concerns raised.

Alternative 2 has been selected because, as described above, it satisfies the threshold criteria, and provides the best balance of the balancing criterion.

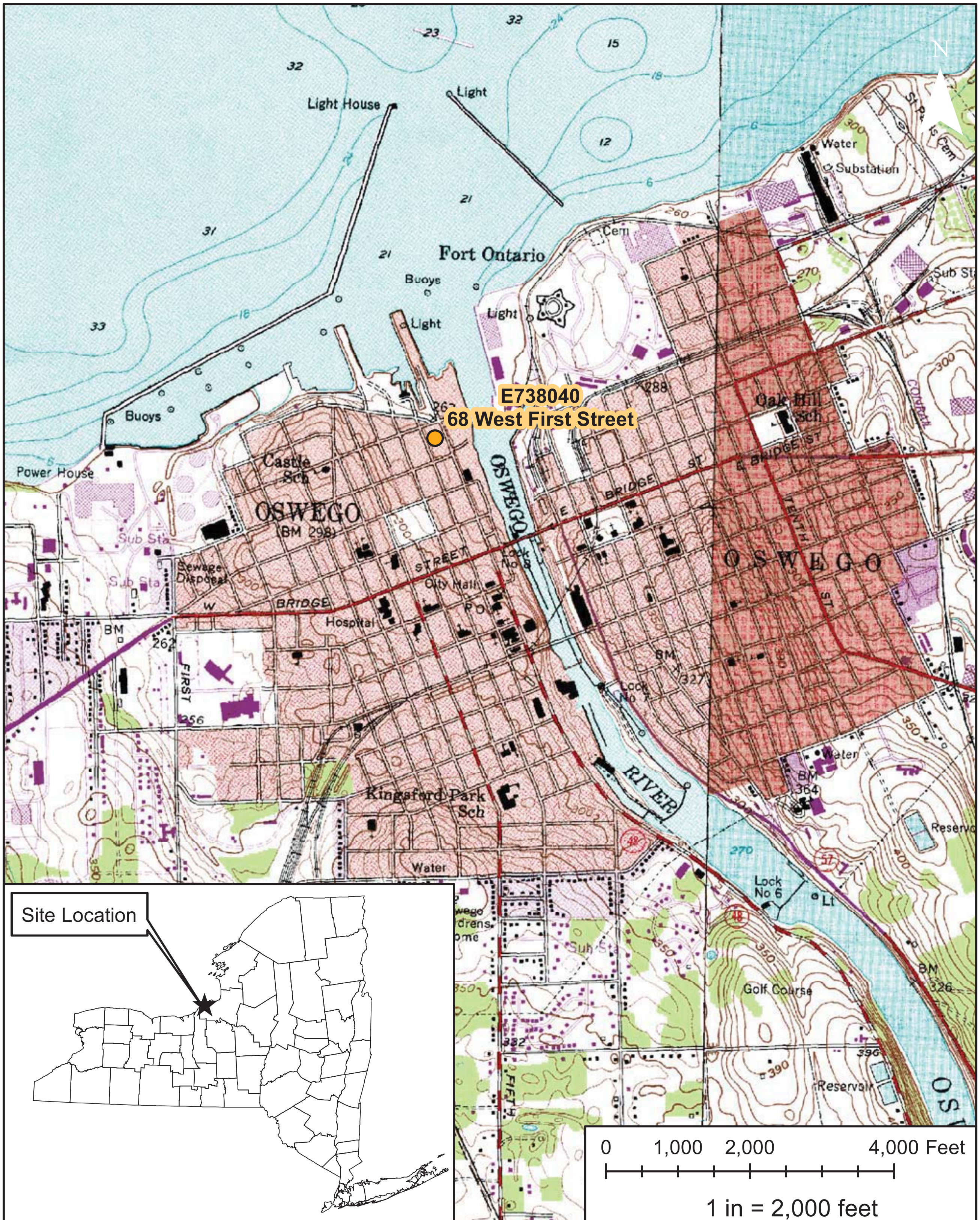


Figure 1 - Site Location

68 West First Street

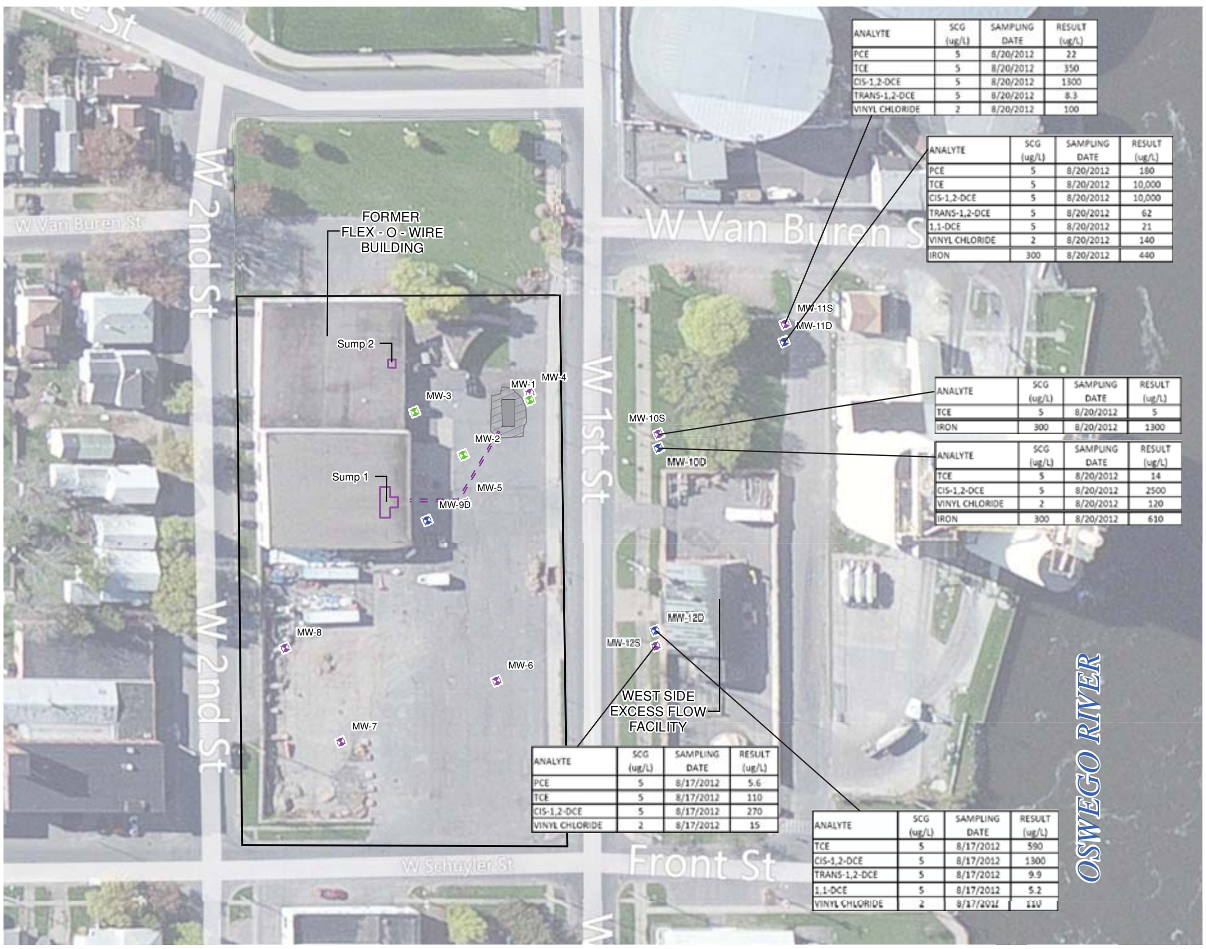
Site ID E738040

City of Oswego, Oswego County, New York

2013-05-02

JPC

FIGURE 2



ANALYTE	SCG (ug/L)	SAMPLING DATE	RESULT (ug/L)
PCE	5	8/20/2012	22
TCE	5	8/20/2012	350
CIS-1,2-DCE	5	8/20/2012	1300
TRANS-1,2-DCE	5	8/20/2012	8.3
VINYL CHLORIDE	2	8/20/2012	100

ANALYTE	SCG (ug/L)	SAMPLING DATE	RESULT (ug/L)
PCE	5	8/20/2012	180
TCE	5	8/20/2012	10,000
CIS-1,2-DCE	5	8/20/2012	10,000
TRANS-1,2-DCE	5	8/20/2012	62
1,1-DCE	5	8/20/2012	21
VINYL CHLORIDE	2	8/20/2012	140
IRON	300	8/20/2012	440

ANALYTE	SCG (ug/L)	SAMPLING DATE	RESULT (ug/L)
TCE	5	8/20/2012	5
IRON	300	8/20/2012	1300

ANALYTE	SCG (ug/L)	SAMPLING DATE	RESULT (ug/L)
TCE	5	8/20/2012	14
CIS-1,2-DCE	5	8/20/2012	2500
VINYL CHLORIDE	2	8/20/2012	120
IRON	300	8/20/2012	610

ANALYTE	SCG (ug/L)	SAMPLING DATE	RESULT (ug/L)
PCE	5	8/17/2012	5.6
TCE	5	8/17/2012	110
CIS-1,2-DCE	5	8/17/2012	270
VINYL CHLORIDE	2	8/17/2012	15

ANALYTE	SCG (ug/L)	SAMPLING DATE	RESULT (ug/L)
TCE	5	8/17/2012	590
CIS-1,2-DCE	5	8/17/2012	1300
TRANS-1,2-DCE	5	8/17/2012	9.9
1,1-DCE	5	8/17/2012	5.2
VINYL CHLORIDE	2	8/17/2012	110

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N

LEGEND

- PROCESS LINE
- EXISTING SUMP
- IRM EXCAVATION AREA
- FORMER 15,000 GALLON UST
- APPROXIMATE SITE BOUDNARY

68 WEST FIRST STREET
SITE ID E738040, OU 2
CITY OF OSWEGO
OSWEGO COUNTY, NY

GROUNDWATER SCG EXCEEDANCES

Modified by NYSDEC 2013-05-28
1. Added groundwater data
2. Corrected site boundary
3. Changed figure name & number

0 37.5 75 150
Feet

FEBRUARY 2013
283.48496

O'BRIEN & GERE

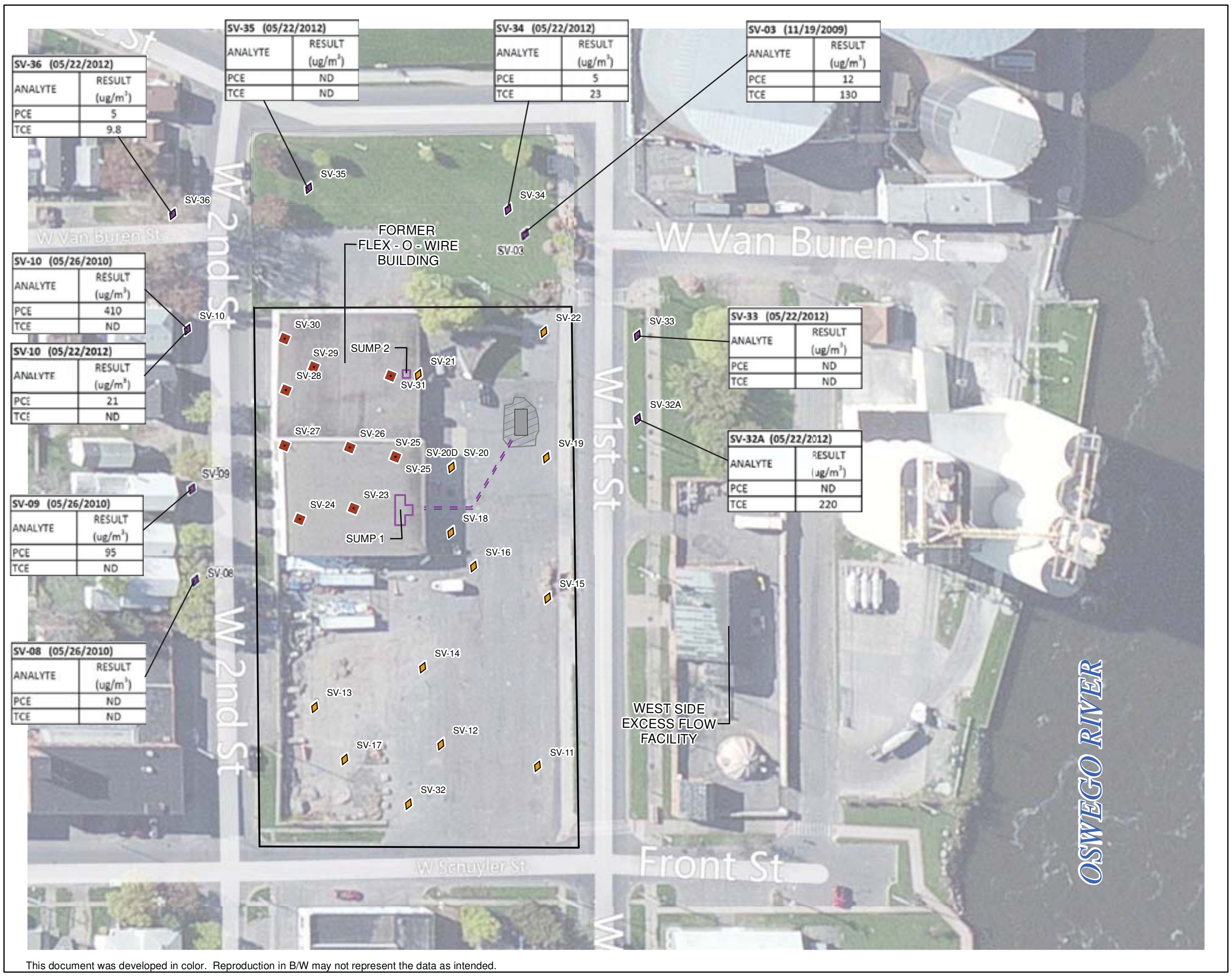

FIGURE 3

N

LEGEND

- SUB-SLAB VAPOR LOCATIONS FEBUARY 2012
- SOIL VAPOR LOCATIONS FEBUARY 2012
- OFF-SITE SOIL VAPOR SAMPLING LOCATIONS
- PROCESS LINE
- EXISTING SUMP
- EXCAVATION AREA
- FORMER 15,000 GALLON UST
- APPROXIMATE SITE BOUNDARY

Modified by NYSDEC 2013-05-29
1. Added SV-03, SV-08 & SV-09
2. Added soil vapor data
3. Corrected site boundary
4. Changed figure name & number

68 WEST FIRST STREET
SITE ID E738040, OU2
CITY OF OSWEGO
OSWEGO COUNTY, NY

SOIL VAPOR SAMPLE RESULTS

0 37.5 75 150
Feet

FEBRUARY 2013
283.48496

O'BRIEN & GERE

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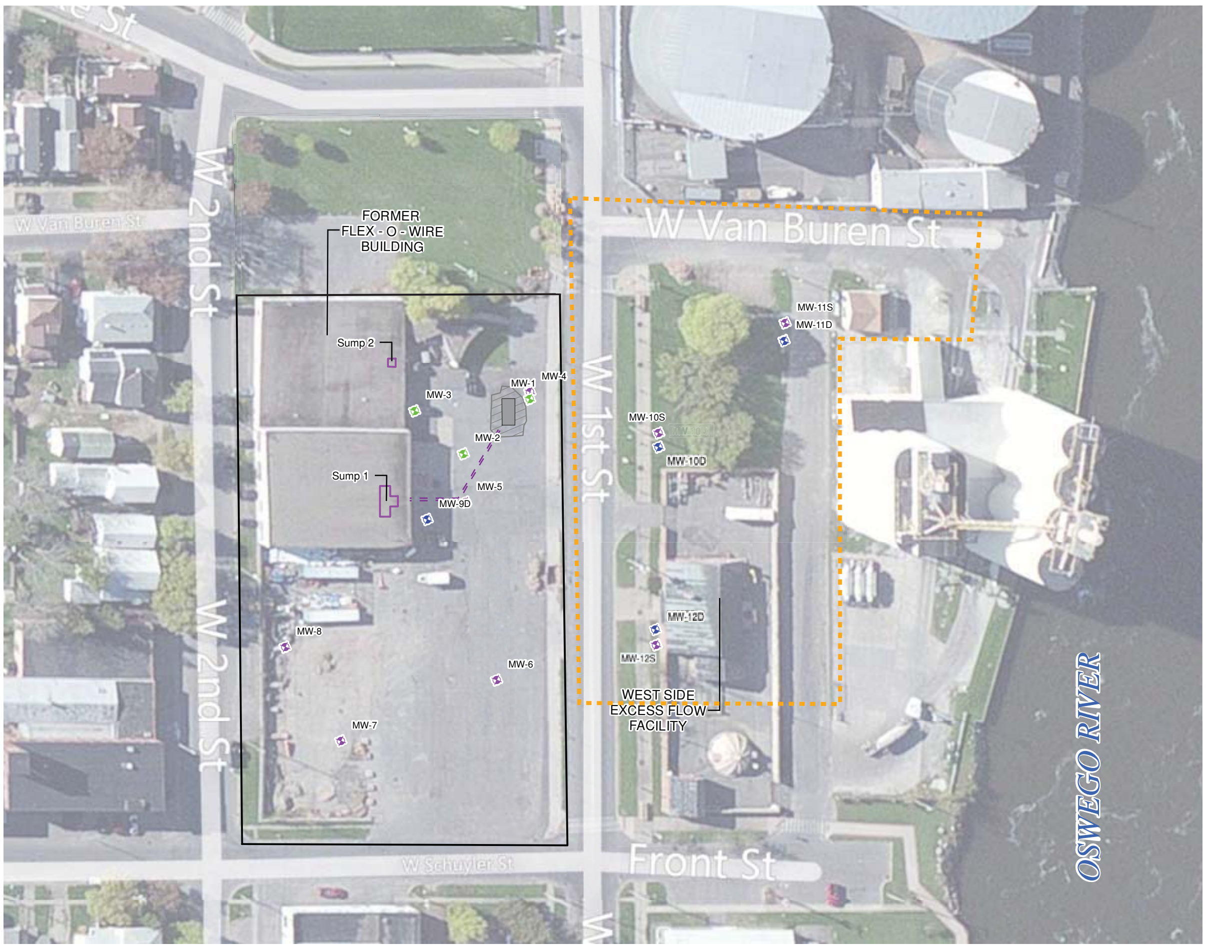

This document was developed in color. Reproduction in B/W may not represent the data as intendedS

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PLOTDATE: 02/06/13 9:20:42 AM StantoSA

FIGURE 4

N

LEGEND

- PROCESS LINE
- EXISTING SUMP
- IRM EXCAVATION AREA
- FORMER 15,000 GALLON UST
- APPROXIMATE SITE BOUNDARY
- GROUNDWATER TREATEMENT AREA CONCEPTUAL ONLY

68 WEST FIRST STREET
SITE ID E738040, OU 2
CITY OF OSWEGO
OSWEGO COUNTY, NY

SELECTED REMEDY

Modified by NYSDEC 2013-05-29
1. Added groundwater treatment area.
2. Corrected site boundary
3. Changed figure name & number

0 37.5 75 150
Feet

FEBRUARY 2013
283.48496

O'BRIEN & GERE

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

68 West First Street
Operable Unit No. 2: Off-Site Groundwater and Soil Vapor Plumes
Environmental Restoration Project
City of Oswego, Oswego County, New York
Site No. E738040

The Proposed Remedial Action Plan (PRAP) for Operable Unit (OU) 2 of the 68 West First Street 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 August 30, 2013. The PRAP outlined the remedial measure proposed for the contaminated groundwater and soil vapor at OU 2 of the 68 West First Street 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 September 12, 2013, which included a presentation of the remedial investigation for the 68 West First Street site as well as a discussion of the alternatives considered and 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 October 14, 2013.

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:

COMMENT 1: How much longer would it take to clean up the site without chemical injection versus with chemical injection?

RESPONSE 1: It would take many years longer for the site to be remediated without chemical treatment. The chemical reaction occurs essentially immediately, as long as the injected chemical can be brought into contact with the contaminants.

COMMENT 2: What is the time frame for completing the remediation?

RESPONSE 2: Requests for funding for projects under the Environmental Restoration Program (ERP) currently exceed the $200 million authorized under the 1996 Clean Water/Clean Air Bond Act for the ERP. As such, the Department is not yet providing funding for any new remediation phase ERP projects under the Bond Act.

For the off-site area, the first step in the remedial process would be for the Department to make a determination as to whether the site poses a significant threat to public health or the environment. If that determination were to be positive, then the Department will determine if there are any responsible parties which are able to implement the remedy for the off-site area. If there are none, the State will implement the remediation of the off-site areas using State Superfund money. Given this, it is likely remediation of the off-site areas will not begin for about two years. It is possible evaluation of whether soil vapor intrusion is occurring could be completed sooner.

COMMENT 3: Who pays for the remediation? Will the City have to pay for any of it?

RESPONSE 3: If a responsible party is identified, they will be responsible for the costs of the remediation. If not, and if the site is determined to pose a significant threat to human health and the environment, the State will implement the remedy using State Superfund money. Thus far, the State's portion of the costs has been paid through the Environmental Restoration Program, which received its funds from the 1996 Bond Act, while the City paid for 10% of the on-site costs. If the off-site area is remediated under the ERP, the State will again fund up to 90% of the cost.

COMMENT 4: Are you choosing chemical injections as part of the remediation because the bedrock is so shallow?

RESPONSE 4: In part, yes. The shallow bedrock would affect the feasibility of implementing certain other remedial technologies.

COMMENT 5: How long and how often will groundwater be monitored if you proceed with proposed alternative? Is it for thirty years?

RESPONSE 5: Groundwater monitoring will continue for as long as levels of contaminants in groundwater exceed the groundwater standards. The cost estimate is based on thirty years of monitoring, but monitoring may continue longer than that or end sooner. Groundwater will be monitored yearly for the first five to ten years, and after that it is likely the frequency will be reduced if the concentrations of the contaminants have decreased.

COMMENT 6: Does the City have the right to choose another alternative other than the proposed alternative?

RESPONSE 6: The City developed and presented the selected remedy in the alternatives analysis prepared by their consultant as their recommended remediation, which the Department, in consultation with NYSDOH, has now selected as the remedy for the site and the off-site contamination. If the site proceeds in the ERP the City would be required to implement it.

APPENDIX B

Administrative Record

ADMINISTRATIVE RECORD

68 West First Street
Operable Unit No. 2: Off-Site Groundwater and Soil Vapor Plumes
Environmental Restoration Project
City of Oswego, Oswego County, New York
Site No. E738040

1. Proposed Remedial Action Plan for the 68 West First Street site, Operable Unit No. 2, dated August 2013, prepared by the Department.

2. The Department and the City of Oswego entered into a State Assistance Contract, Contract No. C303843, July 18, 2008

3. State Assistance Contract (SAC) No. C303843 and SAC Amendments 1 and 2.

4. Remedial Investigation/Alternatives Analysis Report, dated January 2011, prepared by CHA.

5. Supplemental Subsurface Investigation/Alternatives Analysis Report, dated February 2013, prepared by O'Brien & Gere Engineers, Inc.

6. Memorandum regarding cost estimate for OU 2 remedial alternatives, dated September 4, 2013, prepared by the Department