REMEDIAL WORK PLAN

For The Property Located At

7-17 Ludlow Street
City of Yonkers
Westchester County, New York

September 2014
Revised May 2015

NYSDEC BCP#: C360079

ESI File: WY07054.50
MA File: 214076.00

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I, Peter Setaro, certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

STATE OF NEW YORK PETER D. SETARO LICENSED PROFESSIONAL ENGINEER 077008

NYS Professional Engineer # 077008 | 5/12/15 (Date) | Signature

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

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APPENDICES

LIST OF ACRONYMS

AST	Aboveground storage tank
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
Bsg	below surface grade
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
COC	Certificate of Completion
CPP	Citizen Participation Plan
DSHM	Division of Solid & Hazardous Materials
ESCP	Erosion and Sedimentation Control Plan
ECL	Environmental Conservation Law
ECs	Engineering Controls
FER	Final Engineering Report
HASP	Health and Safety Plan
ICs	Institutional Controls
ISCO	In Situ Chemical Oxidation
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOL	New York State Department of Labor
NYSDOT	New York State Department of Transportation
ORC	Oxygen Release Compound
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbons
PBS	Petroleum Bulk Storage
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethylene
PID	Photoionization detector
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
RAOs	Remedial Action Objectives
RWP	Remedial Work Plan
RE	Remedial Engineer
RI	Remedial Investigation
RIR	Remedial Investigation Report
RRUSCOs	Restricted Residential Use Soil Cleanup Objectives
SAP	Sampling and Analysis Plan
SCOs	Soil Cleanup Objectives
SEQRA	State Environmental Quality Review Act
SMP	Site Management Plan
SoMP	Soil/Materials Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-slab Depressurization System
SVOCs	Semi-volatile Organic Compounds
SWPPP	Stormwater Pollution Prevention Plan
TAL Metals	Target Analyte List Metals
TCE	Trichloroethene
TCL	Target Compound List
QHHEA	Qualitative Human Health Exposure Assessment
UST	Underground Storage Tank
UUSCOs	Unrestricted Use Soil Cleanup Objectives
VOCs	Volatile Organic Compounds

EXECUTIVE SUMMARY

SITE LOCATION AND DESCRIPTION

The Site subject to this Brownfield Cleanup Agreement (the BCA) consists of approximately 0.6 acres and is described as follows:

Tax Map/Parcel ID: Section 1, Block 185, Lot 50

Street Number: 7-17 Ludlow Street, City of Yonkers, New York

Owner: Westhab, Inc.

BCA Index No: C360079

Previous Site Usage: Taxi Dispatch and Automotive Repair

The Site is a rectangular-shaped, approximately 0.6-acre parcel located on the northern side of Ludlow Street in the City of Yonkers, Westchester County, New York. A vacant two-story commercial building is located on the northeastern portion of the property and a vacant one-story commercial building is located on the north-central portion of the property. The remainder of the property is composed of paved parking and areas of overgrown vegetation. A Site Location Map and Proposed Remediation Map are s provided as Figures 1 and 2, in Appendix A.

SITE HISTORY

The Site was likely to have been used for commercial purposes from prior to 1942 until circa 2004, and included an on-site automotive repair shop and a taxi dispatching facility. During fieldwork performed by ESI in June 2011, petroleum impacts to the subsurface were encountered in the central portion of the site in the vicinity of a former 4,000-gallon gasoline UST. A spill event was reported to the NYSDEC who issued Spill #101042. The site was subsequently investigated to delineate the extent of on-site petroleum impacts (potential off-site impacts associated with the petroleum release will be addressed by the responsible party or by the NYSDEC under the Spill Response Program).

Following acceptance of the site into the NYSDEC BCP, a Remedial Investigation was performed consistent with BCP requirements and pursuant to a NYSDEC-approved Work Plan, dated March 2014. Portions of the site not covered by the previous Spill investigation were investigated and samples were collected and analyzed for additional parameters as required by the BCP. The results of this investigation were described in a Remedial Investigation Report, dated November 2014.

SUMMARY OF REMEDIAL INVESTIGATION

A Combined Phase I/II Environmental Site Assessment (Phase I/II ESA) was performed on the property by Ecosystems Strategies Inc. (ESI) in January 2011. ESI prepared a Supplementary Phase II Environmental Site Assessment (Supplementary Phase II ESA), dated May 20, 2011 was also prepared by this office.

- Soil borings extended in the central vicinity of the former UST documented the presence of petroleum contaminated soil at depths between 4 and 12'. Free product was also identified in one previously installed monitoring well in the immediate vicinity of the former UST (no product was identified in the other three monitoring wells). Based on these site conditions, a spill event was reported to the NYSDEC and Spill Number 1010142 was assigned to the site.

Borings extended during the BCP remedial investigation documented the absence of significant petroleum contamination at the site outside the areas already identified as petroleum contaminated. Metals at concentrations above guidance levels were detected in surface soils.

- Eleven test pits were extended in an area of disturbed ground that had been the location of a former on-site structure in the southwestern portion of the site on May 9, 2012 and seven test pits were extended across the site during the BCP Remedial Investigation in 2014. The purpose of these investigations was to document the presence or absence of regulated material in the subsurface (debris and/or field evidence of contamination) and to provide guidance as to the presence or absence of remaining underground storage tanks.

  Soils encountered during the extension of test pits generally consisted of medium reddish brown sandy soil with brick and concrete fragments (i.e., urban fill). A stone foundation wall was encountered at six feet below grade at the far western portion of the site. No USTs were encountered and no soils characterized as "grossly contaminated" were encountered during the extension of these test pits; however, the presence of poor quality urban fill was identified at several locations, including within the footprint of the proposed on-site structure.

- During the BCP Remedial Investigation two monitoring wells were installed and sampled [one upgradient, on-site well (2MW-1) and one downgradient, off-site well (3MW-2)] to augment data generated from previously installed wells. In addition, a water sample was collected from a previously existing cross-gradient on-site well to the east (MW-A). Data from these groundwater samples confirmed the absence of groundwater contamination upgradient (and cross gradient to the east) of the former UST grave. Off-site petroleum contamination was documented downgradient at 2MW-1. These findings may support the conclusion that on-site petroleum contaminated soils may have impacted on-and off-site groundwater.

- Tetrachloroethylene (PCE) and various petroleum hydrocarbons were detected in a soil gas sample (SV-1) collected beneath an existing northeastern on-site structure. Data support the need for active vapor interception in the future on-site structure. The absence of elevated concentrations of PCE in soil data indicates a limited source of these vapors.

- No PCBs or pesticides were identified in the location of a hydraulic lift in the western structure. Low levels of PAHs were detected within the urban fill.

- Fingerprint analysis of petroleum product contained in an on-site 275-gallon AST identified the product as fuel oil.

QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

Areas of surface soil contamination, which are not covered by buildings and/or pavement, are limited in areal extent and access to the site is restricted by a fence. These conditions are likely to minimize exposure to contaminants in surface soils. Contaminated subsurface soils are also present at well-defined portions of the Site. Petroleum contamination is present at the location of the former UST grave while areas of urban fill in the eastern and central portions of the site)

contain metals and SVOCs at concentrations above guidance levels there are, however, no ongoing exposures to these contaminants.

Groundwater downgradient of the former UST grave contains contaminants at levels with the potential to represent a health risk; however, the project site and adjoining and surrounding properties are served by the municipal water supply and there are no known uses of groundwater in the vicinity. Vapor intrusion into adjoining buildings to the west (from off-gassing of dissolved VOCs in the groundwater) is possible and will be evaluated as a component of post-remedial groundwater monitoring. Direct contact and/or inhalation of contaminated soils, groundwater, soil vapors or dust generated during future soil excavation are the most likely exposure pathways. On-site workers (or trespassers) present during future remediation and/or development activities are the most likely receptor population through dermal contact with soil or groundwater during such activities. The implementation of a Health and Safety Plan (incorporating a Community Health and Safety Plan), and Community Air-Monitoring Plan, will mitigate possible impacts to any potential receptor populations. Any Site-specific remedial designs that involve soil disturbance will be monitored, and mitigation plans to address potential dust generation and increased contaminant migration will be implemented. Removal of significantly contaminated soil, installation of a barrier soil layer and the use of engineering controls to mitigate contaminated soil vapor at this Site will prevent migration of the contamination from the soil and protect groundwater. Low-level residual contamination remaining in Site soils is likely to be relatively non-mobile and will be physically sequestered from surface areas.

SUMMARY OF REMEDY

The proposed remedy is a Track 4 (Restricted Residential Use) cleanup consisting of the following Standardized Remedial Elements:

SITE PREPARATION

- Building demolition, AST removal and hydraulic lift removal;

EXCAVATION

- Excavation, management and off-site disposal of soils contaminated with petroleum hydrocarbons in the central portion of the site, known to be source material (i.e. the source of groundwater contamination);
- Excavation, management and off-site disposal of poor quality urban fill generated by construction excavations;
- Confirmatory endpoint sampling to document the integrity of remaining soils in excavation areas;
- Back-filling excavated areas (as required) using imported clean fill that meets the requirements of 6NYCRR 375-6.7(d);

IN-SITU CHEMICAL TREATMENT

- Subsequent to excavation of petroleum contaminated soils, a one-time introduction of oxidants to subsurface soils will occur over that portion of the Site where petroleum-contaminated soils will remain.

COMPOSITE COVER SYSTEM

- Importation and placement of a protective 2' cover layer of certified clean fill overlying a demarcation layer in areas not covered with new structures and/or pavement.

VAPOR MITIGATION

- Installation of vapor barrier and an active sub-slab depressurization system (SSDS);

POST-REMEDIAL MONITORING

- Installation and post-remedial sampling of groundwater monitoring wells and evaluation of potential off-site vapor impacts;

POST-REMEDIAL SITE MANAGEMENT

- Implementation of a Site Management Plan (SMP) to manage and document the integrity of the soil cover, and to ensure proper operation and maintenance of the SSDS and/or any other Engineering Controls required for completion of the remedial activities and the long-term management of any residual contamination, including all operation, maintenance and monitoring plans;
- Imposition of Institutional Controls (an environmental easement) to restrict future use of the site to restricted-residential uses. The institutional controls are required to be in conformance with the NYSDEC approved SMP.

DOCUMENTATION

- Upon completion of remedial activities, a PE-certified FER will be prepared and submitted to the NYSDEC.

All responsibilities associated with the Remedial Action, including permitting requirements, will be addressed in accordance with all applicable Federal, State, and local rules and regulations.

1.0 INTRODUCTION

1.1 Purpose

Westhab, Inc. has enrolled in the New York Department of Environmental Conservation Brownfields Cleanup Program (NYSDEC BCP) to investigate and remediate a 0.6-acre parcel located at 7-17 Ludlow Street, Yonkers, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Work Plan (RWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

All proposed work will be conducted according to a Site specific Health and Safety Plan (HASP), provided as Appendix B, a Community Air Monitoring Plan (CAMP), provided as Appendix C.

1.2 Site Location and Description

The property is a rectangular-shaped, approximately 0.6-acre parcel located on the northern side of Ludlow Street in the City of Yonkers, Westchester County, New York. A vacant two-story commercial building is located on the northeastern portion of the property and a vacant one-story commercial building is located on the north-central portion of the property. The remainder of the property is composed of paved parking and areas of overgrown vegetation. A Site Location Map and Proposed Remediation Map are provided as Figures 1 and 2, in Appendix A.

1.3 Previous Environmental Reports

A Combined Phase I/II Environmental Site Assessment (Phase I/II ESA) was performed on the property by ESI in January 2011 and a Supplementary Phase II Environmental Site Assessment (Supplementary Phase II ESA) was also prepared by this office, dated May 20, 2011. Following the acceptance of the site into the NYSDEC BCP a Remedial Investigation was performed consistent with BCP requirements. Portions of the site not covered by the previous Spill investigation were investigated and samples collected were analyzed for additional parameters required by the BCP.

Phase I/II ESA

The Phase I/II ESA found that the subject property was likely to have been used for commercial purposes from prior to 1942 until circa 2004, and included an on-site automotive repair shop and a taxi dispatching facility; however, the portions of the site formerly used for automotive repair purposes were inaccessible due to the presence of large quantities of debris in the buildings and were therefore not investigated (these areas were subsequently inspected during the completion of fieldwork for the RI). There is evidence to suggest that previous work had been performed at the site (e.g., the presence of a monitoring well field and indications of tank removal work) but no documentation was provided describing this work. It was recommended that borings be extended in former automobile repair areas to document the integrity of subsurface soils in the vicinity of these historic activities.

During fieldwork activities, one of the previously installed monitoring wells was inspected and found to contain free product. Soil borings extended in the vicinity of the monitoring well documented the presence of petroleum contaminated soil at depths between 4 and 12'. Soil borings extended in the central and western portions of the site documented the presence of petroleum contaminated soils at the groundwater interface (between 7' and 12' bsg). Based on these site conditions, a spill event was reported to the NYSDEC and Spill Number 1010142 was assigned to the site.

The Phase I/II ESA recommended that contaminated soils in the vicinity of the central monitoring well be excavated and be properly disposed of off- site (it was estimated that ~300-500 cubic yards of such material was present on-site). The Phase I/II ESA also recommended that additional groundwater monitoring wells be installed to document the extent of dissolved VOC contamination.

Supplementary Phase II ESA

The Supplementary Phase II ESA found no field evidence of petroleum contamination in soil borings extended inside the former automotive repair structures. Laboratory data also documented the absence of contamination in samples collected from within these two structures. No further investigation of the subsurface within these two on-site structures was recommended.

Free product was again measured at monitoring well MW-C and 2MW-1. Elevated concentrations of VOCs were detected in monitoring well 2MW-2, located hydrologically downgradient of the locations where measureable free product on the groundwater was documented. These findings support the conclusion that previously documented on-site soil contamination has contaminated on-site groundwater. The Supplementary Phase II ESA concluded that it was likely that remediation of these soils will remove the source of the groundwater contamination.

Subsurface Investigation in Area of Disturbed Ground

Eleven test pits were extended in an area of disturbed ground that that been the location of a former on-site structure in the southeastern portion of the site on May 9, 2012. The purpose of the investigation was to document the presence or absence of regulated material in the subsurface (debris and/or field evidence of contamination). Test pits were extended using a standard back hoe (with a maximum reach of 14') below surface grade to a maximum depth of 10' below grade where native, undisturbed soils were encountered.

Soils encountered during the extension of test pits generally consisted of medium reddish brown sandy soil with brick and concrete fragments. A stone foundation wall was encountered at six feet below grade at the far western portion of the site. No evidence of regulated materials or field evidence of contamination was encountered during the extension of test pits. In the absence of field evidence of contamination, no soil samples were collected and no further investigation was recommended.

Remedial Investigation

A Remedial Investigation Work Plan, dated March 2014 and approved by NYSDEC letter dated March 28, 2014 was implemented at the site between June 10 and August 27, 2014. Fieldwork included the extension of seven test pits; four mechanized borings and three hand borings; the installation of two monitoring wells; one soil vapor sample; and, one petroleum product finger print analysis (contents of AST).

The Remedial Investigation Report (RIR) documented the absence of significant soil contamination (concentrations above Restricted Use "Restricted-Residential" Soil Cleanup Objectives [RRUSCOs]) at the Site outside the areas of known petroleum contamination; however, soils containing debris materials were observed within the footprint of the proposed structure.

The installation and sampling of two monitoring wells (one upgradient, on-site well and one downgradient, off-site well) confirmed the presence of elevated concentrations of petroleum compounds in off-site, down-gradient groundwater, and an absence of groundwater contamination upgradient of the former tank grave. These findings may support the conclusion that off-site contamination originates on-site and removal of the petroleum contaminated soil at the location of the former tank grave will remove the source of groundwater contamination.

One solvent (PCE) was detected in soil vapor beneath the northeastern on-site structure. No other vapor impacts were detected.

No PCBs were detected in the vicinity of the hydraulic lift in subsurface soils beneath the western building and no phenolic compounds were encountered at the Site.

1.4 Environmental Conditions Warranting Remediation

The following terms are used in the summary discussion, below, and throughout this RWP:

"Contaminated" describes media having analyte concentrations exceeding the applicable standards, criteria and guidance established for the Site (see Section 4.1.3), which are based on the following:

Soil	RRUSCOs provided in 6NYCRR 375-6.8(b)
Water	Ambient water quality standards and guidance values (AWQSGV) presented in NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (TOGS 1.1.1)
Vapor	Air Guideline Values (as applicable) presented in NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH Guidance)

"Grossly contaminated" describes soil, sediment, surface water or groundwater which contains sources or substantial quantities of mobile contamination in the form of free product that is identifiable either visually, through strong odor, by elevated contaminant vapor levels or is otherwise readily detectable without laboratory analysis.

"*Source material*" describes petroleum contaminated soil (some of it grossly contaminated) at the location of the former gasoline tank, which is the source of down-gradient petroleum contamination.

"Petroleum impacted" describes media which exhibit field evidence of contamination, but do not meet the definition of "contaminated" or "grossly contaminated".

"Urban fill" describes soil mixed with non-native, exempt material (i.e. stone, concrete or brick) that may require removal from the site because it is unsuitable for use during site development.

"Poor quality urban fill" describes soils mixed with non-exempt materials (e.g. glass, fabric, metal or wood).

The following environmental conditions warranting remediation have been documented to be present on this Site, based on previous investigations completed by ESI:

- Petroleum-contaminated soil containing VOCs at concentrations above RRUSCOs and considered to be source material is present from approximately 4 feet to approximately 12 feet below grade in a limited area in the center of the site (the location of the former gasoline tank). During investigations conducted in April 2011, the peak VOC concentration in soils encountered at this location was total xylenes at 120,000 ug/Kg. The total volume of soil at levels warranting response (i.e. contaminated or grossly contaminated soil) is estimated at 500 cubic yards. To the west and south of this area, petroleum impacted and contaminated soil is present at the groundwater interface (10-13 feet below surface grade) although total hydrocarbon concentrations decrease with distance from the source. This material will be subject to in-situ treatment with chemical oxygenating compounds.
- Urban fill soils are present throughout the site at depths ranging from the surface to 4 feet bsg (southwest portion of the site) to 13 feet bsg (south central portion of the site). Some of these materials are poor quality urban fill containing metal, brick, minor percentages of putrescible materials interspersed with soil. Laboratory analysis document the presence of elevated metals and semi-volatile hydrocarbons in some of these soils. The total volume of soils required to be removed for construction purposes is estimated at 3,500 cubic yards and may include petroleum impacted and contaminated soil, urban fill and poor quality urban fill.
- Dissolved VOCs (peak concentration total xylenes at 3000 ug/L) had historically been documented in on-site groundwater at concentrations above AWQSGV downgradient of the area of source material (2MW-2, April 2011). This monitoring well has since been destroyed. Historical observations at a monitoring well at the location of the tank grave documented limited presence of free product (this well, MW-C, has since been rendered unusable). It is anticipated that removal of the upgradient contaminated and grossly contaminated source soils will result in improvements to down gradient groundwater quality. No other constituents of concern were noted in on-site groundwater.

  The lateral extent of groundwater contamination down gradient of the Site is not known.

- The footprint of the proposed on-site residential structure extends across areas of known soil and groundwater contamination. Although petroleum impacted soils will be removed, the potential will remain for vapor impacts to the interior air of the proposed on-site structure from petroleum contaminated groundwater. It is anticipated that removal of the source (petroleum contaminated soil) will cause groundwater contaminant levels to decrease over time. Tetrachloroethylene (PCE) in soil vapor, detected in a sample collected in the floor of the northeastern vacant building (SV-1), also represents a potential vapor intrusion threat.

1.5 Proposed Development

The 26,000 square foot site will be improved with a 71-unit HUD Section 202 - Supportive Housing for the elderly, mixed-finance rental building for very low-income elderly singles (< = 30% AMI and 30%-50% AMI). The building will be approximately 62,793 gross square feet and will have 8 above-ground residential floors and will be slab on grade with no basement. The building will have 70 one-bedroom apartments, 1 two-bedroom apartment for the Superintendent, surface parking, a laundry room, a community room and management offices.

The building has a footprint of approximately 5,500 square feet. Pavement (including sidewalks) comprise approximately 11,500 square feet. The balance of the Site (9,000 square feet) is landscaped.

2.0 REMEDIAL WORK PLAN: OVERVIEW

This RWP details response actions proposed to address known soil and groundwater and vapor intrusion contamination at the Site, as identified above. A Proposed Remediation Map depicting relevant Site features, conditions of concern, and areas of proposed remedial activities, is provided in Appendix A. All proposed work will be conducted according to a Site specific HASP, provided as Appendix B, and a CAMP, provided as Appendix C.

For the purpose of the work detailed in this RWP, the "Client" is defined as Westhab, Inc., who will contract with the environmental consultant and/or remediation firm (hereafter referred to as the On-site Coordinator [OSC]) to provide the services detailed below.

2.1 Overview of Proposed Remediation Services

The proposed remedial services described in detail in subsequent sections of this RWP consist of the following:

1. Demolition of the on-site buildings (including disposal of the AST and the hydraulic lift) in accordance with applicable NYSDOL (12 NYCRR Part 56) and NYSDEC (6 NYCRR Part 360) regulations for asbestos and disposition of resulting debris, respectively (Sections 4.2.1 and 4.2.2).
2. Pump out and proper disposal of fuel oil contained in the remaining on-site AST and any liquids associated with the hydraulic lift (Section 4.2.2.7).
3. Excavation and disposal of any contaminated soil associated with the hydraulic lift. Confirmatory end point sampling will be performed (Section 4.2.2 and 4.4).
4. The excavation and off-site disposal of source material at the location of the former UST (Section 4.2.2). Excavations will conclude after grossly contaminated soils have been removed and confirmatory endpoint samples document the absence of petroleum compounds at concentrations above RRUSCOs. It is estimated that a volume of approximately 500 cubic yards of such material will be generated. In addition, approximately 3,500 cubic yards of fill material will be generated by construction excavations (see Section 4.2.2 for detailed description of soils). Subject to confirmatory waste characterization sampling, all excavated material will be managed and disposed of as non-hazardous regulated waste. Post-excavation confirmatory endpoint sampling will be conducted to document the integrity of remaining soils.
5. Backfilling excavated areas, if required. Any materials proposed for import onto the Site will be approved by the NYSDEC in accordance with Part 375-6.7(d) (Sections 4.2.2.6 and 4.2.2.9).
6. Installation and sampling of three groundwater monitoring wells (two replacement wells and an additional downgradient well) to document the lateral extent of the dissolved constituents (Section 4.6, below).
7. Subsurface introduction of oxidants over that portion of the Site where petroleum-contaminated soil is proposed to remain. The introduction will be a one-time event, with the expresses intent to reduce concentrations of dissolved hydrocarbons in down-gradient groundwater (Section 4.7).

8. Installation of a vapor barrier to be augmented by an active sub-slab depressurization system to manage potential vapors remaining beneath the proposed on-site structure (Section 4.8).
9. The installation of a protective barrier layer (2' thick barrier of clean fill, building foundations, and paved areas) throughout the entire Site, to prevent exposures to any remaining contaminants present above RRUSCOs (Section 4.9).
10. Documentation of site remediation/closure services in the form of a PE-certified Final Engineering Report (see Section 6.0, below).

2.2 Governing Documents

All remedial work performed under this plan will be in full compliance with the governing documents described in this section of the RWP.

2.2.1 Site Specific Health and Safety Plan (HASP)

All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA. The Volunteer and associated parties preparing the remedial documents submitted to the State, and those performing the construction work, are completely responsible for the preparation of an appropriate HASP and for the appropriate performance of work according to that plan and applicable laws.

The site-specific HASP and requirements defined in this RWP pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion (COC). A copy of the HASP is provided as Appendix B of this report.

The site-specific HASP will be reviewed with Site personnel and appropriate sub-contractors prior to the initiation of fieldwork. All proposed work will be performed in "Level D" personal protective equipment unless field condition warrant additional protection.

The Site Safety Coordinator for environmental matters will be Paul H. Ciminello unless otherwise specified (and approved by) the NYSDEC. A resume is included in Appendix G.

Confined space entry, if required, will comply with all OSHA requirements, including addressing the potential risk posed by combustible and toxic gasses. Potential confined spaces on this project include utility trenches and other excavation areas.

2.2.2 Quality Assurance Project Plan (QAPP)

A QAPP, detailing procedures necessary to generate data of sufficient quality and quantity to represent successful performance of the Remedial Action at the Site, has been provided as Appendix D of this report. The QAPP includes a Sampling and Analysis Plan (SAP), detailing sampling and analysis of all media (endpoint samples, waste characterization samples, fill and soil cover samples, etc.), and which identifies methods for sample collection and handling.

2.2.3 Soil/Materials Management Plan (SoMP)

All soil removal will follow the SoMP plan as specified in Section 5.2, below. All contaminant source removal areas will be surveyed at the completion of excavation. This information will be provided on maps in the FER.

2.2.4 Stormwater Pollution Prevention Plan (SWPPP)

The Volunteer is responsible for ensuring that a storm water pollution prevention plan (SWPPP) will be prepared for the Site prior to demolition and soil removal activities. The plan will accommodate the construction sequencing and staging areas. The erosion and sediment controls will be in conformance with requirements presented in The New York Standard and Specifications for Erosion and Sediment Control.

2.2.5 Community Air Monitoring Plan (CAMP)

The NYSDOH Generic CAMP (provided in Appendix C) will be initiated during all ground intrusive activities, and during any other fieldwork that is reasonably likely to generate significant dust or vapors from known or suspected contaminated soils. The implementation of the CAMP will document the presence or absence of VOCs and dust in the air surrounding the work zone, which may migrate off-site due to fieldwork activities. This plan provides guidance on the need for implementing more stringent dust and emission controls based on air quality data.

Mitigation measures may include reducing the surface area of contaminated soil being disturbed at one time, watering exposed soils to reduce fugitive dust and odors, or stopping excavation activities. Dust suppression activities will be conducted during construction activities that will disturb on-site soils and may include misting, reduction in soil movement, or cessation of excavation.

Continuous air monitoring will be conducted for VOCs and dust during all ground intrusive activities (including soil/waste excavation and handling, test pitting/trenching, and installation of soil borings or monitoring wells) and during the demolition of any structure known or suspected to be contaminated. Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of soil or groundwater samples (continuous monitoring may be conducted based on the proximity of potential sensitive receptors).

Monitoring for VOCs will occur at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified using a PID (upwind concentrations will be measured to establish background conditions). If concentrations of organic vapors at the downwind perimeter of the work area or exclusion zone exceed 5 ppm above background for the 15-minute average, work activities will be temporarily halted. Organic vapor concentrations persistently in excess of 5 ppm over background (but less than 25 ppm) will require identification of the source and corrective actions. Organic vapors 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure (whichever is less, minimum distance 20 feet) must be below 5 ppm over background for the 15-minute average. All work activities will stop if organic vapors are above 25 ppm at the perimeter of the work area.

Odors from the excavation of petroleum contaminated soil may be an issue at this Site. Odor control will be accomplished by wetting soils or through the use of commercially available odor-suppressing foam, which can be sprayed directly onto exposed soils. Thresholds for the implementation of odor-suppression measures will be based on the needs of Site personnel (i.e.

odors interfere with work activities or have acute health impacts) and on the presence of significant objectionable odors at Site boundaries, which could impact off-site receptor populations. Odor suppression will be conducted at any time that odor complaints are received from neighboring properties or local regulatory authorities, or if so directed by NYSDEC personnel.

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less). Specific locations will change daily, depending on the work being conducted and the direction of the wind. Fugitive dust migration will also be visually assessed during all work activities. Dust suppression techniques will be employed if downwind particulate levels are 100 micrograms per cubic meter (mcg/m^3) greater than background or if airborne dust is observed leaving the work area (work may continue with dust suppression techniques provided that downwind particulate levels are not greater than 150 mcg/m^3 above background and no visible dust is migrating from the work area). Work will be stopped and procedures will be re-evaluated if downwind particulate levels are greater than 150 mcg/m^3 above background.

2.2.6 Contractors Site Operations Plan

The Remedial Engineer (RE) has reviewed all plans and submittals for this remedial project (including those listed above and contractor and sub-contractor document submittals) and confirms that they are in compliance with this RWP. The RE is responsible to ensure that all later document submittals for this remedial project, including contractor and sub-contractor site operation plans and/or other document submittals are in compliance with this RWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

2.2.7 Community Participation Plan

A Citizen Participation Plan (CPP) including an overview of the BCP program, background of the Site, a summary of the investigative findings for the Site, and citizen participation activities is included as Appendix E.

A certification of mailing will be sent by the Volunteer to the NYSDEC Project Manager following the distribution of all Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet, (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all of applicable project documents.

No changes will be made to the approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing.

Project documents will be available for review on line at the NYSDEC web site and document repository has been established at:

Yonkers Public Library
1 Larkin Center
Yonkers, New York 10701
(914) 337-1500

2.3 General Remedial Construction Information

2.3.1 Project Organization

Resumes of key personnel involved in the Remedial Action are included in Appendix G.

2.3.2 Key Personnel

Key personnel as proposed for this remedial project are provided below. No change in key personnel will occur without prior notification to the NYSDEC.

2.3.2.1 Remedial Engineer

The Remedial Engineer for this project will be Peter Setaro, P.E. of Morris Engineering. The RE is a registered professional engineer licensed by the State of New York and will have primary direct responsibility for implementation of the remedial program for the Ludlow Site (NYSDEC Site No. C360079). The RE will certify in the Final Engineering Report (FER) that the remedial activities were observed by qualified environmental professionals under the supervision of the RE, and that the remediation requirements set forth in the RWP, the SWPPP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other RE certification requirements are listed later in this RWP.

The RE will coordinate the schedule and services of remedial subcontractors only. Remedial services include: contaminated soil excavation, stockpiling, characterization, removal and disposal; endpoint sampling of remaining soils; introduction of oxidants to the subsurface; air monitoring; emergency spill response services; management of waste transport and disposal; import of clean back fill material; installation of a vapor barrier; and, implementation of a SMP (as needed) for remaining Site controls after the certificate of completion is issued. The RE will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The RE will review all plans submitted by contractors for compliance with this RWP and will certify compliance in the FER. The RE will provide the certifications listed in Section 6.2 in the FER.

2.3.2.2 Qualified Environmental Professional

The Qualified Environmental Professional (QEP) for this project will be Paul Ciminello. The QEP will oversee environmental remedial activities on the Site, document the proper removal of contaminated soils, collect waste characterization as well as site integrity samples, inspect and certify the proper importation of approval fill soils, and assist the Remedial Engineer in the preparation of documents including the FER, the SMP, and periodic status reports.

2.3.3 Remedial Action Construction Schedule

A schedule for the performance of remedial work is provided in Section 6 of this RWP.

2.3.4 Work Hours

Remedial work will be conducted between the hours of 7 AM and 5 PM Monday through Friday. No remedial work will be conducted on the weekend (Saturday or Sunday) unless expressly permitted by NYSDEC. Construction activities not related to site remediation may occur on weekends and holidays.

2.3.5 Site Security

The Site will be secured at a minimum with a six foot fence and locking gates to protect the public during all construction activities.

2.3.6 Traffic Control

Traffic control will be provided by the contractor during equipment entrance and egress from the Site. Trucks will follow the approved truck route in Section 2.2.3.4.

2.3.7 Contingency Plan

If unknown conditions are encountered on-site during sub-grade removal (e.g., discovery of a previously unidentified UST), the Contingency Plan (provided in Section 5.7) and all applicable NYSDEC guidelines will be followed to address the condition(s).

2.3.8 Worker Training and Monitoring

The Volunteer is responsible for insuring that all Site contractors provide their workers with applicable training (i.e. HAZWOPER, site safety training and medical monitoring, as necessary).

2.3.9 Agency Approvals

The Volunteer has addressed all State Environmental Quality Review Act (SEQRA) requirements for this Site. All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

The planned end use for the Site has an approved plan, and is therefore in conformance with City of Yonkers zoning requirements for the property. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

2.3.10 NYSDEC BCP Signage

A project sign will be erected at the main entrance to the Site prior to the start of any remedial activities. The sign will indicate that the project is being performed under the New York State Brownfield Cleanup Program. The sign will meet the detailed specifications provided by the NYSDEC Project Manager.

2.3.11 Pre-Construction Meeting with NYSDEC

A pre-construction meeting among NYSDEC, the Volunteer, ESI, the RE and the designated Contractor will take place prior to the start of major construction activities.

2.3.12 Emergency Contact Information

An emergency contact list with names and telephone numbers that will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency is provided below.

Table: Emergency Contact Information

Emergency Contact	Phone Number
EMERGENCY	**911**
St. Joseph's Medical Center, 127 Broadway	(914) 378-7000
Yonkers Police Department	(914) 377-7252 or 911
Yonkers Fire Department	(914) 377-7555 or 911
Yonkers City Hall	(914) 377-6000
Yonkers City Water/Sewer	(914) 966-8015
Site Health and Safety Officer, Paul Ciminello, ESI	(845) 452-1658
Remedial Engineer, Peter Setaro, PE	(845) 454-3411
NYSDEC Project Manager, William Wu	(518) 402-9662
NYSDOH Project Manager, Maureen Schuck	(518) 402-7860
Construction Manager	TBD

2.3.13 Remedial Action Costs

The total estimated cost of the Remedial Action is $624,401 (Track 4). An itemized and detailed summary of estimated costs for all remedial activities is provided in Appendix H. This will be revised based on actual costs and submitted as an Appendix to the Final Engineering Report.

2.4 Site Preparation

2.4.1 Mobilization

Site mobilization will be conducted in a manner such that erosion and sedimentation control, utility marker and easement layout, and other site preparation tasks are fully instituted before construction begins.

2.4.2 Erosion and Sedimentation Controls

This section describes preventative measures that will be taken to protect the Site from soil erosion and sedimentation during remedial activities. A final ESCP, reflecting final Site development plans and any approved modifications to the scope of remedial work, will be submitted to the NYSDEC for review and approval prior to the start of construction activities.

The final ESCP will include the following elements:

- A location map including the proximity of the Site to relevant off-site features;
- An Existing Conditions Site Plan;
- A grading plan and construction timetable including finished elevations and addressing the sequencing of the project; and,
- The location and type of all erosion and sediment control measures (e.g., silt fence, hay bale checks, stabilized construction entrance, etc.) and sequencing of the measures, if needed.

The Site remediation will occur in such a way as to permit on-site stormwater to remain on the Site.

2.4.3 Stabilized Construction Entrance

A stabilized construction entrance will be included as part of the erosion and sedimentation control for the Site. This stabilized construction entrance will be designed such that there is continuity between the truck wash and the stone-based egress path so that trucks do not become re-contaminated prior to departure from the Site. A design specification for the stabilized construction entrance is included on the Erosion Control Plan in Appendix F.

2.4.4 Utility Marker and Easements Layout

The Volunteer and its contractors are solely responsible for the identification of utilities that might be affected by work under the RWP, and implementation of all required, appropriate or necessary health and safety measures during performance of work under this RWP. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this RWP. The Volunteer and its contractors must obtain any local, State, or Federal permits or approvals pertinent to such work that may be required to perform work under this RWP. Approval of this RWP by NYSDEC does not constitute satisfaction of these requirements.

The presence of utilities and easements on the Site has been investigated by the RE. It has been determined that no risk or impediment to the planned work under this RWP is posed by utilities or easements on the Site.

2.4.5 Sheeting and Shoring

Appropriate management of structural stability of on-site or off-site structures during on-site activities, including excavation, is the sole responsibility of the Volunteer and its contractors. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this plan. The Volunteer and its contractors must obtain any local, State, or Federal permits or approvals that may be required to perform work under this Plan. Further, the Volunteer and its contractors are solely responsible for the implementation of all required, appropriate or necessary health and safety measures during performance of work under the approved Plan, in accordance with all applicable federal OSHA regulations.

2.4.6 Equipment and Material Staging

Specific Site areas will be designated for the staging of equipment and materials. Staging areas will be located and managed such that: a) non-contaminated materials do not contact or become intermixed with contaminated materials; and, b) the likelihood of worker and/or visitor exposures to contaminated media is minimized.

2.4.7 Decontamination Area

Decontamination of field equipment will be conducted to prevent Site cross-contamination, minimize the potential for off-site contamination and to reduce exposures to contaminated media. All decontamination activities will be documented in field logbooks.

Trucks and other heavy equipment remaining on-site will be brushed to remove easily accessible gross accumulations of soil at the end of each work day, and prior to moving between excavation areas or moving toward the Site exit. A dedicated decontamination area will be provided as part of the erosion and sedimentation control for vehicles exiting the Site, and will be designed such that there is continuity between the equipment wash area and the stone-based egress path. Heavy equipment will be brushed and sprayed with high-pressure water and/or steam to remove soil adhering to surfaces (including wheels and vehicle undercarriages), prior to exiting the Site.

Any non-disposable sampling equipment or personal protective equipment requiring decontamination will be conducted on a decontamination line setup on plastic sheeting, proceeding from dirty to clean. All items (disassembled as needed) will be washed/brushed thoroughly in an Alconox (or similar) solution, then rinsed with clean water (and/or nitric acid and methanol, as appropriate) per established USEPA decontamination protocols. All down-hole gauging and pumping equipment will be allowed to run fully submerged in both soapy and clean water. Rinse blanks will be collected as per the requirements of the QAPP.

All decontamination stations will be placed in areas that will subsequently be covered by a barrier layer (likely to consist of both buildings/pavement and imported clean soil); no decontamination activities will occur in areas where soil meets RRUSCOs and is not subject to an engineering control. Equipment known or suspected to be impacted by petroleum or solvent contamination, grossly contaminated media or materials subject to conditions specified in the Contingency Plan (Section 2.3.7), will be decontaminated on an engineered pad designed to capture and contain wash water, which will be containerized and characterized prior to off-site disposal at a permitted facility. Based on known contaminant conditions and the requirement for installation of a barrier layer, decontamination rinse water generated during other decontamination activities will be allowed to infiltrate into on-site soils, either directly to the surface (for minor quantities of water that are not likely to exhibit sheet flow) or to the subsurface via engineered discharge pits (see Section 2.4.7).

2.4.8 Site Fencing

Site fencing (6 feet in height with a locking gate) will be installed as part of Site preparation, as necessary.

2.4.9 Well Decommissioning

Existing monitoring wells located within construction areas will be properly decommissioned according to technical guidance provided in NYSDEC CP-43: Groundwater Monitoring Well Decommissioning Policy. The monitoring well casing will be exposed to a depth corresponding to the depth of planned excavation in the immediate vicinity of the well, the exposed casing will be cut off at the level of the excavation floor and the remaining subsurface portion of the casing will be grouted in-place, as per CP-43 Section 6.0.

2.4.10 Demobilization

Demobilization will address (as applicable):

- Restoration of areas that may have been disturbed to accommodate support areas (e.g. staging, decontamination, storage, temporary water management, and access;
- Removal of temporary access areas (whether on-site or off-site) and restoration of disturbed access areas to pre-remediation conditions;
- Removal of sediment and erosion control measures and disposal of materials in accordance with acceptable rules and regulations;
- Equipment decontamination; and,
- General refuse disposal.

2.5 Reporting

All written communications and reports, documenting ongoing remedial activities, will be included in the FER. The NYSDEC assigned project number will appear on all reports.

2.5.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by noon of the following day, and will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to an alpha-numeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP findings, including excursions; and,
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RWP or other sensitive or time critical information. However, descriptions of such conditions will be included in the reports. Emergency conditions and changes to the RWP will be addressed directly to NYSDEC Project Manager via personal communication.

2.5.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within ten days following the end of the month of the reporting period, detailing:

- Site activities during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed;
- Approved activity modifications, including changes of scope and/or schedule;
- Any sampling results following internal data review and validation, as applicable; and,
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

2.5.3 Other Reporting

Photographs of acceptable quality will be taken to document all remedial program elements, including representative pre-remediation conditions and all remedial activities, and submitted to NYSDEC in digital (JPEG) format. Representative photographs will be provided of each contaminant source, source area and Site structure before, during and after remediation. Submission to NYSDEC will be on compact disk (CD) or other acceptable electronic media, and will be sent to the NYSDEC Project Manager (2 copies) and to the NYSDOH Project Manager (1 copy). CD's will have a label and a general file inventory structure that separates photographs into directories and sub-directories according to logical remedial action components. A log keyed to file ID numbers will be prepared to provide an explanation for all representative photographs. Submission will be on a monthly basis or another agreed upon time interval.

Job site record keeping for all remedial work will be appropriately documented. These records will be maintained on-site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

2.5.4 Complaint Management Plan

Any complaints from the public regarding nuisances or other Site conditions will be handled as follows:

- Information from the person making the complaint (name, phone number, address, etc.) will be obtained, if possible, so follow-up can be completed.
- The nature of the complaint as well as the date, time, and weather conditions will be noted.
- The complaint will be addressed by on-site personnel.
- The person logging the complaint will be re-contacted (if contact information was provided), so that the resolution of the complaint can be documented.
- In the event that the complaint cannot be resolved, the NYSDEC project manager will be contacted in writing.

2.5.5 Deviations from the Remedial Action Work Plan

It is not anticipated that Site development will be conducted in a manner that substantially deviates from the RWP; however, if conditions are encountered that require deviation from the RWP, the following approval process will be followed:

- Immediate notification of the NYSDEC by telephone for conditions requiring immediate action (e.g., conditions judged to be a danger to on-site personnel or the surrounding community).
- For all other changes/editions to the RWP, a formal request (by letter or memorandum) will be submitted to the NYSDEC for review and approval prior to implementation at the Site.

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

3.1 Evaluation of Remedial Alternatives

This section identifies and assesses remedial alternatives that have been selected for possible implementation at the Site. Subsequent to identification, each alternative is assessed relative to the review criteria specified in NYSDEC guidance documents on Brownfield Sites. Specifically, each alternative is assessed relative to:

- Protection of human health and the environment;
- Compliance with standards, criteria, and guidelines (SCGs);
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community acceptance; and,
- Land use.

3.2 Selection of the Preferred Remedy

This Section identifies reasonable remedial options, summarized in Table A, below.

Table A: Summary of Alternatives Subject to Screening

Alternative	Benefits	Deficiencies
No Further Action (No Site Development)	Easily implemented Minimal additional costs	No short- or long-term effectiveness Not protective of human health or the environment
Track 1 Full Soil Removal with Short-Term Controls	Protective of human health and the environment Long- and short-term effectiveness	Moderately difficult to implement Moderate to high cost Potential extended treatment time
Track 4 Partial Soil Removal with Long-Term Controls	Protective of human health and the environment Long- and short-term effectiveness Easy to implement with minimal additional costs	Potential for limited groundwater contamination remaining on-site after remediation

3.2.1 Preliminary Screening of Alternatives

The alternatives identified above for this Site are summarized below, and are evaluated for effectiveness, implementability, and cost.

3.2.1.1 No Further Action Alternative

Description

The No Further Action Alternative would involve no Site redevelopment and no remediation of the Site. The existing buildings would remain and all existing contaminated media would remain in place. No attempt to minimize, treat, or eliminate known on-site contaminants would occur. For the purpose of this analysis, it is assumed that the current Site usage would continue.

Consideration of this alternative is required by the NYSDEC to establish a baseline against which other alternatives are compared.

Feasibility

The No Further Action Alternative would be simple to implement. No local approvals would be required for implementation.

Cost

No short-term or long-term costs are associated with this alternative. The opportunity cost of not developing this property is estimated to be relatively high. Qualitatively, the opportunity costs include lost construction jobs, pre-construction costs, and property taxes.

Effectiveness of the No Further Action Alternative

The No Further Action Alternative is not considered to be protective of human health and the environment in either the short or long term. The potential will exist for contact by future Site users with contaminated soils and groundwater, which will remain on-site.

Based on these findings, it is concluded that the No Further Action Alternative does not meet the requirement for long-term protection of public health from known on-site contaminants.

3.2.1.2 Track 1 Alternative - Full Soil Removal with Short-term Controls

Description

The Track 1 Alternative would involve:

- Removal of all subgrade material at the site containing contaminant concentrations above NYSDEC Unrestricted Use Soil Cleanup Objectives (UUSCOs);
- Topical application of an oxygen release compound (ORC) in impacted excavation areas, to treat groundwater (if necessary);
- Importation of clean fill and backfilling to return excavated areas to grade;
- Installation of a vapor barrier in order to prevent any organic vapors from entering the new on-site structure as a result of likely remaining groundwater contamination.

It is anticipated that 3,500 cubic yards of soil will be removed during construction excavations. An additional 1,000 cubic yards of urban fill containing contaminants at concentrations above UUSCOs will be excavated, all of which will need to be handled as regulated waste. In addition, there is an estimated 2,000 cubic yards of petroleum contaminated soil that would require removal under this alternative. Prior to development, this space will be refilled clean material.

Soil excavation is expected to remove all known on-site petroleum-contaminated source areas as well as areas of urban fill.

Following soil excavation, a SSDS and vapor barrier will be installed concurrent with the installation of the building foundation. This protective action would be taken in response to likely residual groundwater contamination.

This alternative is based on the assumption that all impacted soil will be removed from the Site and that any remaining soils (if occurring) will meet UUSCOs. The Track 1 alternative also assumes that active treatment systems, including groundwater treatment, will operate for or require no more than 5 years to meet Track 1 remedial standards.

Feasibility

Implementation of the Track 1 Alternative is considered to be relatively easy to moderately difficult, depending on the remaining on-site contamination. The topical application of an ORC utilizes simple, well-known methods. Other treatment technologies, if necessitated by site conditions, could require novel design features and could conflict with construction activities due to the need to reapply treatment (difficulties could be encountered during installation or operations/maintenance, based on the functional needs of the proposed on-site structure).

Cost

The costs associated with this alternative include: Application of an ORC or (if required by Site conditions) Site-specific design, implementation, monitoring, and maintenance of an in-situ remediation technology; the off-site disposal of regulated wastes; and, installation and monitoring of on and off-site groundwater monitoring wells. Professional and laboratory costs will be incurred for the design, testing, and the monitoring of an in-situ remediation system, and for installation/monitoring of groundwater monitoring wells. Total costs for the Track 1 Alternative are estimated at $854,590 as detailed in Appendix H.

Effectiveness

This alternative is likely to be effective for protecting human health and the environment. Post-remedial off-site groundwater monitoring will document potential off-site vapors generated by contaminated groundwater migrating off-site; however, removal of the source of groundwater contamination (the on-site petroleum contaminated soil) is likely to mitigate any such impacts.

3.2.1.3 Track 4 Alternative - Soil Removal, with Long-Term Controls

The Track 4 alternative would include:

- Excavation, management and off-site disposal of soils generated by construction excavations as well as grossly contaminated petroleum impacted soils in the central portion of the property at the location of the former UST;
- A one-time introduction of oxidants into the subsurface soils within the portion of the Site where petroleum contaminated soils remain (in situ chemical oxidation [ISCO] injections utilizing direct oxidants and ORC).
- Importation of clean fill and backfilling to return excavated areas to grade;
- Installation of a vapor barrier in order to prevent any organic vapors from entering the new on-site structure;

- Installation of a protective barrier composite cover system consisting of 2' of clean fill (over a demarcation layer), building foundations, and paved areas throughout the entire Site, to prevent exposures to any remaining contaminants present above RRUSCOs.
- Long-term implementation of a SMP and Engineering/Institutional Controls to maintain, over time, the efficacy of the remedial activities, including provisions for groundwater monitoring, periodic inspection, and contingency plans for soil management;
- Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining on-site; and,
- Groundwater monitoring (if required by NYSDEC).

It is anticipated that 3,500 cubic yards of soil will be removed during construction excavations and an additional 500 cubic yards of petroleum contaminated soil will be excavated. All the material will need to be handled as regulated waste. Soil excavation is expected to remove all known petroleum contaminant source areas (endpoint samples will document the absence of petroleum concentrations above RRUSCOs), though areas of urban fill will remain in the subsurface at various locations outside the footprint of the proposed structure.

The presence of the building vapor barrier will prevent impacts from any vapors generated from contaminated media. Use of the Site would be restricted institutional controls (environmental easement). Requirements for maintaining installed engineering controls (any active treatment facilities such as a SSDS) would be ensured through a SMP.

Feasibility

Implementation of the Track 4 Alternative is considered to be relatively easy. Groundwater will be monitored to document conditions subsequent to the remedial activities. The installation of a vapor barrier and SSDS can be easily accomplished using well-known practices, with minimal interference to the construction schedule.

Cost

The costs associated with this alternative include additional costs for: long-term implementation, monitoring, and maintenance of the in-situ remediation technology (as necessary); and implementation of a long-term SMP. Professional and laboratory costs will be incurred for groundwater monitoring wells. Total costs for the Track 4 - Alternative are estimated at $624,401, as detailed in Appendix H.

Effectiveness

This alternative is likely to be effective in protecting on-site human health and the environment. This alternative is expected to result in the removal of petroleum contaminated soils in the source area which will lead to a corresponding reduction of contaminant concentrations in groundwater. In-situ chemical treatment may also be used to meet SCGs for groundwater (AWQSGV).

3.2.2 Preliminary Comparative Analysis of Alternatives

The Track 1 and the Track 4 alternatives, which include removal of some or all petroleum contaminated on-site soils (the likely contaminant source areas) and application of oxidants to treat groundwater, are appropriate remedial strategies for this Site (NYSDEC regulations [Subpart 375-1.8(c)] specify that removal and/or treatment is the most preferable source removal and control measure to be utilized at Remedial Program Sites). These alternatives provide for

effective long-term protection of public health and the environment. These two alternatives are assessed in greater detail in Section 3.3, below.

3.3 Detailed Analysis of Remedial Alternatives

This Section provides a detailed analysis of the Track 1 and the Track 4. A detailed analysis is not warranted for the No Further Action Alternative.

3.3.1 Common Elements and Considerations

Several work elements are common to the Track 1 and the Track 4 Alternatives. By reference, these common elements are incorporated in the detailed description and/or implementation of these alternatives provided in Section 3.3.2.

Pre-Construction Activities

Pre-construction activities are the following:

- Coordination of subcontractors including waste haulers, labs and other auxiliary service providers.
- Administrative services including notifying NYSDEC of project initiation, securing local permits (e.g., wastewater discharge) if warranted, and completing utility mark-outs.

Site Clearing

An asbestos survey will be performed and, if necessary, asbestos abatement will be performed. The on-site structures will then be demolished prior to the implementation of remedial activities. Specifically, the on-site structures will be razed using mechanized equipment and hand tools, as required, after proper removal of all asbestos-containing materials (if encountered). Any encountered waste materials will be disposed of in accordance with applicable NYSDEC regulations.

Health and Safety Plan

A HASP has been prepared that provides comprehensive and appropriate protections for all on-site personnel and surrounding populations. The HASP details known and possible areas of concern. The HASP includes safety and monitoring plans that conform to the standards and requirements of applicable agencies, including the New York State Department of Labor (NYSDOL) and the Occupational Safety and Health Administration (OSHA).

Soil Removal Activities and Confirmatory Soil Sampling

All on-site petroleum contaminated soils will be excavated. It is expected that soil excavation will include all known petroleum contaminated soils. All petroleum soils will be excavated and disposed of in accordance with applicable regulations. In-situ soil sampling will be conducted according to NYSDEC approved protocols prior to and during soil excavation to characterize soils for off-site disposal, and confirmatory endpoint sampling of the excavation base and sidewalls will be conducted to document the integrity of remaining soils Sampling frequency will be in compliance with DER-10 Section 5.4(b).

Personnel performing soil excavation and sampling will be properly trained in accordance with OSHA and NYSDOL requirements. Site personnel will be informed of Site-specific concerns and properly instructed with regard to pertinent details.

Installation of Vapor Barrier

A properly designed vapor barrier of a minimum thickness of 15 mil will be installed concurrent with the installation of the building foundation. The vapor barrier will underlay the entire structure and will serve as a barrier to the infiltration of vapors.

An active Sub-slab Depressurization System (SSDS) will be installed. A design report that includes the layout and details for an active SSDS (dated October 2014) is included in Appendix I.

3.3.2 Detailed Analysis of Remedial Alternatives

3.3.2.1 Track 1 Alternative - Full Soil Removal with Short-term Controls

Description

The Track 1 Alternative would include excavation and off-site disposal of all on-site soils containing contaminant concentrations above UUSCOs and, if necessary, active remediation of contaminated groundwater through topical application of an ORC in impacted excavation areas.

Implementation Schedule

It is estimated that the time necessary to design and conduct soil removal, and any groundwater treatment, would be 6 to 12 months (subsequent to the demolition and removal of the on-site structures and excavation of the contaminated soils). This time schedule is divided into a design phase of 1 month, a bid solicitation and award phase of 1 month, a fieldwork phase of 3 to 5 months, a groundwater monitoring phase of 12 months (will overlap with fieldwork) and a report preparation phase of 1 month. This schedule assumes no seasonal constraints. Should the project schedule result in the remediation occurring in the winter, the total project schedule timetable will be extended.

Criteria Assessment

Overall Protection of Human Health and the Environment: This alternative provides for the protection of human health and the environment in both the short and long term.

Compliance with Standards, Criteria, and Guidance Values: This alternative removes known sources of contamination (i.e., contaminated soil) from the Site and provides for remediation of residual contamination in groundwater following excavation. Post-remedial conditions are anticipated meet applicable Track 1 cleanup requirements and applicable AWQSGV. No SGGs currently exist for soil vapor.

Short Term Effectiveness: The Track 1 Alternative is considered to be effective in protecting human health and the environment in the short term. This alternative will involve the removal of all contaminated soils and the treatment of any remaining contaminated media, eliminating exposure to the contaminant sources. The implementation of appropriate measures, including a Community Air Monitoring Plan, and a Soils Management Plan, etc., during building demolition and on-site soil disturbance activities is likely to effectively prevent the release of significant contaminants into the environment. Construction workers operating under appropriate management procedures, and a HASP, are not likely to be significantly impacted by on-site contaminants (personal protective equipment would be worn consistent with the documented risks within the respective work zones). This alternative provides short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-site contaminants.

The implementation of a HASP and CAMP will serve to minimize potential short-term impacts to the surrounding community.

Long Term Effectiveness: The Track 1 Alternative will involve the removal of all contaminated soils and the treatment of any remaining contaminated media, substantially eliminating future concerns with regard to potential residual contamination. Long-term impacts to the surrounding community will be positive because future threats to human health and the environment will be eliminated or substantially diminished. Residual contamination will be remediated and the potential for exposures will be eliminated.

Reduction in Toxicity, Mobility and Volume: The Track 1 Alternative will eliminate all known contaminated soils. Although soil removal does not directly reduce the toxicity or volume of contaminated groundwater, it will result in the removal and proper disposal of the contaminated soil off-site (the likely source of groundwater contamination). Treatment of groundwater through use of an ORC (or other technology) will significantly reduce the toxicity and volume of any remaining contamination in groundwater. In the short term, the mobility of the groundwater contamination may be increased (due to the addition of in-situ chemicals); however, as the treatment progresses the mobility of the contamination will be decreased.

Implementability: Removal of urban fill soils has been determined by the developer to be both necessary for Site development and technically/economically feasible. However, removal of the deeper petroleum-contaminated soils represents a challenge to site development as any deep soils removed from the Site will either require replacement with engineered fill or necessitate a design change to construct the building on piles. Completion of active remediation may be hampered by conflicts with other construction activities, the construction schedule, or by difficulties with proximity to the roadways. In addition, if treatment technologies beyond application of an ORC are necessary, it is anticipated that at least three treatment rounds would be needed to remediate the groundwater, which could further complicate treatment as the Site is re-developed. Application of an ORC would be planned to occur during the construction period.

Implementation of a dust suppression plan during the excavation of Site soils, in order to avoid accidental dispersion of impacted soils and/or human contact with these soils, will be necessary. The Site has reasonably clear access for trucks to enter and exit and sufficient space for the loading and unloading (including temporary stockpiling) of materials.

Cost: The costs associated with the Track 1 Alternative include the removal and off-site disposal of all soils containing contaminant concentrations in exceedance of UUSCOs, application of an ORC (or other technologies) to treat groundwater (if necessary), and the installation/monitoring of groundwater monitoring wells. For the purpose of cost calculations, a project lifetime of thirty years is assumed in this analysis. Total costs for the Track 1 Alternative are estimated at a present value of $854,590.

Community Acceptance: The project will provide the community with additional residential and commercial opportunities. The community will have the opportunity to become involved in the project throughout the process of citizen participation in the BCP. Community concern is most likely to focus on the anticipated increase in truck traffic, noise, and possible disruption during remedial activities.

Land Use: This alternative provides improvement in Site and local area land use by transforming the Site from a contaminated property to a residential/commercial development.

No historical, archeological, or natural resources are located within the Site and the Site is not in close proximity to a floodplain (the Hudson River located to the west of the Site is the nearest floodplain). The Site is located adjacent to multi-family residential, commercial and single family residential buildings.

The Site is in the vicinity of several bus routes which are available for the residents of the community.

The proposed action is consistent with existing geography and geology at the Site. It is likely that existing contamination has migrated off-site in groundwater. This alternative will treat existing contamination (if necessary) prior to on-site building construction and is expected to remediate on-site contamination. Groundwater is not expected to be used as a drinking water source under existing or future conditions. No institutional controls are known to currently exist at the Site.

3.3.2.2 Track 4 Alternative – Partial Soil Removal with Long-term Controls

Description

The Track 4 Alternative would include excavation of urban fill soils necessary for building construction and a limited volume of petroleum contaminated soil (the "hot spot" of grossly contaminated soil near the former UST. In addition, a one-time introduction of oxidants to the subgrade would occur, in the portion of the Site where petroleum contaminated soils would remain. Finally, this alternative would include installation of a vapor barrier, an active SSDS and implementation of a SMP (including groundwater monitoring) and Institutional Controls (in the form of an Environmental Easement).

Implementation Schedule

It is estimated that the time necessary to design and conduct soil removal would be sixty days. This time schedule is divided into an excavation and stockpiling phase; endpoint and waste characterization phase; and, an off-site disposal phase. This schedule assumes that soil removal will not be constrained by seasonal weather patterns (i.e., frozen soil, ice, and snow). Should the project schedule result in the construction occurring in the winter, the total project schedule timetable will be extended.

Criteria Assessment

Overall Protection of Human Health and the Environment: This alternative provides for the protection of human health and the environment in the short and long term. No known uses of groundwater exist in the area, so it is unlikely that the surrounding community would come into contact with the contaminated groundwater during the time necessary to remediate groundwater contamination and groundwater concentrations of VOCs are not indicative of a substantial source of soil vapor contamination. No known sensitive environmental receptors valued physical, biological, and/or man-made features that may be adversely impacted by environmental contamination exist in the area. An assessment of the potential for post-remedial vapor impacts to adjoining properties will be made as part of a program of post-remedial groundwater sampling.

Compliance with Standards, Criteria, and Guidance Values: This alternative removes known sources of soil contamination (i.e., contaminated soil) from the Site. Post-remedial conditions for petroleum contaminated soils are expected to meet RRUSCOs; in the event that some contaminated urban fill remains on-site above RRUSCOs after excavation, this remedial

alternative ensures that Track 4 cleanup objectives will be met. Under this alternative, groundwater criteria would be achieved (AWQSGV).

Short Term Effectiveness: The Track 4 Alternative is considered to be effective in protecting human health and the environment in the short term. This alternative will involve the removal of urban fill generated during construction excavations as well as those petroleum contaminated soils that are considered the source area for on-site (and possibly off-site) groundwater contamination, and would eliminate on-site exposure to any remaining non- petroleum contaminant sources. The implementation of appropriate measures, including a Community Air Monitoring Plan, and a Soils Management Plan, etc., during on-site soil disturbance activities is likely to effectively prevent the release of significant contaminants into the environment. Construction workers operating under appropriate procedures, and a HASP, are not likely to be significantly impacted by on-site contaminants (personal protective equipment would be worn consistent with the documented risks within the respective work zones). This alternative provides short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-site contaminants. The implementation of a HASP and CAMP will serve to minimize potential short-term impacts to the surrounding community from increased vehicle traffic and noise.

Long Term Effectiveness: The Track 4 Alternative will involve the removal of those petroleum contaminated soils that are considered the source area for on-site (and possibly off-site) groundwater contamination and is anticipated to significantly remove future concerns with regard to potential residual contamination through use of an ORC (or other technology) to treat groundwater (if necessary). Long-term impacts to the surrounding community will be positive because future threats to human health and the environment will be substantially diminished. Any residual contamination remaining (e.g. urban fill) is likely to be deeply sequestered and exposures are unlikely and will be managed in the long-term through a SMP and Engineering and Institutional Controls.

Reduction in Toxicity, Mobility and Volume: The Track 4 Alternative will eliminate the source of contaminants. Although soil removal does not directly reduce the toxicity or volume of contaminated groundwater, it will result in the removal and proper disposal of the contamination off-site (the likely source of groundwater contamination). The introduction of oxidants to remaining petroleum contaminated soil will further reduce toxicity, mobility, and volume of any remaining contamination in the groundwater.

Implementability: Partial removal of contaminated Site soils has been determined by the developer to be both necessary for Site development and technically/economically feasible. Implementation of a dust suppression plan during the excavation of Site soils, in order to avoid accidental dispersion of impacted soils and/or human contact with these soils, will be necessary. The Site has reasonably clear access for trucks to enter and exit and sufficient space for the loading and unloading (including temporary stockpiling) of materials.

Cost: The costs associated with the Track 4 Alternative includes the removal and off-site disposal of all petroleum contaminated soils and soils generated by construction excavations, application of an ORC (or other technologies) to treat groundwater (if necessary), the installation of a composite cover system vapor barrier and active SSDS, and the installation/monitoring of on- and off-site groundwater wells. For the purpose of cost calculations, a monitoring period of thirty years is assumed in this analysis. Total costs for the Track 4 Alternative are estimated at a present value of $624,401.

Community Acceptance: The project will provide the community with additional residential and commercial opportunities. The community will have the opportunity to become involved in the project throughout the process of citizen participation in the BCP. Community concern is most likely to focus on the anticipated increase in truck traffic, noise, and possible disruption during remedial activities.

Land Use: This alternative provides improvement in Site and local area land use by transforming the Site from a contaminated property to a residential/commercial development.

No historical, archeological, or natural resources are located within the Site and the Site is not in close proximity to a floodplain (the Hudson River located to the west of the Site is the nearest floodplain). The Site is located adjacent to multi-family residential, commercial and single family residential buildings.

The Site is in the vicinity of several bus routes which are available for the residents of the community.

The proposed action is consistent with existing geography and geology at the Site. It is likely that existing contamination has migrated off-site in groundwater. This alternative will treat existing contamination (if necessary) prior to on-site building construction and is expected to remediate on-site contamination. Groundwater is not expected to be used as a drinking water source under existing or future conditions. No institutional controls are known to currently exist at the Site.

3.4 Summary of Selected Remedial Actions

The proposed remedy is a Track 4 Restricted Residential Use cleanup consisting of the following elements:

- All known on-site petroleum contaminated soils will be excavated and disposed of off-site.
- In-situ soil sampling will be conducted prior to and during soil excavation to characterize soils for off-site disposal (approximately 4,000 cubic yards of soils will be removed).
- Appropriate off-site disposal of all material removed from the Site in accordance with all Federal, State, and local rules and regulations for handling, transport and disposal.
- Confirmatory endpoint sampling will be conducted to document the integrity of remaining soils.
- A one-time introduction of oxidants to subsurface soils within that portion of the Site where petroleum contamination will remain after excavation.
- Approximately 500 cubic yards of clean fill meeting the requirements if 6NYCRR 375-6.7(d) will be brought in to replace the excavated soil and establish the designated grades at the site.
- A properly designed vapor barrier will be installed concurrent with the start of building construction.
- Implementation of a SMP and Engineering/Institutional Controls to ensure successful completion of the remedial activities and long-term management of any residual contamination; including Institutional and Engineering Controls and operation, maintenance and monitoring plans.

- Recording of an Environmental Easement, including Institutional Controls, to prevent future exposure to any residual contamination remaining on-site.
- Periodic groundwater monitoring, if directed by the NYSDEC.
- All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State, and local rules and regulations.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RWP. All deviation from the RWP will be promptly reported to the NYSDEC for approval and fully explained in the Final Engineering Report (FER).

4.0 REMEDIAL ACTION: DETAIL OF SERVICES

4.1 Proposed Site Preparation Services

This section of the RWP provides details on activities and services necessary to be initiated and/or completed prior to the implementation of Site remediation services.

4.1.1 Agency Notification

The NYSDEC will be notified in writing at least five (5) business days prior to the initiation of any of the on-site work and during the course of the fieldwork. Changes to fieldwork scheduling will be provided via facsimile transmission and/or email. All applicable local agencies will also be notified prior to the initiation of site work. NYSDEC will have the opportunity to participate in all remediation project status meetings (adequate notice of these meetings will be provided).

Prior to the implementation of any of the remedial tasks outlined below, a request for a complete utility markout of the subject property will be submitted as required by New York State Department of Labor regulations. Confirmation of underground utility locations will be secured, and a field check of the utility markout will be conducted prior to the initiation of work. Any utilities on the Site will be protected (as necessary) by the contractor or Volunteer.

4.1.2 Equipment Calibration

Equipment

Prior to the initiation of fieldwork, all field equipment to be used during the work will be properly decontaminated in accordance with NYSDEC Analytical Services Protocol (ASP) [dated July 2005], and all field instruments will be properly calibrated in accordance with procedures set forth by the equipment manufacturer(s). Unless otherwise specified, a MiniRAE 3000 (Model PGM 7320) photo-ionization detector (PID) will be used for the screening of organic vapors and a DustTrak™ Aerosol Monitor (Dust Monitor, Model No. 8520) will be used to perform particulate monitoring. The PID and Dust Monitor are calibrated to read (respectively) parts per million calibration gas equivalents (ppm-cge) of isobutylene and milligrams per cubic meter (mg/m^3) of particulate matter. Instrument calibration will be performed no more than 24 hours prior to the commencement of fieldwork, and a written record of calibration results will be provided in the project files.

Laboratory

All samples will be collected in accordance with the QA/QC Plan and will be submitted to a NYSDOH ELAP-certified laboratory using appropriate chain of custody procedures. Dedicated, laboratory supplied glassware will be used for sample collection. One trip blank and one field blank will be supplied for each day of fieldwork involving sample collection. Field personnel will complete all chain of custody forms.

Laboratory reports will include detailed Quality Assurance/Quality Control (QA/QC) analyses, which will be provided in the Final Report. Category B deliverables, as defined in the NYSDEC ASP, will be submitted for confirmatory and final delineation samples. In addition, Data Usability Summary Reports (DUSRs) will be prepared by a third, independent party, which maintains NYSDOH ELAP CLP Certification. Data validation by an independent validator will be conducted if requested by the NYSDEC.

4.1.3 Clean-Up Levels

Guidance levels for determining the integrity of post-excavation remaining soils and the effectiveness of ISCO treatment will be based on NYSDEC Remedial Program Soil RRUSCOs as provided in 6 NYCRR Subpart 375, Table 375-6.8(b).

Air Guideline Values and fieldwork methodology provided in the NYSDOH Guidance will be used to assess VOC concentrations and guide potential remediation of off-site soil vapors.

Guidance levels for all compounds in water will be based on TOGS 1.1.1 AWQSGV.

4.1.4 Subcontractor Coordination

Subcontractors will perform requested services under the direct supervision of the OSC. Prior to the initiation of fieldwork, all subcontractors will be notified of the components of the HASP (see 2.2.5, below). All necessary insurance certificates will be secured from subcontractors by the Client and/or by the OSC. At this time, the following subcontractors are anticipated to be used on this project:

- Trucking/Hauling Contractor
- Analytical Laboratory

4.1.5 Dust and Odor Suppression

In accordance with the CAMP, dust and odor suppression activities will be conducted during remediation and construction activities that will disturb on-site soils. Engineering controls will be used to control airborne contamination, including wetting soils with water (and/or odor suppressants such as Biosolve, or equivalent where obvious odors are present) and the placement of plastic sheeting over exposed soil and stockpiles (at a minimum, soils will be misted when site conditions indicate dry soils could potentially generate fugitive dust). Complete protocols for monitoring and preventing odor impacts are described in the CAMP (see Appendix C).

4.2 Proposed Specific Remediation Services

This section of the RWP provides a detailed description of the remedial tasks that will be conducted at the Site.

4.2.1 Building Demolition and Asbestos Abatement

Prior to the commencement of remediation, all existing structures will be subject to asbestos abatement and demolition. These actions will be performed in accordance with appropriate regulations including but not limited to NYS Department of labor “Code Rule 56”. Documentation of proper abatement will be included in the Site’s FER. Demolition will include removal of the AST and excavation and disposal of the hydraulic lift (any residual fluids and/or associated soil contamination will be addressed as per Section 4.2.2, below).

4.2.2 Excavation of Contaminated Soils and Soils/Materials Management Plan

The materials that are to be excavated can be broken down into 3 categories: a surface cut of 2,000 cubic yards; fill within the building footprint of 1,500 cubic yards; and, petroleum contaminated soil in the vicinity of the former UST of 500 cubic yards.

The surface cut of 2,000 cubic yards is derived from the civil engineer's grading plan, which calls for an average 2 foot cut from the surface of the entire site.

The fill of 1,500 cubic yards from within the building footprint is structurally unsuitable fill at depths ranging from 4 feet to 13 feet below the surface.

The total amount of soils to be removed from the site for construction purposes is therefore 3,500 cubic yards of this total volume, an estimated 300 cubic yards will be removed to install the two foot soil cover and an additional 170 cubic yards will removed to install the asphalt cover. This total volume (470 cubic yards) represents the volume of urban fill soil anticipated to be removed for environmental remediation purposes.

In addition, based on existing sample data and field observations, approximately 500 cubic yards of petroleum contaminated soils will require excavation and off-site disposal from the vicinity of the former UST. This volume represents soil in the vicinity of the former UST, extending from the four foot depth (already removed as urban fill, as discussed above) and the presumed bedrock in this portion of the Site (10' below surface grade). The precise volume of such material to be generated will be contingent on field observations and confirmatory endpoint sample data (see Section 4.2.2.1 below). Given that some of this material would have required removal as part of the construction excavations described above, the total volume of material requiring excavation is therefore likely to be slightly less than 4,000 cubic yards, of which approximately 1,000 cubic yards will be removed for environmental remediation purposes.

All soils generated by construction and remedial excavations will be removed from the Site in accordance with applicable NYSDEC regulations (6 NYCRR Part 360 and Part 370). All appropriate disposal documentation will be maintained by the Volunteer for inclusion in the Final Engineering Report. The location of soils subject to the removal procedures is provided on the Proposed Site Remediation Map, Figure 2, and Excavation Map, Figure 2B, Appendix A.

The Soils and Material Management Plan (SoMP) is outlined in Sections 4.2.2.1 Sections through 4.2.2.9 below.

4.2.2.1 Soil Screening Methods

Visual, olfactory, and PID soil screening and assessment will be performed by qualified professionals with experience in environmental remediation, under the supervision of the RE, during all remedial and development excavations into known or potentially contaminated material (Residual Contamination Zone). Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during the development phase, such as excavations for foundations and utility work, prior to issuance of the COC. Resumes are provided in Appendix G for all personnel (representing the RE) responsible for field screening of invasive work for unknown contaminant sources during remediation and development work.

Grossly contaminated soil will be identified by the presence of: non-aqueous phase liquids (NAPL); visual indications of staining, discoloration or the presence of other obvious signs of contamination; noticeable odors associated with petroleum, solvents or other chemicals; and/or elevated PID readings compared to background levels.

Soil screening will be used to establish temporary excavation end-points by: 1) establishing the absence of soil exhibiting significant field evidence of contamination (grossly contaminated media) or debris materials likely to be associated with contaminants of concern (e.g., urban fill); and, 2) identifying the presence of non-disturbed native soils. The use of direct-reading hand-held screening devices (e.g., PID) will be employed, as appropriate, to determine likely

excavation boundaries; final endpoints, however, will only be established through laboratory analysis of confirmatory samples.

4.2.2.2 Stockpile Methods

Stockpiles will be located in areas not subject to flooding or excessive sheet flow during storm events. Material to be stockpiled will be placed within an area designed and constructed to contain the materials from all sides and prevent runoff and dispersion. All stockpiles will be underlain with six (6) mil plastic with seams overlapping by one foot (minimum). All stockpiles will be bermed to prevent any liquids from exiting or entering the containment area. A design specification for construction of a typical soil stockpile is included on the Erosion Control Plan in Appendix F.

Stockpiles will be inspected at a minimum of once each week and after every storm event. Results of inspections will be recorded in a logbook maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be kept covered at all times with appropriately anchored tarps (or equivalent material). Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

A dedicated water truck equipped with water cannon, or functionally similar equipment, will be available on-site for dust control if on-site water supplies are not available.

4.2.2.3 Materials Excavation and Load Out

The RE/QEP will oversee all invasive work and the excavation and load-out (as appropriate) of all excavated material. Site entrances and exits, including truck routes and decontamination areas will be established prior to the start of on-site demolition/excavation. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this RWP.

The presence of utilities and easements on the Site has been investigated by the RE. It has been determined that no risk or impediment to the planned work under this RWP is posed by utilities or easements on the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site. The RE/QEP will be responsible for ensuring that all outbound trucks are washed at the truck wash before leaving the Site until the remedial construction is complete.

Handling and disposal requirements may vary among stockpiles; load out equipment, therefore, will be properly washed between the handling of differing stockpiles (based on chemical composition and final repository destination) in order to avoid potential cross-contamination during loading activities.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site sediment tracking.

The RE/QEP will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

The Volunteer and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The RE/QEP will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RWP.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

Mechanical processing of historical fill and contaminated soil on-site is prohibited, unless otherwise authorized by NYSDEC.

4.2.2.4 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

All trucks loaded with Site materials will exit the vicinity of the Site using only the approved truck routes (described below). This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive Sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and, (f) overall safety in transport.

Trucks will enter and exit the Site from Ludlow Street travelling to and from Interstate 87 via Hawthorne Avenue, Knowles Street, Riverdale Avenue and Nepperhan Avenue. Truck staging will occur on Ludlow Street directly in front of the Site (see Figure 3, Appendix A). Trucks will be prohibited from stopping and idling on Riverdale Avenue or in the neighborhood outside the project Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Material transported by trucks exiting the Site will be secured with covers to prevent accidental releases during transport. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks will be washed prior to leaving the Site.

4.2.2.5 Materials Disposal Off-Site

Waste disposal locations, to be established at a later date, will be reported to the NYSDEC Project Manager prior to the start of remedial excavation. The total quantity of material (excluding debris from building demolition) expected to be disposed off-site as a regulated waste is 4,000 cubic yards. Several separate disposal facilities may be secured, based on the expected composition of known contaminated soils. Information from the disposal facilities will be sent to the NYSDEC before the initiation of soil removal at the Site.

All soil/fill excavated and removed from the Site will be disposed in accordance with all local, State (including 6 NYCRR Part 360), and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC Project Manager. Unregulated off-site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 UUSCOs is prohibited from being taken to a New York State recycling facility (6 NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the RE/QEP for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the RE or BCP Volunteer to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the RE/QEP. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and, (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6 NYCRR Part 360-1.2. Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the NYSDEC Division of Solid and Hazardous Materials (DSHM) to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 3 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-site or off-site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the RE/QEP. The letter will include as an attachment a summary of all chemical data for the material being transported.

The FER will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

A Bill of Lading system or equivalent will be used for off-site movement of non-hazardous wastes and contaminated soils. This information will be reported in the FER.

Hazardous wastes (listed and/or characteristic materials as defined in DER-10 Section 1.3(b)25) derived from on-site will be stored, transported and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with all applicable local, State, and Federal regulations.

Waste characterization will be performed for off-site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

4.2.2.6 Materials Reuse On-Site

Materials from on-site (demolition materials and soils) are not anticipated to be reused as fill; however, if the decision is made to reuse materials from the Site the material will meet all criteria of this RWP and NYSDEC approval will be obtained before re-use is allowed. NYSDEC approval for reuse of any materials will require appropriate sampling and analysis, and must meet all requirements specified in DER-10 Section 5.4(e).

Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-site.

Contaminated on-site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This will be expressly stated in the final SMP.

4.2.2.7 Fluids Management/Excavation Dewatering

The on-site AST contains fuel oil and unknown and/or improperly closed USTs may be present on the Site. Prior to the excavation and removal of any tank found to contain liquid product, all fluids will be pumped into a vacuum truck by a licensed hauler, manifested, and will be transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

All liquids to be removed from the Site will be handled, transported and disposed of in accordance with applicable local, State, and Federal regulations.

Dewatering is not anticipated during Site development. With the exception of the limited excavation of "source material" (the 500 yd^3 of petroleum contaminated soils in the former UST area), all excavation and regrading work will be conducted above the static water level. If excavation dewatering is needed during the removal of source material, fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site. A dewatering permit will be secured from the City of Yonkers to treat and discharge any water generated during excavation activities into the sewer.

The following procedures are anticipated:

- Excavation shall be conducted in a manner so that water entering the excavation can be collected and removed from the excavation area.
- The dewatering operations shall be directed to a sediment control device or devices.
- The Contractor shall control surface water to prevent entry into excavations.

- Flow to the sediment control device (or devices) may not exceed the sediment removal device's capacity to settle and filter flow or the devices' volume capacity.
- Water collected in the sediment control device shall be tested prior to off-site disposal (see below).
- The dewatering system shall remain active during all excavation activities, as necessary.
- Upon completion of the dewatering activities the Contractor shall remove all dewatering measures.

Water removed from the excavation area will be collected in secure storage vessels (e.g., tanks) that prevent this water from being discharged onto the ground at the Site. Water storage will permit sediment and other suspended material to be filtered out.

Water in the frac tank (or other equivalent equipment) will be treated with particulate filters to remove sediment and treated with activated carbon to remove organic petroleum compounds.

Testing of the effluent (i.e., post treatment water) will be per permit requirements, with results available and provided to the City of Yonkers and NYSDEC within the 72 hours of sample collection.

4.2.2.8 Demarcation

A physical demarcation layer, consisting of orange snow fencing or equivalent non-biodegradable material will be placed on all areas that are targeted for the placement of the barrier layer. This demarcation layer will constitute the top of the 'Residuals Management Zone', the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in the SMP. A map showing the location(s) of the installed demarcation layer will be included in the FER and the SMP.

4.2.2.9 Backfill from Off-Site Sources

All imported fill or soils will meet NYSDEC approved backfill quality objectives for this Site. All materials proposed for import onto the Site will be approved by the NYSDEC in accordance with Part 375-6.7(d) prior to receipt at the Site. Imported fill or soil will be sampled at the frequency specified in DER-10 Table 5.4(e)10 and will not exceed the lower of the protection of groundwater or the protection of public health RRUSCOs provided in Table 375-6.8(b).

Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in this RWP should be construed as an approval for this purpose.

Solid waste will not be imported onto the Site.

Soils imported to the Site shall be from an acceptable source that is free from potential sources of chemical or petroleum contamination. In order to certify that soil from a specific source is free of contamination, a representative number of samples (as determined by soil volume) will be analyzed. All analyses will be performed by a NYSDOH ELAP certified laboratory.

Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The FER will include the following certification by the Remedial Engineer: "I certify that all import of soils from off-site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan."

4.3 Stormwater Pollution Prevention Plan (SWPPP)

An Erosion and Sediment Control Plan (ESCP) that conforms to the requirements of the NYSDEC Division of Water guidelines and NYS regulations will be developed by the Contractor and approved by the RE. This plan will be provided to the NYSDEC prior to any remedial or development construction activities.

Accumulated sediments will be removed as required to keep the silt fence barrier and hay bale check functional. All undercutting or erosion of the silt fence shall be repaired immediately with appropriate backfill materials.

An assessment of subsurface soil characteristics, including soil type, the presence of foreign materials, field indications of contamination (e.g., unusual coloration patterns, or odors), and instrument indications of contamination (i.e., PID readings) will be made by the OSC during all Site remediation work.

The OSC will be responsible for identifying any soils/debris which, in the opinion of the OSC, may contain elevated concentrations of contaminants and should, therefore, require special handling. The OSC will monitor the removal of all contaminated material, including monitoring the trucks and establishing the designated truck routes. The OSC will also ensure that any unforeseen environmental conditions (e.g., previously unknown USTs) are managed in accordance with applicable federal and state regulations.

4.4 Post-Excavation Soil Sampling

4.4.1 Methodology and Sample Locations

Underlying and surrounding soils will be visually inspected and screened with the PID after all necessary petroleum contaminated soils have been removed. The number of post-excavation soil samples will be determined in the field based on the size and dimensions of the excavation.

At a minimum, one soil sample will be collected from each 30 feet of wall (minimum of one sample per wall) and one sample will be collected from every 900 square feet of floor (minimum of one sample per floor).

Soil samples will be collected using decontaminated stainless steel trowels and dedicated, disposable latex gloves. Samples will be place in pre-cleaned jars provided by the laboratory. After sample collection, the sample containers will be placed in a cooler prior to overnight transport to a NYSDOH-certified laboratory for analysis. Appropriate chain of custody procedures will be followed.

Samples will be analyzed for, the known constituents of concern, Volatile Organic Compounds (VOCs, using USEPA Method 8260) in the vicinity of the petroleum contaminated solid and metals in the vicinity of urban fill soils. It is anticipated that five (5) samples (four [4] wall samples and one [1] base sample) will be collected analyzed for VOCs in the vicinity of the petroleum contaminated soil; it is anticipated that eight base samples and eight wall samples will be collected/analyzed for metals in the vicinity of the urban fill.

4.4.2 QAPP

A QAPP, detailing procedures necessary to generate data of sufficient quality and quantity to represent successful performance of the Remedial Action at the Site, has been provided as Appendix D of this report. The QAPP includes a Sampling and Analysis Plan (SAP), detailing sampling and analysis of all media (endpoint samples, waste characterization samples, fill and soil cover samples, etc.), and which identifies methods for sample collection and handling.

4.4.3 Data Usability Summary Reports

Complete laboratory data packages will provided to an independent, third-party data validator. A summary of the findings in the Data Usability Summary Reports (DUSRs) will be provided in the FER.

4.5 Contingency Plan

This section of the RWP describes actions that must occur upon the discovery of previously unknown contaminated material(s), USTs, demolition debris or other unknown unidentifiable material that requires special handling. On-site personnel should be prepared to respond appropriately if the following previously unknown materials are encountered (if encountered, this material could result in a recommendation from the RE/QEP for an immediate, temporary shutdown of construction activities):

- Previously unknown tanks (including drums) containing a liquid product that is not likely to be water and is likely to present a threat to worker health or safety;
- Previously unknown demolition debris, which could contain significant quantities of asbestos, the disturbance of which is determined, based on field observations, to violate or likely to violate Federal, State, or local asbestos regulations; and,
- Material which cannot be readily identified.

4.5.1 Procedures for Encountered Underground Storage Tanks

Closure of all USTs at the Site will be in accordance with the requirements of DER-10, Section 5.5. Any encountered, previously unknown USTs will be visually inspected to determine if liquids are present in the tank. Significant quantities of liquid remaining in the tanks will be drummed on the Site or removed by a properly licensed disposal company and the particular product (e.g., fuel oil, diesel, etc.) will be identified prior to off-site disposal at a permitted facility. All encountered USTs will be disposed of pursuant to applicable Petroleum Bulk Storage (PBS) and hazardous waste regulations.

4.5.2 Procedures for Encountered Demolition Debris

To the extent practical, all clearly identifiable material suspected of containing asbestos will be removed from the waste stream and handled separately (if encountered). The RE/QEP will recommend that asbestos material visible in the waste stream be separated and analyzed to determine the percent of asbestos present. All applicable Federal, State and local asbestos handling regulations will be followed.

Depending on the amount of asbestos material identified in the waste stream, the RE/QEP may recommend to the Volunteer's Representative that a licensed and accredited asbestos inspector be retained to manage the handling and disposition of asbestos material. Approval to retain an asbestos inspector will be made by the Volunteer's Representative. Samples will be collected by

a properly licensed asbestos inspector and submitted to a NYSDOH ELAP- certified laboratory for analysis, depending on the amount and type of material encountered.

Minor amounts of asbestos may be removed from the waste stream and disposed of in accordance with applicable State and local asbestos remediation requirements. An asbestos abatement firm will be retained to properly handle and remove minor amounts of asbestos.

The presence of significant quantities of asbestos will result in a temporary shutdown of the Site.

4.5.3 Procedures for Encountered Unknown Material

Material which cannot be readily identified but which is considered, based on field observations, to be material that needs further investigation before disposal will be properly stockpiled (as per the SoMP) in an area separate from all other stockpiled material.

4.5.4 Screening and Laboratory Analysis

Unknown material will be screened with a photo-ionization detector (PID) and all recorded levels will be documented. Samples will be collected and analyzed to identify the compounds present and to assist in determining appropriate disposal practices. Until determined by laboratory analysis otherwise, this material will be considered a hazardous substance. Specific materials known to require sampling and analysis prior to final disposition include all building components and debris containing painted surfaces and/or caulk. A plan to describe the handling and disposal of such materials will be submitted to NYSDEC for review and approval.

If previously unknown underground tanks or other previously unidentified contaminant sources are found during on-site remedial excavation or development related construction, sampling will be performed on product, sediment, and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TAL metals, TCL volatiles and semi-volatiles, TCL pesticides, and PCBs). These analyses will not be limited to CP-51 petroleum list parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

4.6 Groundwater Monitoring

Previous investigations document on- and off-site groundwater contamination at 3MW-2 installed in the sidewalk south of the southern property line. An additional down gradient monitoring well (as required by NYSDEC) will be installed to document the lateral extent of off-site contamination to the southeast. Site construction activities will likely result in the damaged/destruction of all on-site monitoring wells. Subject to NYSDEC approval, locations for possible replacement wells are presented on the Proposed Remediation Map (Appendix A).

The procedures outlined below will be followed for the installation of these wells.

4.6.1 Installation of Proposed Monitoring Wells

The monitoring wells will be constructed of two-inch PVC casing with 0.1-inch slotted PVC well screening across the water table. No glue will be used to thread the casing lengths. The wells will be constructed such that a minimum of 2.0 foot of screening will extend above the water table and approximately 8.0 feet of screening will extend below the water level. The annular space between well screen and the borehole will be backfilled with clean #1 silica sand to a depth of one to two feet above the well screen. A one-foot thick bentonite seal will be poured down the borehole above the sand pack and allowed to hydrate before grouting the remaining annular space with cement. Note: the length of the PVC screen, sand filter, and bentonite seal may be

reduced (in that order) in order to accommodate a shallow water table. A locked cap with vent will be installed at the top of the PVC riser.

The wells will be completed with a drive-over cover. The wells will be surveyed vertically to the nearest 0.01 foot and horizontally to an accuracy of one-tenth of a second latitude and longitude. The surveyed measurements will be referenced to the North American Datum of 1983 (NAD83) and National Geodetic Vertical Datum of 1929 (NGVD29). Well locations and all other surveyed data will be provided in the FER.

Well construction logs showing components and details of well casing, well screen, filter pack, annular seal, and associated items will be provided in the final report.

4.6.2 Monitoring Well Development

Subsequent to installation, the wells will be developed with a properly decontaminated mechanical pump and dedicated polyethylene tubing in order to clear fine-grained material that may have settled around the well screen and to enhance the natural hydraulic connection between the well screen and the surrounding soils. Prior to development, the monitoring well casing will be opened and the well column immediately screened with a PID to document the presence of any volatile organic vapors. Water removed from the monitoring well will be visually inspected for indications of petroleum contamination. Well water removed in the course of development will be containerized (disposal of collected groundwater will be based on the results of laboratory analysis).

Well development will begin at the top of the saturated portion of the screening to prevent clogging of the pump within the casing. The pump will be raised and lowered one to two feet within various portions of the screened interval to force water back and forth through the screen. Repeated surging and pumping at intervals of less than five feet will be performed to the bottom of the screen until the discharged water appears clear. Upon completion, the pump assembly will be removed while the pump is still running to avoid discharge of purged water back into the well. The well will be considered developed when turbidity is determined to be less than 50 NTUs.

4.6.3 Groundwater Well Sampling and Analyses

Groundwater samples will be collected from off-site wells quarterly for a minimum of one year, utilizing USEPA low-flow sampling protocols.

Groundwater samples will be submitted for laboratory analysis of VOCs (USEPA Method 8260 plus MTBE).

The direction of groundwater flow will be determined based on elevations of static groundwater as measured at all on-site wells, measured prior to water quality sample collection. Measurements will be collected with an electronic depth meter with an accuracy of measuring depth to the nearest 0.01 foot. Data will be recorded in field logs for use in generating a Direction of Groundwater Flow Map in the FER (Section 2.3.10).

4.7 Introduction of Subsurface Oxidants

Available data indicate that contamination is present at the groundwater interface at locations that will not be subject to “source material” excavation or construction excavation to the southwest of the proposed on-site structure.

A one-time ISCO treatment will occur during the Site remediation phase in the portion of the Site down-gradient of the area of "source material" removal (as discussed in Section 5.2 below, additional applications may occur as part of the Site Management Plan). The area subject to oxidant application is estimated at 12,000 square feet and is shown in Figure 2C. The timing of the application is flexible, subject to the construction schedule, but will occur after the removal of contaminated soil and prior to the installation of the foundation.

Based on current recommendations from the likely supplier of chemical oxidants (Regenesis), the application will proceed as follows:

- Temporary injection wells (approximately 50, based on the lateral extent) will be extended on the Site to at least five feet below static water level or refusal, whichever is encountered first.
- The injection wells will be extended using a truck (or track) mounted Geoprobe using 1 ½ inch drive rods. After the drive rods have been extended, the rod assembly will be withdrawn 3" – 6" and the expendable tips will be dropped from the end of the rod.
- Temporary injections wells will be extended approximately 15 feet apart to ensure that the application will impact all residual petroleum contamination. Based on soil types (medium to coarse sands), the radius of influence is at least 10 feet.
- Each temporary well will have approximately 300 pounds of oxidants (mixed with water) applied using pressure injection.
- Upon completion, each injection well will be filled with clean sand to the static water level, overlain with hydrated bentonite to the surface.

Application of the oxidants will be performed by properly trained personnel under the supervision of the PE and QEP. The current recommendation from the manufacturer, based on known on-site conditions, is for the application of both Persulfox (sodium persulfate) to destroy organic contaminants found in groundwater and soil through abiotic chemical oxidation reactions and ORC (an engineered, oxygen release compound) to provide molecular oxygen in support of biotic breakdown of organic contaminants. The recommended per well injection rate is 307 pounds of oxidants (243 pounds of Persulfox and 64 pounds of ORC) mixed with 177 gallons of water. Preliminary design values from the prospective oxidant supplier are presented in Appendix J.

Subsequent to treatment, down-gradient wells will be sampled (see Section 4.6.3).

4.8 Installation of Vapor Barrier and Sub-Slab Depressurization System

4.8.1 Vapor Barrier

A properly designed vapor barrier will be installed concurrent with the installation of the building foundation. Specifications for the vapor barrier will be determined as part of design of the proposed building. The vapor barrier at the Site will be installed per the manufacture's recommendations; however, it is anticipated that the vapor barrier installation will include the following:

- A minimum 15 mil high-density polyethylene membrane liner (or equivalent material) will be installed beneath the footprint of the entire building.
- The liner will be installed over a sub-grade free of sharp rocks or other protrusions which may cause puncturing.

- The liner will be sealed at the seams (with at least a 12 inch overlap) and at penetrations (e.g., for pipes).
- The vapor barrier will be inspected to insure that it was installed correctly prior to the pouring of concrete for the building slab.

4.8.2 SSDS Installation

An active SSDS will be installed beneath the footprint of the proposed structure. The expressed purpose of this SSDS is to intercept potential subgrade vapors in order to prevent them from entering the on-site structure.

Three-inch diameter slotted PVC pipes will be installed beneath the concrete slab in the approximate locations as shown on the SSDS Design Structural First Floor and Slab on Grade Foundation Plan found in Appendix I. The piping will be configured to cover all portions of the building; vapors accumulating under the slab will be drawn up the vertical riser and out above the roof line. The discharge pipe will be located at least 20 feet from all the air intakes.

Specifically, the SSDS will be constructed as follows:

- Collection piping will be 3", schedule 40 industrial grade PVC casing with 0.02" slotted openings. Piping will be wrapped in filter fabric.
- Collection piping will be underlain and overlain with 3 inches of gravel (3/4 inch stone).
- All pipe fittings will be properly sealed.
- The PVC piping will be connected to a vertical pipe extending above the roofline of the building. The discharge point will be properly located above the roofline to minimize the likelihood of air emissions deleteriously affecting indoor air quality via any roof-mounted air intakes.
- At this time, it is anticipated that all collection piping will be manifolded and served by one riser. The riser will be connected to a fan as well as a Granular Activated Carbon (GAC) tank, should air quality test data document the need for hydrocarbon removal.

4.8.3 System Start-up, Testing and Maintenance

System start-up and initial testing will occur after the concrete slab of the underground service tunnel has been poured. The following activities will be conducted:

1. Prior to system start-up all visible system components will be visually inspected for verification of proper installation. The system will be temporarily started and all vacuum pumps/fans will be inspected for proper functioning. The system will be shut off and documentation of system conditions will be maintained in field logbooks.

   Temporary monitoring points will be installed throughout the building by drilling ¼ inch – ½ inch diameter holes through the slab (or by temporary penetrations of the vapor barrier). An assessment of sub-lab pressure, both with the system off and with the system temporarily on, will be made at each monitoring point using a digital micro-manometer. A difference in pressure of -0.002 inches of water column at each monitoring point will indicate proper system functioning. Observed pressure readings that fall short of these standards may indicate the need for system modification.

2. Carbon filtration will be installed at each system discharge point. The system will be operated for a minimum of 12 hours and subsequently, pre- and post-carbon filtration effluent air samples will be collected and analyzed for VOCs (USEPA Method TO-15). These data will be used to determine the need for and extent of an air quality permit (including the need for continued air discharge treatment).
3. The system will be permanently engaged following the completion of system modifications, the addition of any effluent air treatment, and the receipt of any necessary permits.
4. After the system has been permanently engaged the Volunteer will be responsible for weekly inspections of the system's pressure. In addition, the system fans will be inspected on an annual basis for signs of wear and/or failure.

4.8.4 Post-Construction Indoor/Outdoor Air Sampling

The Volunteer will conduct post-construction indoor and outdoor air quality sampling to document on-site air quality both within the on-site structure(s) and the exterior areas. The Volunteer will consult with the NYSDEC and the NYSDOH prior to sampling. Sampling of indoor air quality will be performed in accordance with established NYSDOH protocols, outlined in the GESVI, and will include analyses for the VOCs previously detected in on-site soil.

Three air samples will be collected to determine external air quality. Prior to sample location, meteorological data on wind velocity and direction will be collected to provide quality assurance to the data set. Measurable precipitation and/or average wind speed in excess of ten miles per hour will be conditions which will necessitate rescheduling of outdoor air quality sampling. The sampling event will consist of one upwind location and two downwind locations. Internal air quality will be determined by collecting and analyzing three air samples at locations inside the structure. Samples will be analyzed for VOCs using USEPA Method TO-15. All sample locations will be shown on a Site map to be provided to the NYSDEC in the Final Report.

4.9 Backfilling and Installation of Soil Cover

The importation of materials suitable for both backfill in excavation areas, and for use as a protective barrier layer, will be required. All materials proposed for these uses will be approved by the NYSDEC in accordance with Part 375-6.7(d) prior to receipt at the Site. Materials will be sampled at the frequency specified in DER-10 Table 5.4(e)10 and will not exceed the lower of the protection of groundwater or the protection of public health RRUSCOs provided in Table 375-6.8(b). Imported material may consist of exempt materials (rock and/or gravel) from a NYSDEC-approved off-site location. In the event that the re-use of on-site materials is proposed for backfill, any materials to be placed above the static water level will be shown to not exceed the excavation criteria (Section 4.2.2), and any materials to be placed below the static water level will be shown to meet applicable RRUSCOs for protection of groundwater.

A protective barrier layer (composite cover system consisting 2' thick barrier of clean fill, building foundations, and paved areas) will be installed throughout the entire Site, to prevent exposures to any remaining contaminants present above RRUSCOs. In areas requiring a 2' soil cover of clean fill, material will be placed over a demarcation layer. Cover material will be placed and compacted in lifts not exceeding 12 inches compacted depth. For all covered areas having exposed soils, the upper six inches of the cover will be comprised of material with sufficient organic matter to permit re-vegetation. This upper layer may be replaced with topsoil in areas where final landscaping has been determined. All finished grades that receive topsoil shall be raked smooth, seeded and mulched, and watered periodically as necessary to insure proper stabilization of soil areas.

The current design anticipates a total volume of 500 cubic yards of cover material.

5.0 SITE CONTROL AND POST-REMEDIATION MONITORING

5.1 Engineering Controls

Engineering controls for residual contamination have been selected to render the Site protective of public health and the environment. The remedial action for the Site calls for importation and placement of a protective cover layer of certified clean fill (overlying a demarcation layer) in areas not otherwise covered by building footprints or paved surfaces to eliminate direct contact with contamination remaining in the Site soil. The barrier cover layer must conform to the requirements of 6NYCRR 375-6.7(d)(1) for restricted-residential use.

5.2 Institutional Controls

Institutional Controls have been selected to ensure continual and proper management of any residual contamination in perpetuity: an Environmental Easement and a SMP. A Site-specific Environmental Easement will be recorded with the City of Yonkers to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. The grantor of the Environmental Easement and the grantor's successors and assigns will be required to adhere to all Engineering and Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy.

ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The SMP describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

5.2.1 Environmental Easement

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-site after the Remedial Action is complete. If the Site will have residual contamination after completion of all Remedial Actions then an Environmental Easement is required. As part of this remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the City of Yonkers. The Environmental Easement will be submitted as part of the Final Engineering Report.

The Environmental Easement renders the Site a Controlled Property and must be recorded with the City of Yonkers before the Certificate of Completion can be issued by NYSDEC. A series of Institutional Controls are required under this remedy to implement, maintain and monitor the Engineering Control systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to Restricted-Residential use(s) only. These Institutional Controls are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. Institutional Controls can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on Site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support Engineering Controls are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors, and required adherence to of all elements of the SMP;
- All Engineering Controls must be operated and maintained as specified in the SMP;
- Any soil vapor mitigation systems must be inspected, certified, and maintained as required by the SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in the SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP;
- On-site environmental monitoring devices, including but not limited to, groundwater monitor wells and soil vapor probes, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP; and,
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these Institutional Controls for the Site is mandated by the Environmental Easement and will be implemented under the SMP (discussed in the next section). The Controlled Property (Site) will also have a series of Institutional Controls in the form of Site restrictions and requirements.

The Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the SMP;
- The Controlled Property may be used for Restricted-Residential use, or for more restrictive uses (such as commercial and industrial uses) subject to local land use regulations, provided the long-term Engineering and Institutional Controls included in the SMP are employed;
- The Controlled Property may not be used for a higher level of use without an amendment or extinguishment of the Environmental Easement; and,

- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable; and,

- Grantor agrees to certify specific statement/forms, etc. in connection with the IC/EC if required by the Department.

5.2.2 Site Management Plan

Site management is the last phase of remediation and begins with the approval of the Final Engineering Report and issuance of the Certificate of Completion for the Remedial Action. The SMP is submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site management responsibilities defined in the Environmental Easement and the SMP are performed.

To address these needs, this SMP will include four plans: (1) an Institutional Control and Engineering Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC DER-10, Sections 6.2 and 6.3, and with guidance provided by NYSDEC.

Site management activities, reporting and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The certification will be based on a calendar year and the initial certification and periodic review report will be due for submission to NYSDEC 18 months following issuance of the COC.

The SMP in the FER will include a monitoring plan for groundwater (at locations approved by NYSDEC and NYSDOH) to evaluate Site-wide performance of the remedy. The SMP will include a discussion of procedures for future chemical oxidant applications, contingent upon groundwater quality data from on-site and off-site monitoring wells collected after Site development has been completed. These data will measure the effectiveness of the initial application (as well as the impact resulting from the removal of source material) on concentrations of dissolved petroleum hydrocarbons. The need for future chemical oxidant applications will be determined by NYSDEC.

No exclusions for handling of residual contaminated soils will be provided in the SMP. All handling of residual contaminated material will be subject to provisions contained in the SMP.

A sample Table of Contents, based on the NYSDEC generic SMP template (February 2013) is reproduced below:

SITE MANAGEMENT PLAN

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Excavation Work Plan
Responsibilities of Owner and Remedial Party
Metes and Bounds
Environmental Easement
Health and Safety Plan and Community Air Monitoring Plan
Stormwater Pollution Control Plan
Monitoring Well Boring and Construction Logs
Groundwater Monitoring Well Sampling Log Form
Field Sampling Plan
Quality Assurance Project Plan
Site-wide Inspection Form
EC As-Built Drawings
EC System Component Manual(s)
EC System Inspection Checklist(s)
EC Trouble Shooting Guide
EC Maintenance Schedules

6.0 FINAL ENGINEERING REPORT

6.1 Anticipated Elements

A FER will be submitted to NYSDEC and NYSDOH following implementation of the Remedial Action defined in this RWP. The FER will be prepared in conformance with DER-10, will be signed and sealed by a Professional Engineer (licensed to practice in New York State), and will provide:

- The documentation that the remedial work required under this RWP has been completed and performed in compliance with this plan;
- A comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources;
- Include as-built drawings for all constructed elements, certifications, manifests and bills of lading;
- A description of the changes in the Remedial Action from the elements provided in the RWP and associated design documents;
- A tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action;
- Test results demonstrating that all mitigation and remedial systems are functioning properly;
- Written and photographic documentation of all remedial work performed under this remedy and an itemized tabular description of actual costs incurred during all aspects of the Remedial Action;
- A summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds NYSDEC Brownfield Cleanup Program (BCP) UUSCOs, as provided in 6 NYCRR Subpart 375, Table 375-6.8(a) and/or RRUSCOs, as provided in 6 NYCRR Subpart 375, Table 375-6.8(b). A table that shows exceedances for all soil/fill remaining at the Site after the Remedial Action and a map that shows the location and summarizes exceedances at the Site after the Remedial Action will be included in the FER;
- A summary of all residual contamination that exceeds the SCOs defined for the Site in the RWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of Site SCOs and a map that shows residual contamination in excess of Site SCOs will be included in the FER; and,
- An accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

6.2 Certifications

The following certification will appear in front of the Executive Summary of the Final Engineering Report. The certification will be signed by the Remedial Engineer, Peter Setaro, who is a Professional Engineer registered in New York State. This certification will be appropriately signed and stamped. The certification will include the following statements:

I, Peter Setaro, am currently a registered professional engineer licensed by the State of New York, I had primary direct responsibility for implementation of the remedial program activities, and I certify that the Remedial Action Work Plan was implemented and that all construction activities were completed in substantial conformance with the Department-approved Remedial Action Work Plan.

I certify that the data submitted to the Department with this Final Engineering Report demonstrates that the remediation requirements set forth in the Remedial Action Work Plan and in all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established in for the remedy.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and/or any operation and maintenance requirements applicable to the Site are contained in an environmental easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded.

I certify that a Site Management Plan has been submitted for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by Department.

I certify that all documents generated in support of this report have been submitted in accordance with the DER's electronic submission protocols and have been accepted by the Department.

I certify that all data generated in support of this report have been submitted in accordance with the Department's electronic data deliverable and have been accepted by the Department.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class “A” misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Peter Setaro, of Morris Engineering, am certifying as Owner’s Designated Site Representative for the site.

NYS Professional Engineer #077008 Date Signature/Stamp

7.0 PROJECT SCHEDULE

It is anticipated that this Work Plan will be approved within four weeks of submission to the NYSDEC.

Week	**Action**
0	NYSDEC receipt of RWP; initiate review and modification (if warranted)
7	NYSDEC approval
June 2015	Contractor selection/mobilization
July 2015	Soil Excavation/application of chemical oxidants
August 2015	Installation of additional monitoring wells
	Well development and baseline sampling
May 2016	Preparation of FER

APPENDIX A

Maps

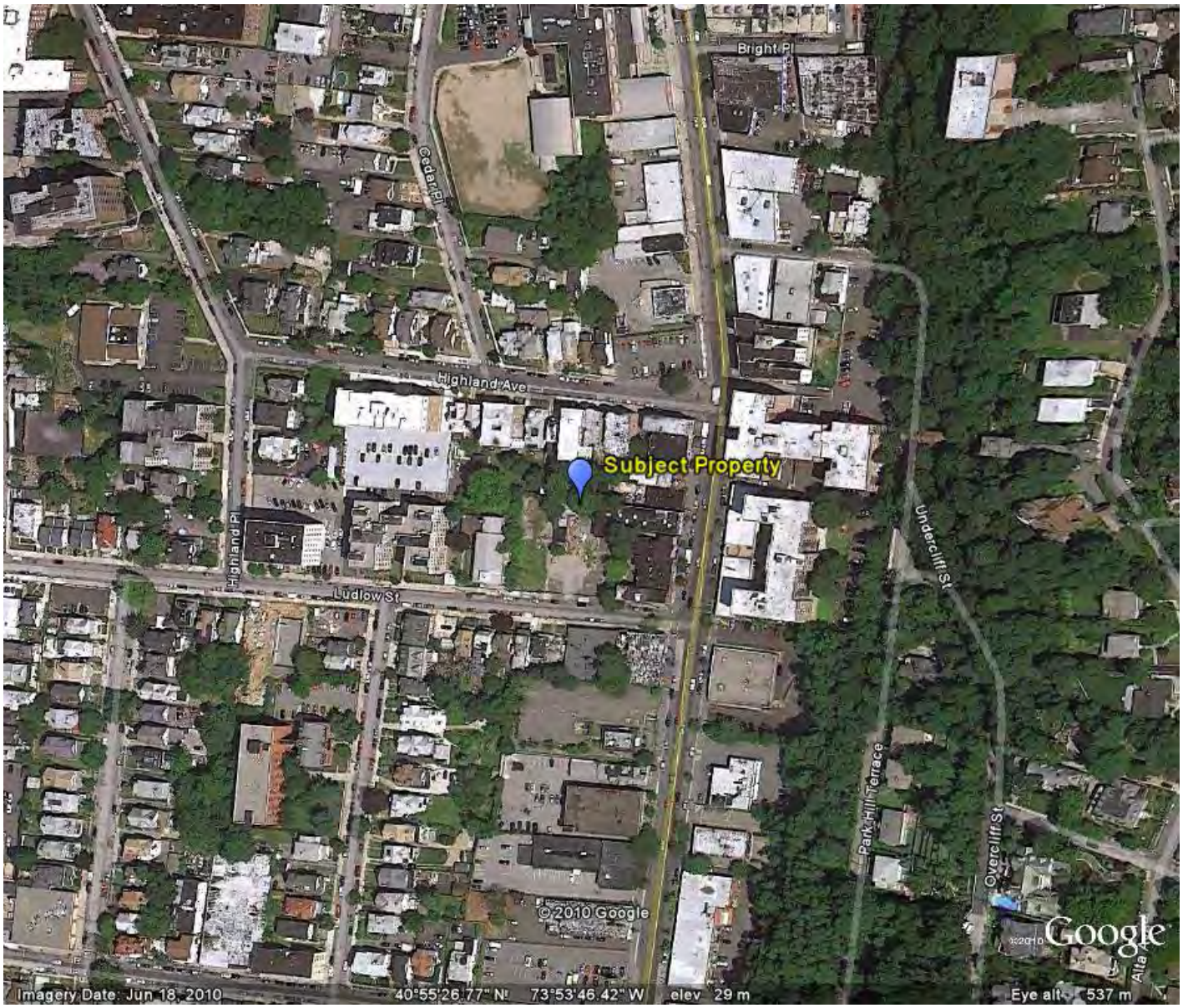


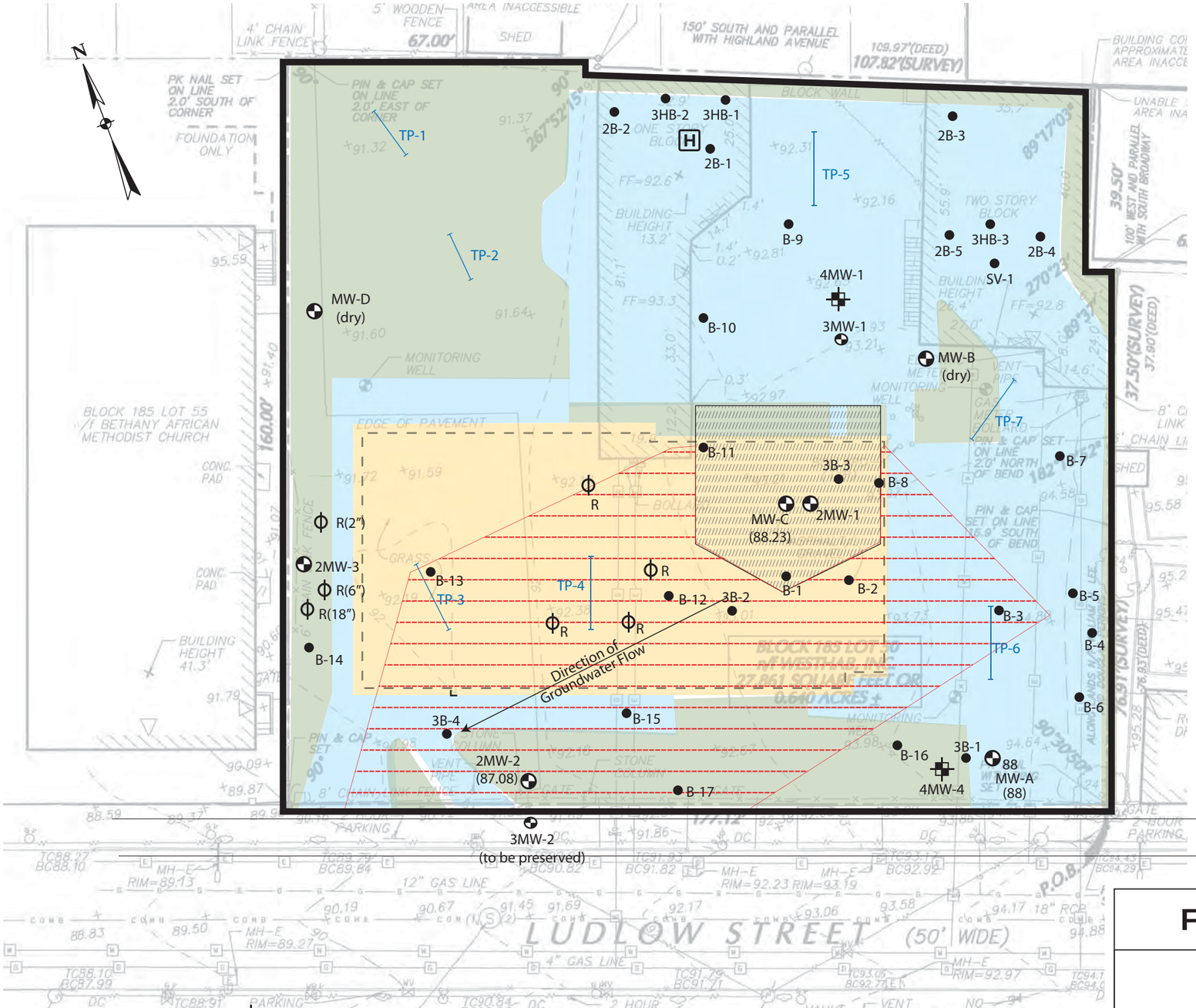
Figure 1
Site Location Map
7-17 Ludlow Street
City of Yonkers
Westchester County, New York

N

ESI File: WY07054.50

April 2015

Appendix A



LEGEND:

- Subject property border
- Proposed landscaped areas subject to 2 feet of certified clean soils
- Proposed paved areas
- Proposed area of removal of urban fill for development purposes (average removal depth of 6.5')
- Monitoring well location
- Sample location
- Test pit location
- Hydraulic lift
- Φ_R Refusal location
- Petroleum impacts observed at saturated zone (approx. 12,000 ft^2)
- Proposed area of removal of grossly contaminated petroleum contaminated soil (additional excavation 4' to 12')
- Footprint of proposed on-site structure
- Proposed monitoring wells

Base map provided by Langan Engineering - Drawing VT101 dated 5/12/12. All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

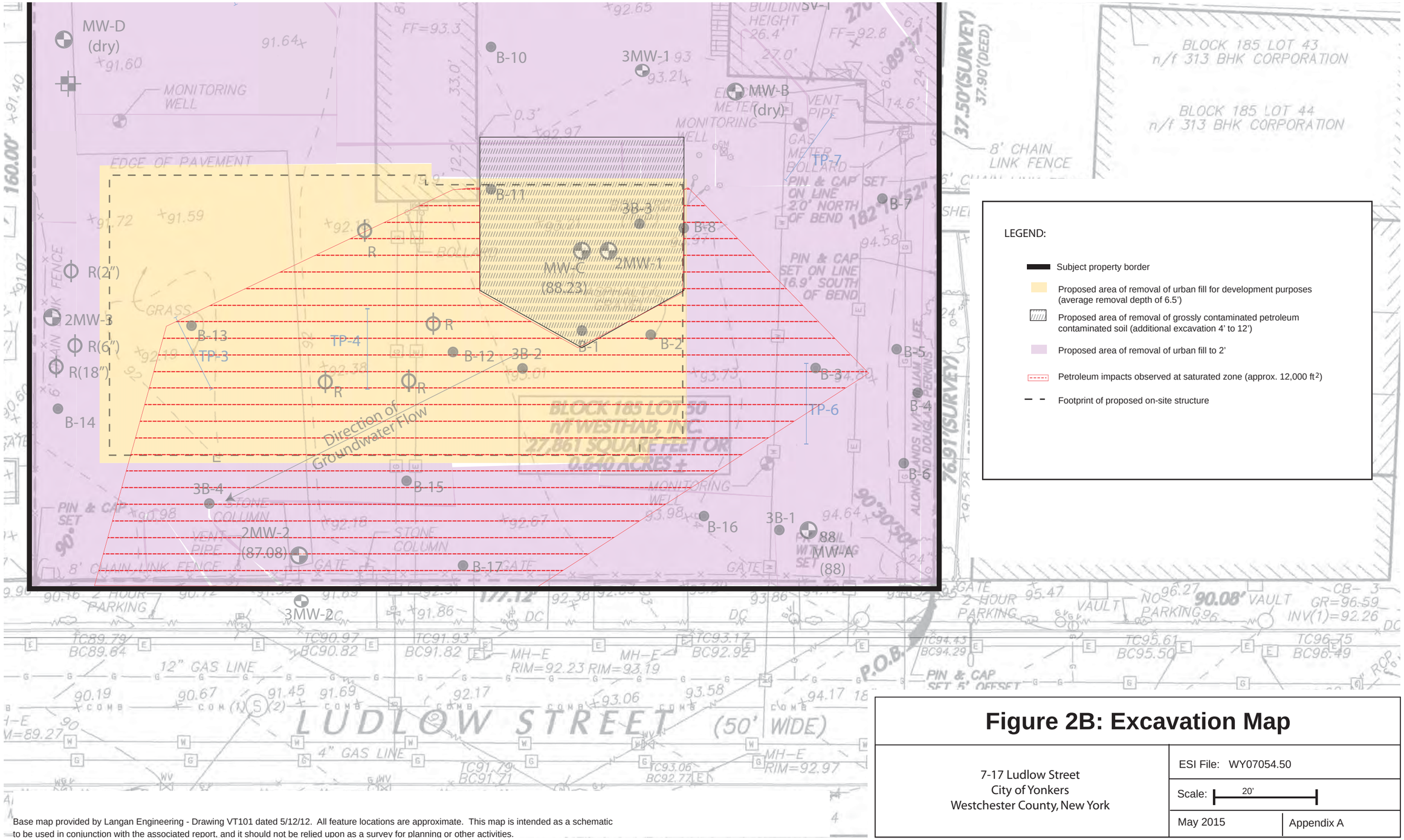
Figure 2: Proposed Remediation Map

7-17 Ludlow Street
City of Yonkers
Westchester County, New York

ESI File: WY07054.50

Scale: 20'

May 2015 | Appendix A



LEGEND:

- Subject property border
- Proposed area of removal of urban fill for development purposes (average removal depth of 6.5')
- Proposed area of removal of grossly contaminated petroleum contaminated soil (additional excavation 4' to 12')
- Proposed area of removal of urban fill to 2'
- Petroleum impacts observed at saturated zone (approx. 12,000 ft²)
- Footprint of proposed on-site structure

Base map provided by Langan Engineering - Drawing VT101 dated 5/12/12. All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

Figure 2B: Excavation Map

7-17 Ludlow Street
City of Yonkers
Westchester County, New York

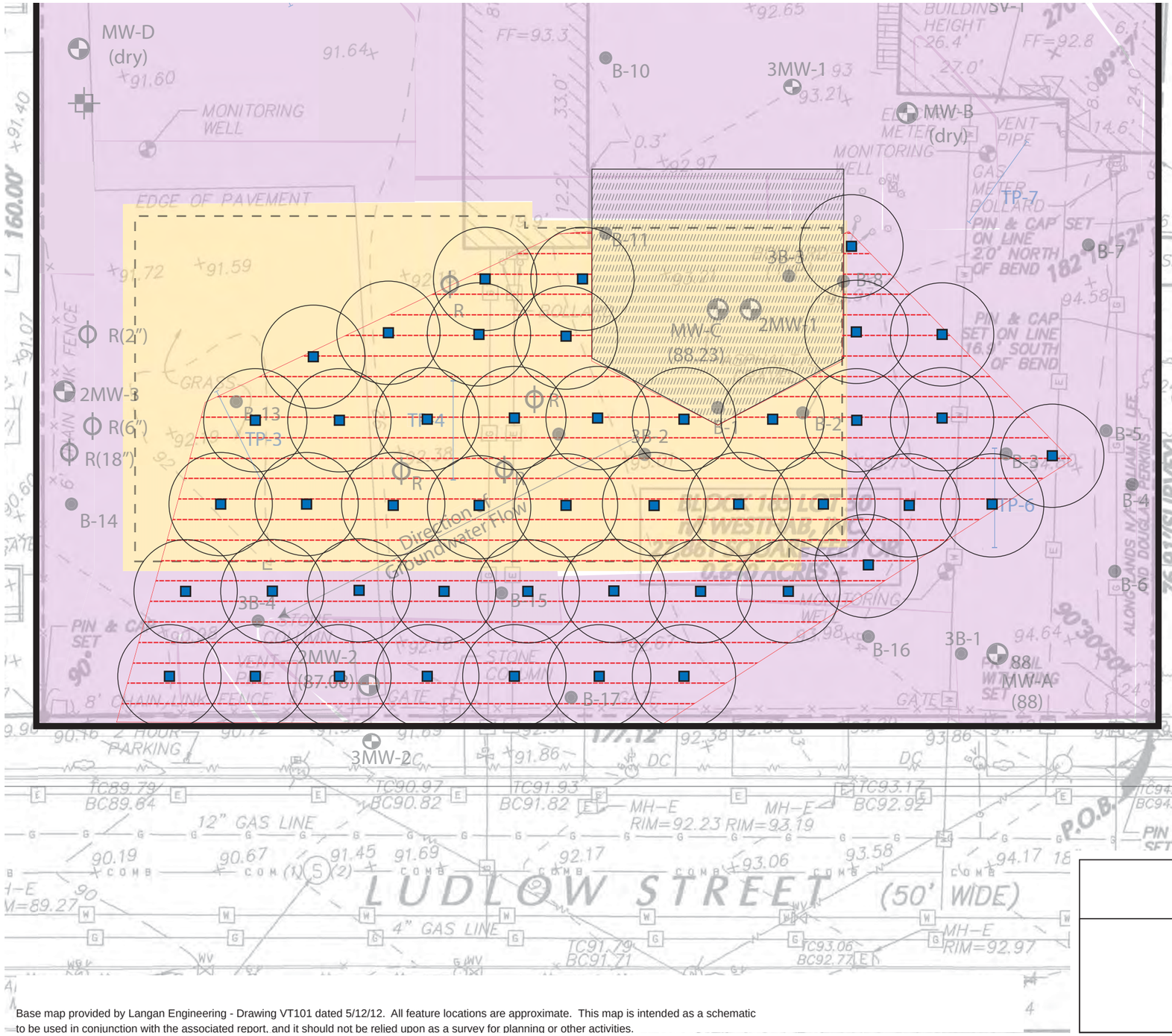
ESI File: WY07054.50

Scale: 20'

May 2015

Appendix A

Ecosystems Strategies, Inc.



LEGEND:

- Subject property border
- ISCO injection point with expected radius of influence
- Proposed area of removal of urban fill for development purposes (average removal depth of 6.5')
- Proposed area of removal of grossly contaminated petroleum contaminated soil (additional excavation 4' to 12')
- Proposed area of removal of urban fill to 2'
- Petroleum impacts observed at saturated zone (approx. 12,000 ft^2)
- Footprint of proposed on-site structure

Base map provided by Langan Engineering - Drawing VT101 dated 5/12/12. All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

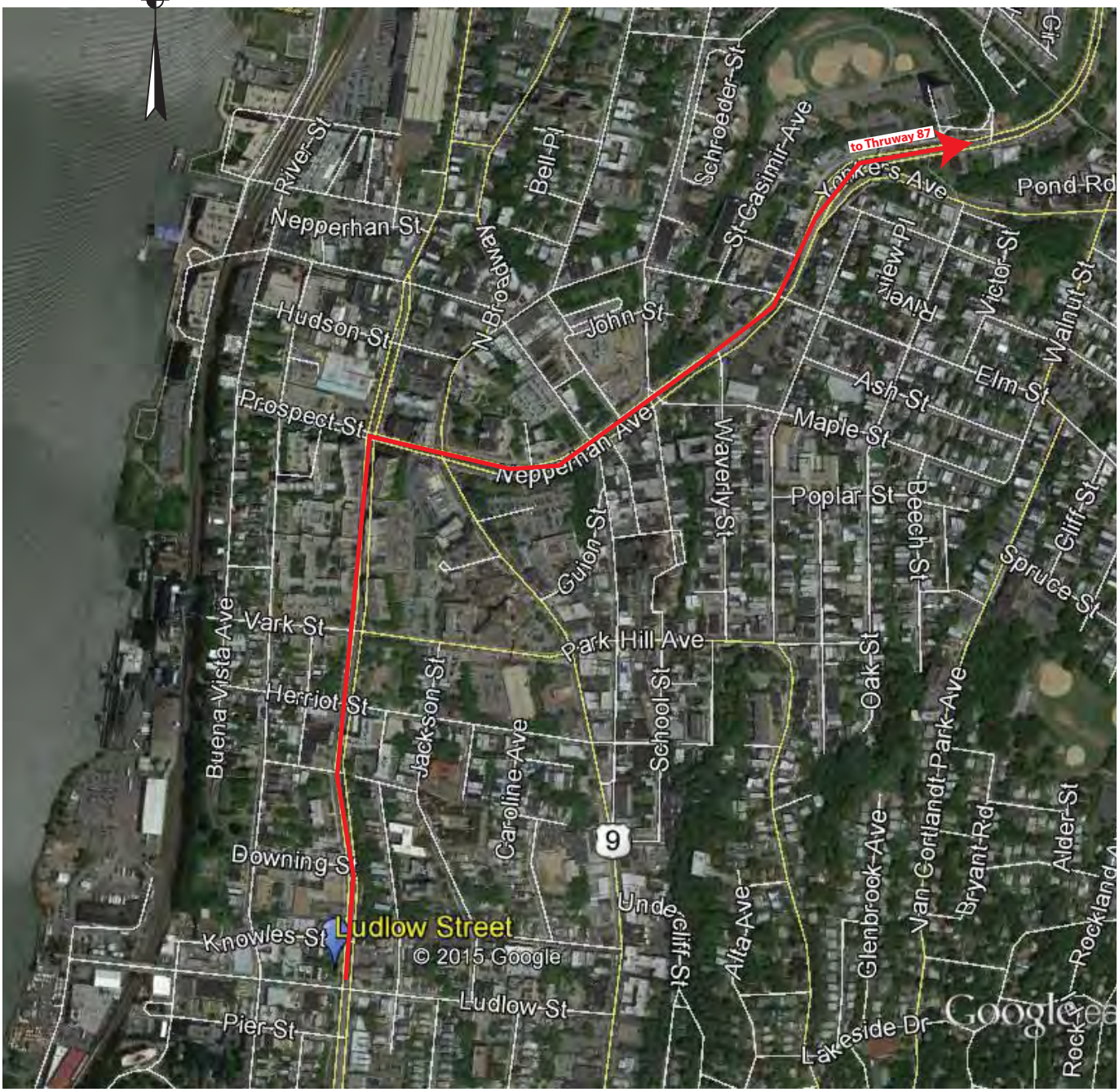
Figure 2C: ISCO Injection Points

7-17 Ludlow Street
City of Yonkers
Westchester County, New York

ESI File: WY07054.50

Scale: 20'

May 2015 | Appendix A



All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

Figure 3 - Truck Route Map

7-17 Ludlow Street
City of Yonkers
Westchester County, New York

Legend:

truck route

ESI File: WY07054.50

April 2015

Appendix A

APPENDIX B

Health and Safety Plan

HEALTH AND SAFETY PLAN

FOR

SITE INVESTIGATION

(INCORPORATING COMMUNITY HEALTH AND SAFETY PLAN)

7-17 Ludlow Street
City of Yonkers
Westchester County, New York

September 2014

NYSDEC Brownfields Program Site: C360079

NYSDEC SPILL FILE: 10-10142

ESI File: WY07054.50

Prepared By

Ecosystems Strategies, Inc.
24 Davis Avenue, Poughkeepsie, NY 12603
phone 845.452.1658 | fax 845.485.7083 | ecosystemsstrategies.com

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Purpose

This Health and Safety Plan for Site Investigation (HASP) has been developed to provide the requirements and general procedures to be followed by Ecosystems Strategies, Inc. (ESI) and on-site subcontractors while performing investigation services at the property located at 7-17 Ludlow Street, City of Yonkers, Westchester County, New York.

This HASP incorporates policies, guidelines, and procedures that have the objective of protecting the public health of the community during the performance of fieldwork activities, and therefore serves as a Community Health and Safety Plan (CHASP). The objectives of the CHASP are met by establishing guidelines to minimize community exposure to hazards during fieldwork, and by planning for and responding to emergencies affecting the public.

This HASP describes the responsibilities, training requirements, protective equipment, and standard operating procedures to be utilized by all personnel while on the Site. All on-site personnel and visitors shall follow the guidelines, rules, and procedures contained in this safety plan. The Project Manager or Site Health and Safety Officer (SHSO) may impose any other procedures or prohibitions believed to be necessary for safe operations. This HASP incorporates by reference the applicable Occupational Safety and Health Administration (OSHA) requirements in 29 CFR 1910 and 29 CFR 1926.

The requirements and guidelines in this HASP are based on a review of available information and evaluation of potential on-site hazards. This HASP will be discussed with Site personnel and will be available on-site for review while work is underway. On-site personnel will report to the Site Health and Safety Officer (SHSO) in matters of health and safety. The on-site project supervisor(s) are responsible for enforcement and implementation of this HASP, which is applicable to all field personnel, including contractors and subcontractors.

This HASP is specifically intended for the conduct of activities within the defined scope of work in specified areas of the Site. Changes in site conditions and future actions that may be conducted at the Site may necessitate the modification of the requirements of the HASP. Although this HASP can be made available to interested persons for informational purposes, ESI has no responsibility over the interpretations or activities of any other persons or entities other than employees of ESI or ESI's subcontractors.

1.2 Site Location and Description

The Site as defined in this HASP is the property located at 7-17 Ludlow Street, City of Yonkers, Westchester County, New York. A Proposed Remediation Map (illustrating the configuration of the Site as well as the areas of proposed fieldwork activities) is included in the Attachments of this HASP.

1.3 Work Activities

Environmental investigation activities are detailed in the Remedial Investigation Work Plan (RIWP), dated October 2013. The specific tasks detailed in the RIWP are wholly incorporated by reference into this HASP. The RIWP was prepared to adequately delineate documented on-site environmental conditions consistent with the NYSDEC Brownfields Program. Existing known contamination consists of petroleum impacted soils.

The Scope of Work includes the extension of soil borings and a test pit; the installation of groundwater monitoring wells and the collection of soil vapor samples.

2.0 HEALTH AND SAFETY HAZARDS

2.1 Hazard Overview for On-Site Personnel

The potential exists for the presence of elevated levels of organic compounds (i.e., gasoline) in on-site soils. The possibility exists for on-site personnel to have contact with contaminated soils, groundwater, and/or vapor during site investigative work. Contact with contaminated substances may present a skin contact, inhalation, and/or ingestion hazard. These potential hazards are addressed in Sections 3.0 through 11.0, below. Material Safety Data Sheet (MSDS) for gasoline has been provided as an attachment to this HASP.

2.2 Potential Hazards to the Public from Fieldwork Activities

The potential exists for the public to be exposed to contaminated soils, groundwater, and/or vapor, which may present a skin contact, inhalation, and/or ingestion hazard. Additional potential hazards to the public that are associated with fieldwork activities include mechanical/physical hazards, traffic hazards from fieldwork vehicles, and noise impacts associated with operation of mechanical equipment.

Impacts to public health and safety are expected to be limited to hazards that could directly affect on-site visitors and/or trespassers. These effects will be mitigated through site access and control measures (see Section 6.0, below). Specific actions taken to protect the public health (presented in Sections 3.0 through 11, below) are anticipated to minimize any potential off-site impacts from contaminant migration, noise, and traffic hazards.

3.0 PERSONAL PROTECTIVE EQUIPMENT

The levels of protection identified for the services specified in the RIWP represent a best estimate of exposure potential and protective equipment needed for that exposure. Determination of levels was based on data provided by previous studies of the Site and information reviewed on current and past Site usage. The SHSO may recommend revisions to these levels based on an assessment of actual exposures and may at any time require Site workers, supervisors, and/or visitors to use specific safety equipment.

The level of protective clothing and equipment selected for this project is Level D. Level D PPE provides minimal skin protection and no respiratory protection, and is used when the atmosphere contains no known hazard, oxygen concentrations are not less than 19.5%, and work activities exclude splashes, immersion, or the potential for unexpected inhalation or contact with hazardous levels of chemicals. Workers will wear Level D protective clothing including, but not limited to, a hard hat, steel-toed boots, nitrile gloves (when handling soils and/or groundwater), hearing protection (foam ear plugs or ear muffs, as required), and safety goggles (in areas of exposed groundwater and when decontaminating equipment). Personal protective equipment (PPE) will be worn at all times, as designated by this HASP.

Disposable gloves will be changed immediately following the handling of contaminated soils, water, or equipment. Tyvek suits will be worn during activities likely to excessively expose work clothing to contaminated dust or soil (chemically-resistant over garments will be required in situations where exposures could lead to penetration of clothing and direct dermal contact by contaminants).

The requirement for the use of PPE by official on-site visitors shall be determined by the SHSO, based on the most restrictive PPE requirement for a particular Work Zones (see Section 6 for Work Zone definitions). All on-site visitors shall, at a minimum, be required to wear an approved hardhat and be provided with appropriate hearing protection as necessary.

The need for an upgrade in PPE will be determined based upon encountered Site conditions, including measurements taken in the breathing zone of the work area using a photo-ionization detector (PID). An upgrade to a higher level of protection (Level C) will begin when specific action levels are reached (see Section 5.0, below), or as otherwise required by the SHSO. Level C PPE includes a full-face or half-mask air-purifying respirator (NIOSH approved for the compound[s] of concern), hooded chemical-resistant clothing, outer and inner chemical-resistant gloves, and (as needed) coveralls, outer boots/boot covers, escape mask, and face shield. Level C PPE may be used only when: oxygen concentrations are not less than 19.5%; contaminant contact will not adversely affect any exposed skin; types of air contaminants have been identified, concentrations measured, and a cartridge or canister is available that can remove the contaminant; atmospheric contaminant concentrations do not exceed immediately dangerous to life or health (IDLH) levels; and job functions do not require self-contained breathing apparatus (SCBAs). The need for Level B or Level A PPE is not anticipated for the planned investigative activities at this Site.

If any equipment fails and/or any employee experiences a failure or other alteration of their protective equipment that may affect its protective ability, that person will immediately leave the work area. The Project Manager and the SHSO will be notified and, after reviewing the situation, determine the effect of the failure on the continuation of on-going operations. If the failure affects the safety of personnel, the work site, or the surrounding environment, personnel will be evacuated until appropriate corrective actions have been taken.

4.0 CONTAMINANT CONTROL

Precautions will be taken during dry weather (e.g., wetting or covering exposed soils) to avoid generating and breathing dust-generated from soils. A PID (or equivalent equipment) will be used to monitor potential contaminant levels. Response to the monitoring will be in accordance with the action levels provided in Section 5.0.

5.0 MONITORING AND ACTION LEVELS

Concentrations of petroleum compounds in the air are expected to be below the OSHA Permissible Exposure Limits (PELs). Air monitoring will be conducted for VOCs. Monitoring will be conducted at all times that fieldwork activities which are likely to generate emissions are occurring. PID readings consistently in excess of 5 ppm will be used as an indication of the need to initiate personnel monitoring, increase worker protective measures, and/or modify or cease on-site operations in order to mitigate off-site community exposure.

PID readings that consistently exceed background in the breathing zone (during any of the proposed tasks) will necessitate moving away from the source or implementing a higher PPE level.

6.0 SITE CONTROL/WORK ZONES

Site control procedures will be established to reduce the possibility of worker/visitor contact with compounds present in the soil, to protect the public in the area surrounding the Site and to limit access to the Site to only those persons required to be in the work zone. Notices will be placed near the Site warning the public not to enter fieldwork areas and directing visitors to report to the Project Manager or SHSO. Measures will be taken to limit the entry of unauthorized personnel into the specific areas of field activity and to safely direct and control all vehicular traffic in and near the Site (e.g., placement of traffic cones and warning tape).

The following Work Zone will be established:

Exclusion Zone ("Hot Zone") - The exclusion zone will be that area immediately surrounding the work being performed for remediation purposes (i.e. the area where contaminated media are being handled). It is anticipated that much of the work will be accomplished with heavy equipment in the exclusion zone. Only individuals with appropriate PPE and training are allowed into this zone. It is the responsibility of the Site Health and Safety Officer to prevent unauthorized personnel from entering the exclusion zone. When necessary, such as in high traffic areas, the exclusion zone will be delineated with barricade tape, cones, and/or barricades.

Decontamination Area - A decontamination area for personnel and equipment is not anticipated being required during completion of the RIWP; however, care will be taken to remove gloves, excess soil from boots, and soiled clothing (if necessary) before entering the Intermediate Zone.

Contamination Reduction Zone and Support Zone - Not anticipated being required during the completion of the RIWP.

Intermediate Zone (Decontamination Zone) - The intermediate zone, also known as the decontamination zone, is where patient decontamination should take place, if necessary. A degree of contamination still is found in this zone; thus, some PPE is required, although it is usually of a lesser degree than that required for the hot zone.

Command Zone - The command zone is located outside the decontamination zone. All exposed individuals and equipment from the "hot zone" and decontamination zone should be decontaminated before entering the command zone. Access to all zones must be controlled. Keeping the media and onlookers well away from the Site is critical and will be the responsibility of both the SSHO and the Project Manager, and other Site personnel as appropriate.

7.0 NOISE CONTROL

All fieldwork activities will be conducted in a manner designed to reduce unnecessary noise generation, and to minimize the potential for both on-site and off-site harmful noise levels. The Project Manager and SHSO will establish noise reduction procedures (as appropriate to the Site and the work) to meet these requirements.

8.0 PERSONNEL TRAINING

Work zones that will accomplish the general objective stated above will be established by the Project Manager and the SHSO. Site access will be monitored by the SHSO, who will maintain a log-in sheet for personnel that will include, at the minimum, personnel on the Site, their arrival and departure times, and their destination on the Site. All workers will be properly trained in accordance with OSHA requirements (29 CFR 1910). Personnel exiting the work zone(s) will be decontaminated prior to exiting the Site. Site-specific training will be provided to each employee. Personnel will be briefed by the SHSO as to the potential hazards to be encountered. Topics will include:

- Availability of this HASP;
- General site hazards and specific hazards in the work areas, including those attributable to known of suspect on-site contaminants;
- Selection, use, testing, and care of the body, eye, hand, and foot protection being worn, with the limitations of each;
- Decontamination procedures for personnel, their personal protective equipment, and other equipment used on the Site;

- Emergency response procedures and requirements;
- Emergency alarm systems and other forms of notification, and evacuation routes to be followed; and,
- Methods to obtain emergency assistance and medical attention.

9.0 DECONTAMINATION

The SHSO will establish a decontamination system and decontamination procedures (appropriate to the Site and the work) that will prevent potentially hazardous materials from leaving the Site. Trucks will be brushed to remove materials adhering to their surfaces. Sampling equipment will be segregated and, after decontamination, stored separately from splash protection equipment. Decontaminated or clean sampling equipment not in use will be covered with plastic and stored in a designated storage area in the work zone.

10.0 EMERGENCY RESPONSE

10.1 Notification of Site Emergencies

In the event of an emergency, the SHSO will be immediately notified of the nature and extent of the emergency (the names and contact information for key site safety and management personnel, as well as other site safety contact telephone numbers, shall be posted at the Site).

Table 1 in this HASP contains Emergency Response Telephone Numbers, and immediately following is a map detailing the directions to the nearest hospital emergency room. This information will be maintained at the work Site by the SHSO. The location of the nearest telephone will be determined prior to the initiation of on-site activities. In addition to any permanent phone lines, a cellular phone will be in the possession of the SHSO, or an authorized designee, at all times.

10.2 Responsibilities

Prior to the initiation of on-site work activities, the SHSO will:

- Notify individuals, authorities, and/or health care facilities of the potentially hazardous activities and potential wastes that may develop as a result of the investigation.
- Confirm that first aid supplies and a fire extinguisher are available on-site.
- Have a working knowledge of safety equipment available.
- Confirm that a map detailing the most direct route to the hospital is prominently posted with the emergency telephone numbers. The SHSO will be responsible for directing notification, response, and follow-up actions and for contacting outside response personnel (ambulance, fire department, or others). In the case of an evacuation, the SHSO will account for personnel. A log of individuals entering and leaving the Site will be kept so that everyone can be accounted for in an emergency.

Upon notification of an exposure incident, the SHSO will contact the appropriate emergency response personnel for recommended medical diagnosis and, if necessary, treatment. The SHSO will determine whether and at what levels exposure actually occurred, the cause of such exposure, and the means to prevent similar incidents from occurring.

10.3 Accidents and Injuries

In the event of an accident or injury, measures will be taken to assist those who have been injured or exposed and to protect others from hazards. If an individual is transported to a hospital or doctor, a copy of the HASP will accompany the individual.

The SHSO will be notified and will respond according to the severity of the incident. The SHSO will perform an investigation of the incident and prepare a signed and dated report documenting the investigation. An exposure-incident report will also be completed by the SHSO and the exposed individual. The form will be filed with the employee's medical and safety records to serve as documentation of the incident and the actions taken.

10.4 Communication

No special hand signals will be utilized within the work zone. Field personnel will utilize standard hand signals during the operation of heavy equipment.

10.5 Safe Refuge

Vehicles and on-site structures will serve as the immediate place of refuge in the event of an emergency. If evacuation from the area is necessary, project vehicles will be used to transport on-site personnel to safety.

10.6 Site Security and Control

Site security and control during emergencies, accidents, and incidents will be monitored by the SHSO. The SHSO is responsible for limiting access to the Site to authorized personnel and for oversight of reaction activities.

10.7 Emergency Evacuation

In case of an emergency, personnel will evacuate to the safe refuge identified by the SHSO, both for their personal safety and to prevent the hampering of response/rescue efforts.

10.8 Resuming Work

A determination that it is safe to return to work will be made by the SHSO and/or any personnel assisting in the emergency, e.g., fire department, police department, utility company, etc. No personnel will be allowed to return to the work areas until a full determination has been made by the above-identified personnel that all field activities can continue unobstructed. Such a determination will depend upon the nature of the emergency (e.g., downed power lines -- removal of all lines from the property; fire -- extinguished fire; injury -- safe transport of the injured party to a medical facility with either assurance of acceptable medical care present or completion of medical care; etc.). Before on-site work is resumed following an emergency, necessary emergency equipment will be recharged, refilled, or replaced. Government agencies will be notified as appropriate. An Incident Report Form will be filed.

10.9 Fire Fighting Procedures

A fire extinguisher will be available in the work zone during on-site activities. This extinguisher is intended for small fires. When a fire cannot be controlled with the extinguisher, the area will be evacuated immediately. The SHSO will be responsible for directing notification, response, and follow-up actions and for contacting ambulance and fire department personnel.

10.10 Emergency Decontamination Procedure

The extent of emergency decontamination depends on the severity of the injury or illness and the nature of the contamination. Whenever possible, minimum decontamination will consist of washing, rinsing, and/or removal of contaminated outer clothing and equipment. If time does not permit decontamination, the person will be given first aid treatment and then wrapped in plastic or a blanket prior to transport.

10.11 Emergency Equipment

The following on-site equipment for safety and emergency response will be maintained in the on-site vehicle of the SHSO:

- Fire extinguisher;
- First-aid kit; and,
- Extra copy of this Health and Safety Plan.

11.0 SPECIAL PRECAUTIONS AND PROCEDURES

The activities associated with this investigation may involve potential risks of exposure to both chemical and physical hazards. The potential for chemical exposure to hazardous or regulated substances will be significantly reduced through the use of monitoring, personal protective clothing, engineering controls, and implementation of safe work practices.

11.1 Heat/Cold Stress

Training in prevention of heat/cold stress will be provided as part of the site-specific training. The timing of this project is such that heat/cold stress may pose a threat to the health and safety of personnel. Work/rest regimens will be employed, as necessary, so that personnel do not suffer adverse effects from heat/cold stress. Special clothing and appropriate diet and fluid intake regimens will be recommended to personnel to further reduce this temperature-related hazard. Rest periods will be recommended in the event of high/low temperatures and/or humidity to counter the negative effects of heat/cold stress.

11.2 Heavy Equipment

Working in the vicinity of heavy equipment is the primary safety hazard at the Site. Physical hazards in working near heavy construction equipment include the following: overhead hazards, slips/trip/falls, hand and foot injuries, moving part hazards, improper lifting/back injuries, and noise. All workers will be properly trained in accordance with OSHA requirements (29 CFR 1910). No workers will be permitted within any excavated areas without proper personal protective equipment (PPE), including, as warranted, any necessary Level C equipment (e.g., respirators and protective suits). Air monitoring in excavation areas will be conducted for VOCs in accordance with Section 5.0.

11.3 Additional Safety Practices

The following are important safety precautions which will be enforced during the investigation activities:

- Medicine and alcohol can aggravate the effect of exposure to certain compounds. Controlled substances and alcoholic beverages will not be consumed during investigation activities. Consumption of prescribed drugs will only be at the discretion of a physician familiar with the person's work.

- Eating, drinking, chewing gum or tobacco, smoking, or other practices that increase the probability of hand-to-mouth transfer and ingestion of material is prohibited except in areas designated by the SHSO.
- Contact with potentially contaminated surfaces will be avoided whenever possible. Workers will not unnecessarily walk through puddles, mud, or other discolored surfaces; kneel on the ground; or lean, sit, or place equipment on drums, containers, vehicles, or the ground.
- Personnel and equipment in the work areas will be minimized, consistent with effective site operations.
- Unsafe equipment left unattended will be identified by a "DANGER, DO NOT OPERATE" tag.
- Work areas for various operational activities will be established.

11.4 Daily Log Contents

The SHSO will establish a system appropriate to the Site, the work, and the work zones that will record, at a minimum, the following information:

- Personnel on the Site, their arrival and departure times, and their destination on the Site.
- Incidents and unusual activities that occur on the Site such as, but not limited to, accidents, spills, breaches of security, injuries, equipment failures, and weather-related problems.
- Changes to the HASP.
- Daily information generated such as: changes to work and health and safety plans; work accomplished and the current Site status; and monitoring results.

12.0 TABLE AND FIGURES

Table: Emergency Response Telephone Numbers

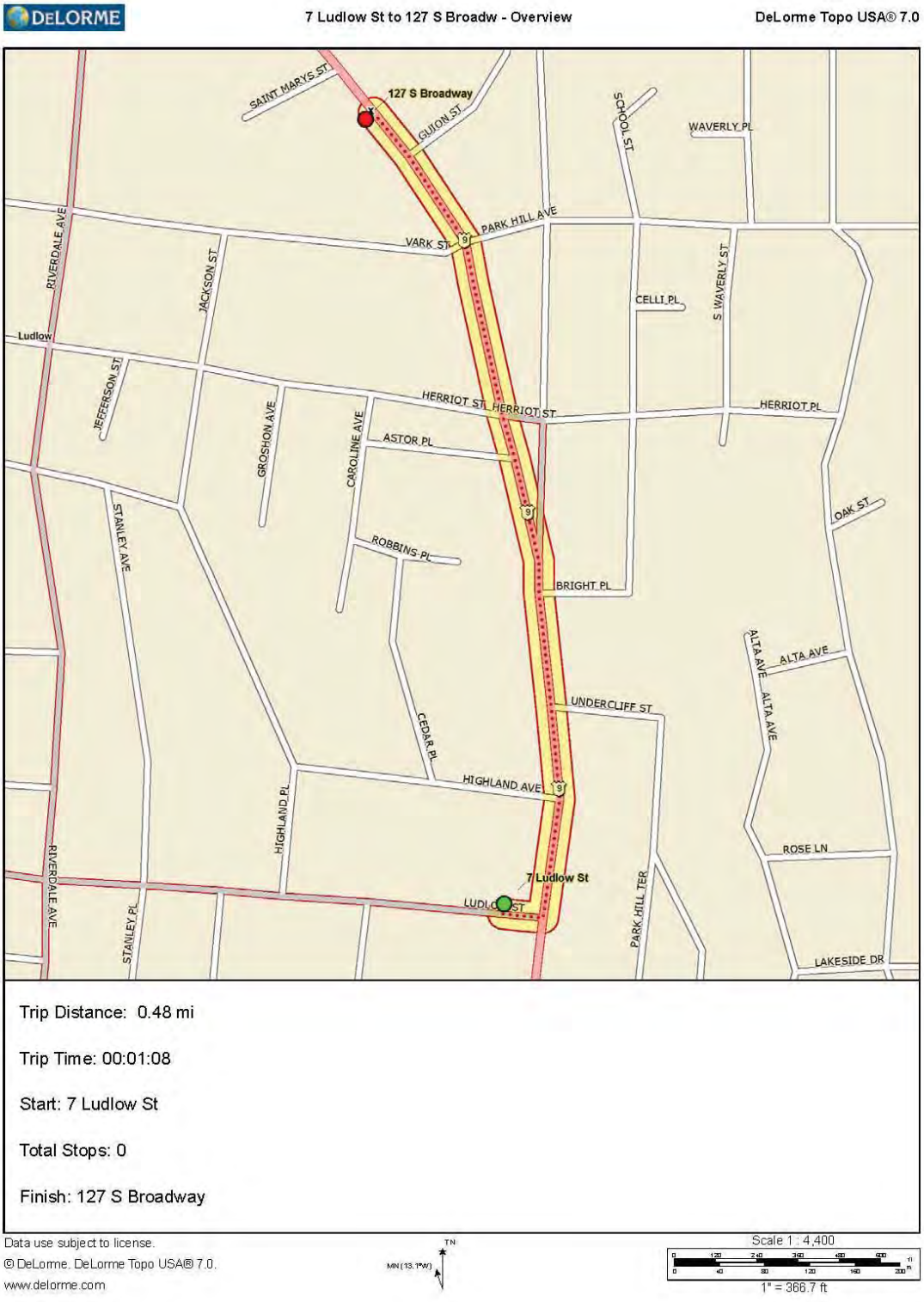
Emergency Agencies	Phone Numbers
EMERGENCY	**911**
Saint Joseph's Medical Center 127 South Broadway	(914) 378-7000 or 911
City of Yonkers Police Department	(914) 377-7252 or 911
Yonkers Fire Department	(914) 377-7555 or 911
City Hall	(914) 377-6000
Water and Sewer	(914) 966-8015

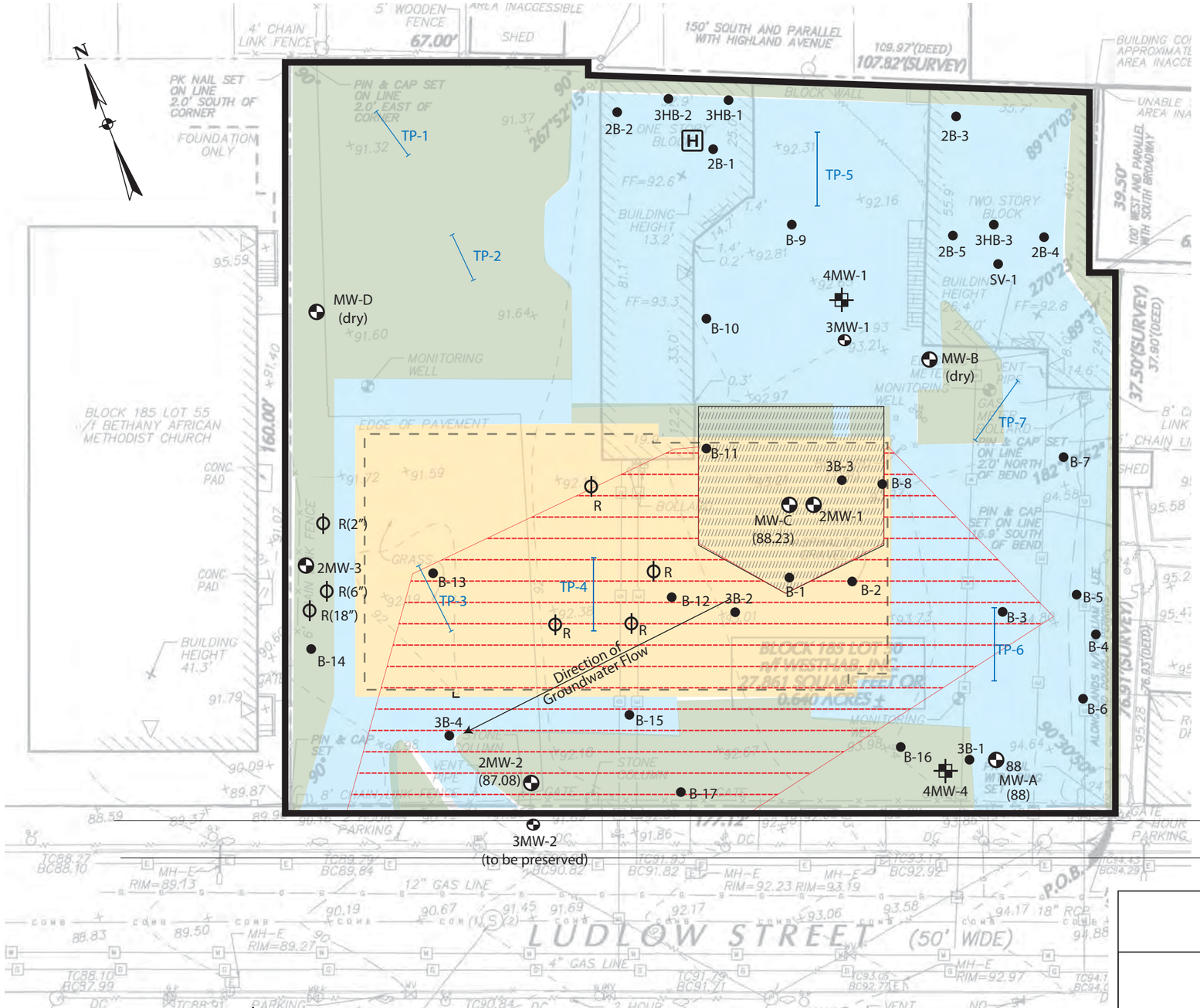
Figure 1: Directions to Hospital

		Dist	Turn		Road	Exit	Total Time	Total Dist
			Start	at	7 Ludlow St		00:00:00	0.00 mi
			Go straight (E)	on	Ludlow St		00:00:00	0.00 mi
	in	0.02 mi	Turn left (NNW)	on to	US 9 (SR 9A|S Broadway)		00:00:03	0.02 mi
	in	0.46 mi	Finish	at	127 S Broadway		00:01:08	0.48 mi

Total Time: 00:01:08 Total Distance: 0.48 mi

Figure 2: Map to Hospital (overview)





LEGEND:

- Subject property border
- Proposed landscaped areas subject to 2 feet of certified clean soils
- Proposed paved areas
- Proposed area of removal of urban fill for development purposes (average removal depth of 6.5')
- Monitoring well location
- Sample location
- Test pit location
- Hydraulic lift
- Φ_R Refusal location
- Petroleum impacts observed at saturated zone (approx. 12,000 ft^2)
- Proposed area of removal of grossly contaminated petroleum contaminated soil (additional excavation 4' to 12')
- Footprint of proposed on-site structure
- Proposed monitoring wells

Base map provided by Langan Engineering - Drawing VT101 dated 5/12/12. All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

Proposed Remediation Map

7-17 Ludlow Street
City of Yonkers
Westchester County, New York

ESI File: WY07054.50

Scale: 20'

May 2015 | Attachment

AMERADA HESS CORPORATION

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades **MSDS No. 9950**

EMERGENCY OVERVIEW
DANGER!
EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD

NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION (rev. Jan-04)

Amerada Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800)424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732)750-6000
MSDS Internet Website www.hess.com/about/environ.html

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS * (rev. Jan-04)

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME). Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION (rev. Dec-97)

EYES
Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES (rev. Dec-97)

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES (rev. Dec-97)

FLAMMABLE PROPERTIES:

FLASH POINT:	-45 ^{o}F (-43^{o}C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 ^{o}F (>280 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

FIRE AND EXPLOSION HAZARDS

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 “Low Expansion Foam - 1994 Edition.”

FIRE FIGHTING INSTRUCTIONS

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES (rev. Dec-97)

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product

vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE (rev. Dec-97)

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL******
******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION (rev. Jan-04)

EXPOSURE LIMITS

Component (CAS No.)	Exposure Limits			
	Source	TWA (ppm)	STEL (ppm)	Note
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	800	--	2003 NOIC: 1000 ppm (TWA) Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3

Component (CAS No.)	Exposure Limits			
	Source	TWA (ppm)	STEL (ppm)	Note
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	50	--	A4 (skin)
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES (rev. Jan-04)

APPEARANCE

A translucent, straw-colored or light yellow liquid

ODOR

A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

	Odor Detection	Odor Recognition
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	85 to 437 ^{o}F (39 to 200 ^{o}C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 ^{o}F (38 ^{o}C) (275-475 mm Hg @ 68 ^{o}F (20 ^{o}C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H_2O = 1):	0.70 – 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %

SOLUBILITY (H_2O): Non-oxygenated gasoline - negligible (< 0.1% @ 77 ^oF). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 ^oF); ethanol is readily soluble in water

10. STABILITY and REACTIVITY (rev. Dec-94)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS

Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES (rev. Dec-97)

ACUTE TOXICITY

Acute Dermal LD50 (rabbits): > 5 ml/kg
Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating
Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY

Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION (rev. Jan-04)

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS (rev. Dec-97)

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION (rev. Jan-04)

DOT PROPER SHIPPING NAME:	Gasoline
DOT HAZARD CLASS and PACKING GROUP:	3, PG II
DOT IDENTIFICATION NUMBER:	UN 1203
DOT SHIPPING LABEL:	FLAMMABLE LIQUID

PLACARD:

15. REGULATORY INFORMATION (rev. Jan-04)

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) or, if not practical, the U.S. Coast Guard with follow-up to the National Response Center, as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION WT. PERCENT
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION - Parts per million (ppm) by weight
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION (rev. Jan-04)

NFPA® HAZARD RATING	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
	* CHRONIC		

SUPERSEDES MSDS DATED: 12/30/97

ABBREVIATIONS:

AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute (212)642-4900
API	American Petroleum Institute (202)682-8000
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
DOT	U.S. Department of Transportation [General Info: (800)467-4922]
EPA	U.S. Environmental Protection Agency
HMIS	Hazardous Materials Information System
IARC	International Agency For Research On Cancer
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Workplace Hazardous Materials Information System (Canada)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

APPENDIX C

Community Air Monitoring Plan

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to

leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

APPENDIX D

QAPP

QUALITY ASSURANCE PROJECT PLAN

for the

7-17 Ludlow Street
City of Yonkers
Westchester County, New York

NYSDEC Brownfields Site: C360079

September 2014

ESI File: WY07054.45

Prepared By:

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1.0 PROJECT MANAGEMENT

1.1 Project/Task Organization

The following individuals are major participants in the project. Following each project participant is their specific responsibilities and authorities for the project. Resumes detailing project personnel are located in Appendix G of the Remedial Action Work Plan (RAWP).

William Wu New York State Department of Environmental Conservation (NYSDEC)

William Wu is the project manager for the NYSDEC. She is responsible for review and approval of all project submittals.

Pete Setaro, P.E. Morris Associates Engineering Consultants, P.L.L.C.

The Remedial Engineer will be responsible for final review and approval of all project submittals prior to submission to the NYSDEC.

Paul Ciminello President, Ecosystems Strategies, Inc. (ESI)

Paul Ciminello will be responsible for overview of all project activities. Mr. Ciminello has authority over all Ecosystems Strategies, Inc (ESI) personnel and subcontractors.

Richard Hooker Project Manager, ESI

Richard Hooker will be responsible for directing and coordinating all project activities, reviewing all project documents, and ensuring that project plans are followed. Ms. Lawson has authority to direct the activities of the field team (OSC and drilling subcontractor).

Field Personnel ESI On-Site Coordinator (OSC) ESI

The OSC will be responsible for the completion of all on-site fieldwork, collection of all samples, completion of the field log, and chains of custody. The OSC will have authority over all on-site subcontractors.

Drilling Subcontractor

The drilling subcontractor will be responsible for the operation of drilling equipment.

Laboratory Subcontractor

The laboratory subcontractor will be responsible for the analysis of samples. The laboratory subcontractor will be New York State Department of Health Environmental Laboratory Approved Program (ELAP) certified in the appropriate categories.

In-situ Treatment Subcontractor

The in-situ treatment subcontractor will be responsible for providing in-situ treatment chemicals and technical assistance during the in-situ treatment (if necessary).

1.2 Principal Data Users

The principal users of the generated data in this project are listed below.

a. Residents of the City of Yonkers, especially those residing in the vicinity of the Site

b. Westhab, Inc.

c. NYSDEC

1.3 Problem Definition/Background

The site is a rectangular-shaped, approximately 0.6-acre parcel located on the northern side of Ludlow Street in the City of Yonkers, Westchester County, New York. A vacant two-story commercial building is located on the northeastern portion of the property and a vacant one-story commercial building is located on the north-central portion of the property. The remainder of the property is composed of paved parking and areas of overgrown vegetation.

The subject property is likely to have been used for commercial purposes from prior to 1942 until circa 2004, including on-site automotive repair and the presence of a taxi dispatching facility. Soil and groundwater contamination has been documented at the site and a spill event was reported to the NYSDEC and Spill Number 1010142 has been issued for the site. The Site has been accepted into the New York State Brownfield Cleanup Program and has been assigned site number C360079.

The primary objective of the proposed action is to remediate the Site under the Brownfield Cleanup Program for re-use as a residential property while being protective of human health and the environment.

1.4 Project/Task Description

The project will meet its objective through the following actions:

- Compliance with DER-10 Technical Guidance for Site Investigation and Remediation, dated May 3, 2010;
- Excavation of petroleum contaminated soils;
- End point sampling to document site integrity subsequent to excavation of petroleum contaminated soils;
- Management and disposal of urban fill soils generated during construction excavations;
- Installation of a vapor barrier and a sub-slab depressurization system in order to prevent any organic vapors from entering the new on-site structure;
- Treatment of subsurface with in-situ methods (if necessary); and,
- Implementation of a Site Management Plan to ensure the long-term effectiveness of the SSDS, including provisions for groundwater monitoring, periodic inspections and contingency plans for soil management.

Endpoint soil and post-remediation groundwater sampling will be conducted per the approved RAWP.

1.5 Quality Objectives and Criteria

The data collected in this project will be used for the following purposes:

- To document removal of on-site soil contamination;
- To off-site contamination;
- To confirm remediation of on- and off-site groundwater contamination;
- To inform and educate the public about potential impacts to human health; and,
- To collect baseline data for planning future IC/IE controls, if necessary.

In order to meet the data quality objectives of precision, accuracy, representation, comparability, and completeness the following actions will be taken:

- Duplicate samples will be collected and analyzed (see Section 2.4, below) in order to determine the degree to which measurements obtained under the same protocols are consistent and reproducible.
- Matrix spike samples will be collected and analyzed (see Section 2.4, below) in order to determine accuracy for the samples.
- Endpoint soil samples will be collected based on the procedures in Section 3.4 of the RAWP so that there will be consistency between the data sets.
- Additional sampling will be conducted, if necessary, based on field observations (elevated PID readings, unusual odors, discoloration, or, any other field evidence of contamination) in order to obtain a representative sample from any areas of residual contamination (if encountered).
- Post-remedial groundwater samples will be collected based on the procedures in Section 3.6 of the RAWP so that there will be consistency between the data sets.
- Data generated during the completion of the RAWP will be submitted for review by a third, independent party (see Section 3.2.1, below).

Prior to field activities, the Project Manager and the OSC will review the RAWP to ensure that the data quality objectives of precision, accuracy, representation, comparability, and completeness will be met during the field activities. At the completion of field activities, the Project Manager will review field logs and chains of custody to ensure that field activities met the intent of the RAWP. If a problem is identified, Mr. Paul Ciminello and the Project Manager will meet to determine corrective measures necessary to meet data quality objectives.

1.6 Documents and Records

Electronic and paper copies of all measurements will be retained by Ecosystems Strategies, Inc. As part of the process, documentation of sufficient quality and quantity to represent subsurface conditions at the Site will be provided to the NYSDEC in a Final Engineering Report (FER). The FER will include necessary institutional/engineering controls (IC/IE controls), if any.

2.0 DATA GENERATION AND ACQUISITION

2.1 Sampling Methods

Samples will be collected in appropriately-sized containers provided by the laboratory, in the manner outlined in the RAWP. Containers will be labeled indicating sample location and depth (if applicable). Soil samples will be collected using properly decontaminated stainless steel trowels and/or dedicated disposable latex gloves. During the sampling procedure, samples will be stored in a cooler prior to transport to the approved laboratory.

2.2 Sample Handling and Custody

Samples will be handled by the OSC. After each sample is collected, it will be placed in a sample cooler that is maintained at 4 (+/-2) °C. For each sampling day, sampling personnel will be required to complete a sampling custody worksheet indicating all pertinent information about the samples collected, handling methods, name of the collector, and chain of custody. Upon the completion of each day of sample collection activities, all samples will be shipped via either courier or overnight delivery (per laboratory requirements) to a NYSDOH ELAP approved laboratory. Laboratory personnel will record the cooler temperature upon receipt and analyze the samples prior to the expiration of the hold times as specified in the Analytical Service Protocol Exhibit I Sample Container Cleaning Procedures, Sample Preservation, and Holding Times.

2.3 Analytical Methods

Selected samples (as outlined in the RAWP) will be analyzed for the following:

Table 1: Analytical Methods/Quality Assurance Summary Table

Matrix	Sample Analysis	Analytical Method	Container (per sample)	Preservative	Number of Samples
Soil	VOC+10	8260C	1, 2 oz glass jar	None	1 per 30' of sidewall and 1 per 900 feet of floor***
Soil	SVOCs+20	8270B	1, 8 oz glass jar	None	Dependent on the Repositories' Requirements
Soil	Priority Pollutant Metals	6010C and 7471B	**	None	Dependent on the Repositories' Requirements
Soil	RCRA Characteristics*	Various	1, 8 oz glass jar	None	Dependant on the Repositories' Requirements
Soil	TCLP (Organics and Metals)*	Various	1, 8 oz glass jar	None	Dependant on the Repositories' Requirements
Groundwater	VOC+10	8260C	2, 40-ml vials	HCL	Quarterly

*****Testing for RCRA characteristics and TCLP will be based on the requirements of the disposal facility.
**SVOCs and metals for soils require 1, 8-ounce glass jar.
***Floor samples will only be collected if soil is left a bottom of excavation.

2.4 Quality Control

Accuracy and precision will be determined by repeated analysis of laboratory standards, and matrix effects and recovery will be determined through use of spiked samples. With each sample run, standards, blanks, and spiked samples will be run.

One duplicate sample will be collected for every 20 matrix samples (or one per week). One in 20 samples will also be submitted for Matrix spike (MS) and Matrix Spike Duplicate (MSD) analysis. One rinse blank will be prepared for each non-dedicated piece of sampling equipment for every 20 analytical samples collected using that piece of equipment. For each day of sampling, a trip blank will be included with each sample cooler and analyzed for VOCs only.

Samples will be identified using a unique ID number. This ID will be recorded on the sampling log and/or field record and the sampling container. Samples for each day of fieldwork will be assigned to a Sample Delivery Group (SDG) for that day and will be shipped via either courier or overnight delivery to the laboratory following proper chain of custody procedure, as described above.

2.5 Instrument/Equipment, Testing, Inspection, and Maintenance

Field measurements will be collected using a PID during all sampling. The PID will be stored at Ecosystems Strategies, Inc. offices when not in use. The instrument will be calibrated each day in accordance with the manufacturer's instructions. Instrument malfunction is normally apparent during calibration. In the event of malfunction, equipment will be cleaned and tested. Equipment testing, inspection, and maintenance will be the responsibility of the Project Manager and/or the OSC for the project.

2.6 Inspection/Acceptance of Supplies and Consumables

All supplies and consumables will be inspected and tested (if necessary) by either the Project Manager or the OSC upon receipt. The following supplies and consumables will be used:

The following supplies and consumables will be used:

- One 8-oz (for SVOCs and Metals) and one 2-oz (for VOCs) clear glass jar will be used for each soil sample. Duplicate soil samples will each require one additional sample volume. Two 40-ml HCL preserved glass vials (for VOCs), two amber liters (for SVOCs), and one 250-ml plastic jar (for metals) will be used for each groundwater sample

- Disposable gloves (nitrile or equivalent).

- Distilled water (for decontamination and the preparation of rinse blanks)

2.7 Data Management

For the purpose of data management, the data can be divided into field and laboratory data. Field data will be recorded at the time of measurement on written field logs. Laboratory data will be reviewed upon receipt and summarized in data summary tables.

3.0 DATA VAILDATION AND USABILITY

3.1 Data Review, Verification, and Validation

Data generated by this project will be reviewed, verified and validated as follows

3.1.1 Field Measurements

If field instruments are determined to be functioning correctly through calibration and measurements of standards, and if there are no inconsistencies between written records and data recorded in the meters, the data will be assumed to be valid and will be accepted as an indication of field conditions. If instruments malfunction prior to field measurement, they will be restored to proper function prior to re-use. If they malfunction immediately after field measurements are taken, the measurements will be retaken as soon as possible. Inconsistencies between written records and recorded meter data will be resolved by re-testing the material, if possible. If re-testing is not possible, (i.e. the sample has been shipped to the laboratory), the inconsistency will be described in the FER and the laboratory analysis will be utilized to classify the material. In addition, all field data will be reviewed by the Project Manager for consistency and plausibility.

3.1.2 Laboratory Analysis

As a NYSDOH ELAP-certified laboratory will provide a NYSDEC ASP Category B data package for the determinative sample analyses, as described in Section 2 of DER-10 and the July 2005 NYSDEC ASP.

3.2 Verification and Validation Methods

3.2.1 Verification Method

Once collected, all data will go to the Project Manager for review and verification. Review will involve determining that all data has been collected at the proper locations by the proper persons and that all field and laboratory logs are complete. In addition, a Data Usability Summary Report (DUSR) will be prepared by a third, independent party, which maintains NYSDOH ELAP CLP Certification. A current resume outlining the education and experience with data validation of the individual preparing the DUSR will be provided to the NYSDEC for review and approval.

3.2.2 Authority for Verification

Authority for verification, validation, and resolution of data issues will be distributed among the investigators. Authority to resolve issues regarding verification of field measurements will rest with the Project Manager and Mr. Paul Ciminello.

3.2.3 Project Reports

Daily and monthly reports will be submitted to the NYSDEC as specified in the RAWP. The Project Manager will pass pertinent information to the other project participants, as needed.

Following review, validation, and verification, all data will be conveyed to users via the FER. This report will include the following:

- All laboratory analytical results obtained from the field sampling event(s). The analytical results will be summarized in tables.
- A detailed account of any field procedures used which deviate from those established in the RAWP.
- A complete set of field notes and/or Field Observation Tables.
- Results of the DUSR review of all laboratory results.

3.2.4 Calculations

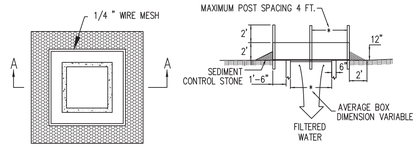
There are no project specific calculations required.

APPENDIX E

Citizen Participation Plan
(To be provided)

APPENDIX F

Erosion and Sedimentation Control Plan



SECTION A–A
MULTI–DIRECTIONAL FLOW

NOTES:

1. SEDIMENT CONTROL STONE SHALL BE NO. 5 OR NO. 57.

2. WIRE MESH SHALL BE HARDWARE CLOTH 23 GAUGE MIN. AND SHALL HAVE 1/4 INCH MESH OPENINGS.

3. TOP OF WIRE MESH SHALL BE A MINIMUM OF ONE FOOT BELOW THE SHOULDER OR ANY DIVERSION POINT.

4. STEEL POST SHALL BE 5 FT. IN HEIGHT, BE INSTALLED 1.5 FT. DEEP MINIMUM, AND BE OF THE SELF–FASTENER ANGLE STEEL TYPE.

5. WOOD POST SHALL BE 6 FT. IN HEIGHT, BE INSTALLED TO 1.5 FT. DEEP MINIMUM, AND BE 3 INCHES IN DIAMETER.

6. POST SPACING SHALL BE A MAXIMUM OF 4 FT.

1 INLET PROTECTION DETAIL

HAY BALE CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.

2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4 INCHES AND PLACED SO THE BINDINGS AREA HORIZONTAL.

3. BALES SHALL BE SECURLEY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE–BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.

4. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

SILT FENCE SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTEN SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.

2. FILTER CLOTH TO BE FASTEN SECURELY TO WOVEN WIRE FENCE TIES SPACED EVERY 24" AT TOP AND AT MID SECTION.

3. WHEN TWO SECTIONS OF THE FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.

4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

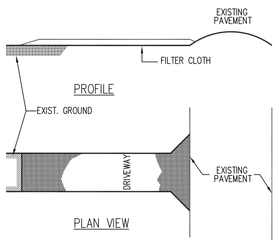
POSTS: STEEL EITHER T OR U TYPE OR 2" HARDWOOD.

FENCE: WOVEN WIRE 14 GA. WITH 6" MAXIMUM MESH OPENING.

FILTER CLOTH: FILTER X, MIRAFI 100X, STABLINKA TI40N OR APPROVED EQUAL.

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.

2 HAYBALE & SILT FENCE DETAIL



STABILIZED CONSTRUCTION ENTRANCE SPECIFICATIONS

1. STONE SIZE – USE 2" STONE OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.

2. LENGTH – AS REQUIRED, BUT NOT LESS THAN 50 FEET.

3. THICKNESS – NOT LESS THAN 6 INCHES.

4. WIDTH – 30 FEET MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.

5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. FILTER WILL NOT BE REQURIED ON A SINGLE FAMILY RESIDENCE LOT.

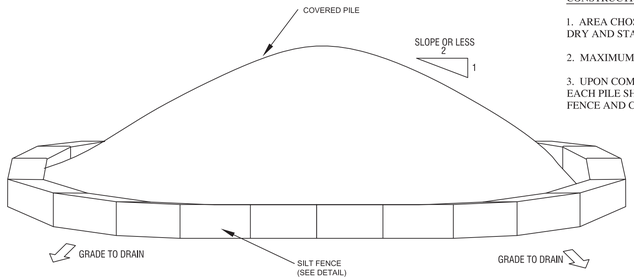
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, AMOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.

7. MAINTENACES – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT–OF WAYS. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEEMED AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT–OF–WAYS MUST BE REMOVED IMMEDIATELY.

8. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAYS. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

9. PERIODIC INSPECTIONS AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

3 STABILIZED CONSTRUCTION ENTRANCE DETAIL



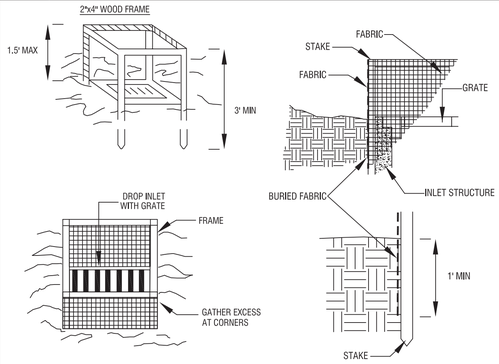
CONSTRUCTION SPECIFICATIONS

1. AREA CHOSEN FOR STOCKPILING SHALL BE DRY AND STABLE

2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 1:2

3. UPON COMPLETION OF SOIL STOCKPILING, EACH PILE SHALL BE SURROUNDED WITH SILT FENCE AND COVERED.

4 CONSTRUCTION STOCKPILING DETAIL



CONSTRUCTION SPECIFICATIONS

1. FILTER FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.

2. CUT FABRIC FROM A CONTINOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.

3. STAKE MATERIALS WILL BE STANDARD 2" X 4" WOOD OR EQUIVALENT. METAL WITH A MINIMUM LENGTH OF 3 FEET.

4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.

5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.

6. A 2" X 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.

MAXIMUM DRAINAGE AREA 1 ACRE

5 FILTER FABRIC DROP INLET PROTECTION DETAIL

EROSION AND SEDIMENT CONTROL NOTES:

1. ALL SEDIMENT CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE "NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL"

2. THE EROSION AND SEDIMENT CONTROL PLAN PRACTICES ARE DESCRIBED IN THE ACCOMPANYING STORMWATER POLLUTION PREVENTION PLAN (SWPPP). REFER TO THE SWPPP FOR DESCRIPTION OF MEASURES AND INSPECTION/MAINTENANCE REQUIREMENTS. CONTRACTOR TO FOLLOW NYSDEC GUIDELINES AND REQUIREMENTS FOR CONSTRUCTION EFFORTS.

AFTER INITIAL SITE CLEARING, CONTRACTOR TO STABILIZE DISTURBED, BUT INACTIVE AREAS OF THE PROJECT SITE TO THE SATISFACTION OF NYSDEC REQUIREMENTS. STABILIZATION TO BE PER CURRENT NYSDEC REQUIREMENTS AND AS PER THE CURRENT EDITION OF THE "NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL."

INITIAL ACTIVE CONSTRUCTION AREAS ARE EXPECTED TO BE LIMITED TO THE SITE HAUL ROADS AND STAGING AREAS FOR PARKING LOT RELATED CONSTRUCTION. AREAS OF THE SITE THAT ARE NOT PART OF THIS ACTIVE CONSTRUCTION EFFORT ARE TO BE IMMEDIATELY STABILIZED AFTER INITIAL SITE CLEARING AS NOTED ABOVE.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH SWPPP AND EROSION AND SEDIMENT CONTROL PRACTICES. THE SEDIMENT AND EROSION CONTROL PRACTICES ARE TO BE INSTALLED PRIOR TO ANY LAND DISTURBANCE AND MAINTAINED UNTIL PERMANENT STABILIZATION IS ESTABLISHED.

4. TIMELY MAINTENANCE OF SEDIMENT CONTROL STRUCTURES IS THE RESPONSIBILITY OF THE CONTRACTOR. ALL STRUCTURES SHALL BE MAINTAINED IN GOOD WORKING ORDER AT ALL TIMES. THE SEDIMENT LEVEL IN ALL SEDIMENT TRAPS SHALL BE CLOSELY MONITORED AND SEDIMENT REMOVED PROMPTLY WHEN MAXIMUM LEVELS ARE DESCRIBED IN THE SWPPP. ALL EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE INSPECTED ON A MINIMUM OF A WEEKLY BASIS AND AFTER EACH RAINFALL EVEN OF 0.5 INCHES OR GREATER WITHIN A 24 HOUR PERIOD, AS PER THE SWPPP. FIELD BOOKS TO BE MAINTAINED TO DOCUMENT COMPLIANCE WITH MEASURES. ALL SUPERINTENDENT AND PROJECT TEAM MEMBERS WILL BE PROPERLY TRAINED FOR MAINTENANCE, INSPECTION AND ENFORCEMENT PROCEDURES.

5. THE CONTRACTOR SHALL KEEP ALL ROADWAYS ADJACENT TO THE IMPROVEMENT AREA CLEAR OF SOIL AND DEBRIS.

6. TEMPORARY SEDIMENT AND EROSION CONTROL STRUCTURES SHALL BE REMOVED AFTER THE AREA OF DISTURBANCE HAS BEEN PERMANENTLY STABILIZED.

7. BEST CONSTRUCTION PRACTICES TO BE IMPLEMENTED TO REDUCE/ELIMINATE DUST AND DEBRIS WITHIN AND ADJACENT TO WORK AREAS, INCLUDING WETTING SOIL SURFACES, COVERING TRUCKS AND STORED MATERIALS WITH TARPULINS AND PROPERLY MAINTAINING EQUIPMENT.

8. EACH PHASE OF CONSTRUCTION WILL BE INITIATED WITH A DELINEATION OF LIMITS OF DISTURBANCE. INTERIM EROSION AND SEDIMENT CONTROL FACILITIES TO BE INSTALLED AS NECESSARY BETWEEN CONSTRUCTION PHASES, AS WARRANTED BY CONSTRUCTION, IN ORDER TO MINIMIZE EROSION AND TRANSPORT OF SOIL AND DEBRIS FROM THE SITE.

9. CONTRACTOR TO PREVENT SEDIMENT FROM ENTERING STORM SEWERS DURING CONSTRUCTION.

10. EXISTING ON-SITE INLETS TO BE PROVIDED WITH APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES UNTIL ON-SITE SITE STORM SEWERS HAVE BEEN REMOVED FROM THE PROJECT SITE.

11. AREAS THAT HAVE BEEN DISTURBED ARE TO BE RESTABILIZED AS SOON AS POSSIBLE AFTER CONSTRUCTION IS COMPLETED IN THAT AREA. TEMPORARY STABILIZATION SHALL INCLUDE, BUT NOT LIMITED TO, SUCH MEASURES AS HYDROSEEDING, MULCHING, JUTE MESH OR TEMPORARY PAVING AND AS ALLOWED BY CURRENT NYSDEC STANDARDS.

12. MISTING AND OTHER CONTROLS WILL BE UTILIZED TO MITIGATE DUST EMISSIONS FROM WORK ZONE. THIS INCLUDES DURING THE DEMOLITION OF CONCRETE STRUCTURES.

13. ALL MATERIALS HAULED FROM THE SITE TO BE PLACED IN LEAK PROOF CONTAINERS AND PROPERLY COVERED WITH TARPS, SCREENS AND/OR OTHER MECHANISMS.

14. A SILT FENCE WILL BE INSTALLED ALONG THE PERIMETER OF THE SITE AND AT THE TOE OF ALL CRITICAL CUT AND FILL SLOPES.

15. STABILIZED CONSTRUCTION ENTRANCE SHALL BE LOCATED AT ALL VEHICLES ACCESS GATES TO THE CONSTRUCTION SITE.

16. CONCRETE WASHOUT AREAS SHOULD BE LOCATED IN DESIGNATED AREAS AWAY FROM AND DOWNSLOPE OF STORMWATER CONVEYANCES, AT LEAST 50' AWAY FROM CATCH BASINS, ROAD GUTTERS, OPEN DITCHES, OR WATER BODIES. PROVIDE A RECOMMENDED MINIMUM LENGTH AND WIDTH OF 10', WITH SUFFICIENT QUANTITY AND VOLUME TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED. VOLUME CAN BE PROVIDED IN ABOVE-GRADE OR BELOW-GRADE PITS. EACH SHOULD BE LINED WITH PLASTIC LINING MATERIAL WITH A MINIMUM OF 10-MIL IN POLYETHYLENE SHEETING AND SHOULD BE FREE OF HOLES, TEARS, OR OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL. ABOVE-GRADE PITS CAN BE FORMED WITH STAKED WOODEN FRAMES OR STRAW BALES. WASHOUTS SHOULD BE EMPTIED WHEN NECESSARY AND ALL CONCRETE SHOULD BE DISPOSED OF ACCORDING TO ALL LOCAL, STATE, AND FEDERAL REGULATIONS. PROVIDE ADEQUATE HOLDING CAPACITY AT ALL TIMES WITH A MINIMUM FREEBOARD OF 4" FOR ABOVE GRADE FACILITIES AND 12" FOR BELOW GRADE FACILITIES. INSTALL A SIGN ADJACENT TO CONCRETE WASHOUT AREA TO INFORM EQUIPMENT OPERATORS.

Project Title:

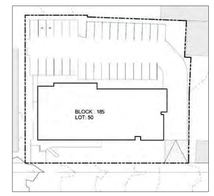
LUDLOW COMMONS

7 Ludlow St Yonkers, NY

Client:

WESTHAB
Building Communities. Changing Lives.

85 Exective Boulevard, Elmsford, NY10523
Tel 914.345.2800 Fax 914.345.3139
www.westhab.org



Key Plan:

Issued:

NUMBER	DATE	DESCRIPTION
1	10-23-13	COY SITE PLAN SUBMISSION
2		
3		
4		

Revisions:

Architect of Record:
Magnusson Architecture & Planning PC
853 Broadway Suite 800, New York, NY
Tel 212.253.7920 Fax 212.253.1276

Structural Engineer:
GACE
31 West 27th Street, New York, NY 10001
Tel (212) 545-7878

MEP Engineer:
Ettinger Engineering Associates
505 Eighth Avenue, 24th Floor
New York, NY 10018
Tel: (212) 244-2410

Landscape Architect:
Terrain-NYC
200 Park Avenue South, Suite 1401
New York, NY 10003
Tel (212) 537-6080 Fax: (212) 537-6079

Civil Engineer:
Philip Habib & Associates
102 Madison Avenue, 11th Floor
New York, NY 10016
Tel: (212) 929-5656 Fax: (212) 929-5605

Filing Representative:

Seal:

Drawing Title:

EROSION & SEDIMENT CONTROL DETAILS

Project Number:	08021
Date:	10-23-12
Drawing #:	C-106.00
Scale:	AS SHOWN
Drawn By:	BK
Checked By:	SM

APPENDIX G

Resumes of Key Environmental Personnel

Scott Spitzer
Director of Environmental Investigations
scott@ecosystemsstrategies.com

PROFESSIONAL EXPERIENCE

Director of Environmental Investigations, Ecosystems Strategies, Inc., Poughkeepsie, NY 2013 - present

Management and quality review of environmental site assessments, technical environmental investigations, and remedial projects including Brownfield sites. Conducts research to obtain field and regulatory information about the environmental status of a designated area. Reviews all documents prepared by ESI to ensure consistency and technical accuracy. Responsibilities associated with the preparation of site assessments include: investigating site histories, conducting facility inspections, reviewing regulatory agency records, documenting facility compliance with relevant State and Federal regulations, and preparing reports. Management of complex technical environmental investigations (including sites currently on the NYSDEC Registry of Inactive Hazardous Waste Sites), including coordinating subcontractors, overseeing fieldwork, designing and implementing sampling plans, preparing technical reports, and interfacing with regulatory agency personnel.

Senior Project Manager, Long-Form Reports, The 451 Group, Inc., New York, NY 2008-2011

- Managed the production of over 150 technical white papers.

Senior Project Manager, Ecosystems Strategies, Inc., Poughkeepsie, NY 2001 - 2008

- Conducted Environmental Site Investigations and prepared final site assessment reports. Over 300 Investigations and Final Reports completed as lead manager.
- Investigated site histories.
- Conducted facility inspections.
- Reviewed regulatory agency records.
- Documented facility compliance with relevant State and Federal regulations.
- Conducted Phase II Technical Environmental Investigations and prepared technical reports.
- Researched field and regulatory information.
- Managed tank removals.
- Coordinated subcontractors.
- Oversaw fieldwork and handled collection of material, soil and water samples.

Select Projects

Scenic Hudson Land Trust, Inc., Beacon Waterfront Project, Beacon, NY

ESI conducted soil and groundwater investigations on a former MOSF and adjacent scrap yard. Projects involved soil remediation of both petroleum and PCB-contaminated soils and long-term groundwater monitoring. Both projects were classified as Voluntary Clean-Up projects by the NYSDEC and closure status was attained.

Sakmann Restaurant Corporation Site, Fort Montgomery, NY

Conducted Phase I Environmental Site Assessment and Phase II Subsurface Investigations for former filling station and automotive repair garage contaminated by solvent and waste-oil discharges to an on-site drywell.

Designed and implemented a sampling plan for soils impacted by chlorinated hydrocarbons, petroleum, and metals. Created Workplan (in coordination with the NYSDEC Voluntary Cleanup Program) for remediation of on-site contamination and long-term sampling of on-site groundwater monitoring wells.

Staten Island Marina Site, Staten Island, NY

Conducted Phase I Environmental Site Assessment and Phase II Subsurface Investigation for an active marine facility engaged in boat painting and engine maintenance activities. Coordinated the delineation of metals contamination over a three-acre area and analyzed potential impacts from on-site fill materials. Submitted remedial and budgetary analysis in support of regulatory agency approval for conversion of boatyard into a public park.

Octagon House Development Site, Roosevelt Island, NY

Conducted Phase I Environmental Site Assessment and Phase II Subsurface Investigations at the former site of a large, urban hospital. Interpreted the results of geotechnical studies, extended test pits, and conducted extensive soil sampling, to document subsurface soil conditions in support of client's application to the U.S. Housing and Urban Development Agency (HUD). Created Workplan (in coordination with the NYCDEP Office of Environmental Planning and Assessment) for site-wide remediation of contaminated soils and secured NYCDEP approval for site remediation as required by HUD.

Camp Glen Gray Boy Scout Facility, Mahwah, NJ

Conducted Phase I Environmental Site Assessment and Phase II Subsurface Investigations at an approximately 800-acre campground containing numerous structures. Documented subsurface soil conditions at the locations of aboveground and underground storage tanks, and delineated lead contamination at a former firing range. Assisted in design and implementation of remediation plans for removal of petroleum and lead contaminated soils, and obtained NJDEP approvals.

EDUCATION

SUNY at Stony Brook, Bachelor of Science - Biology, SUNY at Stony Brook *May 1992*
SUNY at Purchase, extensive studies in Environmental Science

PROFESSIONAL CERTIFICATIONS

OSHA Hazardous Waste Site Operations and Emergency Response (HAZWOPER) – 40 hr

Ecosystems Strategies, Inc.

Richard Hooker
Project Manager

PROFESSIONAL EXPERIENCE

Project Manager, Ecosystems Strategies, Inc., Poughkeepsie, NY *2001 - present*

- Conducts Environmental Site Investigations and prepares final site assessment reports. Over 300 Investigations and Final Reports completed to date.
- Investigates site histories.
- Conducts facility inspections.
- Reviews regulatory agency records.
- Documents facility compliance with relevant State and Federal regulations.
- Conducts Phase II Technical Environmental Investigations and prepares technical reports.
- Researches field and regulatory information.
- Manages tank removals.
- Coordinates subcontractors.
- Oversees fieldwork and handles collection of material, soil and water samples.

EDUCATION

Ph.D. from the University of St. Andrews, St. Andrews, Scotland *1997*
BA from Staffordshire University, Stoke-on-Trent, England *1989*

SELECT PROJECTS

Former Fur Processing Facility, Bronx, NY

Documented the presence of chlorinated hydrocarbon, petroleum, and metals contamination beneath and/or near a former industrial structure. Coordinated the sampling and removal of multiple drums of hazardous and non-hazardous material from the structure and secured NYCDEP approval. Developed a Workplan for site remediation and directed environmental restoration activities, including: excavation and removal of both aboveground and underground storage tanks, removal of contaminated soils, installation of a barrier layer soil cap, and pre-demolition removal of asbestos materials.

Jamaica Hospital Medical Center, Queens, NY

Coordinated and supervised the removal of two, large underground storage tanks and documented site conditions through soil and groundwater sampling. Secured NYSDEC approval of PBS tank closure and registration requirements.

The Point CDC, Bronx, NY

ESI assisted with the open space for community access to the waterfront in revitalization of a former fur processing plant. Activities included subsurface investigation, hazardous waste characterization/disposal program. Worked with architects, engineers, and demolition contractors to demolish existing structure and assisted with site redesign as a multi-purpose community access point to the Bronx River.

PROFESSIONAL CERTIFICATIONS

- OSHA Hazardous Waste Site Operations
- OSHA Emergency Response Training
- 29 CRF 1910.120 (e) – 40 Hour Hazwoper

Paul H. Ciminello, CEM, CAQS
PRESIDENT
paul@ecosystemsstrategies.com

EDUCATION

Master of Environmental Management, 1986
School of the Environment, Duke University, Durham, North Carolina

Master of Arts in Public Policy Sciences, 1986
Institute of Policy Sciences and Public Affairs, Duke University, Durham, North Carolina

Bachelor of Arts, 1980
Tufts University, Medford, Massachusetts

CERTIFICATIONS AND TRAINING

Certified Qualified Environmental Professional (QEP), Institute of Professional Environmental Practice (Cert. Number 08130024)
In compliance with OSHA Hazardous Materials Safety (29 CFR 1910) requirements (updated 2012)
Certified Air Quality Specialist, Environmental Assessment Association, 2007
Certified Environmental Manager, Environmental Assessment Association, 2006
NJ Dept. of Environmental Protection Licensed Subsurface Evaluator (License Number: 0014686)
NYS Dept. of Labor Certified Asbestos Building Inspector (Cert. Number: AH92-14884)
NYS Department of State, Division of Licensing Services, Real Estate Instructor

PROFESSIONAL EXPERIENCE

President, Ecosystems Strategies, Inc., Poughkeepsie, New York *1992 to present*

Coordinates corporate strategic planning, financial management and marketing activities. Oversees corporate work on state and federal superfund sites and manages education/training services. Responsible for technical services in areas of pollution prevention, contaminant delineation and site remediation. Twenty years experience in the investigation and remediation of petroleum contamination at commercial and residential properties. Major recent projects of relevance include:

- Irvington Waterfront Park (Irvington, NY): Project Manager for site investigation and remedial design of abandoned industrial riverfront properties. Documented soil and groundwater contamination and designed remediation including soil removal and site capping. Project completed in 2000; project awarded the 2000 Gold Medal Award by Consulting Engineers Council of New York State.

- Greyston Bakery Site (Yonkers, NY): Project Manager for site investigation and remedial design of former manufactured gas plant site for future use as a bakery. Documented soil, groundwater and soil gas contamination. Remedial systems included installations of a DNAPL collection system, a barrier layer, a subslab depressurization system under the building, and groundwater monitoring. Project completed in 2004.

- 400 Block Redevelopment (Poughkeepsie, NY): Project Manager for site investigation and remedial design of multi-use industrial development property (boiler repair, clothing manufacturer, auto repair) for future retail/residential use. Documented soil (petroleum, PCBs, metals) and groundwater (petroleum) contamination. Remedial systems include: soil (and tank) removal, installation of a barrier, and groundwater monitoring. Project completed in 2006.

- Prospect Court Housing Site (Bronx, NY): Project Manager for site investigation and remediation of a former gas station/auto repair facility. Documented contamination included both dissolved and free-phase petroleum hydrocarbons, dissolved halogenated solvents, and metals contamination in soil. Remedial systems consisted of In-Situ Chemical Oxidation, soil excavation, vapor interception systems, and on-going groundwater monitoring. Project anticipates securing Certificate of Completion from the NYSDEC in December 2012.

- Parkview Commons Site (Bronx, NY): Project Manager for site investigation and remedial design of former gas station/auto repair facility for future use as a residential/commercial building. Certificate of Completion was secured from the NYSDEC in 2007.

Senior Hazardous Waste Specialist, U.S. Hydrogeologic, Inc., Poughkeepsie, New York 1986 to 1992

Supervisor for corporate hazardous and solid waste investigatory and remedial services. Major projects included:

- Coordination of subsurface investigations at a New York State Superfund site (former industrial facility); project manager in charge of site reclassification (delisted as of January, 1991).
- Coordination of petroleum storage tank management plan for Dutchess County (NY) Department of Public Works, including an assessment of regulatory compliance, product utilization and physical conditions of more than 100 tanks at over 20 facilities.
- Environmental compliance Audit of 42,000-square foot printing facility with specific remediations for solvent handling/disposal, inks storage and metal recovery processes.

Adjunct Professor, (various institutions) *1991 to Present*

Dutchess Community College, Poughkeepsie, New York
*M*arist College, Poughkeepsie, New York
Vassar College, Poughkeepsie, New York

Courses: Macroeconomics, Environmental Economics (DCC)
Introduction to Environmental Issues (Marist)
Environmental Geology (Vassar)

Policy Intern, Southern Growth Policies Board, North Carolina *1985*

Prepared several in-depth and short analyses of environmental and economic issues, with specific concern for their impact on Southern state policies. Analyses included: hazardous waste facility setting policies and environmental impacts of "high tech" industries on host communities.

Research Assistant, University of Oregon, Eugene, Oregon *1983*

Analyzed (with Dr. John Baldwin, Chairman of the Department of Planning, Public Policy and Management, U. of Oregon) the "Oregon Riparian Tax Incentive Program". Designed survey, conducted interviews and analyzed data. Summary paper with programmatic recommendations, was presented at the Annual Conference of the National Association of Environmental Educators.

PRESENTATIONS

- "Environmental Risks in Lending" Training Session for Pawling Savings Bank employees, December 18 and 19, 1989; and July 1, 1993.
- "Identifying Environmental Concerns in Appraisals", Workshops for Lakewood Appraisal Corporation, October, and November, 1989 and April, 1990.
- "State and Local Groundwater Protection Strategies", Annual meeting of the New York State Association of Towns, February, 1990.
- "Environmental Audits on Orchards and Agricultural Properties", Resource Education Institute, Inc., Real Estate Site Assessment and Environmental Audits Conference, December 4, 1990.

- "Environmental Audits on Orchards and Agricultural Properties", National Water Well Association Annual Conference, July 29-31, 1991.
- "Principles of Environmental Economics for Ground Water Professionals", National Groundwater Association Outdoor Action Conference, May 27, 1993.
- "Impact of Environmental Liabilities on Real Estate Transactions", a NYS Department of Education approved course for licensed real estate professionals, March 1995; April 1995; May 1995; October 1995.
- "Brownfields Redevelopment in New York: A Discussion of Two Case Studies", New England Environmental Conference 1996, March, 1996.
- "Quantifying Environmental Liabilities", a NYS Department of Education approved course for licensed real estate professionals, March 1997.
- "Environmental Assessments in Urban Settings", Vassar College, Fall 1999 and Fall 2000.
- "Navigating Property Contaminant Problems", Land Trust Alliance Rally 2001, Oct 2001.

ARTICLES

Ciminello, P. 1993. A Primer on Petroleum Bulk Storage Tanks and Petroleum Contamination of Property, ASHI Technical Journal, Volume 3, No. 1

Ciminello, P. 1991. Environmental Audits on Orchard and Other Agricultural Properties, Proceedings of the National Water Well Association Annual Conference

Ciminello, P. 1991. Property Managers Should Carefully Examine Current Fuel Storage Practices, NYS Real Estate Journal, Vol. 3, No. 9

Ciminello, P. 1991. New DEC Regulations Affect Development of Agricultural Lands, NYS Real Estate Journal, Vol. 3, No. 6

Ciminello, P., Hodges-Copple, J. 1986. Managing Toxic Risks From High Tech Manufacturing, Growth and Environmental Management Series (Southern Growth Policies Board)

Ciminello, P. 1986. State Assistance in Financing Water Treatment Facilities, Growth and Environmental Management Series (Southern Growth Policies Board)

Ciminello, P. 1985. Plants Amid Plantings: The Future Role of Environmental Factors in Business Climate Ratings, Southern Growth ALERT (Southern Growth Policies Board)

Ciminello, P., J. Baldwin, N. Duhnkrack,1984, An Incentive Approach to Riparian Lands Conservation, Monographs in Environmental Education and Environmental Studies (North American Association of Environmental Educators)

PROFESSIONAL AFFILIATIONS

American Water Resources Association
National Groundwater Association
Hazardous Materials Control Research Institute
Environmental Assessment Association

ADDITIONAL INFORMATION

Member, Dutchess County (NY) Youth Board (1987-1992); Chairman, 1992
Member, City of Poughkeepsie (NY) School District Ad Hoc Committee on Teen Parents and Pregnancy Prevention (1991)
Member, City of Poughkeepsie School District Budget Advisory Committee (1994 to 2000)
Member, City of Poughkeepsie PTA and Middle School Building Level Team

PETER D. SETARO, P.E.

POSITION

Partner
Morris Associates Engineering Consultants
Poughkeepsie, NY

LICENSES

Professional Engineer – NYS License #077008

EDUCATION

Associate in Applied Science, Civil Technology, 1979
State University of New York at Delhi

EXPERIENCE

Morris Associates Engineering Consultants,
Poughkeepsie, NY – Partner

Raymond Keyes Associates
Elmsford, NY - Project Engineer

PARTNER

Overall responsibility for management of 60 person firm.

Project management responsibilities include office representative as Municipal Engineer in several towns serving both Town Boards and Planning Boards and Highway and Recreation Departments, supervision of projects, engineering design, client meetings, project budgets and attendance at Town meetings.

Responsible for review of SEQRA for development projects within Town Engineer Position.

Responsible for management of engineering design, regulatory approvals and client coordination for Bard College engineering projects.

Responsible for all phases of private development work for realty subdivisions, commercial properties, and highway improvement projects. Secure all regulatory agency approvals and attend Town meetings as required to secure project approvals.

AFFILIATIONS

Member Mid Hudson Consulting Engineers Society
Member Poughkeepsie Elks Lodge No. 275
Member Town of Poughkeepsie Plumbing Board
Member Ramapo for Children Buildings and Grounds Committee

APPENDIX H

Cost Estimate

Ecosystems Strategies, Inc.

7-17 Ludlow Street Remediation Cost Estimate (Track 4 Alternative)
7-17 Ludlow Street, Yonkers, New York
ESI File: WY07054.50

	Total Costs	Soft Costs *Tasks performed or managed by ESI/MA*	Hard Costs *Tasks performed or managed by GC*
Task 1: Soil Removal			
Professional Oversight	$9,000	$9,000	
PCS Excavation and T&D (750 tons @ $81.35/ton)	$61,013		$61,013
Urban Fill Excavation and T&D (5,250 tons @ $62.50/ton)	$328,125		$328,125
Laboratory (waste characterization)	$8,000	$8,000	
Laboratory (post-excavation samples)	$5,000	$5,000	
Materials/disbursement	$2,000	$2,000	
Community Air Monitoring Equipment	$4,000	$4,000	
Task Subtotal	**$417,138**	**$28,000**	**$389,138**
Task 2: Groundwater Monitoring/Treatment			
Well Installation (3 wells)			
Engineer (2 days)	$2,500	$2,500	
Driller (1 days)	$4,000	$4,000	
Well dev't/sampling (4 rounds)			
Engineer (5 days)	$5,000	$5,000	
Equipment	$2,000	$2,000	
Laboratory	$4,200	$4,200	
Monitoring Reports (reports)	$4,200	$4,200	
Task Subtotal	**$21,900**	**$21,900**	**$0**
Task 3: Design/Installation of Vapor Barrier			
Design/approval	$3,000	$3,000	
Installation	$6,500		$6,500
Engineer (2 days)	$2,500	$2,500	
Task Subtotal	**$12,000**	**$5,500**	**$6,500**
Task 4: SSDS Design/Installation			
Design/Approval	$3,000	$3,000	
Subsurface Pipe Trenching	$2,563		$2,563
Installation	$52,550		$52,550
Documentation/System Testing	$2,000	$2,000	
Task Subtotal	**$60,113**	**$5,000**	**$55,113**
Task 5: Soil Cover			
Clean fill soils (450 yd^3 @ $65)	$29,250		$29,250
Professional oversight	$2,000	$2,000	
Task Subtotal	**$31,250**	**$2,000**	**$29,250**
Task 6: ISCO Treatment			
Product Purchases	$34,000	$15,000	
Application Labor	$16,000	$4,000	
Documentation	$2,000	$1,000	
Task Subtotal	**$52,000**	**$20,000**	**$0**
Task 7: Administrative Services			
Status Reports/Communications	$15,000	$15,000	
Final Engineering Report	$6,000	$6,000	
Site Management Plan (Contingency)	$6,000	$6,000	
Meetings	$5,000	$5,000	
Inspections	$5,000	$5,000	
Task Subtotal	**$37,000**	**$37,000**	**$0**
BASE TOTAL	**$631,401**	**$119,400**	**$480,001**
Dewatering	$25,000		$25,000
TOTAL with Dewatering	**$656,401**	**$119,400**	**$505,001**

APPENDIX I

SSDS System Design Document

Ecosystems Strategies, Inc.
24 Davis Avenue, Poughkeepsie, NY 12603
phone 845.452.1658 | fax 845.485.7083 | ecosystemsstrategies.com

Sub-slab Depressurization Systems Design
7-17 Ludlow Street
Yonkers, New York
ESI File: WY07054.50
August 2014

This document, prepared by Ecosystems Strategies, Inc. (ESI) details the proposed active sub-slab depressurization system (SSDS) for the above-referenced property. The active SSDS is a system intended to achieve lower sub-slab air pressure relative to indoor air pressure by use of system piping connecting the sub-slab area to the outdoor air, and relies on a continuously operating fan in the vent stack (riser) to draw air from beneath the slab. A discharge point will be properly located above the roofline to minimize the likelihood of air emissions deleteriously affecting indoor air quality.

The locations of all system piping, discharge point and the SSDS Schematic are shown on Attachments 1 through 4. All locations are approximate and subject to modification.

System Components

The SSDS will consist of a network of sub-slab 4" ID Schedule 40 PVC piping connected to a riser pipe (via a vertical suction point pipe penetrating the building slab) that leads to a discharge point located above the roof-line. The riser pipe will consist of a 4" ID cast iron pipe[1] with fire stops and any other requirements. All sub-slab piping joints will be sealed with plumber's cement (or similar product) to be applied according to the manufacturer's specifications. The riser pipe joints will consist of cast iron[1], no-hub couplers in accordance with applicable building code. All piping joints will be inspected once the system is installed. Temporary monitoring points will be located throughout the building slab to confirm adequate vacuum and system connectivity.

System Design: General Layout and Details

The SSDS will be installed within the proposed building. Installation of the SSDS within the proposed building area will adhere to the following procedures:

1. All sub-slab piping will be perforated Schedule 40 PVC under the proposed concrete slab and vapor barrier. Piping diameter will be four inches (4") and all joints will be sealed with plumber's cement (or similar product) to be applied according to the manufacturer's specifications. The ends of the sub-slab piping will not be capped or plugged.
2. All sub-slab piping will be laid in and covered with a gas-permeable layer with a minimum of three inches (3") sub-grade material beneath system piping. The sub-grade material will consist of one to one and a half inch (1-1 ½") clean crushed stone. All sub-grade and horizontal piping will be level and will follow as straight a line as possible. All sub-slab piping will be wrapped in a filter fabric (or comparable product) covered by at least two inches (2") of sub-grade material. A sub-slab cross section detail, rooftop fan configuration, and the layout of the sub-slab piping network are presented as Attachments 1 and 2.

[1] Schedule 40 PVC may be substituted if permission is secured from the City of Yonkers Department of Buildings. If PVC piping is permitted, appropriate fire stop details will be installed at any location in which the riser pipe penetrates a fire rated wall and all joints will be sealed with plumber's cement (or similar product) to be applied according to the manufacturer's specifications.

3. All sub-slab piping will be installed at least two inches (2") below the vapor barrier and twelve inches (12") inside the perimeter of the structure. Relocation to accommodate other piping is acceptable, subject to review and approval by ESI/MA. It is anticipated that the sub-slab piping will penetrate grade beams with the use of reserved sleeves as presented in Attachment 2. The structural engineer is advised to evaluate these penetrations.

   Note: Horizontal runs of utility pipes and conduit will be installed below the gas-permeable layer. Pipes and conduits passing through the gas-permeable layer will be airtight after installation. Heating ducts passing through the gas-permeable layer should be avoided. All penetrations extending through the slab will be sealed with caulk or sealant to prevent air leakage into the gas-permeable layer.

4. The vertical suction point pipe penetrating the slab and connecting the sub-slab piping to the riser pipe will be non-perforated, four inch (4") ID Schedule 40 PVC. The vertical suction point will be located six foot (6') north of the door entrance in Trash Room (First Floor Level) to provide sufficient door clearance. The location of the vertical suction point pipe is presented in Attachments 2, 3 and 4.

5. All riser piping above the slab will be no-hub, four inch (4") ID cast iron[1] with corresponding no-hub iron couplers at the piping joints, as required by Fire Code. The riser will extend upward via a dedicated pipe chase identified by Magnusson Architecture & Planning and can be relocated so long as the eventual location of the riser is vertical throughout all floors.

6. The discharge point will be properly located above the roofline, at least ten feet (10') from any air intake and at least twelve inches (12") above the highest point in the roof to minimize the likelihood of air emissions entering interior portions of the building. The location of the discharge point is presented in Attachment 4. A four inch (4") diameter roof turbine ventilator will be installed at the discharge pipe terminus as a passive ventilation device to enhance air flow in the riser.

An SSDS Schematic indicating all relevant design features is presented as Attachment 1.

System Installation Testing

Initial system testing will occur after installation of sub-slab piping, the vapor barrier, and the system's vertical suction point pipe penetrating the building slab. System testing will be conducted as follows:

1. The system will be visually inspected and documentation of existing conditions will be recorded.

2. With the rooftop fan running a negative pressure field within the system piping will be created, and pressure levels will be recorded at temporary monitoring points. Vacuum data (as measured in inches of water) will be collected from each monitoring point using a digital manometer. Sufficient vacuum will be achieved if negative pressure readings are documented at each monitoring point at less than - 0.02 inches of water column. Pressure readings will be documented in the Remedial Action Report.

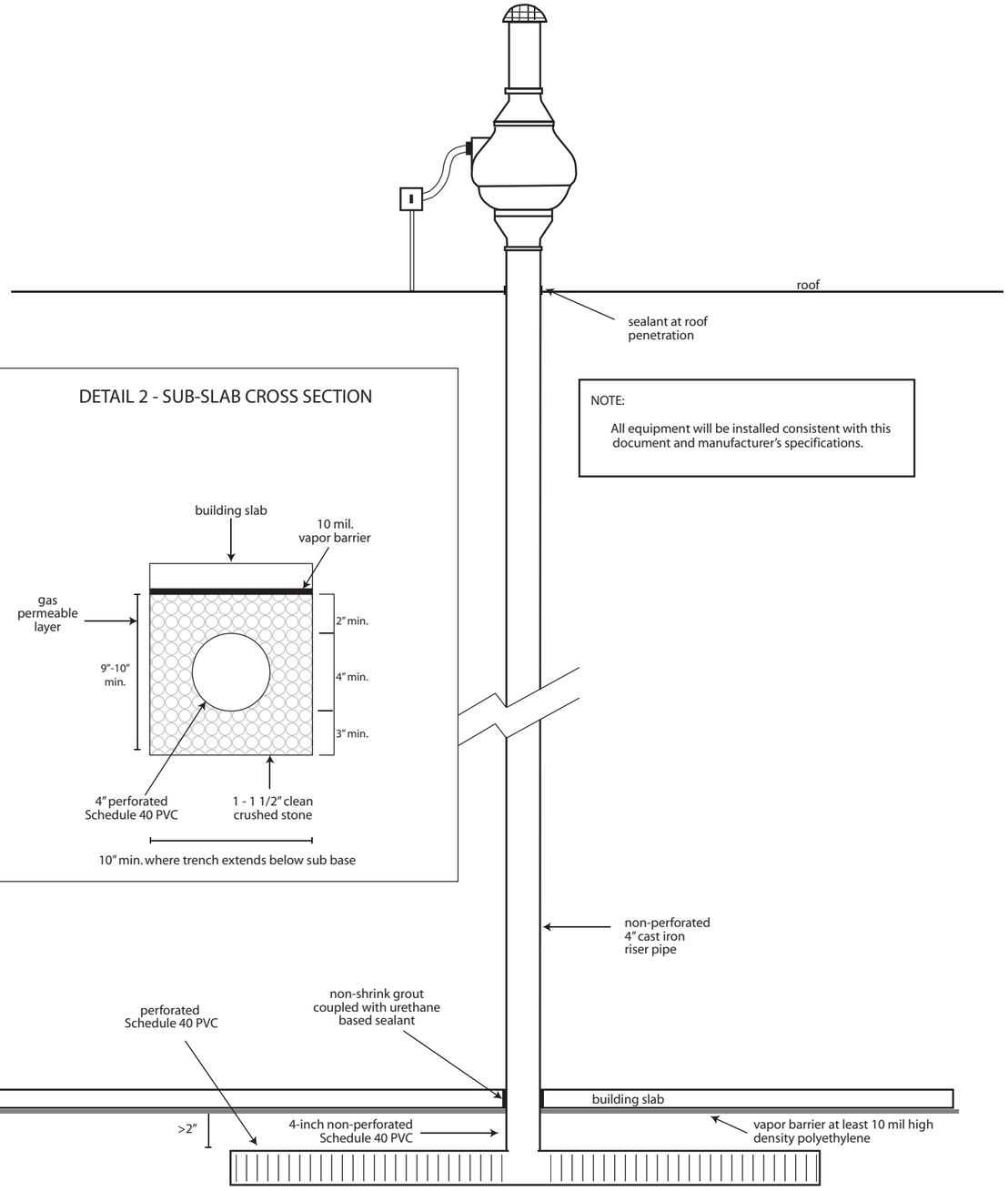
3. The temporary monitoring points will be removed after vacuum testing activities are complete.

Project Reporting

Upon completion of all work, a summary letter will be prepared inclusive of as-built drawings and operations/maintenance instructions. This document will be available for inclusion in the Remedial Action Report, to be prepared for the Site.

Ecosystems Strategies, Inc.

DETAIL 1 - SYSTEM CONFIGURATION

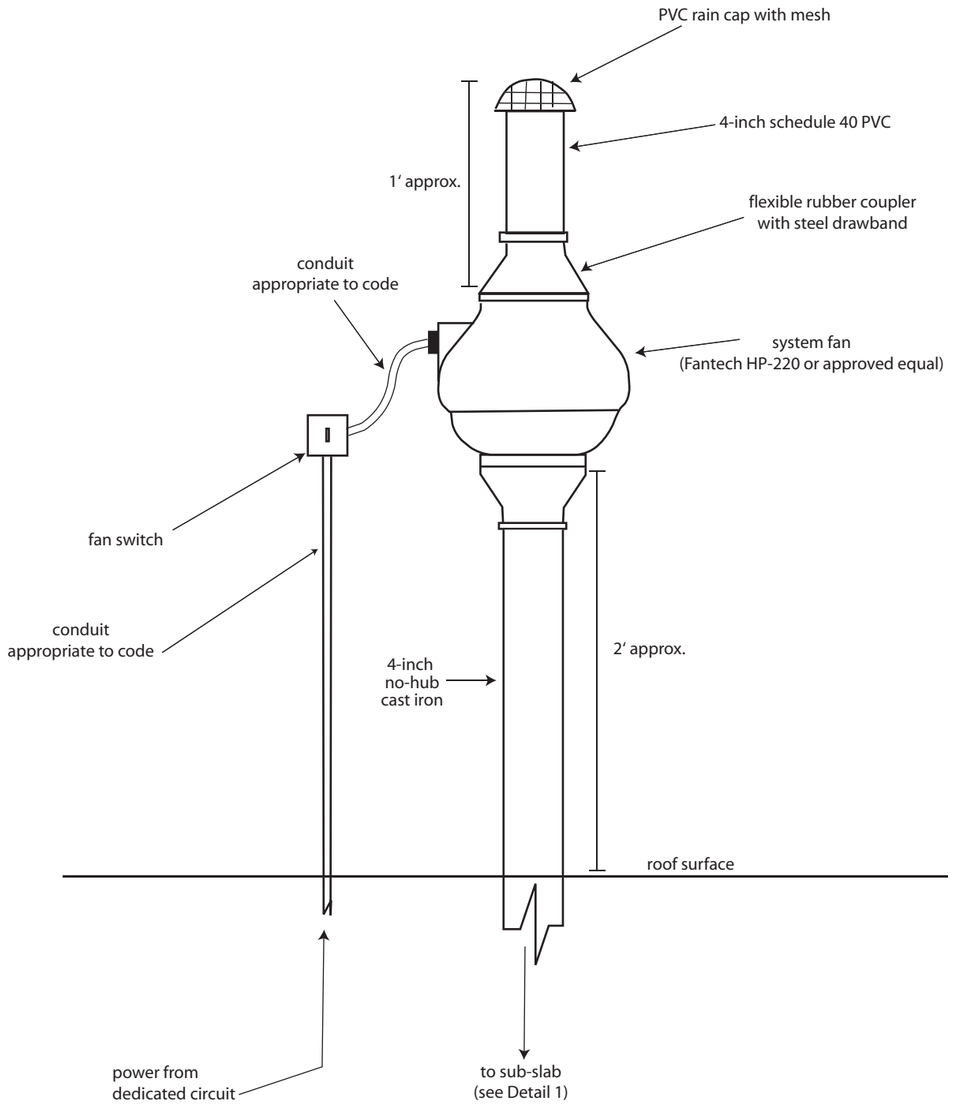


NOTE:

All equipment will be installed consistent with this document and manufacturer's specifications.

DETAIL 2 - SUB-SLAB CROSS SECTION

DETAIL 3 - ROOF TOP CONFIGURATION



All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

Sub-Slab Depressurization System Schematic

7 -17 Ludlow Street Yonkers, New York	ESI File: WY07054.50	
	August 2014	Attachment 1

Ecosystems Strategies, Inc.

Notes:

1) Sub-slab piping shall be installed at least two inches (2") below the vapor barrier and twelve inches (12") inside the perimeter of the structure. All sub-slab piping shall be wrapped in filter fabric (or comparable product) and covered with at least two inches (2") of 1- 1 ½" clean crushed stone .

2) Sub-slab piping shall be perforated four inch (4") ID Schedule 40 PVC, joined with appropriate primer/cement to be applied according to manufacturer's specifications. Piping shall be laid into the gas permeable layer with at least three inches (3") of 1- 1 ½" clean crushed stone below the piping as indicated in the drawing "Sub-slab Depressurization System Schematic, Attachment 1".

3) Sub-slab piping shall be laid level or positively sloped to the riser pipe and follow the layout indicated in the drawing "SSDS Design - Structural Foundation Plan, Attachment 2".

4) System piping slab penetration to be non-perforated four inch (4") ID Schedule 40 PVC, transition to four inch (4") ID no-hub cast iron above-slab riser pipe installed with fire stops and any other requirements in accordance with appropriate codes. Schedule 40 PVC may be substituted if permission is secured from the New York City (NYC) Department of Buildings. If PVC piping is permitted, appropriate fire stop details shall be installed at any location in which the riser pipe penetrates a fire rated wall and all joints shall be sealed with plumber's cement (or similar product) to be applied according to the manufacturer's specifications.

5) Corresponding cast iron no-hub couplers shall be used at all pipe unions in the vertical riser pipe. All vertical piping should be installed in accordance with NYC building codes with appropriate pipe supports.

6) Riser pipe from system piping slab penetration to dedicated chase indicated by Magnusson Architecture & Planning PC, project architect, shall be routed as indicated in the "SSDS Design Typical Floor Plan, Attachment 3" and "SSDS Design Roof Plan, Attachment 4".

7) Riser pipe termination shall extend at least twelve inches (12") above the highest point in the roof and at least ten feet (10') from any window, door, or other opening, and HVAC intakes. The roof turbine ventilator shall be above the roof.

8) The General Contractor shall provide shop and coordination drawings for approval.

Legend:

SSDS piping

Riser

Base map provided by Magnusson Architecture & Planning PC, 1st Floor Plan dated 10/2/13. All feature locations are approximate.
This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

SSDS Design - Structual First Floor and Slab on Grade Foundation Plan

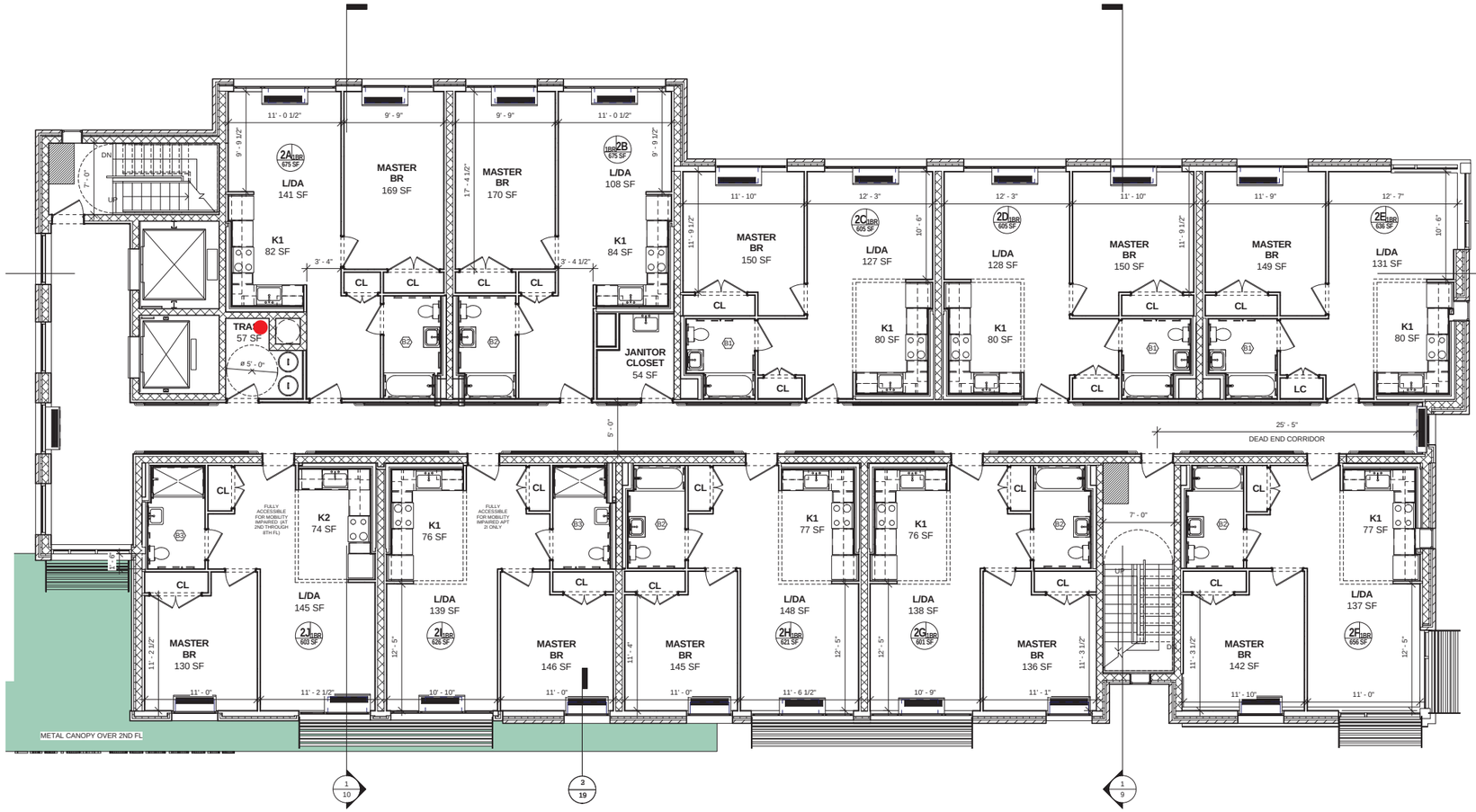
7-17 Ludlow Street
Yonkers, New York

ESI File: WY07054.50

Scale: 10'

August 2014

Attachment 2



Notes:

1) Sub-slab piping shall be installed at least two inches (2") below the vapor barrier and twelve inches (12") inside the perimeter of the structure. All sub-slab piping shall be wrapped in filter fabric (or comparable product) and covered with at least two inches (2") of 1- 1 ½" clean crushed stone .

2) Sub-slab piping shall be perforated four inch (4") ID Schedule 40 PVC, joined with appropriate primer/cement to be applied according to manufacturer's specifications. Piping shall be laid into the gas permeable layer with at least three inches (3") of 1- 1 ½" clean crushed stone below the piping as indicated in the drawing "Sub-slab Depressurization System Schematic, Attachment 1".

3) Sub-slab piping shall be laid level or positively sloped to the riser pipe and follow the layout indicated in the drawing "SSDS Design - Structural Foundation Plan, Attachment 2".

4) System piping slab penetration to be non-perforated four inch (4") ID Schedule 40 PVC, transition to four inch (4") ID no-hub cast iron above-slab riser pipe installed with fire stops and any other requirements in accordance with appropriate codes. Schedule 40 PVC may be substituted if permission is secured from the New York City (NYC) Department of Buildings. If PVC piping is permitted, appropriate fire stop details shall be installed at any location in which the riser pipe penetrates a fire rated wall and all joints shall be sealed with plumber's cement (or similar product) to be applied according to the manufacturer's specifications.

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6) Riser pipe from system piping slab penetration to dedicated chase indicated by Magnusson Architecture & Planning PC, project architect, shall be routed as indicated in the "SSDS Design Typical Floor Plan, Attachment 3" and "SSDS Design Roof Plan, Attachment 4".

7) Riser pipe termination shall extend at least twelve inches (12") above the highest point in the roof and at least ten feet (10') from any window, door, or other opening, and HVAC intakes. The roof turbine ventilator shall be above the roof.

8) The General Contractor shall provide shop and coordination drawings for approval.

Legend:

Riser

Base map provided by Magnusson Architecture & Planning PC, Typical Floor Plan dated 10/2/13. All feature locations are approximate.
This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

SSDS Design - Typical Floor Plan

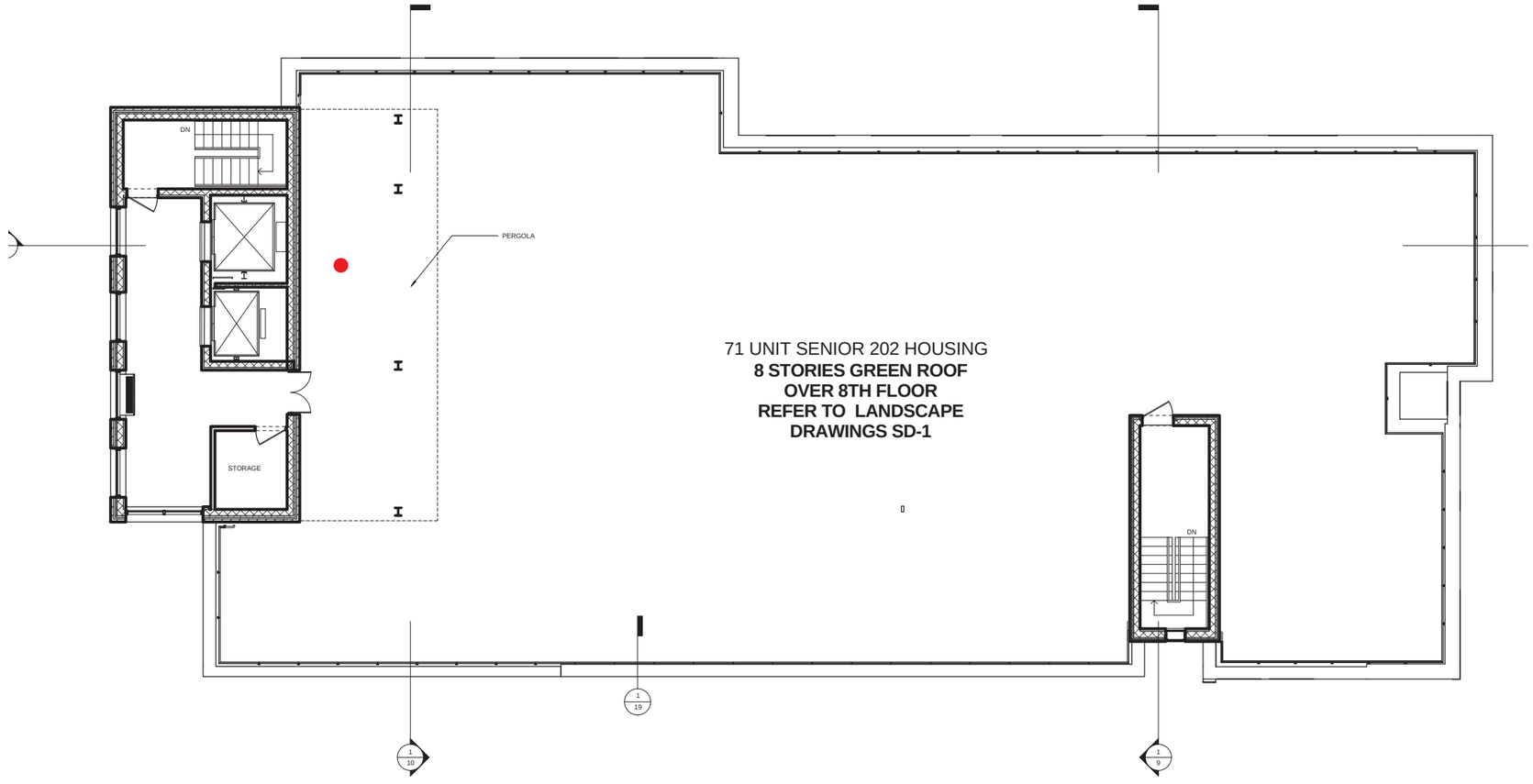
7-17 Ludlow Street
Yonkers, New York

ESI File: WY07054.50

Scale: 10'

August 2014

Attachment 3



Notes:

1) Sub-slab piping shall be installed at least two inches (2") below the vapor barrier and twelve inches (12") inside the perimeter of the structure. All sub-slab piping shall be wrapped in filter fabric (or comparable product) and covered with at least two inches (2") of 1- 1 ½" clean crushed stone .

2) Sub-slab piping shall be perforated four inch (4") ID Schedule 40 PVC, joined with appropriate primer/cement to be applied according to manufacturer's specifications. Piping shall be laid into the gas permeable layer with at least three inches (3") of 1- 1 ½" clean crushed stone below the piping as indicated in the drawing "Sub-slab Depressurization System Schematic, Attachment 1".

3) Sub-slab piping shall be laid level or positively sloped to the riser pipe and follow the layout indicated in the drawing "SSDS Design - Structural Foundation Plan, Attachment 2".

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5) Corresponding cast iron no-hub couplers shall be used at all pipe unions in the vertical riser pipe. All vertical piping should be installed in accordance with NYC building codes with appropriate pipe supports.

6) Riser pipe from system piping slab penetration to dedicated chase indicated by Magnusson Architecture & Planning PC, project architect, shall be routed as indicated in the "SSDS Design Typical Floor Plan, Attachment 3" and "SSDS Design Roof Plan, Attachment 4".

7) Riser pipe termination shall extend at least twelve inches (12") above the highest point in the roof and at least ten feet (10') from any window, door, or other opening, and HVAC intakes. The roof turbine ventilator shall be above the roof.

8) The General Contractor shall provide shop and coordination drawings for approval.

Legend:

Riser/Fan discharge point

Base map provided by Magnusson Architecture & Planning PC, Roof Plan dated 10/2/13. All feature locations are approximate.
This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

SSDS Design - Roof Plan

7-17 Ludlow Street
Yonkers, New York

ESI File: WY07054.50

Scale: 10'

August 2014

Attachment 4

APPENDIX J

ISCO Design Calculations

REGENESIS

Project Info		
confidential yonkers NY		
Yonkers NY		
ISCO treatment area		
Prepared For:		
Ecosystems		
Target Treatment Zone (TTZ) Info	**Unit**	**Value**
Treatment Area	ft^2	12,000
Top Treat Depth	ft	9.0
Bot Treat Depth	ft	13.0
Vertical Treatment Interval	ft	4.0
Treatment Zone Volume	ft^3	48,000
Treatment Zone Volume	cy	1,778
Soil Type	---	sand
Porosity	cm^3/cm^3	0.33
Effective Porosity	cm^3/cm^3	0.20
Treatment Zone Pore Volume	gals	118,491
Treatment Zone Effective Pore Volume	gals	71,813
Fraction Organic Carbon (foc)	g/g	0.002
Soil Density	g/cm^3	1.7
Soil Density	lb/ft^3	108
Soil Weight	lbs	5.2E+06
Hydraulic Conductivity	ft/day	25.0
Hydraulic Conductivity	cm/sec	8.82E-03
Hydraulic Gradient	ft/ft	0.003
GW Velocity	ft/day	0.38
GW Velocity	ft/yr	137
Sources of Oxygen Demand	**Unit**	**Value**
Dissolved Phase Contaminant Mass	lbs	0
Sorbed Phase Contaminant Mass	lbs	708
Reduced Metals (Fe2+ and Mn2+) Mass	lbs	30
BOD mass equivalent	lbs	0
COD mass equivalent	lbs	49
Total Mass Contributing to O_2 Demand	**lbs**	**787**
Stoichiometric Demand	**Unit**	**Value**
Stoichiometric O_2 Demand	lbs	2,300
Stoichiometric ORC Advanced Demand	**lbs**	**13,532**
Application Dosing	**Unit**	**Value**
Engineering/Safety Factor	**---**	**0.3**
ORC Advanced to be Applied	**lbs**	**3,400.0**

ORC Advanced® Application Design Summary

ISCO treatment area	
Application Method	**Direct Push**
Spacing Within Rows (ft)	**15.0**
Spacing Between Rows (ft)	**15.0**
Application Points	**53**
Areal Extent (square ft)	12,000
Top Application Depth (ft bgs)	9
Bottom Application Depth (ft bgs)	13
ORC Advanced to be Applied (lbs)	**3,400**
ORC Advanced per point (lbs)	64
Percent Slurry	**30%**
Volume Water (gals)	**951**
Volume ORC Advanced (gals)	153
Total Application Volume (gals)	**1,104**
Injection Volume per Point (gals)	21

Field App Instructions

Input special application instructions here as needed.

Field Mixing Ratios

Water per Pt (gals)	18
ORC Advanced per Pt (lbs)	64
Total Volume per Pt (gals)	21

Technical Notes/Discussion

Prepared By: Maureen Dooley

Date: 4/1/2015

Assumptions/Qualifications

In generating this preliminary estimate, Regenesis relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

REGENESIS

Project Information

confidential yonkers NY

Yonkers NY

ISCO treatment area

Prepared For:

Ecosystems

Target Treatment Zone (TTZ) Info	Unit	Value
Treatment Area	ft^2	12,000
Top Treat Depth	ft	9.0
Bot Treat Depth	ft	13.0
Vertical Treatment Interval	ft	4.0
Treatment Zone Volume	ft^3	48,000
Treatment Zone Volume	cy	1,778
Soil Type	---	sand
Porosity	cm^3/cm^3	0.33
Effective Porosity	cm^3/cm^3	0.20
Treatment Zone Pore Volume	gals	118,491
Treatment Zone Effective Pore Volume	gals	71,813
Fraction Organic Carbon (foc)	g/g	0.002
Soil Density	g/cm^3	1.7
Soil Density	lb/ft^3	108
Soil Weight	lbs	5.2E+06
Hydraulic Conductivity	ft/day	25.0
Hydraulic Conductivity	cm/sec	8.82E-03
Hydraulic Gradient	ft/ft	0.003
GW Velocity	ft/day	0.38
GW Velocity	ft/yr	137
Sources of Oxidant Demand	**Unit**	**Value**
Sorbed Phase Contaminant Mass	lbs	708
Dissolved Phase Contaminant Mass	lbs	0.0
Total Contaminant Mass	lbs	708
Stoichiometric PersulfOx Demand	lbs	23,623
Engineering/Safety Factor	**---**	**0.5**
Stoichiometric PersulfOx Required	lbs	7,087
Additional Soil Oxidant Demand	g/kg	1.0
SOD PersulfOx Required	lbs	5,759
Total PersulfOx Required	**lbs**	**12,846**

Application Dosing

PersulfOx Required	**lbs**	**12,893**

PersulfOx® Application Design Summary

ISCO treatment area	
Application Method	**Direct Push**
Spacing Within Rows (ft)	15
Spacing Between Rows (ft)	15
Injection Points (per app.)	**53**
Number of Applications	**1**
Areal Extent (square ft)	12,000
Top Application Depth (ft bgs)	9
Bottom Application Depth (ft bgs)	13
PersulfOx to be Applied (lbs)	**12,893**
PersulfOx Solution %	15%
Volume Water (gals)	**8,755**
Total Volume (gals)	**9,400**

Field App. Instructions

Input special application instructions here as needed.

Field Mixing Ratios

Water per Pt (gals)
165
PersulfOx per Pt (lbs)
243
Total Volume per Pt (gals)
177
44
Volume per vertical ft gals)

Technical Notes/Discussion

Prepared By: Maureen Dooley

Date: 4/1/2015

Assumptions/Qualifications

In generating this preliminary estimate, Regenesis relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.