PROPOSED REMEDIAL ACTION PLAN

Former Syracuse Rigging Property
Environmental Restoration Project
Syracuse (c), Onondaga County
Site No. B00146
February 2012

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 contaminants at the site has resulted in threats to public health and the environment that will be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of contaminants at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum. 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 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 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:

Onondaga County Public Library

The Galleries of Syracuse
447 South Salina Street
Syracuse, NY 13202
Phone: 315-435-1900

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

A public comment period has been set from:

2/7/2012 to 3/23/2012

A public meeting is scheduled for the following date:

3/5/2012 at 5:30 PM

Public meeting location:

NYSDEC Region 7 Office, Hearing Room, 615 Erie Blvd W., Syracuse, NY 13204

At the meeting, the findings of the remedial investigation (RI) and the alternatives analyses (AA) 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 3/23/2012 to:

Joshua Cook
NYS Department of Environmental Conservation
Division of Environmental Remediation
615 Erie Blvd W
Syracuse, NY 13204
jpcook@gw.dec.state.ny.us

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 Syracuse Rigging Property is an approximately 6.8 acre site located in the City of Syracuse at 341 Peat Street, approximately 800 feet north of the intersection of Peat Street and Erie Boulevard East. It is bordered to the north by Interstate Route 690, to the east by commercial properties and Peat Street, to the south by CSX property and commercial and industrial properties, and to the west by the former D.W. Winkelman Company property.

Site Features: The property is generally flat and is partially covered with overgrown brush and vegetation, crushed stone, and portions of concrete slabs associated with the former building foundations. There are several piles of vegetative debris at the site, associated with current operations at the site. There are berms of soil located on-site that were generated by a soil excavation performed in 2001.

Current Zoning/Use(s): The site is currently zoned for commercial use. The City of Syracuse Department of Public Works is temporarily utilizing the site for mulching operations and storage of vegetative debris. The surrounding properties are used for commercial and industrial purposes.

Historic Uses(s): The site formerly supported several commercial and industrial operations since at least the 1890s, including a structural steel works (Archbold Brady Company), a forge shop and machine shop (Globe Forge and Manufacturing Company), an equipment repair facility (Finger Lakes Equipment Corporation), a paint and varnish supplier (Syracuse Paint and Varnish Company), several contractors and several trucking companies. Prior uses that appear to have led to site contamination include the various industrial operations and the release of petroleum products to the ground from point sources (i.e., bulk storage tanks and associated piping).

Several environmental investigations were conducted prior to the site entering the Environmental Restoration Program. Several areas of concern were identified by these investigations. In 2001, petroleum impacted soils were excavated from the northeast portion of the site and stockpiled on-site in berms, which remain on-site.

Site Geology and Hydrogeology: Native unconsolidated soils in the vicinity of the site generally consist of glaciolacustrine deposits, which consist primarily of fine sand and silt, but also include gravel, coarse sands and clay, underlain by glacial till.

Three basic geologic units were identified at the site during the investigation. The uppermost unit consists of fill, followed by a layer of peat and marl, which is underlain by clay. The fill unit ranged from approximately 3 to 5 feet thick and consisted of sand and/or silt mixed with concrete, brick, ash, cinders, wood, stone and other debris.

The fill layer was underlain by a layer which consisted primarily of brown peat and extended to approximately 11-14 feet below grade. This layer also contained black and gray peat, and marl which varied in color, but was primarily white with some brown and black.

Gray clay was encountered below the peat and marl layer and extended to at least 19 feet below grade. The clay layer ranged from at least 3 feet thick to at least 7 feet thick. In one location the clay layer was penetrated and was found to be underlain by gray sand and gravel from 19 to 21 feet below grade.

Groundwater was encountered at depths ranging from 4 feet to 14 feet below grade and appears to flow generally to the south. Along the western side of the site, groundwater appears to flow towards the southeast. Perched groundwater was also encountered in some locations in veins of fill materials.

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, alternatives (or an alternative) that restrict(s) the use of the site to commercial use (which allows for industrial use) as described in Part 375-1.8(g) are/is being evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the investigation 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. Syracuse Industrial Development Agency will assist the state in its efforts by providing all information to the state which identifies PRPs. Syracuse Industrial Development Agency 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.

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 Information

The analytical data collected on this site includes data for:

- groundwater
- soil

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 at this site is/are:

ARSENIC	ZINC
NICKEL	BENZ(A)ANTHRACENE
BARIUM	BENZO(A)PYRENE
LEAD	BENZO(B)FLUORANTHENE
CHROMIUM	CHRYSENE
COPPER	DIBENZ[A,H]ANTHRACENE
MERCURY	INDENO(1,2,3-cd)PYRENE
SELENIUM	PETROLEUM PRODUCTS

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

- groundwater
- soil

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 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 because the area is served by a public water supply that is not affected by site-related contamination. Access to the property is unrestricted and people may come into contact with contaminants in the soil by walking on the site, digging, or otherwise disturbing the soil. 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 sub-surface into the indoor air of buildings, is referred to as soil vapor intrusion. Because the site is vacant, the inhalation of site-related contaminants due to soil vapor intrusion does not represent a concern for the site in its current condition. However, the potential exists for the inhalation of on- and off-site contaminants due to soil vapor intrusion for any future on-site redevelopment and occupancy.

6.4: 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 01.

Nature and Extent of Contamination: The primary contaminants of concern at the site are petroleum, several semi-volatile organic compounds (SVOCs) and several metals, primarily nickel and arsenic.

Soil: Petroleum-impacted soils were encountered in several locations which were identified by the presence of petroleum, odors, staining or some combination. Two areas were more heavily impacted by petroleum; one being in the north-central portion of the site, and the other in the south portion of the site.

Several polycyclic aromatic hydrocarbons (PAHs), a subset of SVOCs, were detected in sub-surface soils in various locations across the site at concentrations exceeding unrestricted use soil cleanup objectives (SCOs). In several locations, the concentrations of one or more PAH also exceeded the SCO for the protection of public health for commercial use. Benzo(a)pyrene (a PAH) was detected at a maximum concentration of 4.0 parts per million (ppm), compared to its unrestricted use SCO of 1 ppm, which is also its commercial use SCO. In general, the highest concentrations of PAHs in soil samples corresponded to locations where there were obvious petroleum impacts to soil.

Several metals (arsenic, barium, chromium, copper, nickel, lead, mercury, selenium and zinc) were detected across the site in surface soils at concentrations greater than their unrestricted use SCOs. Nickel was also detected at concentrations greater than its commercial use SCO in six samples, covering approximately 1.5 acres of the northeast portion of the site. Nickel was detected in surface soil at a maximum concentration of 4,840 ppm, compared to its commercial use SCO of 310 ppm. Arsenic and barium were detected in surface soil in isolated locations at concentrations slightly greater than their commercial use SCO. Arsenic exceeded its commercial use SCO at two locations (one of which also contained nickel above its commercial SCO) at a maximum concentration of 23 ppm, compared to its commercial use SCO of 16 ppm. Barium was detected in one location at a concentration of 405 ppm, compared to its commercial use SCO of 400 ppm. In all other samples arsenic and barium did not exceed their unrestricted SCOs (13 ppm and 350 ppm, respectively).

Metals were also detected in sub-surface soils across the site at elevated levels. In nearly every sample one or more metal exceeded unrestricted SCOs. Many sub-surface soil samples from across the site also contained metals above commercial use SCOs as well. The most widespread metals exceeding commercial use SCOs are nickel and arsenic. Nickel was detected in sub-surface soil at a maximum concentration of 7,120 ppm. Arsenic was detected in sub-surface soil at a maximum concentration of 118 ppm. Barium and lead were also detected in a few samples in the north-central portion of the site in excess of their commercial use SCOs. The maximum concentrations of barium and lead detected in sub-surface soil were 2,300 ppm and 24,700 ppm, respectively, as compared to their commercial use SCOs of 400 ppm and 1,000 ppm, respectively.

Groundwater: A groundwater monitoring well in the southern portion of the property has been shown to collect recoverable quantities of floating petroleum product (light non-aqueous phase liquid [LNAPL]) within a few days. While LNAPL is present in this well, dissolved phase groundwater contamination was not identified. Several metals (arsenic, chromium, lead and nickel) were detected in groundwater at concentrations exceeding groundwater SCGs on two occasions in one well, in the southern portion of the site.

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.

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

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater 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 at a site.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

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 AA 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 estimated present worth cost to implement the remedy is $1,560,000. The cost to construct the remedy is estimated to be $1,350,000 and the estimated average annual cost is $13,400.

The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, 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 gas 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. All on-site soils located in the north-central portion of the site which are grossly-contaminated as defined by 6 NYCRR Part 375-1.2(u) will be excavated and transported off-site for disposal or beneficial reuse. It is anticipated this excavation area will extend to a depth of approximately 4 feet over an area of 3,500 square feet. The approximate limits of the excavation are indicated on Figure 4. Approximately 520 cubic yards of soil will be removed.

3. Soil stockpiled on the site will be used to backfill the excavation. If additional fill is needed, clean fill will then be brought in to replace the remainder of the excavated soil and establish the designed grades at the site. Any fill material brought to the site will meet the

requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d). If the quantity of the stockpiled soil exceeds the volume of the excavation, the stockpiled will be spread across the site under a cover system. Any grossly-contaminated soils encountered in the stockpiled soils will be disposed of off-site.

4. Soil and debris stockpiled along the western portion of the site which reportedly originated from the adjacent Winkelman property will be disposed of off-site.

5. Petroleum recovery wells will be installed to remove petroleum from the subsurface in the southern portion of the site in the vicinity of MW-5. The details of the wells and recovery system will be determined during the remedial design phase.

6. A site cover will be required to allow for commercial use of the site. The cover will consist either of the structures such as buildings, pavement, sidewalks comprising the site development or a soil cover in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d) for commercial use. The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d).

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

- 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);
- allows the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- 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;
- prohibits agriculture or vegetable gardens on the controlled property; and
- requires compliance with the Department approved Site Management Plan.

8. A Site Management Plan is required, 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:

Institutional Controls: The Environmental Easement discussed in Paragraph 6 above.
Engineering Controls: The soil cover discussed in Paragraph 5 and the petroleum recovery system discussed in Paragraph 4.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any land use and groundwater use restrictions;
- a 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;
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- 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 of groundwater to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department;
- monitoring for vapor intrusion for any buildings occupied or developed on the site, as may be required by the Institutional and Engineering Control Plan discussed in item a. above.

c. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, 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;
- maintaining site access controls and Department notification; and
- 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 two categories; semi-volatile organic compounds (SVOCs) and inorganics (metals). 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.

Waste/Source Areas

As described in the RI report, waste/source materials were identified at the site and are impacting soil and groundwater.

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and Source areas were identified at the site include, areas where petroleum is present in the subsurface as a separate phase (non-aqueous phase liquid [NAPL]). While petroleum staining or odors are present in several areas, the areas in the north-central portion of the site and in the south portion of the site showed heavier impacts by petroleum. Groundwater monitoring well MW-5, located in the southern portion of the site, has been shown to collect several inches of floating NAPL (light NAPL [LNAPL]).

The waste/source areas identified will be addressed in the remedy selection process.

Groundwater

Groundwater samples were collected from overburden monitoring wells to assess groundwater conditions on and off-site. Six overburden groundwater sampling locations were established across the site. Groundwater samples were collected from five of those locations on two separate occasions. The other on-site well was sampled once. One round of sampling was also conducted at four off-site locations. Monitoring well locations are depicted on Figure 3.

A sample collected from an off-site well which is cross-gradient to the site contained several chlorinated VOCs (CVOCs) above groundwater SCGs. This location was located to the west of the Syracuse Rigging Property, and was located on or immediately adjacent to the site known as the Peter Winkelman Company, Inc. site, which is an inactive hazardous waste disposal site (Site ID 734047). There were no source areas of CVOCs indentified on the Syracuse Rigging Property. It does not appear the CVOC groundwater contamination identified in this off-site location is attributable to the Syracuse Rigging Property.

Several metals were detected above SCGs in groundwater. Sodium, iron and magnesium were detected above SCGs in several groundwater samples, including upgradient wells. Since these metals are present in upgradient wells and are naturally occurring, exceedances of sodium, iron and magnesium are not necessarily attributable to the site. Manganese was detected slightly above SCGs in both samples collected from MW-4 and in the sample collected from MW-6. Several metals were detected above SCGs during both rounds of sampling in samples collected from monitoring well MW-5, located in the south portion of the site. It is possible that exceedances of metals in groundwater were due to turbidity in the samples. It was reported that during well development turbidity of the extracted groundwater ranged from 111 to 641 nephelometric turbidity units (NTU). Guidance for groundwater sampling states the target level for well development and sampling should be 50 NTU.

Table 1 – Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Inorganics			
Antimony	ND – 4.8	3	2 / 11
Arsenic	ND – 65.2	25	2 / 11
Chromium	ND – 324	50	2 / 11
Copper	ND – 313	200	1 / 11
Lead	ND – 98	25	2 / 11
Manganese	53.2 – 1,470	300	5 / 11
Nickel	2.1 – 1,480	100	2 / 11

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

Several inorganic contaminants found in groundwater were also found in upgradient monitoring wells and are considered to represent site background conditions. Other inorganic contaminants found in groundwater may be present due to elevated turbidity of the sample, and may not actually represent dissolved phase contamination of groundwater. The data do not support development of a remedy for groundwater, other than to address the potential sources of contamination to groundwater (*i.e.*, NAPL).

Surface Soil

Surface soil samples were collected from across the site during the RI and analyzed for metals, PCBs and cyanide in order to assess direct exposure. Surface soil samples were not analyzed for other potential contaminants; however, fill materials were identified in test pits and borings in the top several feet across the site. Fill materials include ash and other anthropogenic materials and can be assumed to contain SVOCs (specifically polycyclic aromatic hydrocarbons [PAHs]) at concentrations greater than the unrestricted soil cleanup objectives (SCOs).

The surface soil sampling results show that surface soils across the site exceed the unrestricted SCOs for several metals and exceed the commercial SCOs in the northeast portion of the site, primarily for nickel. Figure 2 shows the locations of surface soil samples and shows which exceed commercial SCOs.

Nickel was the most wide-spread contaminant and was detected at the highest concentrations, relative to its SCO. Arsenic and barium were also detected at concentrations slightly greater than their commercial SCOs in one location, respectively, that was not also impacted by nickel at concentrations greater than its commercial SCO. These isolated locations were surrounded by samples which did not exceed the unrestricted SCO for arsenic or barium.

Table 2 - Surface Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Inorganics (Metals)					
Arsenic	2.9 – 23	13	3 / 40	16	2 / 40
Nickel	9.5 – 4,840	30	25 / 40	310	6 / 40
Barium	15.7 – 405	350	1 / 40	400	1 / 40
Lead	6.7 – 349	63	21 / 40	1,000	0 / 40
Chromium	7.1 – 246	1 [d]	40 / 40	400 [d]	0 / 40
Copper	10.1 – 180	50	15 / 40	270	0 / 40
Mercury	0.020 – 0.98	0.18	8 / 40	2.8	0 / 40
Selenium	ND – 7	3.9	1 / 40	1,500	0 / 40
Zinc	24.4 – 506	109	17 / 40	10,000	0 / 40

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use, unless otherwise noted.
d – This value represents the lower of the Soil Cleanup Objectives for hexavalent and trivalent forms of chromium. Chromium results were not speciated during the Remedial Investigation.
ND = not detected

Based on the findings of the Remedial Investigation, the presence of nickel and several other metals has resulted in the contamination of surface soil. It is assumed PAHs are present in surface soils as well, due to the presence of fill materials. The site contaminants identified in surface soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are metals and PAHs.

Subsurface Soil

Subsurface soil samples were collected from across the site and in several off-site locations during the RI in order to assess soil quality and to evaluate whether off-site migration was occurring. Subsurface soil samples were collected from depths ranging from one foot to 14 feet below grade. The results show that soils at the site exceed the unrestricted SCOs and commercial SCOs for several PAHs and several metals. Petroleum-impacted soil was also identified in several locations.

Several metals were detected in subsurface soil at concentrations greater than unrestricted SCOs. Nearly every sample contained at least one metal at concentrations greater than unrestricted SCOs. Nickel and arsenic were found above their commercial SCOs in samples from across the site. Lead and barium were detected in subsurface soil at concentrations greater than their commercial SCOs in three samples collected in the north-central portion of the site. Lead also slightly exceeded its commercial SCO in one other sample. Metal contamination at concentrations greater than commercial SCOs in subsurface soil is depicted on Figure 3.

PAHs were detected in subsurface soils at concentrations greater than unrestricted SCOs across the site. Several samples also had PAHs at concentrations greater than commercial SCOs. Several subsurface soil samples with elevated levels of PAHs were collected from areas that were obviously impacted by petroleum, which was identified by staining and odors. PAHs are constituents of petroleum. Areas of petroleum-impacted soil and sampling locations where one or more PAH or metal exceeded commercial SCOs are depicted on Figure 3.

Table 3 - Subsurface Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
SVOCs					
Benzo(a)anthracene	ND – 4.2	1	10 / 49	5.6	0 / 49
Benzo(a)pyrene	ND – 4.0	1	8 / 49	1	8 / 49
Benzo(b)fluoranthene	ND – 4.1	1	9 / 49	5.6	0 / 49
Benzo(k)fluoranthene	ND – 3.3	1	8 / 49	56	0 / 49
Chrysene	ND – 3.7	1	13 / 49	56	0 / 49
Dibenz[a,h]anthracene	ND – 0.68	0.33	1 / 49	0.56	1 / 49
Indeno(1,2,3-c,d)pyrene	ND – 1.6	0.5	8 / 49	5.6	0 / 49
Inorganics (Metals)					
Arsenic	2.4 – 118	13	20 / 44	16	16 / 44
Nickel	3.6 – 7,120	30	23 / 44	310	12 / 44
Barium	28.1 – 2,300	350	3 / 44	400	3 / 44
Lead	5.7 – 24,700	63	27 / 44	1,000	4 / 44
Cadmium	ND – 5.2	2.5	4 / 44	9.3	0 / 44
Chromium	2.5 – 210	1 [d]	44 / 44	400 [d]	0 / 44
Copper	6.9 – 286	50	9 / 18	270	1 / 18

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG
Mercury	ND – 2.4	0.18	18 / 44	2.8	0 / 44
Selenium	ND – 24.1	3.9	9 / 44	1,500	0 / 44
Zinc	19.5 – 5,020	109	21 / 44	10,000	0 / 44

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use, unless otherwise noted.
d – This value represents the lower of the Soil Cleanup Objectives for hexavalent and trivalent forms of chromium. Chromium results were not speciated during the Remedial Investigation.
ND = not detected

The primary soil contaminants are petroleum, PAHs and metals, with arsenic and nickel being the most prevalent metal contaminants.

Based on the findings of the Remedial Investigation, the presence of petroleum, metals, and PAHs has resulted in the contamination of sub-surface soil. The site contaminants identified in sub-surface soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are petroleum, metals and PAHs.

Exhibit B

<u>Description of Remedial Alternatives</u>

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: Limited Action

The Limited Action Alternative includes only the construction of a perimeter fence and implementation of institutional controls.

The fence would limit trespass on the site, and thereby reduce the potential for exposure to site contaminants. An institutional control, in the form of an environmental easement would be placed on the property. The environmental easement would: require 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); restrict the use of site groundwater as a source of potable or process water without proper treatment; prohibit agriculture or vegetable gardens on the controlled property; and require compliance with the Department approved Site Management Plan. The environmental easement would also restrict the use and development of the controlled property for uses not consistent with the level of contamination present in near-surface soil at the site. Arsenic was detected at concentrations slightly exceeding its SCO for industrial use, the most restrictive land use category in two isolated surface soil samples.

The Site Management Plan would identify and implement the required institutional and engineering controls, as well as any necessary monitoring and/or operation and maintenance of the remedy. It would include but not be limited to: an Excavation Plan which would detail the provisions for management of future excavations at the site; provisions for the management and inspection of the identified engineering controls; the steps necessary for periodic review and certification of the institutional and engineering controls; and a groundwater monitoring plan to assess the performance and effectiveness of the remedy.

Given the limited scope of this alternative, the capital cost to implement it would be minimal, but would include the costs to construct the fence, develop the Site Management Plan and place the environmental easement on the property. Annual costs under this alternative include the cost to collect and analyze groundwater samples, report the results and provide periodic certifications. The estimated cost of Alternative 2 is as follows:

Present Worth:..........*$201,000*
Capital Cost:..........*$116,000*
Annual Costs:..........*$5,550*

Alternative 3: Restoration to Unrestricted Conditions

This alternative achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meets the unrestricted soil cleanup objectives listed in Part 375-6.8 (a). This alternative would include: excavation and off-site disposal of all soil stockpiled on-site from previous excavations, all soil impacted by petroleum and all soil containing contaminants at concentrations greater than the unrestricted use SCOs. Following the excavation, the site would be restored with clean, imported fill. This alternative does not rely on institutional or engineering controls to prevent future exposure.

Prior to implementing the excavations, a remedial design would be implemented. The design phase would include collection of additional data to more accurately define the depths of excavation necessary. Upon receipt and evaluation of the results of this pre-design investigation, detailed engineering plans and specifications would be developed. It is estimated the remedial design will take nine to twelve months.

Excavation and off-site disposal is a conventional remedial method for sites contaminated by petroleum, PAHs, and/or metals. This alternative would require excavation across the entire site to varying depths, ranging from approximately 4 feet to at least 16 feet. The excavations would be restored with clean backfill which meets the requirement of 6 NYCRR 375-6.7(d) for unrestricted use. It is estimated approximately 56,400 cubic yards of soil would be excavated for off-site disposal, which includes the 1,850 cubic yards of soil stockpiled on-site. Approximately 54,500 cubic yards of soil would be imported to restore the site.

In the course of performing the excavations, groundwater and petroleum would be extracted from the subsurface by pumping to prevent water from collecting within the excavation. This would create a depression of the water table which would further direct petroleum and groundwater toward the pumps. Once extracted, the petroleum would be separated from groundwater and disposed of off-site. After separation the groundwater would either be disposed of off-site or subjected to treatment prior to discharge. A variety of methods are used to treat the extracted groundwater which include, but are not limited to, adsorption using granular activated carbon. Typically, the groundwater would be pumped through filters to remove solids followed by a series of vessels containing a sorbent, most commonly activated carbon, 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 would 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. Following any necessary on-site treatment, the groundwater would be discharged, either back to the subsurface or to the sanitary sewer system.

Given the depths of the excavations necessary under this alternative, excavation support systems would need to be installed in certain areas to prevent collapse of the excavations. The configuration of the support systems would be determined during the remedial design.

It is estimated that construction of Alternative 3 would take 32 to 36 weeks to complete. The estimated cost to implement Alternative 3 is as follows:

Capital Cost:..$8,610,000

Alternative 4: Excavation, Petroleum Recovery & Site Cover

This alternative would include: excavation and off-site disposal of petroleum-impacted soil from an area in the north-central portion of the site; construction and operation of a petroleum recovery system in the southern portion of the site; construction of a cover system; implementation of an intuitional control in the form of an environmental easement; and development of a Site Management Plan.

Prior to implementing the excavations, a remedial design would be implemented. The design phase would include collection of additional data to support the design of the petroleum recovery system and collection of additional surface soil samples for analysis of SVOCs and pesticides. Upon receipt of the surface soil sampling results, engineering plans and specifications for the construction of the excavation and cover system would be developed. It is estimated the remedial design will take six to nine months.

As discussed in Alternative 3, excavation and off-site disposal is a conventional remedial technology for soils contaminated by petroleum, PAHs or metals. Under this alternative, on-site areas which are grossly-contaminated by petroleum and reasonably accessible to excavation will be excavated for off-site disposal. There is one area targeted for excavation under this alternative, which is located in the north-central portion of the site. Petroleum contamination was encountered within the upper 4 feet of soil in this area, which is identified on Figure 4 as the area of excavation. It is estimated that 520 cubic yards of soil will be excavated and disposed of off-site. The excavation would be backfilled with soil which is stockpiled on-site from a previous excavation. It is estimated there is 1,850 cubic yards of soil stockpiled on the site. If gross-contamination is encountered within the stockpiled soil, the grossly-contaminated soil will be disposed of off-site. For cost estimate purposes, as a conservative measure, it is assumed 10% of the stockpiled soils (185 cubic yards) will require off-site disposal. Soil and debris which is stockpiled on the western portion of the site which reportedly originated from the adjacent Winkelman property will also be disposed of off-site.

A petroleum recovery system will also be installed in the southern portion of the site, in the vicinity of monitoring well MW-5, to remove petroleum from the subsurface and prevent off-site migration of petroleum. Petroleum recovery is a conventional remedial technology commonly employed to remove petroleum contamination from the subsurface that cannot be removed by excavation feasibly or in a cost-effective manner. Petroleum is present on groundwater in this area at a depth of approximately 16 feet below grade. The details of the collection system will be determined during the remedial design phase; however, the system will most likely consist of several recovery wells and will likely use a skimmer system to remove petroleum.

A skimmer system utilizes low-flow devices to remove petroleum floating on the groundwater table. Skimming is a conventional remedial technology used primarily for petroleum hydrocarbons that cannot be accessed directly by excavation feasibly or in a cost-effective manner. With this system, there is very little or no recovery of water. Mechanical skimmers and passive skimmers are the two types of skimming equipment that are available. Mechanical skimming equipment actively extracts free product from targeted recovery areas. The recovery efficiency of a mechanical skimmer increases when there is a large amount of free product on the groundwater. It is applicable to settings in permeable conduits such as utility bedding or buried underground open structures. Passive skimming equipment is used for smaller amounts of free product, since it accumulates free product over time prior to removal.

It is possible the recovery system would be operated as a groundwater and petroleum extraction system, which is a conventional remedial technology for groundwater contaminated by petroleum. The system would create a depression of the water table by pumping groundwater so that petroleum and contaminated groundwater is directed toward pumping wells within the plume area. Both free product and groundwater are collected during recovery operations. Once extracted, the petroleum would be separated from groundwater and disposed of off-site. After separation, the groundwater would either be disposed of off-site or subjected to treatment prior to discharge. A variety of methods are used to treat the extracted groundwater which include, but are not limited to, adsorption using granular activated carbon. This treatment method is the same as is discussed for treatment of water removed from excavations under Alternative 3. The design of the extraction system may be constrained by the need to minimize the drawdown of the water table. Minimizing the drawdown will both reduce the volume of co-produced water and reduce smearing of petroleum along the drawdown surface. It is estimated petroleum would continue to be recovered from the subsurface for approximately 5 years; however, recovery of petroleum would continue until the Department determined it was no longer necessary.

Under this alternative, a cover system would be constructed across areas of the site where soil in the top foot exceeds the SCOs for commercial use. Based on existing information, it is assumed the cover system will be needed across the entire site; however, additional surface soil data will be collected during the remedial design phase to determine if any areas do not exceed the commercial use SCOs and therefore do not require construction of a cover system. For purposes of the cost estimate, it is assumed the cover system will be needed across the entire site. At a minimum, the cover system will be needed across the northeast portion of the site where there is metal contamination in excess of commercial SCOs. Surface soil contamination is identified on Figure 2.

A cover system is a commonly employed engineering control used to prevent exposure to contamination that cannot be removed or treated feasibly or in a cost-effective manner. The cover system would consist of a minimum of one foot of imported soil which meets the SCOs for cover material as set forth in 6 NYCRR 375-6.7(d) for commercial use. The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. If any development of the site occurs, structures such as buildings, pavement or sidewalks comprising the site development may replace the one-foot soil cover for the area covered by those structures.

Prior to placing the demarcation layer and cover system, the soil stockpiled on-site would be placed across the area to be covered, and the site would be re-graded as necessary. It is estimated 1,150 cubic yards of stockpiled soils will remain after the excavation is backfilled. Concrete slabs and asphalt paving which is present at the surface across areas of the site would be removed to a depth of one to two feet to facilitate installation of the soil cover.

It is estimated that construction of Alternative 4 would take 10 to 12 weeks to complete.

Since contamination would remain at the site, an institutional control would be placed on the site. The institutional control, in the form of an environmental easement, would: require 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); allow the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws; restrict the use of site groundwater as a source of potable or process water without proper treatment; prohibit agriculture or vegetable gardens on the controlled property; and require compliance with the Department-approved Site Management Plan.

The Site Management Plan would identify and implement the required institutional and engineering controls, as well as any necessary monitoring and/or operation and maintenance of the remedy. It would include but not be limited to: an Excavation Plan which would detail the provisions for management of future excavations at the site; provisions for the management and inspection of the identified engineering controls; the steps necessary for periodic review and certification of the institutional and engineering controls; an Operation and Maintenance Plan to ensure continued operation, maintenance, monitoring and inspection of the petroleum recovery system; and a groundwater monitoring plan to assess the performance and effectiveness of the remedy.

The capital cost to implement this alternative would include: the costs to design and construct the excavation, petroleum recovery system and site cover system; develop the Site Management Plan; and place the environmental easement on the property. Annual costs under this alternative for the first 5 years include the cost to operate the petroleum recovery system, collect and analyze groundwater samples, report the results and provide periodic certifications. The annual costs for the remaining 30 years include the cost to monitor groundwater and provide periodic certification of the remedy. The estimated cost to implement Alternative 4 is as follows:

Present Worth:..$1,560,000
Capital Cost:..$1,350,000
Annual Costs:..$13,400

Alternative 5: Expanded Excavation & Site Cover

This alternative would include: excavation and off-site disposal of areas grossly-contaminated by petroleum; construction of a cover system; implementation of an intuitional control in the form of an environmental easement; and development of a Site Management Plan. Excavation would occur in the area targeted by Alternative 4 and in the southern portion of the site.

Prior to conducting the excavations and installing the cover system a remedial design would be implemented. The design phase would include collection of additional surface soil samples for analysis of SVOCs and pesticides and collection of additional data to more accurately define the depth of excavation necessary in the southern portion of the site. Upon receipt of the data, engineering plans and specifications for the excavation and cover system would be developed. It is estimated the remedial design will take six to nine months.

As discussed in Alternatives 3 and 4, excavation and off-site disposal is a conventional remedial technology for soils contaminated by petroleum, PAHs or metals. Under this alternative, areas which are grossly-contaminated by petroleum would be excavated for off-site disposal. This would include the area targeted for excavation under Alternative 4 and an area in the southern portion of the site measuring approximately 14,000 square feet, in the vicinity of monitoring well MW-5. Petroleum contamination was encountered from approximately 6 feet to 16 feet below grade in this area. It is estimated that 5,200 cubic yards of soil would be excavated and disposed of off-site from the southern area of concern.

Soil removed during the course of the excavations which is not grossly-contaminated by petroleum may be re-used as backfill. It is estimated that the top 6 feet of soil from the southern excavation area would be able to be re-used. Similar to Alternative 4, soil which is stockpiled on-site from a previous excavation would be used as backfill. It is estimated there is 1,850 cubic yards of soil stockpiled on the site. If gross-contamination is encountered within the stockpiled soil, the grossly-contaminated soil will be disposed of off-site. For cost estimate purposes, as a conservative measure, it is assumed 10% of the stockpiled soils (185 cubic yards) will require off-site disposal.

In the course of performing the excavation in the southern portion of the site, groundwater and petroleum would be extracted from the subsurface by pumping to prevent water from collecting within the excavation. The handling of this water would be the same as described for dewatering conducted under Alternative 3 (Restoration to Unrestricted Conditions).

Given the necessary depth of the excavation in the southern portion of the site, an excavation support system would need to be installed to prevent collapse of the excavations. The configuration of the support system would be determined during the remedial design.

Based on the expanded area of excavation it is assumed all mobile petroleum would be removed while completing the excavations, and therefore a petroleum recovery system would not need to be installed.

It is estimated that construction of Alternative 5 would take 14 to 16 weeks to complete.

Since contamination would remain at the site under this alternative, an environmental easement and Site Management Plan would be necessary. The environmental easement and Site Management Plan required by this alternative would include the same provisions and requirements as the environmental easement and Site Management Plan discussed under Alternative 4, except that the Site Management Plan for this Alternative would not include an Operation and Maintenance Plan since there is no mechanical or physical component to the remedy other than the cover system.

The capital cost to implement this alternative would include: the costs to design and construct the excavation, and site cover system; develop the Site Management Plan; and place the environmental easement on the property. Annual costs under this alternative include the cost to collect and analyze groundwater samples, report the results and provide periodic certifications. The estimated cost to implement Alternative 5 is as follows:

Present Worth:..*$2,490,000*
Capital Cost:...*$2,400,000*
Annual Costs:..*$5,550*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
1. No Action	0	0	0
2. Limited Action	116,000	5,550	201,000
3. Restoration to Unrestricted Conditions	8,610,000	0	8,610,000
4. Excavation, Petroleum Recovery & Site Cover	1,350,000	13,400	1,560,000
5. Expanded Excavation & Site Cover	2,400,000	5,550	2,490,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 4, Excavation, Petroleum Recovery & Site Cover as the remedy for this site. Alternative 4 would achieve the remediation goals for the site by removing potentially mobile petroleum contamination through excavation and the recovery system and by preventing exposure to contamination remaining at the site through the cover system and institutional controls. The elements of this remedy are described in Section 7. The proposed remedy is depicted in Figure 4.

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 AA 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.

The proposed (Alternative 4, Excavation, Petroleum Recovery & Site Cover) would satisfy this criterion by removing the potentially mobile petroleum contamination through excavation and the recovery system and by preventing exposures to remaining contamination through institutional and engineering controls; specifically the environmental easement, Site Management Plan and site cover system. Alternative 1 (No Action) does not provide any protection to public health and the environment and will not be evaluated further. Alternative 2 provides only limited protection to public health and the environment. Alternative 3, by removing all soil contaminated above the unrestricted soil cleanup objectives, meets the threshold criteria. Alternative 5 would also comply with this criterion.

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.

Alternative 4 complies with SCGs to the extent practicable. It addresses source areas of contamination and complies with the commercial use soil cleanup objectives at the surface through construction of a cover system. It also creates the conditions necessary to restore groundwater quality to the extent practicable. Under Alternative 2 surface soil contamination would remain in excess of commercial use SCOs. The site is currently zoned for commercial use; therefore this alternative does not comply with SCGs and will not be evaluated further. Alternative 3 complies with this criterion. Similarly, Alternative 5 also complies with this criterion, in part through a cover system. Because Alternatives 3, 4 and 5 satisfy the threshold criteria, 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.

Alternative 3 would be the most effective in the long-term since all contamination would be removed. Alternatives 4 and 5 would be equally effective in the long-term since they would both prevent off-site migration of contaminants and would manage remaining contamination on-site through institutional and engineering controls.

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 3 would result in the largest reduction of volume of contamination at the site. Alternative 5 would result in a greater reduction of volume of contamination than Alternative 4, since a greater volume of contaminated soil would be removed from the site; however, both Alternatives 4 and 5 would reduce the mobility of contamination such that it would not migrate off-site.

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.

Alternatives 3 through 5 all have short-term impacts which could easily be controlled; however, Alternative 4 would have the smallest impact. Alternatives 3 and 5 would require more soil to be hauled to and from the site and would take more time to implement, and therefore would require more fuel use during construction due to the increased trucking and increased hours of construction equipment operation. Alternatives 3 and 5 would also require more imported clean backfill, and so would utilize more natural resources than Alternative 4. Alternative 3 would require a significantly greater quantity of clean soil and result in significantly more fuel use than either Alternative 4 or 5. Given the depth of excavation required in the south portion of the site, Alternatives 3 and 5 would require installation of an excavation support system, most likely sheet-piling. Installation of sheet-piling creates noise and vibration, which would increase the potential for impacts to the surrounding community; however, given the setting of the site, it is not likely this would be a significant concern.

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 are implementable using standard remedial technologies and construction equipment. Some logistical issues may be presented by the current operations at the site by the City of Syracuse. Some disruption to the mulching operation would occur during remediation. It is likely that under Alternatives 4 and 5 the remediation could be implemented such that the City's operations could continue on part of the site while the remediation was conducted over the remainder of the site. It is possible the same could be done under Alternative 3; however, the much larger volume of soil to be handled under Alternative 3 would result in more space being needed for soil stockpiles and it may not be feasible for the City to continue their mulching operations if Alternative 3 were to be implemented. Since Alternative 4 would take the least time to implement, it would result in less disruption to site operations than the other alternatives. Alternative 3 would take the longest time to implement and therefore create the largest disruption in site operations.

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

The costs of the alternatives vary significantly. Alternative 4 has the lowest cost, both for construction of the remedy and for the present worth. With its large volume of soil to be handled, Alternative 3 (excavation and off-site disposal) would have the highest cost. Alternative 5 would cost more than Alternative 4, but would not provide greater protection of public health and the environment. The cost to operate Alternative 4 would be higher than Alternative 5 for the first several years, but would be reduced once the system had removed all recoverable petroleum; and the annual costs would be the same as Alternative 5 thereafter.

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.

The Syracuse Industrial Development Agency has stated the intended land use for the site is industrial; however, it is currently zoned commercial. Alternatives 4 and 5 would be less desirable because at least some contaminated soil would remain on the property whereas Alternative 3 would remove all contaminated soil, and thereby permit any use of the site. However, the residual contamination that would remain under Alternatives 4 and 5 would be manageable through the implementation of a 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.

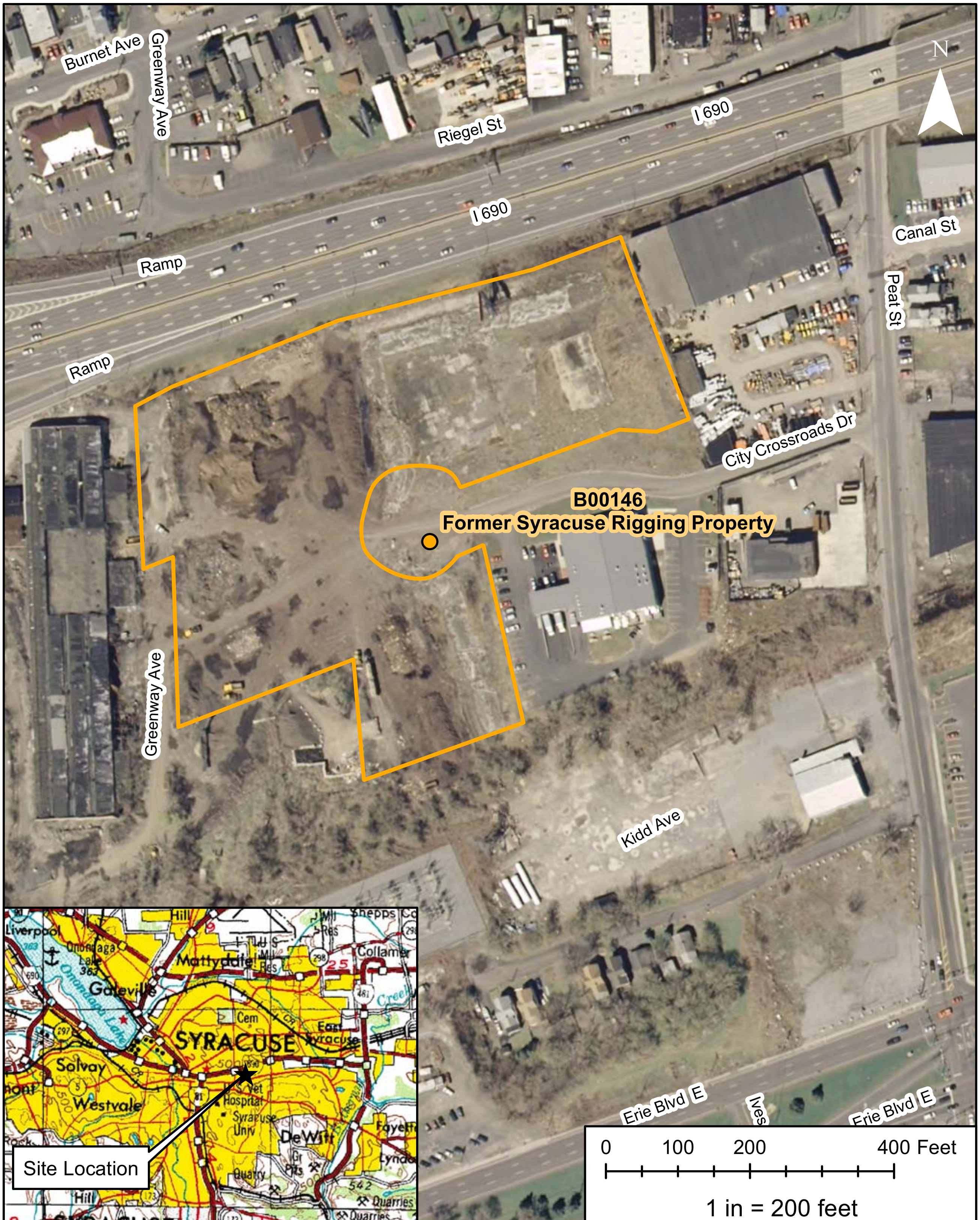

Figure 1 - Site Location

Former Syracuse Rigging Property
Site ID B00146
City of Syracuse, Onondaga County, New York

2011-11-10
JPC

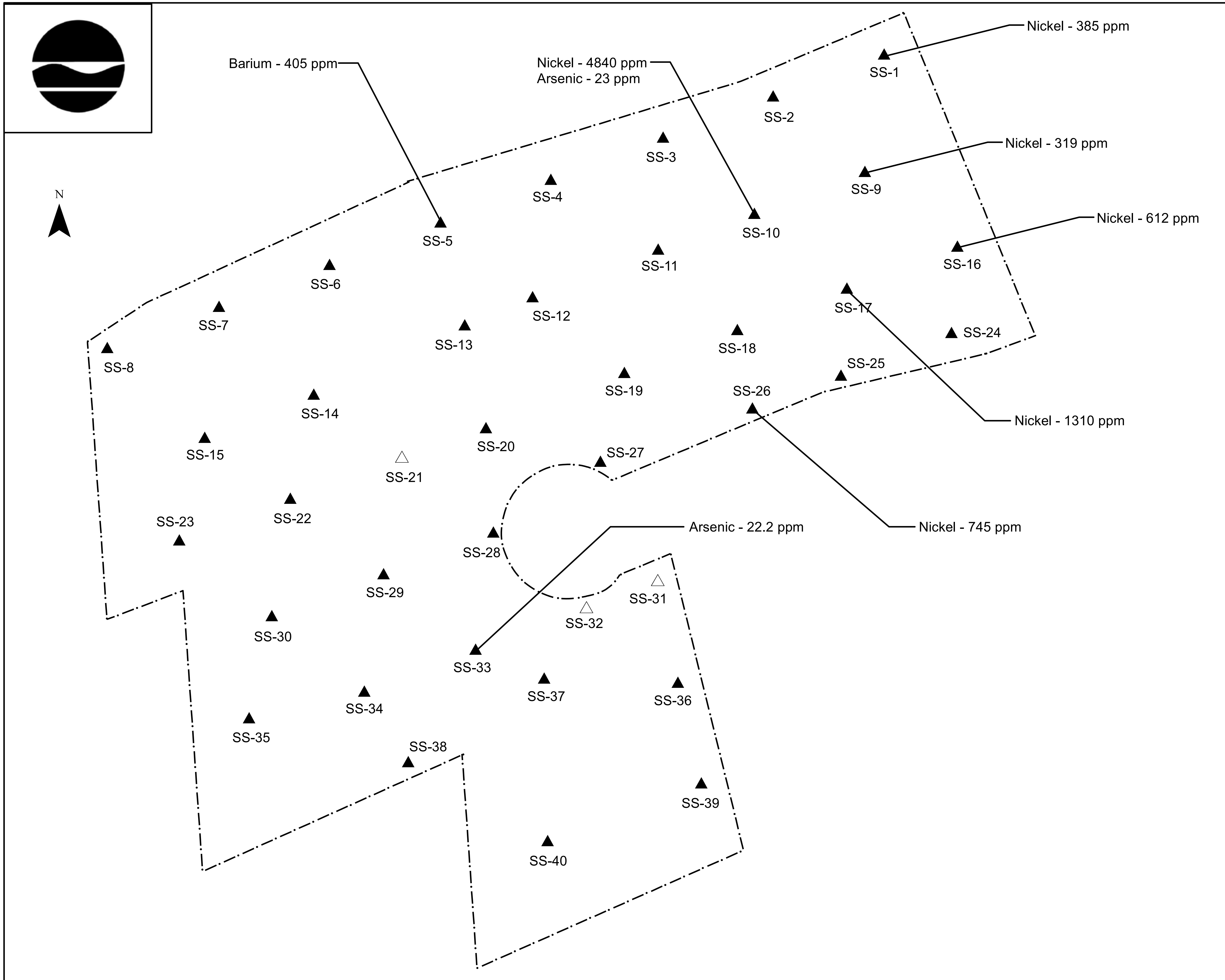

Figure 2 - Metal Contaminated Surface Soil

Former Syracuse Rigging Property
Site ID B00146
City of Syracuse, Onondaga County, New York

80 40 0 80 160 Feet

1 inch = 80 feet

Property Boundary

Surface Soil Sample Locatoin No Metals Exceed Unrestricted SCOs

Surface Soil Sample Locatoin One or More Metals Exceed Unrestricted SCOs

Nickel - 385 ppm

Surface Soil Sample Locatoin One or More Metals Exceed Commercial Use SCOs with Concentration of Metal Exceeding Commercial Use SCO (ppm - parts per million)

All locations approximate.

Based on "Site Investigation Report," December 2008, Beardsley Design Assoc.

Drawn: 2011-11-15 by JPC

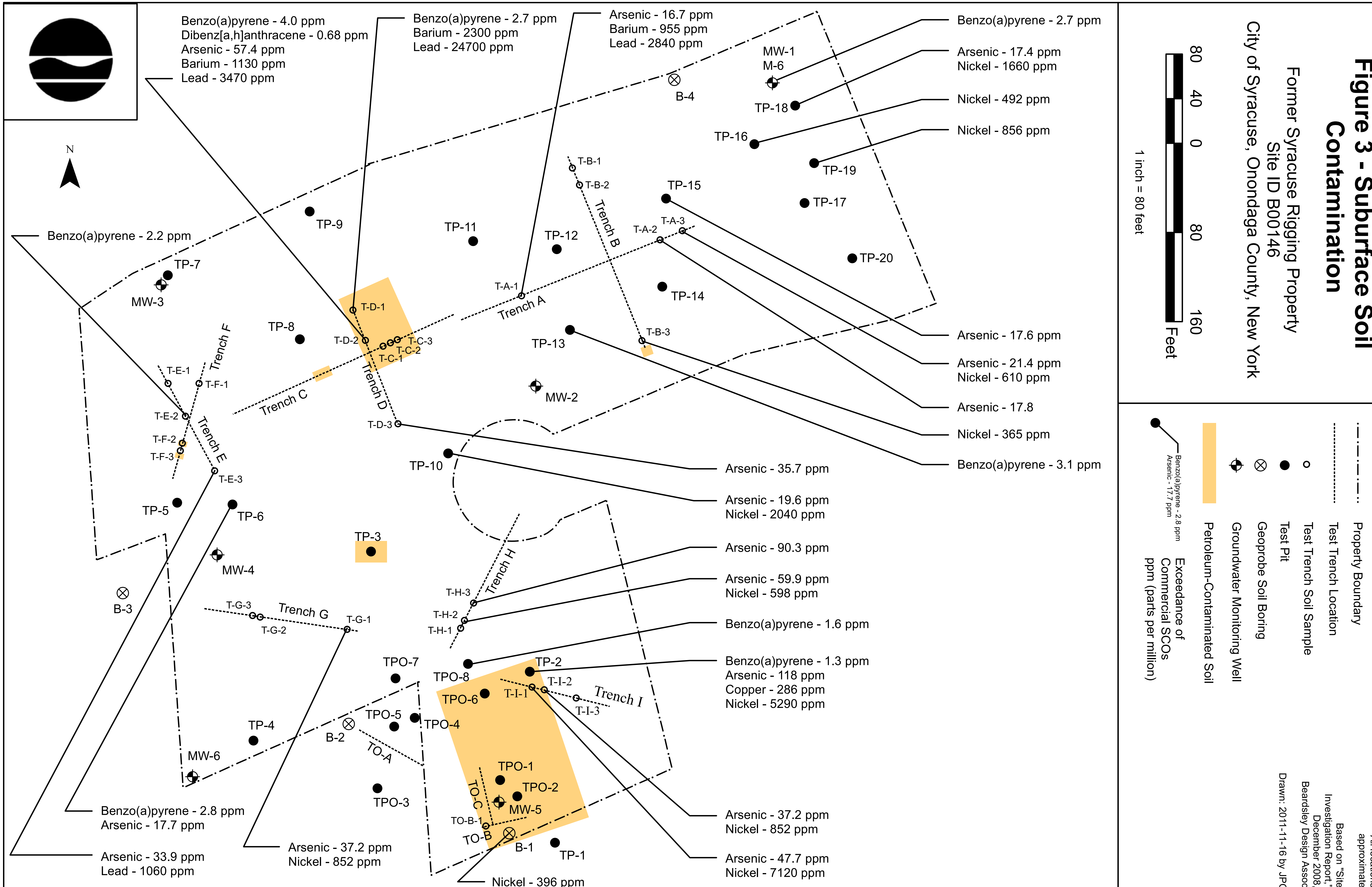

Figure 3 - Subsurface Soil Contamination

Former Syracuse Rigging Property
Site ID B00146
City of Syracuse, Onondaga County, New York

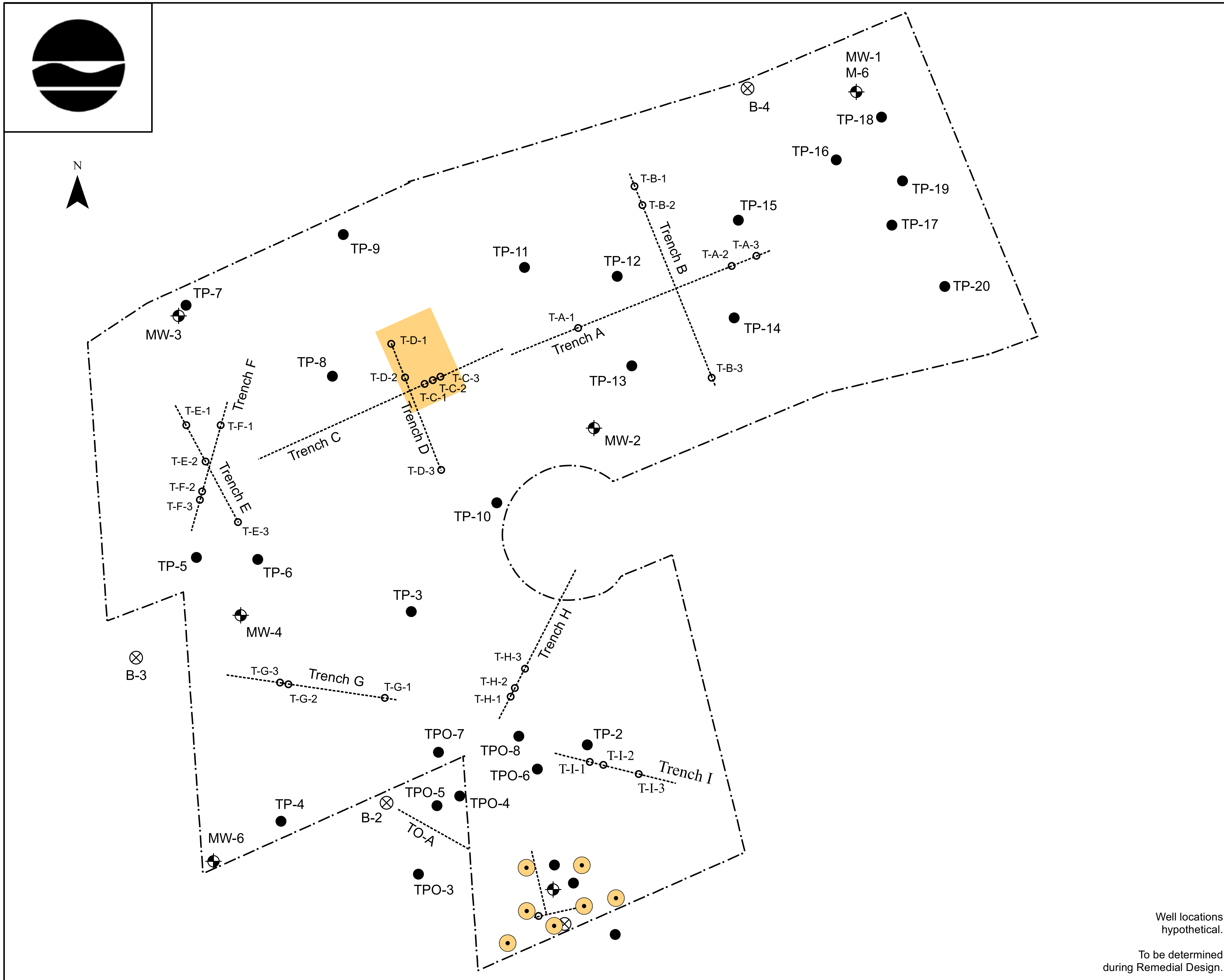

Figure 4 - Proposed Remedy

Alternative 4: Excavation, Oil Recovery & Site Cover

Former Syracuse Rigging Property
Site ID B00146
City of Syracuse, Onondaga County, New York

80 40 0 80 160
Feet
1 inch = 80 feet

Property Boundary
Extent of Cover System
Test Trench Location
Test Trench Soil Sample
Test Pit
Geoprobe Soil Boring
Groundwater Monitoring Well
Area of Excavation
Recovery/Extraction Well

All locations approximate.
Based on "Site Investigation Report," December 2008, Beardsley Design Assoc.
Drawn: 2011-11-16 by JPC