

Red Devil Paint-Off Site Removal

Bronx River Parcel

City of Mount Vernon, New York

Final Monitoring Plan

NYSDEC Standby Contract No. D007621

Prepared for:

New York State Department of Environmental Conservation
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Revisions to Final Approved Monitoring Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

CERTIFICATION STATEMENT

I, John P. Blaum, certify that I am currently a NYS registered Professional Engineer and that this Monitoring 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).

John P. Blaum P.E.
August 10, 2014 Date



8-10-14

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Acronyms

AST	aboveground storage tanks
BCA	Brownfields Cleanup Agreement
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, xylenes
DER	Division of Environmental Remediation
ERM	ERM-Northeast
ft	feet
IRM	interim remedial measures
LBG	Leggett, Brashears and Graham, Inc.
LNAPL	light non-aqueous phase liquid
MNR	Metro-North Railroad
NOAA	National Oceanic and Atmospheric Administration
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
OU	operable units
PA	phthalic anhydride
PID	photoionization detector
ppm	parts per million
PRP	potentially responsible party
PSA	Preliminary Site Assessment
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SSF	State Superfund
TDI	toluene-2-4 diisocyanate
USEPA	United States Environmental Protection Agency
UST	underground storage tanks
VOC	volatile organic compounds

Executive Summary

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Monitoring Plan:

Site Identification:	NYSDEC Standby Contract No. D007621 30 North West Street Mount Vernon, NY
Institutional Controls:	1. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the New York State Department of Health or the Westchester County Department of Health.
	2. Groundwater and other environmental or public health monitoring must be performed as defined in this Monitoring Plan.
	3. Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this Monitoring Plan.
	4. All future activities that will disturb remaining contaminated material must be conducted in accordance with this Monitoring Plan.
	5. Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner.
	6. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this Monitoring Plan.
	7. Maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this Monitoring Plan..
	8. Vegetable gardens and farming is prohibited on the Site.
	9. All engineering controls must be inspected at a frequency and in a manner defined in this Monitoring Plan.

Site Identification:	NYSDEC Standby Contract No. D007621 30 North West Street Mount Vernon, NY	
Engineering Controls:	Boom system in the Bronx River and periodic removal of the product.	
Inspections:		Frequency
Bronx River Bank Seepage Inspection		Quarterly
Monitoring:		Frequency
Groundwater Monitoring Wells: DW-16, DW-17, DW-18, and DW-19		Quarterly
Reporting:		
LNAPL Monitoring Report		Quarterly

Further descriptions of the above requirements are provided in detail in the following sections of this Monitoring Plan.

Section 1

Introduction

1.1 General

This Monitoring Plan was prepared for the Red Devil Paint Site Bronx River Parcel (herein referred to as the “Site”), adjacent to the former Red Devil Paint Company Brownfield Cleanup Site located at 30 North West Street in the City of Mount Vernon, Westchester County, New York (herein referred to as the “Facility”), as shown on **Figures 1-1** and **1-2**. This plan was prepared by CDM Smith for the New York State Department of Environmental Conservation (NYSDEC) under the Engineering Services for Investigation and Design Standby Contract No. D007621. The Site is currently in the New York State (NYS) Superfund Program administered by NYSDEC and designated as Site No. C360031A. This plan was developed in accordance with the January 2016 Work Assignment No. D07621-15, Amendment No. 1 and NYSDEC *Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation*, dated May 2010.

In 2005, a non-Potentially Responsible Party (PRP) entered into a Brownfields Cleanup Agreement (BCA) to remediate the Site. The current owner of the Site, SUSA Mt. Vernon, LLC, subsequently hired Legette, Brashears and Graham, Inc. (LBG) as their environmental consultant for the BCA. In 2007, the Bronx River Parcel was referred to the State Superfund (SSF) program. All investigation and remedial reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the Site is provided in **Appendix A** of this Monitoring Plan.

Light non-aqueous phase liquid (LNAPL) from the Facility continues to seep into the Bronx River. The LNAPL is a mixture that consists of approximately 10-20% polymers dissolved in a mineral spirits solvent. Toluene-2-4 di-isocyanate (TDI) and phthalic anhydride (PA) are detected components of the LNAPL as well. When LNAPL is exposed to air, the mineral spirits evaporate leaving the solid, agglomerated polymers behind. This polymer agglomeration process differentiates this LNAPL from other hydrocarbon LNAPLs; it has led to fouling of more typical LNAPL remedial techniques. The NYSDEC maintains a boom system in the Bronx River and periodically collects the LNAPL.

The objective of this Monitoring Plan is to outline the requirements of site inspection and monitoring events that will be conducted quarterly at the Site to monitor the dissipation of LNAPL.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC’s project manager. Revisions will be necessary upon, but not limited to, the following occurrences: a change in media monitoring requirements or other significant change to the site conditions. An amendment to this plan will be prepared to document any revisions.

Section 2

Summary of Previous Investigations and Remedial Action

2.1 Site Location and Description

The Site is a parcel of land adjacent to the Bronx River, in the City of Mount Vernon, Westchester County, New York. The location of the Site, as seen in **Figure 1-1**, is 40°54'52" north latitude and 73°50'59" west longitude. The Site is an approximately 380-foot-long segment of the Bronx Riverbank bounded to the east by the Metro-North Railroad (MNR), to the south by the Mount Vernon Avenue bridge, and to the north by the Oak Street bridge. The Site is wooded and accessible by a wooden staircase on Mount Vernon Avenue.

Four delineation wells (DW-16 through DW-19 shown on **Figure 1-2**) and the boom system are located along the western boundary of the site (i.e., eastern bank of the Bronx River). Onsite, next to the Mount Vernon Avenue staircase, is a small building that houses the abandoned groundwater treatment system. The Site tapers off to the northeast when approaching the Oak Street Bridge. Just east of the wells, another sloped embankment drops another approximately 10 to 15 feet to the flood plain, adjacent to the Bronx River.

Offsite, to the east, past the MNR, is the Facility listed on the State Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 Site (No. 360031). The Facility contamination is monitored and remedied by ERM-Northeast (ERM). The portion of the river that runs parallel to the Site is classified as a Class C stream, which is fresh surface water suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation (e.g., swimming and boating), though other factors may limit the use for these purposes (LBG, 2009).

2.2 Physical Setting

2.2.1 Land Use

Mount Vernon is bounded by the New York City Borough of the Bronx to the south, Yonkers to the west, Bronxville and Eastchester to the north, and Pelham and Pelham Manor to the east. The MNR runs northeast to southwest directly adjacent to the northwest of the Facility, while the Bronx River and Bronx River Parkway run parallel to the railroad approximately 150 feet further to the northwest. Land use in Mount Vernon is predominantly industrial with retail trade, manufacturing, and wholesale trade occupying the largest percentage of establishments. Health care and social assistances businesses and other services, with the exception of public administration, also occupy a large portion of the industry.

2.2.2 Regional Geology and Hydrogeology

The Site is located within the Lower Hudson River Valley of the New England Physiographic Province. The area consists of northeast trending ridges, separated by rivers that flow southward in narrow valleys.

Regional bedrock geology in this portion of southern Westchester County consists of the Manhattan Schist and Hartland Formation. The metamorphic bedrock is overlain by a thin layer of unstratified glacial deposits. The Manhattan Schist is a highly-folded, coarsely crystalline, micaceous schist. Outcrops of the Manhattan Schist can be found in road cuts and on ridges through the area, although no outcrops are present on the Site. The Manhattan Schist is relatively impermeable and does not serve as an important source of water.

The overburden typically consists of an unsorted mixture of clay, boulders, and gravel deposited as ground moraine. The glacial deposits generally have a low permeability and are a poor source of water. In stream valleys, such as the Bronx River, the overburden can be much thicker and consist of stratified glacial deposits, recent stream sediments, and reworked glacial material. The water yielding capacity of the unconsolidated stream valley deposits is highly variable, but can be significant in places.

There are no major aquifers in southern Westchester County. Both the Manhattan Schist and the glacial sediments are capable of yielding small quantities of water to wells, but these aquifers are no longer used. Wells tapping these aquifers have been abandoned due to urbanization. All potable water in the area is supplied by a public water system, which is derived principally from surface water sources located north of the Site (LBG, 2009).

2.2.3 Site Geology

Off-site, the subsurface consists of brown, unconsolidated, fine and medium sand with some gravel in the first four to five feet below ground surface (bgs). A fill layer was encountered beneath this layer. The fill consists of cobbles and boulders that extend to approximately 12 feet bgs. Below the fill layer is a northwestward-thinning layer of glacial/alluvial material that consists of stratified deposits of sand, clay, gravel, and schist boulders. This is most likely a mixture of glacial moraine deposits and alluvial deposits. Not much variation was observed in lithology between boring locations installed during the 2011 Remedial Investigation (RI).

The river bank sediments display a fining-upward sequence characterized by a higher percentage of clay in the top few feet, then below that a medium silty sand, and then finally by coarse sand and gravel from approximately 8 to 15 feet bgs.

Soils located above the water table were odorless. However, soils below the water table had a strong paint-like odor and total volatile organic compounds (VOCs) ranged from 470 to over 2,000 parts per million (ppm) on the photoionization detector (PID). Soils below the vadose zone were mostly brown to dark brown with some gray staining. The glacial/alluvial layer thins in the direction of the riverbank and is underlain by bedrock.

In March 2016, CDM Smith attempted to advance additional borings and install three monitoring wells behind a retaining wall at the northern end of the Site. The purpose of this effort was to investigate the presence of LNAPL behind the retaining wall, separating the MNR and the Bronx River. This area is approximately 10 feet wide with a steep slope. Based on site conditions, the portable 420M Geoprobe was used during the field event. Refusal due to bedrock was encountered between 2 to 6 feet bgs along the retaining wall. Pieces of rock, most likely schist, was observed throughout the macrocore. The water table was not encountered and no odors were present in the boring. Monitoring wells were not installed due to encountering bedrock.

2.2.5 Site Hydrogeology

The water bearing unit immediately underlying the Site is comprised of unconsolidated glacial/alluvial overburden materials. The base of this unconfined aquifer corresponds with the top of bedrock. Depth to water observed immediately upgradient of the Bronx River in this aquifer ranged from 13 to 15 feet bgs. The depth to bedrock at this location is estimated to be 25 feet, making the saturated thickness for the surficial water bearing unit estimated at approximately 1 to 15 feet. Estimates of hydraulic conductivity for the Site were made from a series of rising head slug tests performed on monitoring wells DW-16, DW-17, DW-018, and soil boring SB-15, shown on **Figure 1-2**. The average hydraulic conductivity of the surficial unit was calculated from DW-16, DW-18 and SB-15 and was estimated to be approximately 15.8 ft/day. This value is consistent with sand and gravel. The data from DW-17 was evaluated, but not included in the average because it was considered unreliable.

2.3 Investigation and Remedial History

2.3.1 Site and Facility Investigation History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in *Section 7.0 - References*.

From 1959 to 1971, Red Devil Paints & Chemicals, Inc. operated a paint facility, which blended and manufactured paints and varnishes. From 1971 to 1989, Red Devil was operated as a division of Insilco Corporation. After manufacturing operations ceased in 1990, Insilco initiated a program to mitigate any potential environmental damages associated with the Red Devil Paint Facility. ERM was hired by Insilco to implement a decommissioning program to identify environmental management actions required for facility deactivation. In 1990, the permanent closure of underground storage tanks (USTs) and vaulted above ground storage tanks (ASTs) began. During the closure activities, a spill was identified and reported to NYSDEC (NY Spill # 91-01562). During the period of Facility operations, materials were reportedly released from leaking USTs and ASTs, and associated piping. It was unclear whether material releases were a result of leaking tanks, poor housekeeping practices, infiltration from the unlined Facility floor drains and sumps, and/or dumping into drywells.

Tank closure activities were expanded to include a Preliminary Site Assessment (PSA), which was conducted in May 1991. The PSA consisted of soil sampling in the vicinity of the former USTs and ASTs, soil gas sampling, and groundwater sampling to determine if soil and groundwater had been impacted by historic releases. Based on the sampling results, contaminants of concern in soil were categorized as chlorinated volatile organic compounds (VOCs), benzene, toluene, ethylbenzene and xylenes (BTEX) compounds, and non-BTEX hydrocarbons. Monitoring wells installed during the PSA revealed the presence of LNAPL at the water table interface. Groundwater sampling indicated that VOC concentrations exceeded applicable standards.

On June 29, 1992, the Facility was listed on the State Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 Site (No. 360031), indicating that it poses a significant threat to public health or the environment.

In early 1993, LNAPL seepage was discovered entering the Bronx River from the southern banks of the Site. The seep material was tested and compounds similar to those found in mineral spirits used by the Facility were detected. Since 1993, an absorbent inner boom and skirted outer boom have been deployed to contain the seep material for collection.

In April 1993, an Order of Consent requiring a Remedial Investigation/Feasibility Study (RI/FS) and Interim Remedial Measures (IRMs) was executed by Insilco Corporation and the NYSDEC. Two operable units (OU), OU-1 and OU-2, were identified for the Site and Facility. OU-1 consists of LNAPL and paint material both on- and off-site. OU-2 consists of residual groundwater and soil contamination after LNAPL recovery. Based on the findings of the RI/FS, a Record of Decision (ROD) for OU-1 was issued by NYSDEC in March 1996. The ROD (and subsequent Consent Order) for OU-1 identified several remedial alternatives, as follows: Recovery of LNAPL from off-site groundwater, recovery of on-site paint materials from the Bronx River, and investigation and design implementation of on-site LNAPL recovery.

In 1993, ERM began pumping and collecting the LNAPL beneath the Facility. Up until April 2003, approximately 8,850 gallons of product were collected from the Facility

Insilco signed a second Consent Order agreeing to implement the ROD in March 1997. However, in April 2003, Insilco stopped all remedial operations after initiating bankruptcy proceedings. In 2005, a non-PRP entered into a BCA to remediate the Facility. The current owner of the Facility, SUSA Mt. Vernon, LLC, subsequently hired LBG as their environmental consultant for the BCA. In 2009, LBG implemented several remedial alternatives to cleanup residual contamination beneath the Facility. These alternatives include: sub-slab depressurization, vertical groundwater pumping and horizontal groundwater pumping. Horizontal groundwater pumping was more successful than vertical groundwater pumping.

In 2007, the Bronx River Parcel was referred to the SSF program. CDM Smith prepared a RI/FS in November 2011 to investigate the status of the Facility and Site groundwater, soil, sediment and surface water quality. The results of this investigation are in the subsequent subsection.

2.3.2 2011 Remedial Investigation Findings

Both dissolved phase contamination and LNAPL are present at the Site. Soluble components of the LNAPL continue to transfer into dissolved phase in groundwater. Through the processes of advection and dispersion, dissolved phase contamination flows with groundwater west-northwest from the Site, beneath the MNR tracks, and to the Bronx River parcel. The contaminated groundwater and some NAPL then pass through sediments and discharges into the Bronx River. Given the heterogeneous geology of the Site, the groundwater likely follows preferential flow paths with larger grain size and higher hydraulic conductivity. During travel, anaerobic bacteria are biodegrading a fraction of the contamination, and another fraction will sorb to areas of organic silt present in the subsurface and retard transport. Since chlorinated solvents and hydrocarbons are generally volatile, contaminated soil vapor will rise from the plume into the vadose zone and potentially the atmosphere.

LNAPL migration is primarily driven by the forces of gravity exerted on the LNAPL plume rather than groundwater flow. The LNAPL plume grew large enough to intersect the Bronx River causing LNAPL seepage into the river. Presently, CDM Smith and NYSDEC believe the LNAPL

plume has reached an equilibrium and ceased to expand. Field observations by CDM Smith as well as NYSDEC's callout Contractor, Tristate, indicate LNAPL thickness and seepage into the Bronx River has declined. LNAPL flux will continue to diminish until the footprint of the plume is no longer large enough to reach into the Bronx River; at this point, LNAPL flux into the River will stop. Soluble components of the remaining LNAPL will continue to dissolve into groundwater.

Currently, the LNAPL and dissolved phase plume are seeping into the Bronx River, contaminating the sediment they pass through as they discharge into the river. Once in the surface water, the mineral spirits carrier in the LNAPL evaporates, leaving a polymer film on the water surface. The dissolved phase contamination is rapidly diluted by Bronx River flow. During the sections of turbulent flow in the river, the contaminants vaporize into air. Additionally, since the river is shallow it is likely well oxygenated. Aerobic bacteria living in the river will likely degrade the hydrocarbons that enter the river from the Site.

There is no potential human health impact from drinking or bathing with groundwater from the Site since the area is served by public water. Human and ecological receptors are at risk from discharges to the Bronx River. There is minimal indoor air exposure to contaminant vapor in the Site buildings.

2.3.2 LNAPL Characterization

During the 1993 ERM RI, the LNAPL underlying the Site and the Facility was characterized as being an amber-colored paint product or paint intermediate that resembled varnish and solidified when exposed to air. The product was not hazardous in terms of corrosivity and reactivity, however it was hazardous with respect to ignitability.

Figure 2-1 shows the groundwater potentiometric surface and LNAPL thickness recorded on November 8, 2010. The LNAPL was characterized during the November 2011 RI. It was concluded that the LNAPL consists primarily of polymers of varying molecular weights present in a mineral spirits carrier, with percent concentrations of toluene-2,4-diisocyanate (TDI), phthalic anhydride (PA) present. This chemistry of the plume explains its physical behavior. When exposed to a vacuum or the atmosphere over time, the mineral spirits carrier evaporates, leaving behind agglomerated and coagulated polymers. LNAPL continues to be observed in the wells DW-17 and DW-18. No product has ever been detected in DW-16. Product has not been detected in DW-19 since 2005. Product thickness in DW-17 has ranged from 0.02 to 0.61 feet. Product thickness in DW-18 has ranged from 0 to 1.03 feet. **Table 2-1** presents LNAPL thickness measurements in wells DW-16 through DW-19 recorded from June 20, 2007 through March 10, 2016.

2.3.3 Onsite Remedial History

In 1993, a five-inch disposable absorbent boom was placed in the river to collect the discharging product. Also, a heavy duty, six-inch boom with a 12-inch weighted skirt was installed around the smaller boom, to address conditions during high precipitation events. SUSA Mt. Vernon, LLC, conducts routine maintenance of the Site boom system. Maintenance and removal of the disposable inner boom is conducted periodically, with activities being scheduled in response to observed field conditions.

A LNAPL Recovery System was installed on the Site in June 1999. It consisted of a LNAPL “seeking” pump located in each of the four recovery wells, DW-16, DW-17, DW-18, and DW-19 a 500-gallon storage tank located in a concrete block building on the river bank, and associated piping and process controls. A fiberglass vault housed each of the recovery wells to prevent water filtration. Shortly after the system was started, it was taken off-line due to pump fouling from the LNAPL and was not restarted.

Section 3

Monitoring Plan

3.1 General

This Monitoring Plan outlines the requirements of site inspection and monitoring events that will be conducted quarterly at the Site to monitor the dissipation of LNAPL. More specifically, monitoring activities include:

- Measure LNAPL thickness in onsite monitoring wells (DW-16, DW-17, DW-18, and DW-19);
- Record observations of LNAPL seepage along the bank of the Bronx River;
- Evaluate Site information periodically to identify trends in LNAPL thickness and determine if LNAPL is dissipating overtime; and
- Bail out excess LNAPL from monitoring wells.

To adequately achieve monitoring objectives, this Monitoring Plan provides information on:

- Monitoring locations, protocol and frequency;
- Bailing procedures; and
- Riverbank seepage investigation procedures;

Reporting requirements are provided in *Section 6.0* of this Plan.

3.2 Site–Wide Inspection and Monitoring Event

Site-wide inspection and monitoring events will be performed on a quarterly basis until LNAPL is no longer observed in onsite monitoring wells and seeping into the Bronx River. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections and monitoring will also be performed after all significant weather events that may affect the discharge of LNAPL into the Bronx River. The National Oceanic and Atmospheric Administration (NOAA) defines a storm event as having one or more of the following characteristics:

- The occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce;
- Rare, unusual, weather phenomena that generate media attention; and
- Other significant meteorological events, such as record maximum or minimum temperatures or precipitation, that occur in connection with another event.

During site inspections, general site conditions at the time of the inspection, including a health and safety inspection will be recorded in the field logbook. In addition, the following will be recorded on the Site Monitoring Form (provided as **Appendix B**):

- Depth to product and water in existing monitoring wells (DW-16 through DW-19);
- Amount of product bailed;
- Conditions of each monitoring well; and
- Observations of riverbank LNAPL seepage activity.

The following subsections provide detailed operating procedures for conducting the inspection and monitoring scopes.

3.2.1 LNAPL Thickness Monitoring

The depth to product and LNAPL thickness will be measured on a quarterly basis (approximately every 3 months) from four onsite monitoring wells, DW-16 through DW-19 shown on **Figure 3-1**. Monitoring well parameters are provided on **Table 3-1**.

Table 3-1 – Monitoring Well Construction Details

Monitoring Well ID	Coordinates (longitude/latitude)	Well Diameter (inches)	Elevation (ft above mean sea level)			Screen Top (ft bgs)	Screen Bottom (ft bgs)
			Casing	Screen Top	Screen Bottom		
DW-16	671936.3/758714.2	4	74.37	66.87	56.87	6.5	16.5
DW-17	671907.4/758680.1	4	74.17	68.67	58.67	6.5	16.5
DW-18	671860.1/758617.8	4	73.60	67.10	57.10	6.5	16.5
DW-19	671844.1/758579.8	4	73.64	66.14	56.14	7.5	17.5

*bgs = feet below ground surface; ft = feet; ID = identification

Each well is located in a vault with a hinged cover and padlock and are considered to be in good condition. The onsite wells were installed parallel to the Bronx River, with DW-16 furthest north and DW-19 furthest south. Groundwater is typically encountered between 9 to 11 feet bgs. No product has ever been detected in DW-16. Product has not been detected in DW-19 since 2005. Product thickness in DW-17 has ranged from 0.02 to 0.61 feet. Product thickness in DW-18 has ranged from 0 to 1.03 feet. Water level and LNAPL measurements will be performed using an oil/water interface probe in accordance with Section 3.25 Water Level/NAPL Measurement of the CDM Generic Quality Assurance Project Plan (QAPP) for the NYSDEC Standby Contract No. D007621, dated May 2011. All measurements will be recorded on the Site Monitoring Form.

Monitoring well construction logs for the aforementioned wells are included in Appendix C of this Plan. The network of four wells will be monitored quarterly as per the instructions set forth in this section unless the condition of the well(s) is deemed unusable or prevents monitoring to occur using proper methods. The condition of each well should be noted in the field logbook during each monitoring event.

The monitoring frequency may only be modified with the approval of the NYSDEC. This Plan will be modified to reflect changes in monitoring plans approved by the NYSDEC. Deliverables for the LNAPL monitoring program are specified in Section 5.0 – Reporting Requirements.

3.2.2 LNAPL Bailing

Following LNAPL measurements, product will be removed from the well using a bailer. The product will be collected in a 5-gallon bucket or equivalent until no product remains in the well. The amount of product collected from each well will be recorded on the Site Monitoring Form. The bailed product and any byproducts of bailing will be disposed of as non-hazardous waste through the treatment system located at the Facility.

3.2.3 LNAPL Seepage Survey

The Site encompasses approximately 380 feet of riverbank. Five-inch oil absorbent booms have been deployed to contain the seeped product for collection. There are three major LNAPL seepage points along the riverbank, just south of the rock outcrop jutting out into the riverbank, as shown on **Figure 3-1**. The length of LNAPL on the surface of the water body is usually 2 to 4 feet. The following procedures will be performed as part of the seepage survey:

1. Lay out a tape measure along the riverbank, starting from the fence north of DW-16 to just north of the former groundwater treatment building, as shown on **Figure 3-1**.
2. Record observations pertaining to the following:
 - a. Product and sheen observed on the water surface;
 - b. Amount, color, and thickness of product; and
 - c. Reference length of LNAPL, including distance and direction to nearest well, or other landmark.

It is recommended that the seepage survey be performed by two field personnel, one adjacent to the riverbank to observe the LNAPL seeps and the other further inland to record the locations and distances of the product and landmarks on the Site Management Form.

Section 4

Climate Change Vulnerability Assessment and Monitoring

4.1 Climate Change Vulnerability Assessment and Monitoring

Increases in both the severity and frequency of storm/weather events, shifting precipitation patterns, and wide temperature fluctuations, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness, and protectiveness of a remedy. Vulnerability assessments and monitoring provide information to conduct precautionary measures to alleviate Site impacts from the increasing frequency and intensity of severe storm/weather events and associated flooding.

The rate of LNAPL seepage onsite is influenced by water table fluctuations and precipitation events. NYSDEC's boom maintenance contractor, Tri-State, indicated LNAPL seepage increases during the wet season (i.e., increased precipitation events) when surface water flow increases and debris along the riverbank is removed subsequently unclogging the seepage points. Snow pack, leaves, and other forms of debris present during the fall and winter months act as a barrier and reduces LNAPL seepage flow. Increased precipitation events can potentially result in increased LNAPL seepage into the Bronx River thus, requiring more frequent site inspections, bailing events, and collection of LNAPL along the riverbank.

The United States Environmental Protection Agency's (USEPA) *Climate Change Adaptation Plan* recommends consideration of whether the future 100-year storm event, and other applicable events (e.g., 100-year flood plain and extended droughts), is expected to differ from the historical 100-year storm event. Since LNAPL is effected primarily by precipitation and river elevation, changes in these site characteristics can directly impact seepage rates. In order to determine if characteristics of the historical (and current) 100-year weather-related events are changing over time, baseline monitoring will be conducted for the following:

- Flow velocity and water levels of the Bronx River will be recorded during periodic site inspections and designated significant storm events. Flow velocity and water level measurements will be collected using a handheld meter, such as the OTT MF Pro, Global Flow Probe, or equivalent.
- Rainfall data will be obtained from the Southeast Yonkers weather station (Station ID: KNYONKE14) to correlate amount of precipitation to observed surface water flow velocity.

The data will be used to develop a continuous baseline of "current" site conditions in order to identify trends towards renewed static conditions reflective of increased surface water flow velocity and flooding frequency. Monitoring data will be used in conjunction with site inspection observations to determine if climate change impacts are having a direct effect on LNAPL seepage.

Upon NYSDEC authorization, CDM Smith would use monitoring data to assist in determining cause of change of future trends of LNAPL production and ensure observations are consistent with the MNA alternative. In addition, the monitoring data can be used to develop triggers that induce implementation of precautionary measures to ensure the existing containment system (i.e., booms) is resilient to the anticipated weather-related event, such as:

- Installment of temporary seepage control materials if the flow velocity reaches a specific threshold to avoid LNAPL from entering the riverbank system.
- Installment of submersible pumps to maintain hydraulic control during flood events.

All monitoring data and an evaluation of climate change vulnerabilities will be provided in the Quarterly Reports.

Section 5

Reporting Requirements

5.1 Quarterly Monitoring Reports

All site management inspection and monitoring events will be recorded in the field logbook and Site Management Form provided in **Appendix B**. These forms are subject to NYSDEC revision. All applicable inspection forms and other records generated for the site during the reporting period will be provided in electronic format to the NYSDEC on a quarterly basis.

All quarterly monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Copies of all field forms completed (e.g., inspection and monitoring forms, etc.);
- LNAPL thickness trend table;
- A figure illustrating location of LNAPL seepage along riverbank;
- Precipitation, water levels, and flow velocity data collected;
- Any observations, conclusions, or recommendations; and
- A determination as to whether LNAPL seepage, containment, and temporal conditions have changed since the last reporting event.

The Quarterly Report will be submitted to NYSDEC one-month from the inspection and monitoring event. One round of comments by NYSDEC is assumed.

Section 6

References

CDM Smith. 2011. *CDM Generic Quality Assurance Project Plan (QAPP)*, NYSDEC Standby Contract No. D007621. May.

CDM Smith. 2011. *Remedial Investigation Report Red Devil Paint Site*. November.

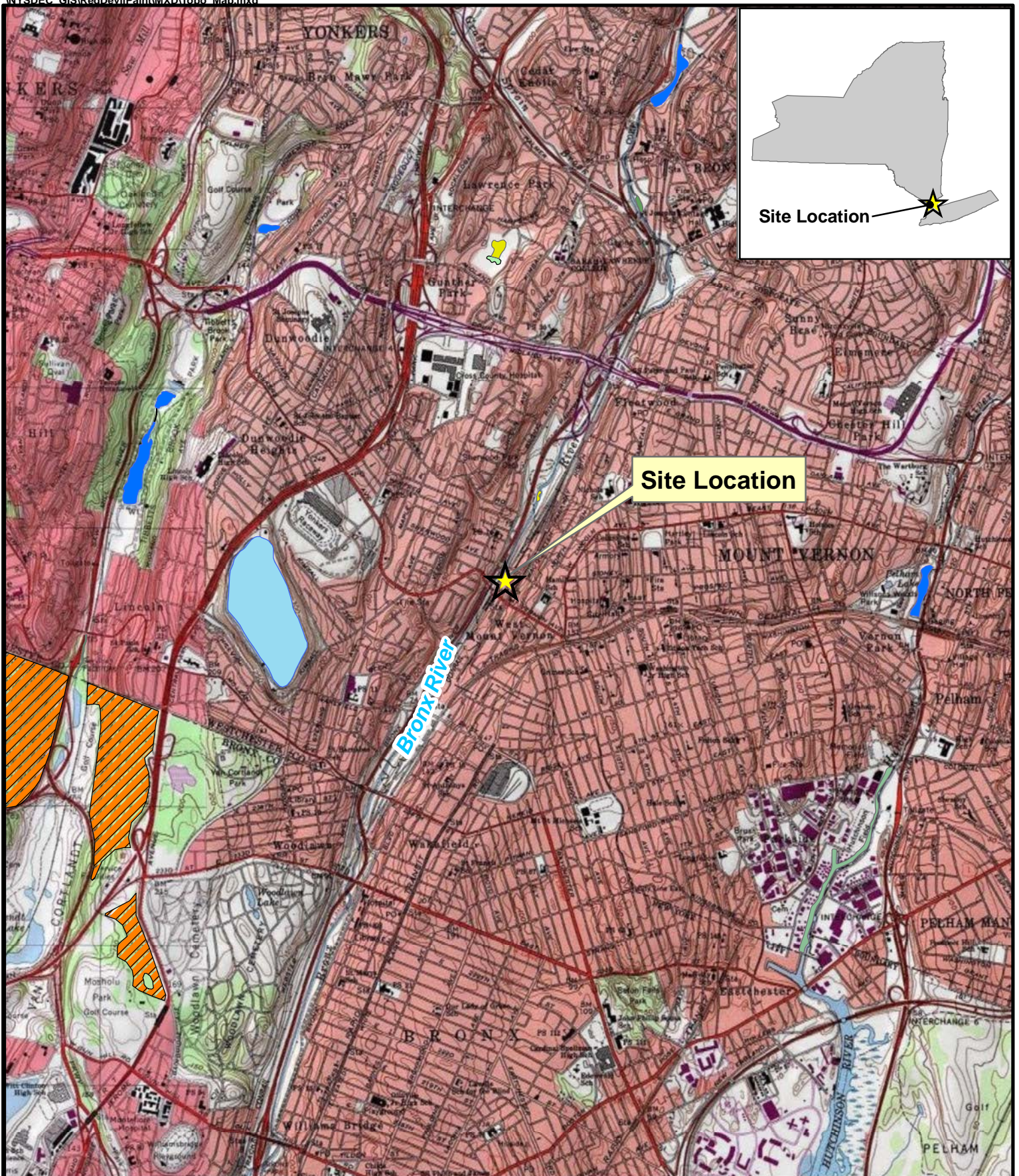
Leggett, Brashears and Graham, Inc. (LBG). 2009. *Remedial Investigation Report Former Red Devil Paint Facility*.

National Oceanic and Atmospheric Administration (NOAA), National Centers for Environmental Information. *Storm Events Database*.

<https://www.ncdc.noaa.gov/stormevents/>. Accessed on May 11, 2016.

New York State Department of Environmental Conservation. 2010. *DER-10 – Technical Guidance for Site Investigation and Remediation*. May.

Figures



Source: U.S.G.S. 7.5 Minute Topographic Quadrangle; Mount Vernon, New York; 1966, Photorevised 1979.

NY Natural Heritage Program
Database Records

Oak-Tulip Tree Forest

Lake

**CDM
Smith**

Freshwater Emergent Wetland

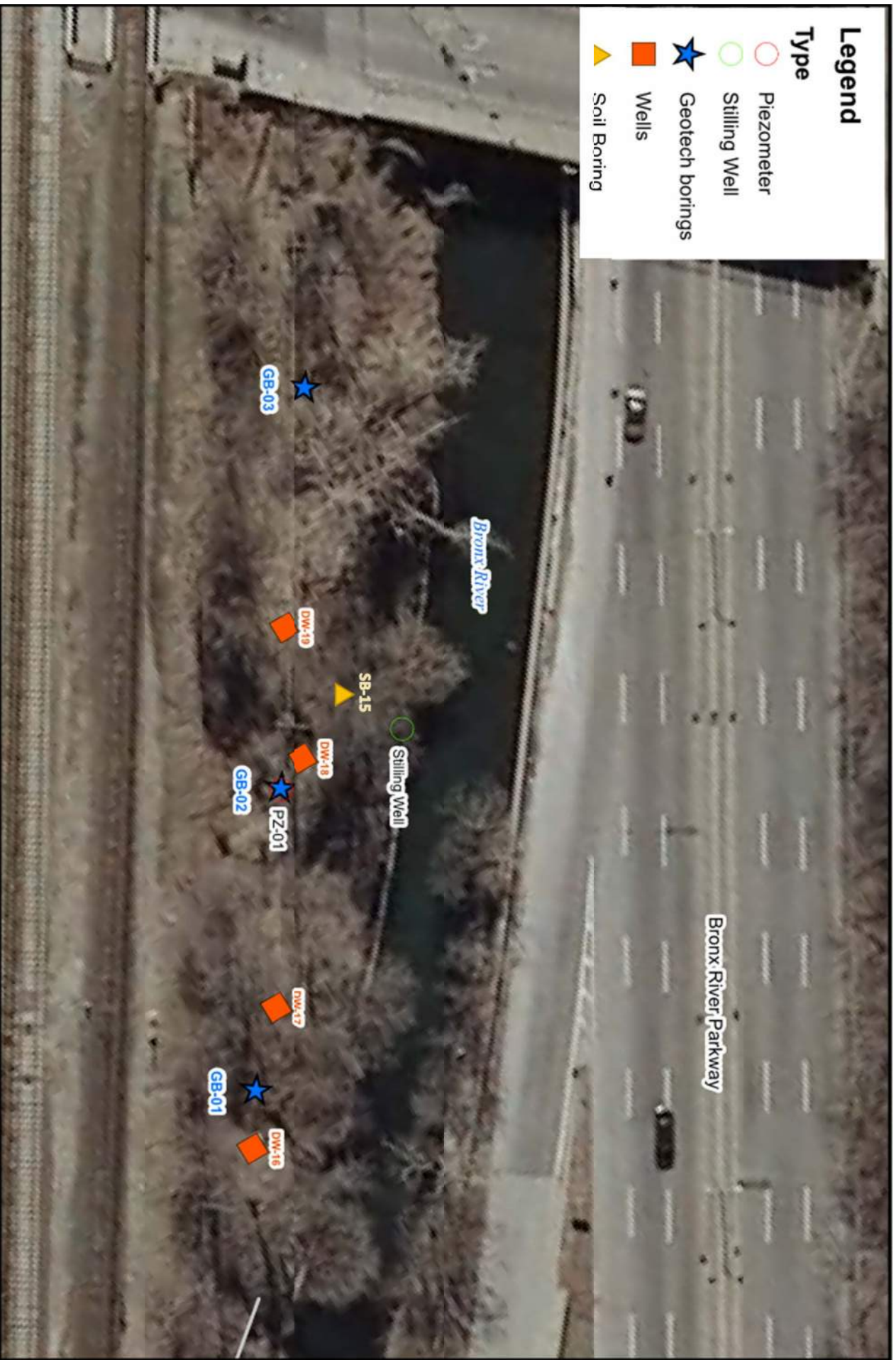
Freshwater Forested/Shrub Wetland

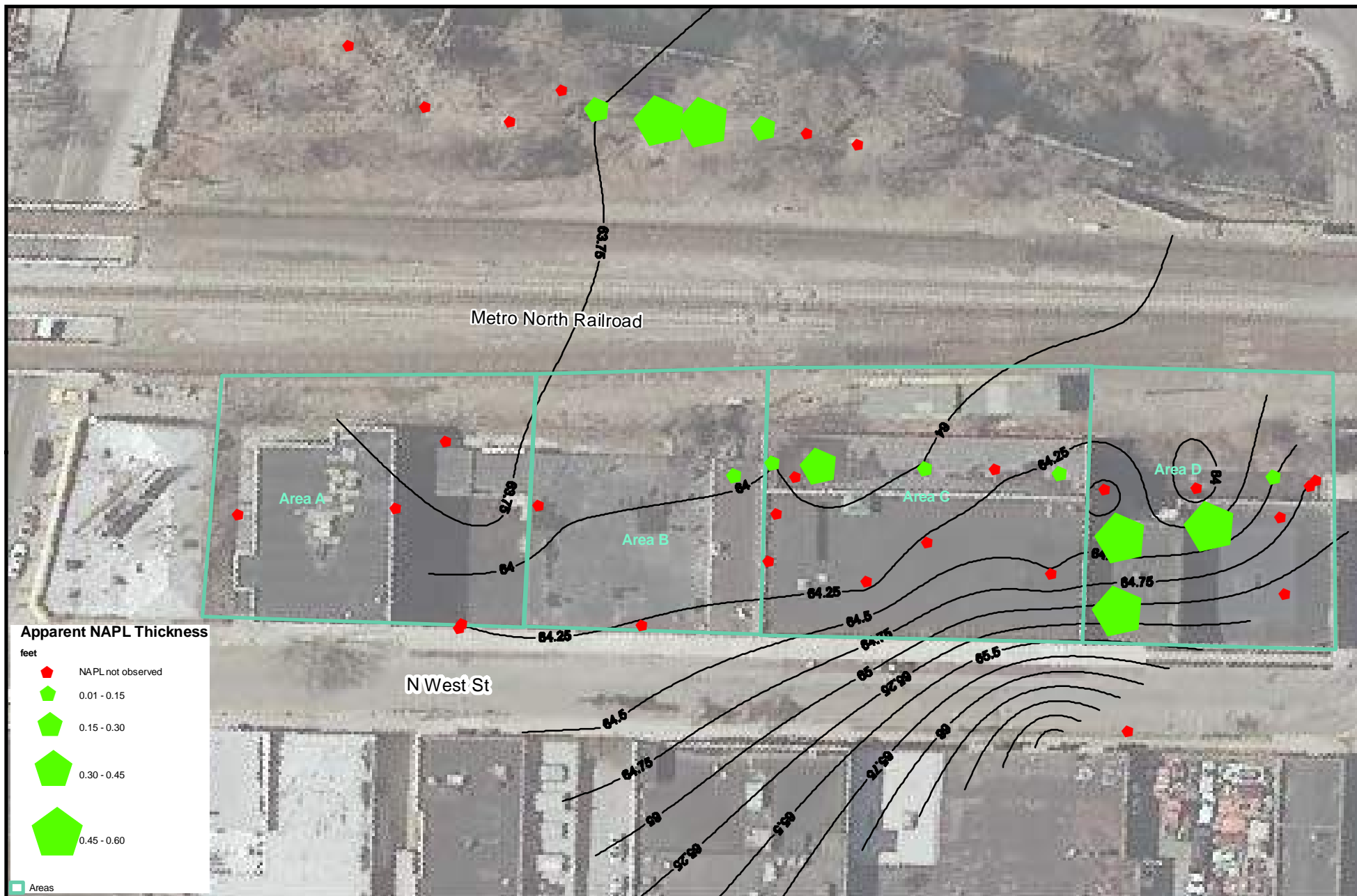
Freshwater Pond



0 1,500 3,000
Feet

Figure 1-1
Site Location Map
Red Devil Paint Site
30 North West Street
Mount Vernon, New York



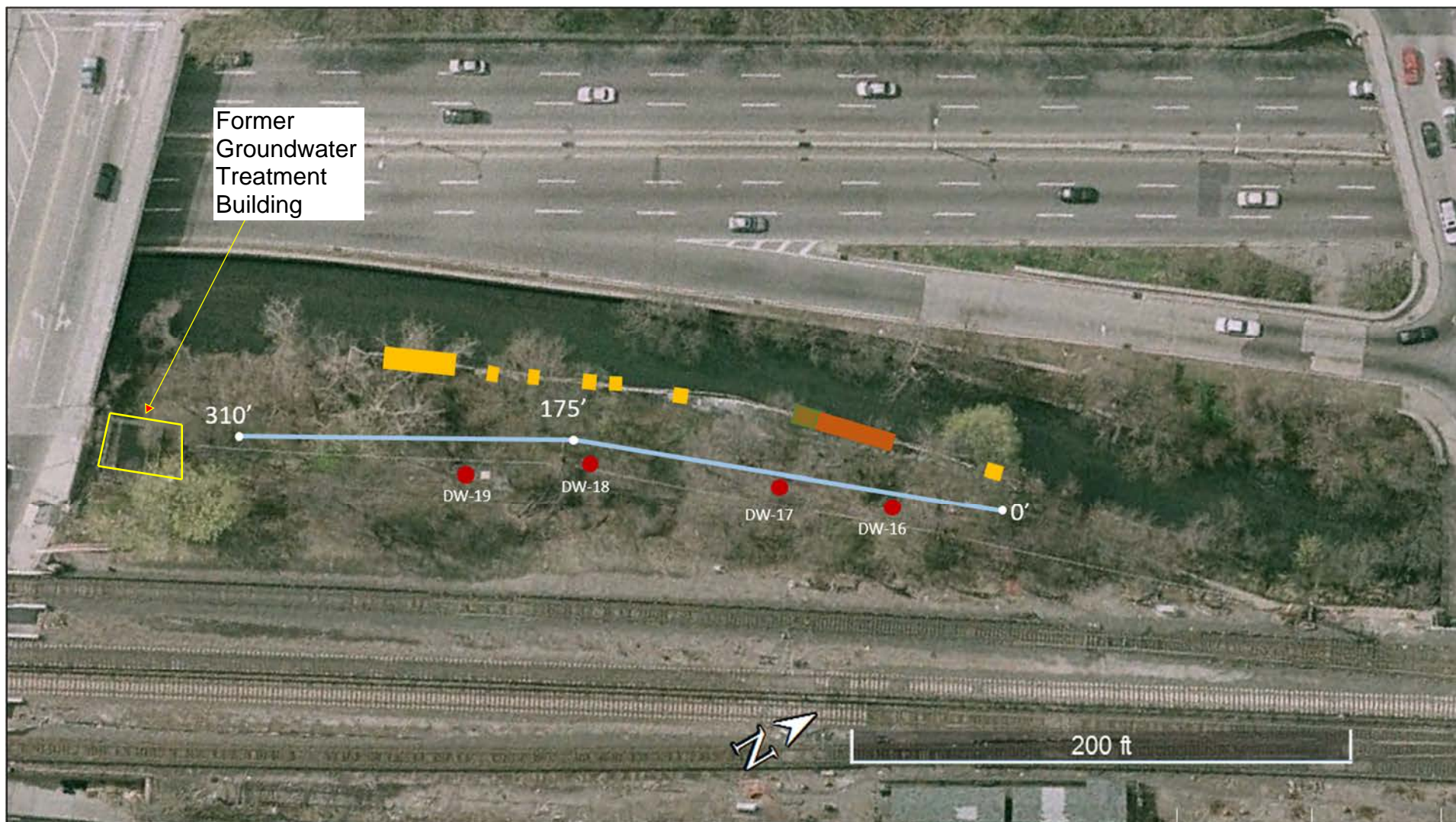


—62— Groundwater elevation contours (ft amsl)

*LNAPL measurements collected
on 11/08/2010

0 75 150
Feet

Figure 2-1
Groundwater Potentiometric Surface & LNAPL Thickness
Red Devil Paint Site
30 North West Street, Mount Vernon, New York



**CDM
Smith**

- Small amount of clear product observed
- Rainbow sheen and polymer observed
- Concentrated sheen

- Tape measure layout
- Delineation Wells

**LNAPL measurements collected on 03/10/2016*

Figure 3-1
Inspection Scope Layout
Red Devil Paint Site
30 North West Street
Mount Vernon, New York

Tables

Table 2-1
LNAPL Thickness Measurements
Red Devil Paint Site
30 North West Street
Mount Vernon, New York

Date	LNAPL Thickness (feet TIC)			
	DW-16	DW-17	DW-18	DW-19
6/20/2007	0	0.51	0.49	0
3/3/2008	0	0.4	0.79	0
6/16/2008	0	0.27	0.59	0
10/14/2008	0	0.32	0.2	0
1/1/2009	0	0.61	0.77	0
1/19/2009	0	0.61	0.77	0
4/21/2009	0	0.15	0.41	0
7/20/2009	0	0.26	0.55	0
10/11/2010	0	0.61	0.31	0
11/8/2010	0	0.28	0.18	0
1/29/2013	0	NM	0	0
3/5/2013	0	0.49	0.01	0
5/10/2013	0	present	1.03	0
7/1/2013	0	present	0	0
8/2/2013	0	present	0.28	0
9/24/2013	0	present	0.14	0
10/9/2013	0	present	NM	0
11/26/2013	0	present	0	0
1/29/2014	0	present	0.49	0
2/7/2014	0	present	0.47	0
3/14/2014	0	present	0.76	0
4/9/2014	0	present	0.64	0
12/15/2014	NM	0.13	0.21	NM
12/30/2014	NM	0.23	0.01	NM
1/13/2015	0	0.21	0.42	NM
3/8/2016	NM	0.22	0.49	NM
3/10/2016	0	0.2	0.5	0

Notes:

LNAPL - light non-aqueous phase liquid

NM - Not measured

TIC - top of inner casing

Appendix A

List of Contacts

Appendix A – List of Contacts

NYSDEC Representative:	Jeffrey Trad 625 Broadway, 12 th Floor Albany, NY 12233-7017 Phone: (518) 402-9814 Fax: (518) 402-9819 Email: Jeffrey.trad@dec.ny.gov
Environnemental Consultant:	CDM Smith 110 Fieldcrest Avenue, No. 8, 6th Floor Edison, New Jersey 08837 Phone: (732) 225-7000 Fax: (732) 225-7851
CDM Smith Project Manager:	Melissa Harclerode Phone: (732) 590-4616 Cell: (917) 575-1543 E-mail: harclerodema@cdmsmith.com
Boom Maintenance:	Tri-States Environmental Services, Inc. Contact: Lisa Hauer 3 Browns Lane Hawthorne, NY 10532 Phone: (914) 592-3385 Cell: (914) 589-8418 Fax: (914) 345-9008 E-mail: lhauer@tristaeenvironmental.net
Facility Tenant:	Extra Space Storage 30 North West Street Mount Vernon, NY Phone: (914) 667-7506
Metro North Railroad:	Contact: Larry DeResh 525 North Broadway White Plains, NY 10603 Cell: (646) 335-6939

Appendix B

Monitoring Forms

Quarterly Monitoring Form - Red Devil Paint Site
30 North West St., Mount Vernon, NY

[illegible]

Appendix C

Well Construction Logs

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, NY 11797

MONITORIN WELL CONSTRUCTION LO

WELL: DW-16

Project Name & Location	Project No.	Water Level(s)			Site Elevation Datum (feet)
Insilco corporation	488.010.4	(ft below top of PVC casing)			
Drilling Company	Foreman	Date	Time	Level (feet)	Ground Elevation (feet)
Aquifer Drilling & Testing	T. Gombarra	9/26/96	11:35	11.6	Top of Protective Steel Cap Elevation (feet)
Surveyor					Top of Riser Pipe Elevation (feet)
Date and Time of Completion	Geologist				
9/10/96 1500	J C Sheehan				

Generalized Soil Description	*Elevation	**Depth	CONSTRUCTION DETAILS		
	0.00	0.0	PROTECTIVE STEEL CAP FLUSH WITH GROUND		
	0.00	0.0	GROUND SURFACE		
0-3 FT.: Brown fine SAND and SILT with organic material and occasional gravel. Loose material. Dry. No odor.	0.00	0.0	WATER TIGHT CAP WITH LOCK		
	0.00	0.0	PROTECTIVE STEEL CASING CEMENTED IN PLACE		
	-3.50	3.5	BENTONITE SEAL		
3-12 FT.: Very hard drilling. Heavy gravel and large cobbles/boulders. Trap rock material, blue-gray in color. Wet at approximately 12.0 feet below grade. Strong odor at water table.	-4.50	4.5	RISER		
	-6.50	6.5	WELL SCREEN		
			SLOT SIZE: 0.02		
			DIAMETER: 4 INCH		
			MATERIAL: PVC		
			SAND PACK		
			TYPE: #2 MORIE		
12-16.5 FT.: Soft material. Brown and dark brown fine SAND and SILT. Some cobbles/gravel. River bed material. Strong odor. Wet.	-16.50	16.5	BOTTOM CAP		
	0.00		BOTTOM OF BOREHOLE: 16.5 FEET		

REMARKS

* Elevation (feet) above mean sea level unless noted

** Depth in feet below ground surface

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, NY 11797

WELL : DW-17

MONITORING WELL CONSTRUCTION LOG

Project Name & Location Insilco corporation		Project No. 488.010.4		Water Level(s) (ft below top of PVC casing)		Site Elevation Datum (feet)	
Drilling Company Aquifer Drilling & Testing		Foreman T. Gombarra		Date 9/9/96	Time 11:55	Level (feet) DTW	Ground Elevation (feet)
Surveyor						11.44/	Top of Protective Steel Cap Elevation (feet)
Date and Time of Completion 9/9/96 1400		Geologist J C Sheehan				12.1	Top of Riser Pipe Elevation (feet)

Generalized Soil Description	*Elevation	**Depth	CONSTRUCTION DETAILS	
	0.00	0.0	PROTECTIVE STEEL CAP FLUSH WITH GROUND	
	0.00	0.0	GROUND SURFACE	
0-4 FT.: Brown fine SAND and SILT with organic material and occasional gravel. Very loose material. Dry. No odor.	0.00	0.0	← WATER TIGHT CAP WITH LOCK	
	0.00		← PROTECTIVE STEEL CASING CEMENTED IN PLACE	
	-3.00	3.0		
	-4.00	4.0	← BENTONITE SEAL	
4-12 FT.: Very hard drilling. Heavy gravel and large cobbles/boulders. Trap rock material, blue-gray in color. Wet at approximately 11.0 feet below grade. Strong odor at water table.	-5.50	5.5	← RISER	
			DIAMETER: 4 INCH	
			MATERIAL: PVC	
			← WELL SCREEN	
			SLOT SIZE: 0.02	
			DIAMETER: 4 INCH	
			MATERIAL: PVC	
12-16FT.: Soft material. Brown and dark brown fine SAND and SILT. Some cobbles/gravel. River bed material. Strong odor. Wet.	-15.50	15.5	← SAND PACK	
			TYPE: #2 MORIE	
	0.00		← BOTTOM CAP	
			BOTTOM OF BOREHOLE: 16 FEET	
REMARKS				

* Elevation (feet) above mean sea level unless noted ** Depth in feet below ground surface

ERM-Northeast

175 Froehlich Farm Blvd., Woodbury, NY 11797

MONITORING WELL CONSTRUCTION LOG

WELL : DW-18

Project Name & Location Insilco corporation	Project No. 488.010.4	Water Level(s) (ft below top of PVC casing)		Site Elevation Datum (feet)
Drilling Company Aquifer Drilling & Testing	For whom T. Gombarra	Date 9/26/96	Time 3:15	Level (feet) D1W/
Suveyo				Ground Elevation (feet)
Date and Time of Completion 9/10/96 1600		Geologist J C Sheehan		Top of Protective Steel Cap Elevation (feet)
				Top of Rise Pipe Elevation (feet)
				11.01/
				11.45

Generalized Soil Description	*Elevation	**Depth	CONSTRUCTION DETAILS	
	0.00	0.0	PROTECTIVE STEEL CAP FLUSH WITH GROUND	
	0.00	0.0	GROUND SURFACE	
0-3 FT.: Brown fine SAND and SILT with organic material and occasional gravel. Loose material. Dry. No odor.	0.00	0.0	← WATER TIGHT CAP WITH LOCK	
	0.00		← PROTECTIVE STEEL CASING CEMENTED IN PLACE	
	-3.00	3.0		
	-4.00	4.0	← BENTONITE SEAL	
3-12 FT.: Very hard drilling. Fill material. Trap rock. Large cobbles/boulders. Blue-gray in color. Wet at approximately 12.0 feet below grade. Strong odor at water table.	-6.50	6.5	← RISER	
			DIAMETER: 4 INCH	
			MATERIAL: PVC	
			← WELL SCREEN	
			SLOT SIZE: 0.02	
			DIAMETER: 4 INCH	
			MATERIAL: PVC	
12-16.5 FT.: Soft material. Brown and dark brown fine SAND and SILT. Some cobbles/gravel. River bed material. Strong odor. Wet.	-16.50	16.5	← SAND PACK	
			TYPE: #2 MORIE	
	0.00		← BOTTOM CAP	

BOTTOM OF BOREHOLE: 16.5 FEET

REMARKS

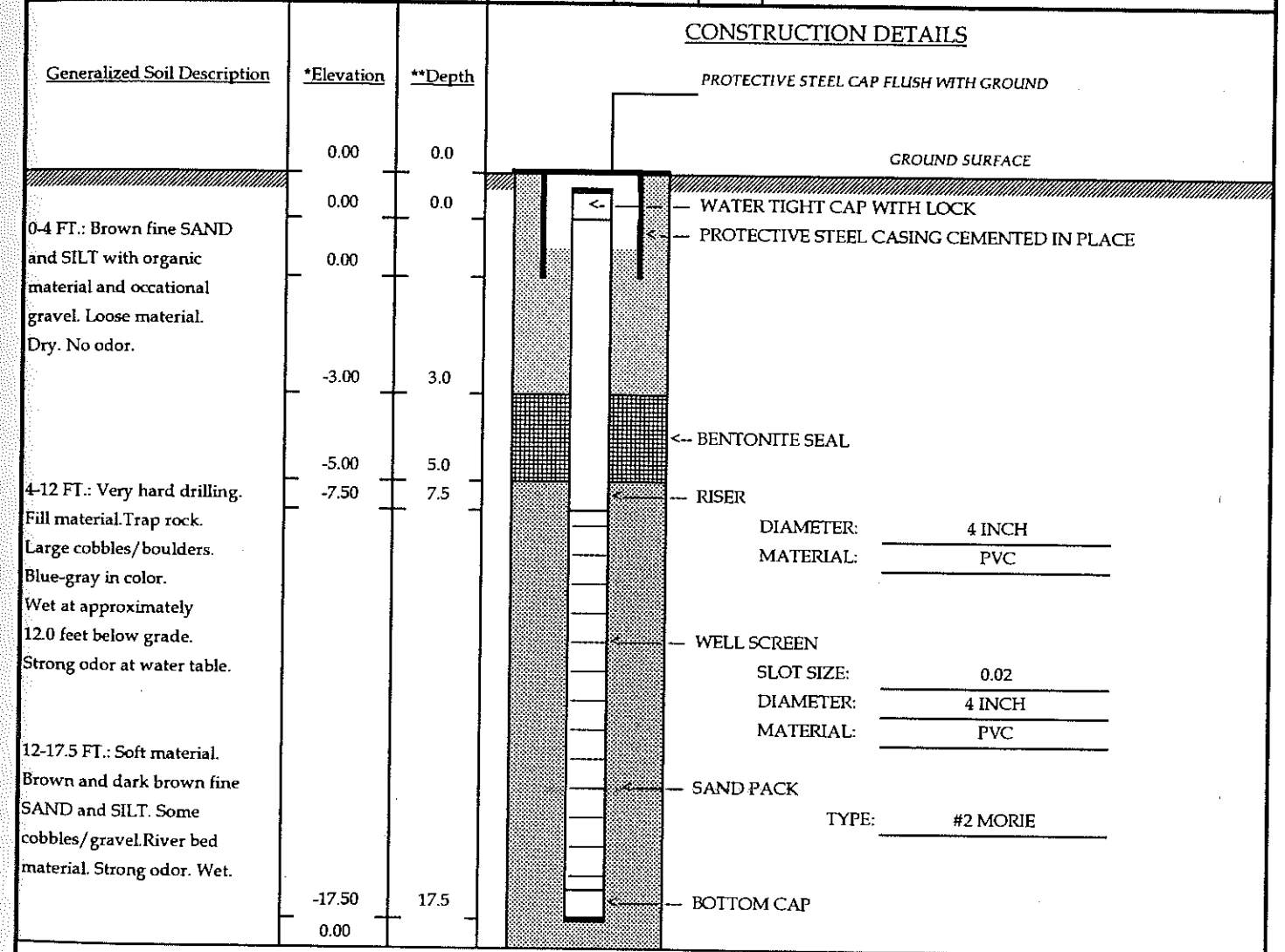
* Elevation (feet) above mean sea level unless noted

** Depth in feet below ground surface

ERM-Northeast
175 Froehlich Farm Blvd., Woodbury, NY 11797
MONITORING WELL CONSTRUCTION LOG

WELL : DW-19

Project Name & Location Insilco corporation		Project No. 488.010.4		Water Level(s) (ft below top of PVC casing)		Site Elevation Datum (feet)	
Drilling Company Aquifer Drilling & Testing		Foreman T. Gombarra		Date 9/26/96	Time 3:35	Level (feet) DTW/ 10.97/ DTP 11.4	Ground Elevation (feet)
Surveyor						Top of Protective Steel Cap Elevation (feet)	
Date and Time of Completion 9/11/96 1700		Geologist J C Sheehan				Top of Riser Pipe Elevation (feet)	



BOTTOM OF BOREHOLE: 17.5 FEET

REMARKS

* Elevation (feet) above mean sea level unless noted ** Depth in feet below ground surface