Five-Year Review Report

for the

Liberty Industrial Finishing Superfund Site

Farmingdale

Town of Oyster Bay

Nassau County, New York

June 2012

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U.S. Environmental Protection Agency
Region II
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June 4, 2012

Five-Year Review Report

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List of Abbreviations and Acronyms

AOC	Administrative Order on Consent
AWQS	Ambient Water Quality Standards
BHHRA	Baseline Human Health Risk Assessment
bgs	below ground surface
cis-1,2-DCE),	cis-1,2-dichloroethene
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980 as Amended
CY	cubic yards
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
GAC	granulated activated carbon
GRS	Groundwater Remediation System
HI	Hazard Index
HQ	Hazard Quotient
IC	Institutional Control
MCLs	Maximum Contaminant Levels
mg/kg	milligrams per kilogram
mg/l	milligrams/liter
MSL	Mean Sea Level
µg/l	micrograms/liter
MNA	monitored natural attenuation
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&F	Operational & Functional
O&M	Operation and Maintenance
OMMP	Operation, Maintenance, and Monitoring Plan
OU	Operable Unit
PCBs	Polychlorinated Biphenyls

PCE	Tetrachloroethene
PCOR	Preliminary Close-out Report
PPA	Prospective Purchaser Agreement
PRP	Potentially Responsible Party
RA	Remedial Action
RD/RA	Remedial Design/ Remedial Action
RAB	Removal Action Branch
RAO	Remedial Action Objective
RAR	Remedial Action Report
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
ROW	right of way
RPM	Remedial Project Manager
SCOs	Soil Cleanup Objectives
SEL	Severe Effect Level
SMP	Site/Soil Management Plan
SPDES	State Pollutant Discharge Elimination System
SVI	Soil Vapor Intrusion
SVOCs	Semivolatile Organic Compounds
TAGM	NYSDEC's Technical and Administrative Memorandum
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leachate Procedure
TOB	Town of Oyster Bay
UST	Underground Storage Tank
UAO	Unilateral Administrative Order
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

A five-year review was completed for the Liberty Industrial Finishing Superfund site (Site), located in the Village of Farmingdale, Nassau County, New York. This is the first five-year review for this Site, triggered by the initiation of the first remedial action at the Site, namely, the pond sediments remedial action. The comprehensive remedy selected in the 2002 Record of Decision (ROD) required excavation and off-Site disposal of 73,100 cubic yards of contaminated soils, removal of contaminated aqueous and/or solid materials from underground storage tanks and subsurface features, construction and operation of a conventional pump-and-treat system to address on-property and off-property groundwater contamination (designated as Plume A, the origin of which is attributed to the Site), and excavation and off-Site disposal of 2,600 cubic yards of contaminated Pond A sediments at the Massapequa Preserve. The comprehensive remedial action also calls for and includes construction and operation of an on-property conventional pump-and-treat system to address groundwater underlying the Site property, designated as Plume B, which originates to the north of the Site and migrates in a southerly direction before commingling with a portion of Plume A.

All components of the remedial action specified in the 2002 ROD have been implemented except for the installation of the Plume B extraction and treatment system because the New York State Department of Environmental Conservation (NYSDEC) has taken over the investigation and remediation of Plume B. NYSDEC's actions, which will be taken pursuant to its hazardous waste remediation legislation, will ensure protectiveness of human health and the environment so that the remedy selected in the 2002 ROD for Plume B is no longer necessary under Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended (CERCLA). EPA is presently proceeding with a separate action to amend the 2002 ROD to acknowledge that the NYSDEC has the lead agency role to address Plume B, including any Plume B remediation, as part of its response action at the Farmingdale Plaza Cleaners site, a state Superfund site which is upgradient of the Liberty Industrial Finishing site and is suspected to be the source of Plume B.

Institutional controls (ICs) at the Site include prohibition on groundwater use for human consumption until the aquifer is restored and restriction of the use of the Site property to commercial-industrial or recreational uses, pursuant to the ROD. The ICs have been implemented at the Liberty site. EPA expects to shortly announce an Explanation of Significant Difference (ESD) which would document the change of the land use for the 7.5 acre Central Parcel (Tax Lot 331) of the Liberty site from commercial or industrial to recreational.

The Groundwater Remediation System (GRS) groundwater monitoring program has been put in place to monitor the effectiveness of the GRS as well as the progress of groundwater improvement following the removal of on-Site sources. The GRS groundwater monitoring program is scheduled to continue for as long as the GRS is in operation and until the groundwater cleanup goals are attained.

The remedy protects human health and the environment because contaminated soils and Pond A sediments have been excavated and disposed of off Site, the pump and treat system is addressing contaminated groundwater, the ICs have been implemented at the Site, and the State and County ordinances prevent groundwater consumption until the aquifer is restored.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Liberty Industrial Finishing Superfund Site		
EPA ID: NYD000337295		
Region: 2	**State:** NY	**City/County:** Farmingdale/Nassau County

SITE STATUS	
NPL Status: Final	
Multiple OUs? No (Comprehensive Remedy)	**Has the site achieved construction completion?** No

REVIEW STATUS
Lead agency: EPA **If "Other Federal Agency" was selected above, enter Agency name:** Click here to enter text.
Author name (Federal or State Project Manager): Lorenzo Thantu
Author affiliation: EPA/ERRD/NYRB/ENYRS
Review period: 09/2007 – 03/2012
Date of site inspection: December 12, 2011
Type of review: Statutory
Review number: 1
Triggering action date: September 27, 2007
Due date *(five years after triggering action date)*: September 27, 2012

Five-Year Review Summary Form (continued)

The table below is for the purpose of the summary form and associated data entry and does not replace the two tables required in Section VIII and IX by the FYR guidance. Instead, data entry in this section should match information in Section VII and IX of the FYR report.

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
N/A - Comprehensive Remedy

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 01	**Issue Category:** Monitoring			
	Issue: Reinstatement of various pre-existing monitoring wells as part of the GRS groundwater monitoring program			
	Recommendation: Refurbish and reinstate pre-existing monitoring wells MW-9A, MW-36A, MW-10A, MW-10B, and potentially MW-23B, contingent on sampling results from the previously listed wells			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	PRPs	EPA	March 31, 2013
OU(s): 01	**Issue Category:** Monitoring **Issue:** Plume B Vapor Intrusion Evaluation **Recommendation:** Recommend NYSDEC continue to consider the potential VI pathway as part of its ongoing Plume B investigation and remediation			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	NYSDEC	N/A	N/A
OU(s): 01	**Issue Category:** Monitoring			
	Issue: Enhanced monitoring program for the Massapequa Preserve			
	Recommendation: Recommend the design and implementation of the enhanced monitoring program			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**

No	No	PRPs	EPA	December 31, 2012
OU(s): 01	**Issue Category:** Study/Evaluation			
	Issue: Statistical groundwater data evaluation			
	Recommendation: Recommend Mann-Kendall statistical trend test on groundwater sampling data for cadmium and chromium as to why there is not overall decreasing trend of Cr6+ in the on-Site/property boundary monitoring wells and also a trend analysis of GRS's mass influent for 2002-present period in order to assess the overall efficiency of the GRS			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	PRPs	EPA	December 31, 2012

To add additional issues/recommendations here, copy and paste the above table as many times as necessary to document all issues/recommendations identified in the FYR report.

Protectiveness Statement(s)
Include each individual OU protectiveness determination and statement. If you need to add more protectiveness determinations and statements for additional OUs, copy and paste the table below as many times as necessary to complete for each OU evaluated in the FYR report.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
01	Protective	Click here to enter date.
Protectiveness Statement: The remedy protects human health and the environment because contaminated soils and Pond A sediments have been excavated and disposed of off Site, the pump and treat system is addressing contaminated groundwater, the ICs have been implemented at the Site, and the State and County ordinances prevent groundwater consumption.		

Liberty Industrial Finishing Superfund Site
Farmingdale, New York
Five-Year Review Report

I. Introduction

This first five-year review was conducted pursuant to Section 121 (c) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended (CERCLA), Section 300.430(f)(4)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and in accordance with the *Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P* (June 2001). The purpose of a five-year review is to assure that implemented remedies protect public health and the environment and function as intended by the decision documents. This document will become part of the Site file.

This five-year review of the remedy for the Liberty Industrial Finishing Superfund site (Site), located in Farmingdale, Nassau County, New York was performed by the Remedial Project Manager (RPM) for the Site. This is the first statutory five-year review for the Site, triggered by the initiation of the first remedial action at the Site, namely, the pond sediments remedial action, on September 27, 2007.

The comprehensive remedy selected in the 2002 Record of Decision (ROD) required excavation and off-Site disposal of 73,100 cubic yards (CY) of contaminated soils, removal of contaminated aqueous and/or solid materials from underground storage tanks and subsurface features, construction and operation of a conventional pump-and-treat system to address on-property and off-property groundwater contamination (designated as Plume A which is attributed to the Site), and excavation and off-Site disposal of 2,600 CY of contaminated pond sediments at the Massapequa Preserve. The comprehensive remedial action also calls for and includes construction and operation of an on-property conventional pump-and-treat system to address groundwater underlying the Site property, designated as Plume B, which originates to the north of the Site and migrates in a southerly direction before commingling with a portion of Plume A. The New York State Department of Environmental Conservation (NYSDEC) has taken over the investigation and remediation of Plume B. Upon completion of the ongoing Plume B investigation, Plume B remedial action will commence. NYSDEC's actions will ensure protectiveness of human health and the environment so that the remedy selected in the 2002 ROD for Plume B is no longer necessary. EPA is presently proceeding with a separate action to amend the 2002 ROD to acknowledge that NYSDEC has the lead agency role to address Plume B. Therefore, the 2002 Plume B remedy will not be evaluated in this five-year review.

II. Site Chronology

Table 1 summarizes the events from EPA's first response actions at the Site to this first five-year review.

III. Background

Site Location and Description

The Site is located approximately one mile south of Bethpage State Park in Farmingdale, Town of Oyster Bay, Nassau County, New York. The Site includes a 30-acre property located at 55 Motor Avenue (see **Figure 1**). The property is bordered by the Long Island Railroad to the north, Motor Avenue to the south, Main Street to the east and a small town park, Ellsworth Allen Park, to the west. The surrounding area is primarily residential with several commercial establishments on the major roads.

The Site includes a former aircraft parts manufacturing and metal-finishing facility that began its operation in the early 1930's. From 1940 to 1944, the federal government and private corporate interests utilized the Site to develop and maintain production of materials needed for World War II. From 1944 through 1957, aircraft-related manufacturing activities predominated at the Site. Starting about 1957 through the 1980's, the facility operated as an industrial park and was used for various operations, including metal plating and finishing and fiberglass product manufacturing. Since the 1980's, the Site has been used for light manufacturing and warehousing but those operations have ceased.

The 30-acre Liberty Industrial Finishing site property consists of three tax parcels, 15-acre Western Parcel (Tax Lot 327), 7.5-acre Central Parcel (Tax Lot 331), and 7.5-acre Eastern Parcel (Tax Lot 332) (see **Figure 2**). The Town of Oyster Bay (TOB) acquired the 15-acre Western Parcel and 7.5-acre Central Parcel in September 2003 and July 2010, respectively, to expand adjacent Ellsworth Allen Recreational Park for future park development and construction. Site operations on the Western Parcel and Central Parcel have ceased; however, the groundwater treatment system is located in the southwestern portion of the Western Parcel. The Eastern Parcel has been redeveloped and is paved over with a large-scale grocery/retail store and adjacent parking lot that was completed in May 2010.

Geology/Hydrogeology

The Site is situated on the glacial outwash plain of Long Island. The regional geology consists of the following units from surface to depth: Upper Glacial Aquifer, Port Washington confining unit, Port Washington Aquifer, Magothy Aquifer, Raritan Clay, and Lloyd Aquifer. The surficial unit, Upper Glacial, is estimated to be 85 feet thick beneath the Site. The depth to the water table fluctuates between 15 and 21 feet below ground surface (bgs), but principally occurs at approximately 21 feet bgs. The saturated portion of the Upper Glacial Aquifer, with a thickness of 64 feet, begins at the water table and extends down to 85 feet bgs. The Upper Glacial Aquifer is underlain by the Magothy Aquifer which is approximately 700 feet thick in the vicinity of the Site.

Groundwater flow within the Upper Glacial Aquifer was determined to be predominantly horizontal and in the south-southwesterly direction; the horizontal flow velocity in the Upper Glacial Aquifer was estimated to be about 1.6 feet/day. The direction of the horizontal component of groundwater flow within the Magothy Aquifer is also in the south-southwesterly direction, with a slight south-southeasterly component north of the Farmingdale High School; the horizontal flow velocity in the Magothy Aquifer was estimated to be about 0.17 foot/day. In addition, vertical hydraulic gradients exist between the Upper Glacial and the Magothy Aquifers. In general, the vertical gradient is downward, from the Upper Glacial to the Magothy Aquifers, except in the spring months when upward gradients have been observed in the southern portions of the off-Site areas. The actual flow between the aquifers is mainly dependent on the vertical hydraulic connectivity between the two formations. The hydraulic connection of the Upper Glacial to the Magothy Aquifer is believed to be limited in the Site vicinity, because a low-permeability layer is present between the Upper Glacial and the Magothy Aquifers throughout much of the on-Site and Off-Site areas.

Groundwater aquifers underlying the Site are classified as Class GA pursuant to 6 New York Codes, Rules and Regulations Parts 700-705 (6 NYCRR Parts 700-705, reissued July 1995). The Class GA standards apply to any fresh groundwater which may be a source of potable water supply. Similarly, the groundwater aquifers are classified as Class IIA by EPA in that the aquifers are current or potential sources of drinking water.

Land and Resource Use

The Site property was zoned for industrial use from the 1920's until the mid-1980's; since that time, it was used for light industrial activities. In September 2011, the TOB rezoned the Western Parcel and Central Parcel from "Light Industrial" to "Recreational" for future park development and construction. The Eastern Parcel continues to be zoned for "Light Industrial" but in grocery/retail commercial business. The surrounding area of the Site property is primarily residential with several commercial establishments on the major roads. Approximately ten schools, both primary and secondary, are located within 1.5 miles of the Site.

There are no private drinking wells in the vicinity of the Site. People living near the Site obtain their drinking water from local water utilities; the water utilities routinely test their supplies to ensure compliance with State and federal drinking water standards. In 1998, the Potentially Responsible Parties (PRPs) installed "sentinel" wells, under EPA oversight, between the Site property and public drinking water wells of the local water districts. These sentinel wells serve as an early warning system should any plume of contamination migrate close to the well fields. Periodic monitoring of the sentinel wells, since 1998, by the local water districts, has not detected any Site-related contamination.

History of Contamination

Materials used in historic Site operations included Volatile Organic Compounds (VOCs) such as cis-1,2-dichloroethene (cis-1,2-DCE), trichloroethene (TCE), and tetrachloroethene (PCE); inorganic compounds containing cadmium, chromium, and cyanide; as well as other materials such as caustics and acids. Throughout most of the period of industrial operation, wastes containing these materials were discharged untreated into below-grade sumps, underground leaching chambers, and unlined, in-ground wastewater disposal basins.

A groundwater plume contaminated with organic and inorganic substances, which originated from on-Site industrial activities, underlies the former industrial area and extends approximately a mile in a southwesterly direction (designated as Plume A). A portion of the Massapequa Preserve, a nature preserve located about half mile to the south, was also contaminated from the on-Site activities and has been addressed as part of the Superfund cleanup. A separate plume of organic contamination, designated as Plume B, which is believed to originate from the Farmingdale Cleaners and its vicinity to the north of the Site, migrates in a southerly direction before commingling with a portion of Plume A (see **Figure 3**). The purple-colored blip or island at the southern end of Plume A in the Upper Glacial Aquifer and to the west of the Farmingdale High School is where Plume B reappears in the Upper Glacial Aquifer, after disappearing after the middle part of Plume A or south of Woodward Parkway elementary school. This indicates that the leading edge of Plume B contains higher PCE from a spill or an upgradient source with lower concentrations of PCE trailing behind. This leading edge of Plume B, however, dissipates before the Southern State Parkway and the lower PCE concentration trailing part of the Plume B dissipates upon reaching the Woodward Parkway elementary school. This phenomenon is likely due to natural attenuation consisting of dechlorination, dispersion, dilution, and degradation of PCE. In the Magothy Aquifer, presence of both PCE and TCE appears to end at the Woodward Parkway elementary school.

Initial Responses

In the 1980's, NYSDEC was the lead agency for the Site and directed the early Site investigation and early cleanup activities. In 1978 and 1987, under administrative orders issued by NYSDEC, several of the PRPs at the Site removed contaminated soil and sludge from industrial waste disposal basins.

The Site was placed on the National Priorities List on June 10, 1986.

In 1990, EPA assumed the role of the lead governmental agency for environmental investigation and remediation of the Site. Between 1991 and 1997, EPA conducted a Remedial Investigation (RI) to define the nature and extent of contamination and a Feasibility Study (FS) to identify alternatives to address contamination. Additional investigatory activities were carried out by several of the PRPs at the Site under EPA oversight pursuant to an administrative order issued by EPA in 1997.

EPA conducted a Removal Site Evaluation at the Site during late 1993 and early 1994, and determined that electrical transformer areas contaminated with polychlorinated biphenyls (PCBs), wastes contained in underground storage tanks, and drums located at the Site posed an immediate risk to trespassers. At EPA's request, a number of PRPs agreed to remove these materials and transport them to appropriate facilities for treatment and disposal. This removal action, which eliminated significant current-use risks associated with the Site, was completed in April 1996.

On March 31, 1998, EPA issued an Action Memorandum selecting a non-time-critical removal action as an interim response action at the Site, the objective of which was to prevent contaminated groundwater from migrating beyond the boundary of the Liberty property until the comprehensive soil and groundwater remedy could be implemented. This work was initially implemented starting in 1998 by PRPs pursuant to an EPA administrative order and has, since August 2004, been continued by the PRPs pursuant to a Consent Judgment. After design and testing, in January 2001 the PRPs constructed separate treatment systems to address both the organic and inorganic contamination in the groundwater. However, various operational problems initially prevented the interim groundwater treatment system from continuous operation and effective treatment of groundwater contamination. As a result, in January 2002, EPA directed the PRPs to begin the process of converting the on-property system for Plume A into a conventional pump and treat system. Since the conversion in June 2004, the existing on-property groundwater remediation system has been operating at its full design capacity in effectively treating both organic and inorganic contamination.

Pursuant to an EPA order issued per Section 16(a) of the Toxic Substances Control Act, in late 1999, the owners of the Liberty site removed approximately 1.5 million pounds of PCB-contaminated shredded auto-fluff that had been stored at the Site.

In April 2001, EPA released a Supplemental RI/FS report which described the nature and extent of contamination in Site soils and groundwater, in pond sediments in Massapequa Creek downstream of the Site, and in Plume B. The Supplemental RI/FS also evaluated alternatives for comprehensive Site cleanup. The Supplemental RI sampling data revealed that two distinct plumes exist beneath the property. Plume A originates on the western portion of the Liberty property, while Plume B originates hydrogeologically upgradient of the Site, east of Plume A. Plume A is characterized by TCE concentrations (including degradation products such as cis-1,2-DCE). There is no significant PCE concentration in Plume A. Plume A is also characterized by chromium and cadmium contamination. Plume B is characterized by PCE concentrations (including its degradation products).

On March 2002, prior to the issuance of the 2002 ROD, EPA issued an administrative order to the owners of the property at the Site requiring them to perform a removal action to address below ground features on the easternmost ten-acre portion of the Site. These features include sumps, vaults, drains, pipes, underground leaching chambers, underground storage tanks as well as a sanitary leaching field. The order also required the property owners to remove a mound of contaminated soil located on the western portion of the Site. Pursuant to this March 2002 administrative order, the soil mound was removed in March 2003, and the work to address the

underground features began in July of 2004 and was completed in December 2008.

Basis for Taking Action

Soils

The Initial RI and the Supplemental RI confirmed several significant on-property source areas including the former Wastewater Disposal Basins, the former Building B Basement area, the former Building B Ramp Pile, and the Northwest Disposal Area (see **Figure 4**). This figure shows Tax Lot 327 and former 15-acre Tax Lot 326 which is now Tax Lots 331and 332.

Sampling conducted during the Initial RI focused on the western Site soils. Results indicated that the majority of contaminated soils at the Site were contaminated with metals, primarily cadmium and chromium. The sampling results also indicated that certain soils were also contaminated with VOCs. The Initial RI sampling did not fully characterize the extent of soil contamination. Therefore, a comprehensive soil sampling program was conducted in the western portion and part of eastern portion of the Site as part of the Supplemental RI to fully delineate the horizontal and vertical extent of contamination. Using a grid layout approach, 92 soil borings were completed to 20 feet bgs with samples collected at five-foot intervals, beginning with the collection of a surficial sample. Leachability testing was also conducted to derive soil cleanup levels for cadmium and chromium that would be protective of the underlying groundwater aquifers. These levels were established at concentrations of 10 milligrams/kilogram (mg/kg) of cadmium and 143 mg/kg of chromium, which are more restrictive than the health-based levels that EPA typically uses for contact under a residential use exposure scenario. Based on NYSDEC's Technical and Administrative Memorandum (TAGM), the following soil cleanup objectives were adopted for VOC contaminants: 0.7 mg/kg of TCE, 0.25 mg/kg of cis-1,2-DCE, and 1.4 mg/kg of PCE.

Inorganic sampling results indicated that the former Wastewater Disposal Basins, the former Building B Basement area, the Northwest Disposal Area, and the former Building B Ramp Pile represented the major on-property source areas with cadmium and chromium concentrations in excess of their respective soil cleanup levels; outside these source areas, cadmium and chromium were also detected, in scattered locations, in concentrations above their respective soil cleanup levels. Also, analytical sampling results using the Toxicity Characteristic Leaching Procedure (TCLP) established that soils in the Northwest Disposal Area, the former Building B Basement area, and the former Building B Ramp Pile were hazardous wastes as defined by the Resource Conservation and Recovery Act (RCRA).

VOC contamination was detected in a very few soil samples. TCE was detected above soil cleanup objectives in samples collected within the vicinity of the former Building B Basement, with concentrations as high as 5.09 mg/kg. Only two other soil samples (collected from locations immediately south of the former Wastewater Disposal Basins and near the northwest corner of former Building N) had VOC concentrations above soil cleanup objectives with TCE concentrations of 1.17 and 0.78 mg/kg, respectively. Also, it was found that the VOCs are, in general, co-located with soils that also have cadmium and chromium concentrations above their respective soil cleanup levels.

Soil sampling results demonstrated that approximately 95% of the contaminated soils that exceeded above-mentioned soil cleanup levels were located on the western 15-acre portion of the Site property (e.g., the former Wastewater Disposal Basins, the former Building B Ramp Pile, and the Northwest Disposal Area); the balance of the soil contamination was situated on the eastern 15-acre portion of the Site (e.g., the Building B Basement area and the Building G floor drain).

Subsurface Features, Underground Storage Tank (UST) and Storm Drain Investigations

As part of the Supplemental RI, various subsurface features, underground storage tanks and the County storm drain on Motor Avenue in front of the Liberty Industrial property were investigated.

The subsurface feature investigation and sampling program was undertaken to identify the contents of various sumps, vaults, drains, or other on-Site subsurface containment features that are located on the eastern portion of the Site and to determine whether any of these features represents continuing sources of groundwater contamination. Sampling results indicated that the features did not represent significant sources of VOC or metals contamination to groundwater. However, the results did identify two semivolatile organic compounds (SVOCs), namely, benzo[a]pyrene and dibenz[a,h]anthracene, in concentrations as high as 0.041 milligrams/liter (mg/l) and 0.007 mg/l, respectively, in several of the subsurface features. These SVOCs do not present a potential threat to groundwater due to their limited mobility and low concentrations within the concrete subsurface features but would present a risk to future Site workers who may come in contact with these substances.

The UST investigation was conducted to evaluate suspected locations of five tanks to determine if the tanks contained hazardous liquids such as waste solvents or PCB-bearing waste oils. Two of the five tanks were not deemed to be of concern. The remaining three tanks could not be accessed due to safety considerations and inaccessibility, but they were investigated and remediated as part of the soil and subsurface feature remedial action.

Historic plans indicated that the on-Site storm drainage system was connected to the County storm sewer system which discharges into the headwaters of Massapequa Creek near Spielman and Roberts Street. To determine if Site-related contamination was present within the storm sewer, soil/sludge residuals were sampled by accessing five manholes along the north side of Motor Avenue. Site-related VOCs were not detected in any of the five samples and cadmium and chromium were detected at concentrations below their respective soil cleanup levels.

Groundwater

An extensive groundwater investigation has been conducted to evaluate the nature and extent of groundwater contamination, in particular Plume A, in both the Upper Glacial and the Magothy Aquifers. RI sampling results indicate that two distinct plumes, Plume A and Plume B, exist beneath the property. As stated above, Plume A originates on the western portion of the Liberty property, while Plume B originates upgradient of the Site, northeast of Plume A. Plume A is characterized by TCE concentrations (including degradation products such as cis-1,2-DCE) coming mainly from the former Building B Basement area and the former Wastewater Disposal Basins and extending south-southwest (generally west of Woodward Parkway). There is no significant PCE concentration in Plume A. Plume A is also characterized by chromium and cadmium contamination. Plume B is characterized by PCE concentrations (including degradation products) and extends across the Site toward the south-southwest (generally east of Woodward Parkway). Unlike Plume A, Plume B is not characterized by chromium and cadmium contamination.

Sediment

The Initial RI revealed that the Liberty groundwater contaminant plume within the Upper Glacial Aquifer discharges into Massapequa Creek north of Pond A. The County storm sewer system, to which the on-Site storm drainage system is connected, also discharges into the headwaters of Massapequa Creek. The six ponds (Ponds A, 1, 2, 3, 4, and 5, from upstream to downstream) located along the Massapequa Creek corridor are about 1 to 4 feet deep and were constructed

to control localized flooding and silting of the streambed (see **Figure 5**). The conceptual model of Site contamination based upon the RI indicates that these ponds serve as detention basins for runoff and associated sediments entering the creek from the watershed. Pond A, being located furthest upstream and closest to the Site property, therefore has the greatest potential to be affected by contaminated groundwater discharge from the Site property. This information indicated the need to expand the limited investigation of the Massapequa Creek that was initially conducted during the RI.

The objective of the Supplemental RI was to further define the extent of groundwater plume discharge, and to evaluate potential ecological effects in an ecological risk assessment.

Water samples were collected from 13 locations within the Massapequa Creek system and analyzed for VOCs and cadmium, chromium and lead. The samples were collected between the eastern branch headwaters of Massapequa Creek and just south of Pond 2. Results indicated only trace concentrations of VOCs in the surface water samples, none above the NYSDEC chronic ambient water quality standards (AWQS). Cadmium was detected above the NYSDEC chronic AWQS between Pond A and Pond 1 and above the NYSDEC acute AWQS upstream of Pond A; cadmium concentrations to the south of Pond 1 were either nondectable or below the AWQS. Total chromium concentrations were below the NYSDEC AWQS throughout the study area. These results are compatible with overall characteristics of shallow groundwater discharge into the Massapequa Creek.

Five rounds of stream sediment and pond sediment sampling were conducted, though not all locations were sampled in each round. Metal concentrations in stream sediments were lower (by about two orders of magnitude) than the metals concentrations in pond sediments. The metals data were compared to NYSDEC guidance values used to screen contaminated sediments for possible adverse ecological impacts. Cadmium concentrations, which exceeded the NYSDEC Severe Effect Level (SEL) sediment screening guideline (9 mg/kg) in all ponds except the reference pond (Mill Pond), were highest in Pond A and Pond 1. Chromium concentrations also exceeded the NYSDEC SEL sediment screening guideline (110 mg/kg) in all ponds except the reference pond; chromium concentrations were highest in Pond A, Pond 1, and Pond 4.

Risk Assessment Results

Risk assessment was conducted based upon the RI data, which may not reflect current conditions where remediation has been implemented.

For the western portion, in the Baseline Human Health Risk Assessment (BHHRA), the only receptor whose noncarcinogenic hazard exceeds EPA's benchmark value of a Hazard Index (HI) of 1 is the commercial/industrial worker, exposed to contaminants in the Upper Glacial groundwater and evaluated under a future use scenario, with an HI of 8.9. This exposure currently does not occur, since groundwater is not used as a drinking water source at the Site. The primary contributors to this HI are cadmium (Hazard Quotient (HQ) of 7.5) and chromium (HQ of 1.4). None of the cancer risks estimated for the western portion exceed EPA's target risk range. A subsequent BHHRA Addendum determined that there is an unacceptable noncancer risk to certain recreational users.

For the eastern portion, the receptor whose cumulative risk exceeds one-in-a-million excess cancer risk is the future construction worker (1×10^{-3}), which is greater than the upper boundary of the acceptable cancer risk range. For the future construction worker, the primary contributing medium and route is dermal exposure to aqueous waste, with benzo(a)pyrene and dibenzo(a,h)anthracene as the primary contributors to the cumulative risk. Dermal protection during handling of aqueous wastes would significantly reduce potential exposure and risks for this receptor. The only receptor whose cumulative hazard index exceeds 1.0 is the future

construction worker (31). The primary contributor to the hazard index is dermal exposure to aqueous wastes, with chromium (HQ of 1.5) and a PCB (Aroclor 1260 with an HQ of 31) being the primary contaminants of concern.

For the off-property residential areas, the receptors whose cumulative cancer risks exceed EPA's target cancer risk are current and future off-property residents. The current off-property resident's cumulative cancer risk from exposure to the Upper Glacial groundwater is 1.9×10^{-3}, which is driven by vinyl chloride and 1,1-DCE (two degradation products of TCE). The evaluation of noncarcinogenic effects shows that the hazards to the off-Site child resident are 95 (HI values for cadmium of 35, for chromium of 8.7, and for manganese of 50), and the off-Site adult resident are 26 (HI values of 8.4 for cadmium, 6.1 for chromium, and 11 for manganese). Under a future use scenario, the risks to the child and adult residents from exposure to the Magothy groundwater are 4.5×10^{-4}, with vinyl chloride and 1,1-DCE as the most significant contributors to the risk. The noncarcinogenic hazards to the off-Site residents using the Magothy groundwater are 6.8 for the child resident, with chromium (HQ of 1.7) and manganese (HQ of 3.2) as the primary chemicals of concern. The HI for the adult resident is less than EPA's acceptable level. It is noted, however, that these scenarios are hypothetical as the groundwater in the vicinity of the Site is not used for public drinking water supply.

For the Massapequa Preserve, all carcinogenic risks estimated for surface water, sediment, and fish tissue are within EPA's acceptable risk range for all populations. Noncarcinogenic HI values for surface water and fish tissue for all populations and for adults exposed to sediment are less than EPA's benchmark of an HI value of 1. The HI value for children exposed to sediment slightly exceeds the benchmark (HI of 1.1), although no HQ values for an individual chemical exceeds 1.

Finally, several locations were identified as potential areas of concern for chromium. Dermal exposure to chromium may result in allergic responses in certain sensitive individuals, which is called "contact dermatitis." The areas of concern are the western portion surface samples in the northwest disposal area and the southern portion of the disposal basins; the western portion subsurface soil in and near the disposal basins, northwest disposal area and the ramp excavation pile on the Building N foundation (or former Building B Ramp Pile); and the eastern portion subsurface soil in the Building B basement (see **Figure 4**). Potential effects from exposure to chromium in these areas can be managed and reduced by following the appropriate measures as outlined in the health and safety plan, including wearing gloves and other personal protection equipment and limiting exposure to the contaminated materials.

Based on the weight-of-evidence from the cumulative Massapequa Creek investigatory results from sediment toxicity analyses, fish tissue analyses, and macroinvertebrate analyses, it was concluded that Pond A poses potential risks to ecological receptors that include benthic invertebrates and fish. In the sediment toxicity analyses, the concentration below which toxicity to two standard benthic invertebrates was not reported was 55.4 mg/kg cadmium and 268 mg/kg chromium. Therefore, a conservative risk-based criteria of 50 mg/kg cadmium and 260 mg/kg chromium were established as sediment cleanup levels for the remediation of Pond A sediments.

IV. Site-wide Remedial Actions

Remedy Selection

In July 2001, EPA released a Proposed Plan that outlined the Agency’s preferred long-term comprehensive remedy for the Site.

Following the issuance of the Proposed Plan in July 2001, the Town announced its intention to acquire the Western Parcel for expansion of the adjacent Ellsworth Allen Park for community recreational activities. In October 2002, EPA entered into a prospective purchaser agreement with the Town, which released the Town from Superfund liability in contemplation of their future ownership and which would discharge existing and prospective Superfund liens against the parkland in exchange for a substantial payment of money from the Town to EPA which would be used for cleanup activities or reimbursement of EPA costs at the Site. In September 2003, the Town acquired the Western Parcel from the owners via condemnation. Now that the soils and subsurface features cleanups selected in the 2002 ROD have been completed and meet NYSDEC's Part 375 Soil Cleanup Objectives (SCOs) for Restricted Residential land use, the Town will construct the recreational facilities and establish the new community park.

Prior to the Town's announced plans for the additional parkland, EPA had assumed, for purposes of remedy selection, that the Site would continue to be used for commercial or industrial purposes. The newly planned parkland use, and other considerations including widespread support by community members and their elected representatives, caused EPA to re-evaluate the soils remedy. EPA's selected soil remedy included an expanded soil excavation for the Liberty Industrial Finishing site at an estimated additional cost of more than $4 million dollars.

In 2002, EPA selected a remedy for the Site. The Record of Decision included the following remedial action objectives (RAOs):

On-Site Soils

- Prevent the direct exposure of receptors to Site-related contaminants through inhalation, direct contact or ingestion, or mitigate soil contaminant concentrations to a level that will not pose unacceptable risks to human health and the environment.
- Reduce the concentration or mobility of soil contaminants to a level which will prevent further degradation of groundwater.
- Remove all RCRA hazardous waste from the Site.
- Remove any structural impediments that might interfere with pre-design sampling and implementation of soil, subsurface feature, and groundwater remediation.

On-Site Subsurface Features (on Eastern Portion of the Site) and Underground Storage Tanks

- Removal of contaminated aqueous and/or solid materials from subsurface features and underground storage tanks.

On-Site and Off-Site Groundwater

- Prevent or minimize ingestion, dermal contact and inhalation of inorganic- and organic-contaminated groundwater that are above State and Federal maximum contaminant levels (MCLs).
- Restore groundwater quality to levels which meet State and Federal MCLs.

Massapequa Creek Pond A Sediments

- Prevent adverse effects to ecological receptors within the Massapequa Creek and associated ponds caused by exposure to Site-related contaminants.

In order to achieve these RAOs, EPA selected the following remedial action components as described in the 2002 ROD:

On-Site Soils

- Excavation and off-Site disposal of all soils contaminated above groundwater protection levels, estimated at 73,100 CY.
- ICs to restrict the use of the Site to commercial/industrial or, where applicable, to recreational uses.

On-Site Subsurface Features (on Eastern Portion of the Site) and Underground Storage Tanks

- Removal of contaminated aqueous and/or solid materials from underground storage tanks and other subsurface features (structures).

On-Site and Off-Site Groundwater

- Continued operation of the ongoing interim groundwater treatment system that is being converted to a conventional pump-and-treat system to address the groundwater underlying the Site property contaminated by previous operations at the Site.
- Continuation of the interim groundwater action by construction and operation of a conventional pump-and-treat system to address groundwater underlying the Site property which is believed to have been contaminated by an upgradient source.
- Construction and operation of a conventional pump-and-treat system to treat off-property groundwater contamination.
- Implementation of a groundwater monitoring program.
- ICs to prohibit installation or use of groundwater wells for human consumption until the aquifer is restored.

Massapequa Creek Pond A Sediments

- Excavation and off-Site disposal of approximately 2,600 CY of contaminated sediments within Pond A of the Massapequa Preserve.
- Implementation of a monitoring program for the remainder of the ponds within the Massapequa Preserve.

The remedial work at the Site is summarized below.

Remedy Implementation

The remedial activities were undertaken in accordance with the September 30, 2003 Remedial Design/Remedial Action (RD/RA) Consent Judgment, and attached Statement of Work thereto, that was entered in the United States District Court for the Eastern District of New York on August 27, 2004.

On-Site Soils (Remedial Work Element I) and Subsurface Features and Underground Storage Tanks (Remedial Work Element II)

The remedial activities for on-Site soils and subsurface features and underground storage tanks were initiated in March 2007 and were completed in May 2011. The objectives of the work performed were to:

- Excavate and dispose off Site all soils impacted above the Site-specific groundwater protection standards of 10 mg/kg for cadmium and 143 mg/kg for chromium.
- Remove impacted aqueous and/or solid materials from three USTs and fifty-six

subsurface features, as well as the northern and eastern leaching chamber fields, if warranted. Eighteen USTs and eighteen subsurface features were to be removed pursuant to the September 30, 2003 RD/RA Consent Judgment. The remaining USTs and subsurface features were addressed in accordance with a March 21, 2002 Administrative Order on Consent (AOC) for Removal Action for Phase I Demolition Area. **Figure 6** shows the Phase I Demolition Area/Stop & Shop Parcel, which is also the Eastern Parcel, where subsurface features were remediated under the March 21, 2002 AOC, as well as subsurface features on the Western Parcel and Central Parcel.

- Remove and dispose off Site soil surrounding the subsurface features that exceed the following Site-specific soil Performance Standards:
    - 10 mg/kg for cadmium;
    - 143 mg/kg for chromium;
    - 0.7 mg/kg for TCE;
    - 0.25 mg/kg for cis-1,2-DCE;
    - 1.4 mg/kg for PCE;
    - 0.29 mg/kg for Benzo(a)pyrene;
    - 0.29 mg/kg for Dibenz(a,h)anthracene;
    - 35 mg/kg for Cyanide
    - 1 mg/kg for PCBs between 0 and 1-foot below ground surface;
    - 10 mg/kg for PCBs 1-foot or more below ground surface.

Final construction inspection was conducted on September 7, 2010.

Based on total waste volume disposal log, 57,967 tons of non-hazardous soils, 24,897 tons of hazardous soils, 436 tons of construction and demolition materials, 2,098 tons of mixed soil and Debris, 880 CY of wood chips, 15.8 tons of scrap metal, 17,704 gallons of oil, 177 tons of asphalt, and 5,899 tons of concrete were removed from the Site in the performance of Remedial Work Elements I and II. A total of 125 subsurface features and 15 USTs were remediated and removed pursuant to the September 30, 2003 RD/RA Consent Judgment and the March 21, 2002 AOC, in the performance of Remedial Work Element II.

On-Site and Off-Site Groundwater (*Remedial Work Element III)*

Construction activities for Remedial Element III were performed at the Site property, as well as at off-property locations, including the Massapequa Preserve, various TOB and Nassau County rights-of-way (ROWs) and the Woodward Parkway Elementary School located at 95 Woodward Parkway, Farmingdale, New York (see **Figure 7**). **Table 2** provides a chronological summary of major events for the Groundwater Remediation System (GRS) upgrades for Remedial Work Element III. The on-property GRS extracts water from the Upper Glacial Aquifer. The off-property GRS includes recovery wells screened in both the Upper Glacial and Magothy Aquifers, with the deepest Magothy well set to approximately 185 feet below grade, which is shallower than public water supply wells within the TOB. The GRS operates on a continuous basis, 24 hours per day. **Table 3** provides the design flow rate for each on and off-property recovery well. Extracted groundwater is piped from either on- or off-property recovery well locations into the on-property GRS building where it is processed first through a filtration unit (5 to 10 microns) and then through a pair of granulated activated carbon (GAC) vessels prior to discharge as treated effluent.

Discharge permits exist for both sewer discharge (350 gpm) and State Pollutant Discharge Elimination System (SPDES) discharge (100 gpm) through an on-Site ground water infiltration gallery. Magothy recovery wells (RW-8, RW-9, and RW-10) primarily discharge to the on-property infiltration gallery. The remaining recovery wells (all Upper Glacial recovery wells) discharge primarily to the sewer system. A portion of the Upper Glacial flow from wells RW-4, RW-5, and RW-6 (also called mid-field wells) is blended into the infiltration gallery discharge in

order to maximize treated groundwater discharge to the gallery, while still meeting permitted discharge limitations. Overall, from October 2002 through June 2011, the GRS extracted a total volume of 525.6 million gallons. The approximate mass of contaminants recovered from groundwater sources from October 2002 through June 2011 includes 17.3 pounds of TCE, 373 pounds of cadmium, and 1,285 pounds of chromium.

The GRS startup and testing occurred from January 18, 2010 until February 2, 2010. During this period, all system equipment was tested and configured to achieve the performance criteria specified in the RD (e.g., design flow rates, operating pressures, effluent contaminant concentrations). The integrated control system was tested to demonstrate its ability to perform specified functions, including initiating and performing backwash cycles, duty cycling of the GAC vessels, and initiating various alarms. After the startup and testing period, the system was operated at full capacity for a 5-day, 24-hour–per-day shakedown period. During the shakedown, the system was operated in the full auto mode and performed for the entire 5-day period without any manual adjustments. At the conclusion of the successful 5-day shakedown, the GRS was considered Operational & Functional (O&F) and transferred to the Operation and Maintenance (O&M) phase. Post-construction O&M of the upgraded GRS has been performed by the PRPs in accordance with the Operation, Maintenance, and Monitoring Plan (OMMP), issued with the February 2008 Final 100% Groundwater RD Report and the O&M plans prepared by the PRPs' contractors. These plans discuss general O&M activities, including system monitoring and discharge sampling as well as detailed O&M for each operable piece of equipment in the system. They also discuss Site-wide groundwater monitoring until restoration of the aquifer is complete.

EPA's Final construction inspection was conducted on September 7, 2010, subsequent to which September 2010 Groundwater Remedial Action Report was submitted to EPA. Based on EPA and NSYDEC's review of the September 2010 Groundwater Remedial Action Report, a determination was made that the on-property and off-property pump and treat system is O&F, consistent with EPA's May 2011 Close Out Procedures for National Priorities List Sites (OSWER Directive 9320.2-22).

Plume B

The 2002 ROD included a separate conventional pump-and-treat system to address Plume B, which originates to the north (upgradient) of the Site and which underlies the Site property. In December 2002, NYSDEC listed the "Farmingdale Plaza Cleaners" site (NYSDEC Site I.D. No. 130107) on its Registry of Inactive Hazardous Waste Disposal Sites in New York State. The Farmingdale Plaza Cleaners site is located approximately 1,000 feet to the north (upgradient) of the Liberty site (see **Figure 8**) and is suspected to be the source of Plume B. NYSDEC has been investigating the Farmingdale Plaza Cleaners site with resources from the New York State Hazardous Waste Remedial Fund. NYSDEC is currently performing an RI/FS for the Farmingdale Plaza Cleaners site (Plume B RI/FS). In March 2009, NYSDEC formally requested that EPA give NYSDEC the lead agency role to address Plume B, including any Plume B remediation, as part of its response action at the Farmingdale Plaza Cleaners site. EPA agreed to this request.

NYSDEC completed the first phase of the Plume B RI in June 2009. Based on the Phase 1 Plume B RI results, NYSDEC concluded, and EPA concurred, that another groundwater investigation (Phase 2) is warranted to fully delineate Plume B, in particular, the portion of Plume B that is downgradient of the Site property. Phase 2 Plume B RI investigation commenced in July 2011 and is projected for completion during the Summer of 2012. Plume B RI/FS reports are expected to be completed during the Fall of 2012. Upon completion of the Plume B RI/FS reports, NYSDEC will prepare a Plume B ROD selecting a Plume B remedy, which is projected for completion by the Spring of 2013.

With the construction and operation of on-property and off-property Plume A pump-and-treat systems, human health risks from Site-related contamination are controlled. The removal of potential sources (i.e., contaminated Site soils) has further reduced the migration of contaminants from the Site. Over the last several years, EPA and NYSDEC have performed extensive monitoring of Plume B and also conducted investigations to evaluate the nature and extent of Plume B contamination. The most recent groundwater sampling data show that the Plume B levels beneath the Site property have significantly declined to near drinking water standards. Based on the recent groundwater sampling data, EPA and NYSDEC have now determined that the on-property Plume B pump-and-treat system is no longer necessary. Instead, EPA believes, as described above, that Plume B, including any off-property Plume B remediation, will be best addressed by NYSDEC as part of its response action at the Farmingdale Plaza Cleaners site. Analysis of Plume B monitoring data to date indicates that natural attenuation and physical processes are contributing to the apparent, significant decline in PCE concentration within Plume B. As part of the ongoing Phase 2 Plume B RI investigation, the NYSDEC will also be collecting additional groundwater samples for analysis of monitored natural attenuation (MNA) parameters in order to substantiate the degree of natural attenuation occurring.

As part of the response action at the Farmingdale Plaza Cleaners site, NYSDEC has also implemented a soil vapor extraction (SVE) treatment system as an Interim Action to address the source of Plume B. The SVE construction commenced in June 2011 and was completed in November 2011, and is currently operating. The SVE system is anticipated to remediate any residual soil contamination that could otherwise continue to contribute to Plume B groundwater contamination. This additional source removal anticipated with NYSDEC's SVE system operation, coupled with treatment of significant portion of Plume B by on-property and off-property Plume A pump-and-treat systems, are expected to result in further significant decline in PCE concentration within Plume B.

EPA is presently proceeding with a separate action to amend the 2002 ROD to give NYSDEC the lead agency role to address Plume B, including any Plume B remediation, as part of its response action at the Farmingdale Plaza Cleaners site, a state Superfund site which is upgradient of the Site property and is suspected to be the source of Plume B.

Massapequa Creek Pond A Sediments (*Remedial Work Element IV)*

The remedial activities for Pond A sediments were initiated in September 2007 and were completed in March 2009. **Table 4** provides a chronological summary of major pond sediments remedial action construction events for Remedial Work Element IV. EPA's Final construction inspection was conducted on November 18, 2008.

Waste characterization samples were collected from the Pond A bottom prior to mobilization activities in order to pre-characterize the waste. The waste characterization analyses demonstrated that the waste was nonhazardous. A total of approximately 4,200 CY, or the equivalent of approximately 5,000 tons, of impacted sediment was excavated as determined by pre- and post-excavation surveys of the Site. The excavated sediments were transported to and disposed of at EPA-approved disposal facilities.

The PRPs had also conducted baseline and post-remediation sediment and surface water sampling for chemical and sediment toxicity analyses at Ponds 1 through 5 before and after the remediation of Pond A sediments, respectively. Baseline sediment sampling results revealed a maximum cadmium concentration of 44.4 mg/kg and a maximum chromium concentration of 117 mg/kg in Pond 2. Baseline surface water sampling results revealed a maximum cadmium concentration of 91 micrograms/liter (µg/l) and a maximum chromium concentration of 750 µg/l in Pond 1. Baseline sediment toxicity analyses revealed that three of the four sediment samples collected at the Site were predicted to be acutely toxic. Post-remediation sampling was

conducted at the same locations as the baseline that involved collection of sediment and surface water samples for chemical and bioassay analyses. Post-remediation sediment sampling results revealed a maximum cadmium concentration of 24.2 mg/kg and a maximum chromium concentration of 293 mg/kg in Pond 2. Post-remediation surface water sampling results revealed a maximum cadmium concentration of 11 µg/l and a maximum chromium concentration of 46.2 µg/l in Pond 1.

The 2002 ROD also called for implementation of a monitoring program for the remainder of the ponds within the Massapequa Preserve. The remedy for Pond A sediments has been fully implemented. The enhanced monitoring for the five lower ponds downstream of Pond A has not yet been implemented. This component of the remedy will consist of periodic surface water and sediment sampling and bioassays. This enhanced monitoring program is also warranted based on aforementioned elevated post-remediation sediment and surface water sampling results (maximum cadmium concentration of 24.2 mg/kg and a maximum chromium concentration of 293 mg/kg in Pond 2 sediments and maximum cadmium concentration of 11 µg/l and maximum chromium concentration of 46.2 µg/l in Pond 1 surface water. It is expected that this enhanced monitoring program will further support the Agency's determination that only Pond A required remediation, and demonstrate that, over time, removal of the contaminant source in Pond A will have a beneficial effect on downstream pond sediment quality. This enhanced monitoring program will be designed and implemented by the PRPs.

Redevelopment

In a June 19, 2007 meeting, the Town officials informed EPA that the Town had retained the services of a consulting firm to assist with engineering investigations and analysis regarding the Town's future Ellsworth Allen Park expansion development plans not only for the Western Parcel but also for the adjacent Central Parcel. This new piece of information for the Central Parcel necessitated an update to the July 2000 Baseline Human Health Risk Assessment (BHHRA) and March 2002 BHHRA Addendum, which were the basis for the remedy selected in the 2002 ROD, to determine whether the Central Parcel was suitable for recreation land use. The 2002 ROD established Site-specific cleanup concentrations in soils that would be protective of groundwater quality and would also be protective of human health for the most reasonably anticipated future uses of the Site property (i.e., commercial/industrial or recreational for the Western Parcel and commercial/industrial for the Central Parcel and Eastern Parcel).

In July 2010, the Town acquired the Central Parcel from the owners also via condemnation.

Under EPA oversight, the Town's consultant prepared and submitted to EPA for approval the November 2011 Risk Assessment Update to the July 2000 BHHRA and March 2002 BHHRA Addendum. With EPA approval, the November 2011 Risk Assessment Update concludes that soil conditions in the Central Parcel, upon completion of the soils and subsurface features remedial action in September 2011, are protective of recreational land use scenario for this area.

Vapor Intrusion Investigation

In addition, in February and early March 2006, EPA conducted a Phase I vapor intrusion investigation, which involved the collection of air samples at fifteen homes in the vicinity of the Site, and at the Woodward Parkway Elementary School in Farmingdale, New York, in order to determine if vapors associated with groundwater contamination at the Site were entering those properties. In April 2006, EPA conducted follow-up sampling of indoor air at two of the homes and at the school. The sampling results did not show any vapor intrusion impact and, therefore, do not indicate any potential impact on the health of the occupants. Since 2006, EPA has continued to conduct vapor sampling at the Woodward Parkway Elementary School and several homes, and the sampling results to date have not shown any vapor intrusion impact.

Institutional Controls

The 2002 ROD required ICs to restrict the use of the Site to commercial/industrial or, where applicable, to recreational uses for the soils remedial component and to prohibit installation or use of groundwater wells for human consumption for the groundwater remedial component. EPA expects to shortly announce an Explanation of Significant Difference (ESD) which would change the land use for the Central Parcel of the Liberty site from commercial or industrial to recreational.

The Liberty site property is comprised of three contiguous Tax Lots in Section 48, Block 518 of the Nassau County, New York Land and Tax Map. These Tax Lots, also called the Western, Central and Eastern Parcels, are from west to east: i) Tax Lot 327 being an approximately 15-acre parcel owned by the TOB; ii) Tax Lot 331 being an approximately 7.5-acre parcel owned by the TOB; and iii) Tax Lot 332 being an approximately 7.5-acre parcel owned by 55 Motor Avenue Co., LLC and leased to The Stop & Shop Supermarket Company for commercial use as a shopping center under a long term ground lease. Tax Lot 327 was acquired by the TOB in September 2003 to expand the adjacent Ellsworth Allen Recreational Park, and the ROD requires recreational use for that parcel. Tax Lot 331 was acquired by the TOB in July 2010 to further expand the park, and EPA expects that it will very shortly publish an ESD which will change the permitted use of Tax Lot 331 to recreational use. In September 2011, the legislative body of the TOB changed the zoning for Tax Lots 327 and 331 from Light Industrial to Recreational. Furthermore, under New York State legal precedents, once land has been dedicated to municipal parkland use, it cannot be diverted for uses other than recreation, in whole or in part, temporarily or permanently, even for another public purpose, without specific legislative approval of the State of New York. For the Eastern Parcel (Tax Lot 332), the ROD requires that its use be restricted to commercial or industrial purposes. The owner of that Tax Lot has imposed an Environmental Protection Easement and Declaration of Restrictive Covenants against the property restricting its use to commercial or industrial, prohibiting the installation or use of groundwater wells for human consumption, and providing that EPA and NYSDEC be third party beneficiaries with the right to enforce such restrictions. The use of groundwater at all of the Liberty site property is further institutionally controlled by State and County ordinances prohibiting installation or use of groundwater wells for human consumption until the aquifer is restored.

Operation and Maintenance (Monitoring)

The 2002 ROD projected a 20-year O&M period for the on-property and off-property GRS. As stated above, post-construction O&M of the GRS has been performed by the PRPs in accordance with the OMMP and the O&M plans prepared by the PRPs' contractors. These plans discuss general O&M activities, including system monitoring and discharge sampling as well as detailed O&M for each operable piece of equipment in the system. They also discuss Site-wide groundwater monitoring until restoration of the aquifer is complete.

In addition, to ensure that the Pond A sediments remedy is protective of the entire Massapequa Creek and Preserve, including the five lower ponds, the PRPs will design and implement the enhanced monitoring program, which will consist of periodic surface water and sediment sampling and bioassays.

V. Progress Since the Last Five-Year Review

This is the first Five-Year Review Report being conducted for the Liberty Industrial Finishing site.

VI. Five-Year Review Process

Administrative Components

The EPA five-year review team consisted of:

Lorenzo Thantu - Remedial Project Manager
Sal Badalamenti - Chief, Eastern NY Remediation Section
Michael Mintzer - Assistant Regional Counsel
Cecilia Echols - Community Involvement Coordinator
Rebecca Ofrane – Human Health Risk Assessor
Katherine Mishkin – Hydrogeologist
Michael Clemetson – Ecological Risk Assessor
Kate Garufi - EPA Headquarters Five-Year Review Coordinator
Michael Sivak – Region 2 Five-Year Review Coordinator

Community Involvement

EPA published a public notice of the performance of the first five-year review for the Liberty Industrial Finishing Superfund site in the February 3, 2012 edition of the *Farmingdale Observer* (**Appendix 1)**. EPA indicated that it would be reviewing operation, maintenance, and monitoring information with regard to the implemented actions at the Site. EPA also welcomed any public comment, including concerns about the implemented remedy.

EPA believes that the local community is informed of the current status of the Site. The first Five-Year Review Report will be made available in the local Site repository, i.e., the Farmingdale Public Library, upon completion.

Document Review

This five-year review consisted of a review of relevant documents, including various RARs and groundwater monitoring data (see Section XI).

Data Review

As part of the GRS O&M, the PRPs have implemented a groundwater monitoring program in accordance with the 2002 ROD. Site property boundary monitoring wells are being sampled semi-annually and off-Site property key monitoring wells are being sampled annually. In June 2011, the most recent sampling event, a total of 32 recovery wells, monitoring wells, and piezometers were sampled as part of the semi-annual on-Site property boundary and annual off-Site property key monitoring wells. VOCs of concern related to releases from the Liberty Industrial property include TCE and degradation products of TCE, such as cis-1,2-DCE and vinyl chloride. Site-related metals are principally cadmium and chromium, specifically the more toxic form hexavalent chromium (Cr^{6+}). PCE is detected in several monitoring wells but because this contaminant has been associated with Plume B, the NYSDEC will address this contaminant of concern. A summary of groundwater sampling results, focusing on Plume A contaminants, differentiated by area and aquifer is provided below:

On-Site/Property Boundary - Upper Glacial Aquifer - TCE Data – On-Site monitoring wells situated upgradient of recovery wells indicate an overall decrease in TCE concentrations from 1991 to present day where TCE is below laboratory method detection limits. Maximum concentrations of TCE previously exceeded 1000 µg/l (MW-02AR, MW-21AR) prior to year 2000. Remaining on-Site monitoring wells in line with recovery wells as well as property

boundary wells indicated concentrations below MCL, with the exception of MW-38B (6.3 μg/l), and/or were eliminated after several rounds of data revealing concentrations below laboratory method detection limits. Recovery wells, RW-01, -02, and -03A have most recently shown non-detect concentrations of TCE while maximum TCE concentrations measured in on-Site recovery wells was 18 μg/l in 2002 in RW-01.

On-Site/Property Boundary - Upper Glacial Aquifer - Metals Data – On-Site monitoring wells situated upgradient of recovery wells reveal that cadmium concentrations remain above its MCL. Since sampling was initiated in 1991, there does not appear to be an overall decrease in cadmium concentrations in the Upper Glacial Aquifer, but instead fluctuating concentrations of the contaminant over the monitoring period. Cadmium concentrations in wells upgradient of the recovery wells ranged from 8.5 μg/l (MW-02BR) to 590 μg/l (MW-02AR) in June 2011. Wells situated in line and downgradient of recovery wells range from 0.44 to 260 μg/l (MW-39B). The majority of wells indicate concentrations are above MCLs and some wells, such as MW-39B, show an increasing trend of cadmium since August 2002. Sampling results indicate that cadmium concentrations in RW-01 have decreased from 119 μg/l in May 2002 to 36 μg/l in June 2011 and a more subtle decrease is noted in RW-3A as well. Hexavalent chromium concentrations in wells upgradient of the recovery wells are all below its NYSDEC screening criteria, while Cr^{6+} concentrations in wells in line and downgradient of recovery wells from the June 2011 sampling event ranged from non-detect to 180 μg/l (MW-40A). On-Site recovery wells indicate Cr^{6+} as well as total chromium concentrations are below the NYSDEC screening criteria. Again, there does not appear to be an overall decreasing trend of Cr^{6+}, but fluctuating concentrations since the onset of the sampling program. For this reason, a Mann-Kendall statistical trend test should be conducted for trend analysis of groundwater sampling data for cadmium and chromium as to why there is not overall decreasing trend of Cr^{6+} in the on-Site/property boundary monitoring wells. In addition, a trend analysis of GRS's mass influent for 2002-present period should also be evaluated in order to assess the overall efficiency of the GRS.

Mid-field – Upper Glacial Aquifer – TCE Data - Monitoring wells in the mid-field area indicate low to non-detectable concentrations of TCE. Several monitoring wells in this area have been eliminated from the sampling plan after several consistent years revealing clean sampling results. Mid-field recovery wells were installed in June 2010 and concentrations of TCE detected in RW-04 have decreased from 26 μg/l in December 2010 to 5.6 μg/l in July 2011.

Mid-field – Upper Glacial Aquifer – Metals Data – Cadmium measured in mid-field wells in June 2011, reveals a concentration range from below method detection limits in several wells to 130 μg/l in MW-17B. Similar to metals data across the Site in the Upper Glacial Aquifer, there does not appear to be an overall decrease in cadmium concentrations in the mid-field area. Cadmium concentrations are relatively stable with small-scale fluctuations in concentrations. Cadmium concentrations in mid-field recovery wells have been above its MCL since their initial sampling event in December 2010. Maximum concentrations were found in RW-04 with cadmium at 140 μg/l. Hexavalent chromium concentrations exceed its NYSDEC screening criteria in MW-29B (240 μg/l), MW-17B (200 μg/l), and MW-25B (250 μg/l) while concentrations were non-detect in MW-11B and below its MCL in MW-17A. There appears to be an overall increasing trend in hexavalent concentrations in the mid-field area, with some smaller scale fluctuations in concentration values. For example, Cr^{6+} concentrations have increased from 57.4 μg/l in April 1998 to 240 μg/l (MW-29B) in June 2011 and from 29 μg/l in March 1992 to 200 μg/l (MW-17B) in June 2011. Cr^{6+} concentrations have been above its MCL in all mid-field Upper Glacial Aquifer recovery wells with the exception of RW-04. Cr^{6+} concentrations were greatest in RW-06, but reveal a small decrease from 2010 with a drop from 150 μg/l to 130 μg/l in 2011.

Far-field – Upper Glacial Aquifer – TCE Data - Concentrations of TCE in the far-field area that are in line with Plume A indicate TCE concentrations that exceed the MCL. Remaining Plume A dedicated monitoring wells include MW-9B MW-36B, and RW-07. Concentrations in MW-09B reveal a decreasing trend of TCE with current levels below its MCL at 4.1 μg/l. MW-09A was last sampled in May 2009 when TCE concentrations were 12 μg/l. MW-36B, the most downgradient well in the sampling program for Plume A, reveals an overall increasing trend of TCE since sampling was initiated in August 1998, with current levels at 10 μg/l. Far-field recovery wells were installed in June 2010 and TCE concentrations detected in RW-07 have slightly increased from 8.3 μg/l in December 2010 to 9.4 μg/l in June 2011.

Far-field – Upper Glacial Aquifer – Metals Data – Cadmium contamination is only exceeding Its MCL in a single far-field Upper Glacial Aquifer monitoring well, MW-09B, with a cadmium concentration of 29 μg/l In June 2011. Concentrations have fluctuated in this well since it was introduced in the sampling program in March 1992. The only other off-Site far-field Upper Glacial Aquifer monitoring well, MW-36B, indicates cadmium concentration is below Its MCL. Cr^{6+} remains high in MW-09B with an overall increase in concentration since this well was introduced in the sampling program in March 1992 from 380 μg/l to 520 μg/l in June 2011. The remaining far-field Upper Glacial Aquifer monitoring wells reveal chromium is below the laboratory detection limit in groundwater samples.

On-Site/Property Boundary – Magothy Aquifer – TCE Data – There are no on-Site/property boundary wells that are screened in the Magothy Aquifer.

On-Site/Property Boundary – Magothy Aquifer – Metals Data – Previous sampling data indicates that metals are not a concern in the Magothy Aquifer on-Site and at the property boundary. Monitoring was discontinued after several rounds of results below method detection limits.

Mid-field – Magothy Aquifer – TCE Data – MW-11C has consistently shown the highest concentrations as well as substantial fluctuations of TCE. Concentrations are presently lower (440 μg/l) than the maximum detected in July 1992 at 1300 μg/l; however, more recently an overall decreasing trend is not evident. Remaining wells indicate TCE concentrations are below its MCL during the last several sampling events. There is some indication for degradation processes, such as the presence of cis-1,2-DCE (14 μg/l) in MW-11C. Three recovery wells are screened mid-field in the Magothy Aquifer. During the last two sampling events, all VOC detections have been below MCLs in these wells. Recovery wells -08, -09, and -10 were installed to capture VOCs in the Magothy Aquifer, and since their installation sampling results have shown no indication of VOCs exceeding MCLs.

Mid-field – Magothy Aquifer – Metals Data – There is evidence of some lower level exceedances of the MCL of cadmium in the Magothy Aquifer, suggesting some hydraulic communication between the Upper Glacial Aquifer and the Magothy Aquifer. Cadmium concentrations range from below laboratory method detection limits to 11 μg/l in MW-29C. Concentrations in this well have shown an overall increasing trend of cadmium since it was introduced to the monitoring program in April 1998 when cadmium was below 1 μg/l. Several Magothy Aquifer monitoring wells have been eliminated from the sampling program after several monitoring episodes with concentrations below detection limits. Cr^{6+} concentrations are below its MCL in all mid-field Magothy Aquifer wells. Recovery wells MW-08, -09, -10 reveal no exceedances of metals, with the exception of iron and nickel, since their installation.

Far-field – Magothy Aquifer – TCE Data – No VOC exceedances have been detected in the far-field wells screened in the Magothy Aquifer. Some low level TCE hits were found in MW-28C, a Plume B monitoring well with a detection of 2 μg/l in June 2010. Given that PCE was measured at 120 μg/l at that time, the presence of TCE may be an indicator for degradation of PCE contamination.

Far-field – Magothy Aquifer – Metals Data – Cadmium and Cr^{6+} have never been detected in distal wells screened in the Magothy Aquifer. Some low level detections below the MCLs of total chromium were detected in MW-28C and MW-31D, which are designated as Plume B wells.

Overall, groundwater monitoring data indicate that the concentrations of TCE are substantially lower than historical concentrations detected prior to implementation of the groundwater recovery system. However, at several Upper Glacial Aquifer wells situated near the edge of the contaminant plume, a slight increase in TCE concentrations have been observed. The concentrations of TCE in these wells is very low, or just above the MCL, but, nonetheless, may be an indicator of migration of the groundwater contaminant plume. For this reason, existing wells should be utilized and reinstated in the sampling plan in order to adequately delineate the full lateral extent of the current TCE plume. The Magothy Aquifer shows an overall decreasing trend in TCE concentrations, with the exception of MW-11C (located at Woodward Parkway Elementary School – see **Figure 3**) where the TCE concentration has fluctuated significantly compared to other wells. It is also possible that TCE concentrations may be attributed to the degradation of Plume B, where the primary contaminant of concern is PCE; however, distinguishing the source of TCE is outside the scope of this five-year review. Degradation products of PCE and TCE have rarely been detected, but include one occurrence of cis-1,2-DCE in the Magothy Aquifer (MW-11C). This downward trend of TCE is consistent with the recovery and treatment of the contaminant in the on-Site GRS and the removal of on-Site sources. Total cadmium, total chromium, and hexavalent chromium concentrations in off-Site wells sampled in June 2011 were consistent with results over the last several sampling events. An overall decreasing trend in metals data is not evident, and somewhat of an increasing trend is noted in a few wells, but concentrations of these metals have been relatively stable throughout the monitoring period. Fluctuations may be indicative of plume migration since the GRS data indicate that these contaminants are being captured and treated and the cadmium and chromium plumes appear to be contained by the GRS since downgradient wells screened in the Magothy Aquifer indicate sampling results are below the MCLs. Future monitoring results will be compared with baseline conditions obtained prior to implementation to guide operation of the off-Site GRS recovery system. It is anticipated that as Plume A continues to decrease in size, recovery rates can be adjusted to more effectively operate the system.

Site Inspection

A Site inspection was performed on December 12, 2011 by the following EPA and NYSDEC personnel:

EPA
Lorenzo Thantu - Remedial Project Manager
Sal Badalamenti - Chief, Eastern NY Remediation Section
Cecilia Echols - Community Involvement Coordinator
Rebecca Ofrane – Human Health Risk Assessor
Katherine Mishkin – Hydrogeologist

NYSDEC
Heather Bishop, Project Manager
Chek Beng Ng, Project Manager
John Swartwout, Section Chief

No interviews were conducted and no issues were noted during the Site inspection. The Site inspection report prepared for this five-year review is provided in **Appendix 2**.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The main elements of the 2002 ROD include excavation and disposal of contaminated on-Site soils, removal of contaminated materials from underground storage tanks and other subsurface features, excavation and disposal of contaminated sediments within Pond A, implementation of a monitoring program for the remainder of the ponds within Massapequa Preserve, construction and operation of pump-and-treat systems for Plumes A and B, implementation of a groundwater monitoring program, and institutional controls to prevent access to groundwater. All of these remedial components have been implemented with the exception of the installation of the on-property Plume B extraction and treatment system, which the NYSDEC will address as part of its response action at the Farmingdale Plaza Cleaners site.

Drinking water in the Liberty Industrial Finishing Site area is provided by public supply wells which are outside any possible impact from the Site. The GRS groundwater monitoring program is in place to monitor the progress of groundwater remediation following the removal of on-Site sources. Review of the monitoring well sampling results indicates that on-Site TCE has decreased compared to historical concentrations, a trend consistent with the recovery and treatment of these constituents in the on-Site GRS and the removal of on-Site sources. TCE concentrations have decreased in the Upper Glacial Aquifer and the Magothy Aquifer in the mid-field, while they have shown a subtle increase to low level concentrations in the Upper Glacial Aquifer in the far-field wells. As this increase in the shallower aquifer may suggest further migration of the TCE contaminant plume, it is suggested that additional pre-existing wells be reinstated in the monitoring program to be able to evaluate the full extent of the groundwater plume. Metal contamination throughout the Site has not revealed an overall decreasing trend in concentration values, but mass removal data for the recovery system indicates metals are effectively being removed from the groundwater. The GRS groundwater monitoring program is scheduled to continue for as long as the GRS is in operation and until the groundwater cleanup goals are attained.

The State and County ordinances restrict any future potable water well installations in the aquifer at the Liberty site and, therefore, constitute additional ICs for the groundwater remedial component, thereby effectively preventing any current or future use of contaminated groundwater until the aquifer is restored. In addition, as explained above, the ICs have been implemented at the Liberty site property (Tax Lots 327, 331, and 332). EPA is presently proceeding with a separate action to prepare and publish an ESD to notify the public of the change in the permitted use from commercial-industrial to recreational for the Central Parcel (Tax Lot 331).

To ensure that the completed Pond A sediments remedy remains protective of the entire Massapequa Creek and Preserve, the PRPs will design and implement, under EPA oversight, an enhanced monitoring program for the remainder of the lower ponds that will consist of periodic surface water and sediment sampling and bioassays.

Question B: Are the (a) exposure assumptions, (b) toxicity data, (c) cleanup levels and (d) remedial action objectives used at the time of the remedy selection still valid?

Changes in land use requirements necessitated an update to the July 2000 BHHRA and March 2002 BHHRA Addendum, which were the basis for the remedy selected in the 2002 ROD. The Central Parcel, which was previously assumed to be commercial/industrial, was requested by the Town to be used as an extension of the recreational Ellsworth Allen Park. The November 2011 updated Risk Assessment concludes that soil conditions in the Central Parcel, upon completion

of the soils and subsurface features remedial action in September 2011, are protective of recreational land use scenario for this area. As also explained above, all ICs have been implemented at the Liberty site and the ESD, which is being prepared by the Agency, will confirm the change in use of the Central Parcel to recreational use.

In addition, NYSDEC has taken over responsibility of Plume B remediation and off-Site source work. The RAO to restore Plume B will be removed from the Liberty Industrial site remedy through a pending ROD Amendment.

While a new toxicity value for TCE was released in September 2011, the toxicity value used in the human health risk assessment and addenda are still protective of human health. The groundwater MCL remains at 5 μg/l, and the selected cleanup level for soils remains more stringent than the new residential TCE soil levels currently utilized by the State of New York State. Therefore, the cleanup goals presented in the 2002 ROD are still valid.

Soil vapor intrusion (SVI) is evaluated when soils and/or groundwater are known or suspected to contain VOCs. Vapor intrusion investigations have been conducted for properties downgradient of the Site, including the Woodward Parkway Elementary school building. New York State Department of Health (NYSDOH) evaluated vapor intrusion data collected by EPA and issued their conclusions in a letter dated September 16, 2009. Site-related VOCs were found to be below screening levels in sub-slab soils and indoor air. One property had exceedances of non-Site-related contaminants, and indoor ambient sources were found to be the cause. EPA agreed that Site-related VOCs do not appear to be affecting properties in the vicinity of Plume A through the vapor intrusion pathway. It is recommended that NYSDEC continues to consider the potential VI pathway, as it relates to Plume B, as part of Plume B investigation.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Fluctuating concentrations in far-field Upper Glacial Aquifer wells indicate that TCE contamination may be migrating further downgradient at very low concentrations just above its MCL. Additional groundwater monitoring in existing wells should be administered to monitor the full lateral extent of the TCE contaminant plume.

Technical Assessment Summary

The comprehensive remedy for excavation and off-Site disposal of contaminated soils and Pond A sediments, the removal of subsurface features and USTs, and their contaminated materials content, and construction and operation of the Plume A pump-and-treat systems was performed in accordance with the 2002 ROD. The NYSDEC has taken over the lead role to address Plume B, including any Plume B remediation, as part of its response action at the Farmingdale Plaza Cleaners site. The ongoing groundwater monitoring program and the pending enhanced monitoring program for the remainder of the lower ponds of the Massapequa Preserve are the only active remedial components remaining to be conducted at the Site.

No one is presently using contaminated groundwater. In the future, no installation of potable wells is expected for use of groundwater in any manner that could cause an unacceptable exposure to groundwater contamination, as a result of existing controls administered and enforced by the New York State and the Nassau County Public Health Ordinances.

The ICs have been implemented at the Liberty site. EPA is presently proceeding with a separate action to prepare and publish an ESD to notify the public of the change in the permitted use from commercial-industrial to recreational for the Central Parcel.

VIII. Issues, Recommendations and Follow-up Actions

See **Table 5**.

IX. Protectiveness Statement

The remedy protects human health and the environment because contaminated soils and Pond A sediments have been excavated and disposed of off Site, the pump and treat system is addressing contaminated groundwater, all ICs have been implemented, and the State and County ordinances prevent groundwater consumption.

X. Next Review

EPA will conduct another Site-wide five-year review within five years of the date of this report.

XI. Bibliography for Liberty Industrial Finishing Superfund Site

1) Record of Decision for the Liberty Industrial Finishing Superfund Site *March 28, 2002*

2) Administrative Order on Consent for Removal Action for Phase I Demolition, *March 21, 2002*

3) Remedial Design & Remedial Action Consent Judgment *September 30, 2003*

4) Pond Sediments Remedial Action Report *December 2008*

5) Groundwater Remedial Action Report *September 2010*

6) Site-wide Groundwater Monitoring Program Report for 2005 Summer *November 2005*

7) Site-wide Groundwater Monitoring Program Report for Semiannual Period (July to December 2010) *June 2011*

8) Site-wide Groundwater Monitoring Program Report for Semiannual Period (January to June 2011) *December 2011*

9) Soils and Subsurface Features Remedial Action Report *September 2010*

10) Soils and Subsurface Features Remedial Action Report Addendum *September 2011*

11) Site Management Plan for the Western and Central Parcels *March 18, 2011*

12) Public Health Consultation Letter *September 16, 2009*

13) Update of Risk Assessment Addendum (Central Parcel) to the Baseline Human Health Risk Assessment *November 2011*

Table 1: Chronology of Events

DATE	EVENT
June 1986	Listing of Liberty Industrial Finishing Superfund Site on NPL
January 1994	EPA completion of Initial RI Report
April 1996	PRP completion of PCB Removal Action
July 1997	EPA completion of Initial FS Report
April 2001	PRP completion of Supplemental RI/FS
March 2002	ROD for Comprehensive Remedy
December 2002	NYSDEC's Listing of Farmingdale Plaza Cleaners Site on its Registry of Inactive Hazardous Waste Disposal Sites
December 2008	PRP completion of Subsurface Features Removal Action
December 2008	PRP Completion of Pond Sediments RAR
September 2010	PRP Completion of Groundwater RAR
September 2010	PRP Completion of Soils and Subsurface Features RAR
September 2011	PRP Completion of Soils and Subsurface Features RAR Addendum

Table 2 - Chronology of Major Groundwater Remediation System Construction Events

Si. No.	Event	Date	Task Description
1	Notice to Proceed (NTP) Issued	5/29/2009	The EPA conditional approval of the Remedial Action Work Plan (RAWP) received; NTP issued to Prime Contractors
2	Moretrench Site Mobilization	6/8/2009	Moretrench American Corporation (Moretrench) began mobilizing to the site for treatment system and recovery well work
3	Preconstruction Meeting	6/11/2009	Discussed project expectations, lines of communication, record keeping, health and safety, and project schedule, among other things. Supervising Contractor, Engineer, and Prime Contractors present.
4	Selective Demolition	6/12/2009	Moretrench began demolition and removal of existing treatment system components
5	Well Installation, Main Site	6/24/2009	Moretrench began drilling wells and piezometers at the Site
6	Temporary Interim Treatment System Completed	6/29/2009	Interim treatment system completed for operation during construction activities
7	Recovery Well Installation, School Property	6/30/2009	Moretrench began drilling wells and piezometers at the School Property
8	Treatment System Construction	7/8/2009	Begin construction of new treatment system, including process equipment, piping, fittings, and valves.
9	Bove Site Mobilization and Preparation	8/3/2009	Bove began digging test pits for utilities; equipment and materials delivered to Site
10	Pipeline Installation, Main Site and School Property	8/26/2009	Bove began installing pipelines at the Site and School Property by open trenching; Piping connections to recovery wells installed
11	Pipeline Installation, Residential Neighborhoods Rights-of-Way (ROWs)	9/8/2009	Bove began installing pipe through the residential neighborhoods by horizontal directional drilling (HDD)
11	Massapequa Preserve Permits Approved	9/25/2009	Received utility easement and work permit for construction in the Preserve; NTP issued to contractors upon receipt of signed permits
12	Preserve Mobilization and Preparation	9/30/2009	Bove began preparation in the Preserve including limited clearing and trimming, installation of silt fence at Massapequa Creek crossing
13	Pipeline Installation, Massapequa Preserve	10/1/2009	Began pipelines installation in the Preserve by HDD
14	Well Installation, Massapequa Preserve	10/5/2009	Moretrench began drilling PZ-14 and RW-7 in the Preserve
15	Control Panel Installations	10/23/2009	Moretrench and Elemco transferred the Electrical Control Panels from the Motor Ave. building to 1st Ave. extraction wells location and secured the panels to the concrete pad. Elemco began pulling wire from the well chambers to the Electrical Control Panel.
16	Treatment System Startup and Testing	2/3/2010	Five-day test of treatment system begins
17	Complete System Testing	2/9/2010	Five-day test of treatment system ends

Table 2 - Chronology of Major Groundwater Remediation System Construction Events (Continued)

Si. No.	Event	Date	Task Description
18	Contractor Demobilization	2/10/2010	Moretrench demobilizes off site
19	Substantial Completion Inspection	2/12/2010	Moretrench contract substantially completed in accordance with Remedial Design documents
20	United States Environmental Protection Agency Pre-Certification Inspection	9/7/2010	

Note: This table does not include events for Remedial Element III prior to 5/29/2009.

Table 3 - Groundwater Recovery System Design Flow Rate

On-site UGA Recovery Wells	
RW-1	60 gpm
RW-2	26 gpm
RW-3	0 gpm (standby only)
RW-3A	30 gpm
	Total Flow – 116 gpm
Off-site UGA Recovery Wells	
RW-4 (mid-field)	45 gpm
RW-5 (mid-field)	45 gpm
RW-6 (mid-field)	70 gpm
RW-7 (far-field)	65 gpm
	Total Flow – 225 gpm
Off-site MA Recovery Wells	
RW-8	30 gpm
RW-9	20 gpm
RW-10	35 gpm
	Total Flow – 85 gpm

Key:

gpm = Gallons per minute.
MA = Magothy Aquifer.
UGA = Upper Glacial Aquifer.

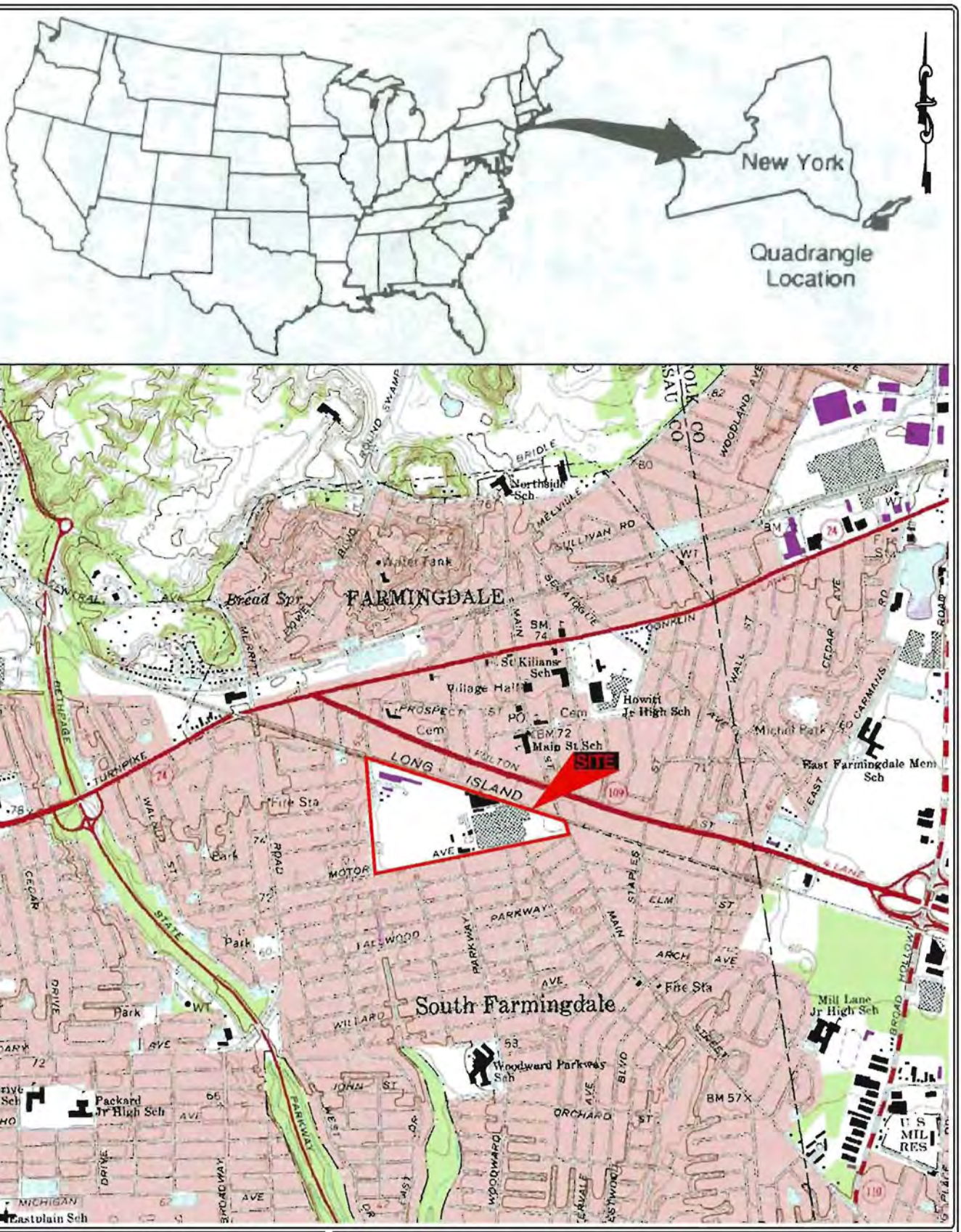
Table 4 - Chronology of Major Pond Sediments Remedial Action Construction Events

Si. No.	Event	Date	Task Description
1	Pre Construction Meeting	5/15/2008	ENTACT's site supervisor, health & safety officer, PRP representative, EEEPC project manager, and construction oversight were present at the meeting
3	Clearing/Grubbing	5/21/2008	Removed small trees, shrubs, vegetation
4	Support Facilities	5/28/2008	Received office trailers, furniture, file cabinets
5	Site Preparation	6/13/20008	Install by-pass systems, installed perimeter fences, silt fencing, sediment trap, decontamination pad, water treatment systems, post-excavation survey
6	Pond Sediment Excavation	6/27/2008	Remove contaminated sediment from pond and transport off-site
7	Demobilization	8/21/2008	Demobilization of Equipment and Supplies
8	Begin Site Restoration	9/3/2008	Planting, Grading
9	End Site Restoration	9/25/2008	--
10	Substantial Completion Inspection	10/3/2008	--
11	USEPA Pre-Certification Inspection	11/18/2008	--

Note: The table does not include events at Pond A before May 15, 2008.

Table 5: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Monitoring	Recommend refurbishing and reinstating pre-existing monitoring wells MW-9A, MW-36A, MW-10A, MW-10B, and potentially MW-23B, contingent on sampling results from the previously listed wells	PRPs	EPA	March 31, 2013	N	N
Plume B Vapor Intrusion Evaluation	Recommend NYSDEC continue to consider the potential VI pathway as part of its ongoing Plume B investigation and remediation	NYSDEC	N/A	N/A	N	N
Monitoring	Recommend the Design and implementation of the enhanced monitoring program for the Massapequa Preserve	PRPs	EPA	December 31, 2012	N	N
Statistical Groundwater Data Evaluation	Recommend Mann-Kendall statistical trend test on groundwater sampling data for cadmium and chromium as to why there is not overall decreasing trend of Cr^{6+} in the on-Site/property boundary monitoring wells and also a trend analysis of GRS's mass influent for 2002-present period in order to assess the overall efficiency of the GRS.	PRPs	EPA	December 31, 2012	N	N



LEGEND:

GRAPHIC SCALE

1000 0 1000 2000

1 inch = 2000 ft.

SOURCE: UNITED STATES GEOLOGICAL SURVEY 7.5 MINUTE SERIES AMITYVILLE, NY QUADRANGLE 1979

TITLE: SITE LOCATION MAP

PROJECT: LIBERTY INDUSTRIAL FINISHING SITE FARMINGDALE, NEW YORK

CLIENT NAME: USEPA

WESTON MANAGERS DESIGNERS/CONSULTANTS

DATE: MARCH 2002

FIGURE #: 1

00561TopomapFig1

FIGURE 1 - SITE LOCATION MAP

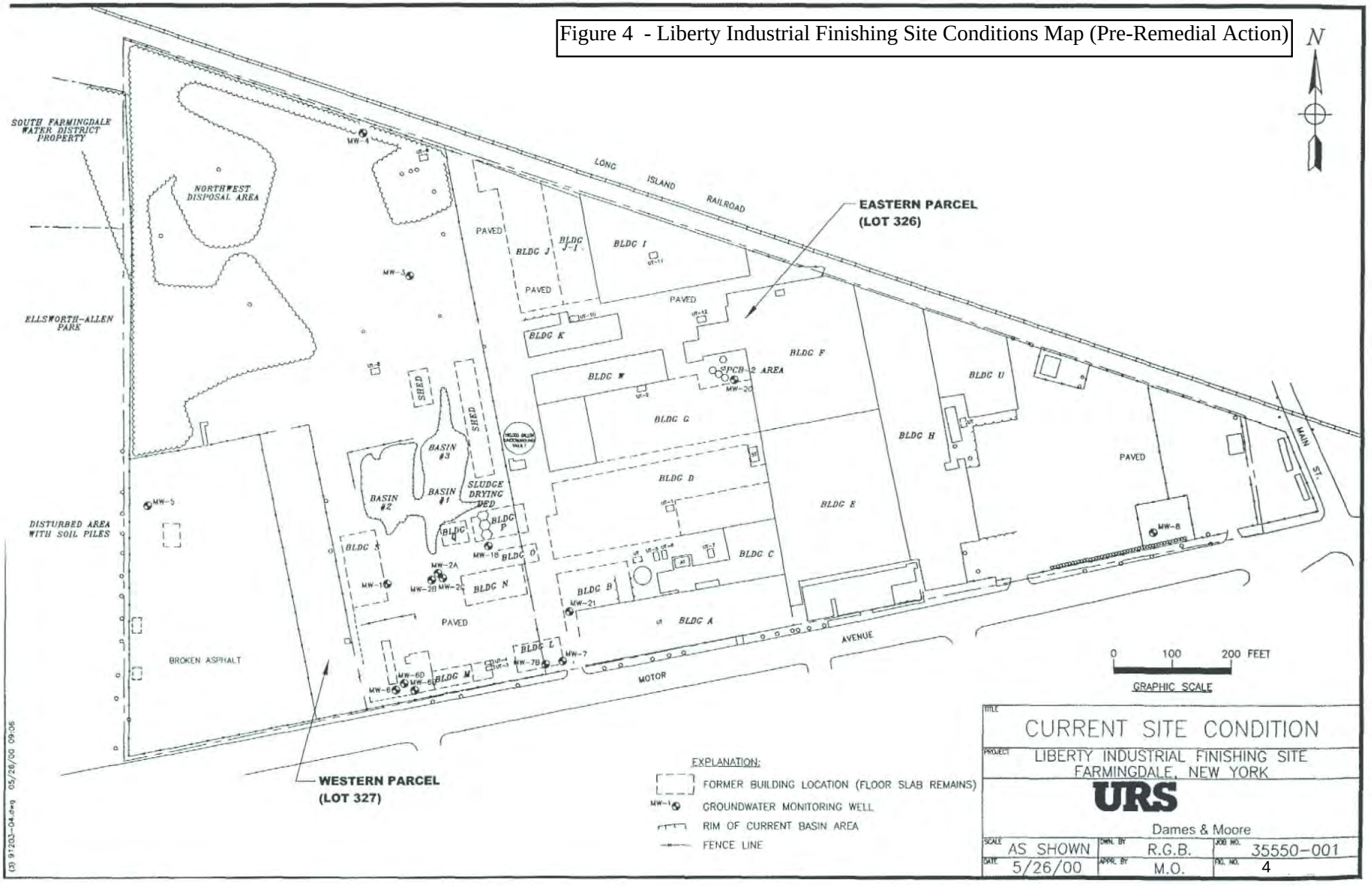
Figure 2 – Current Map of Liberty Tax Lots 327, 331, and 332

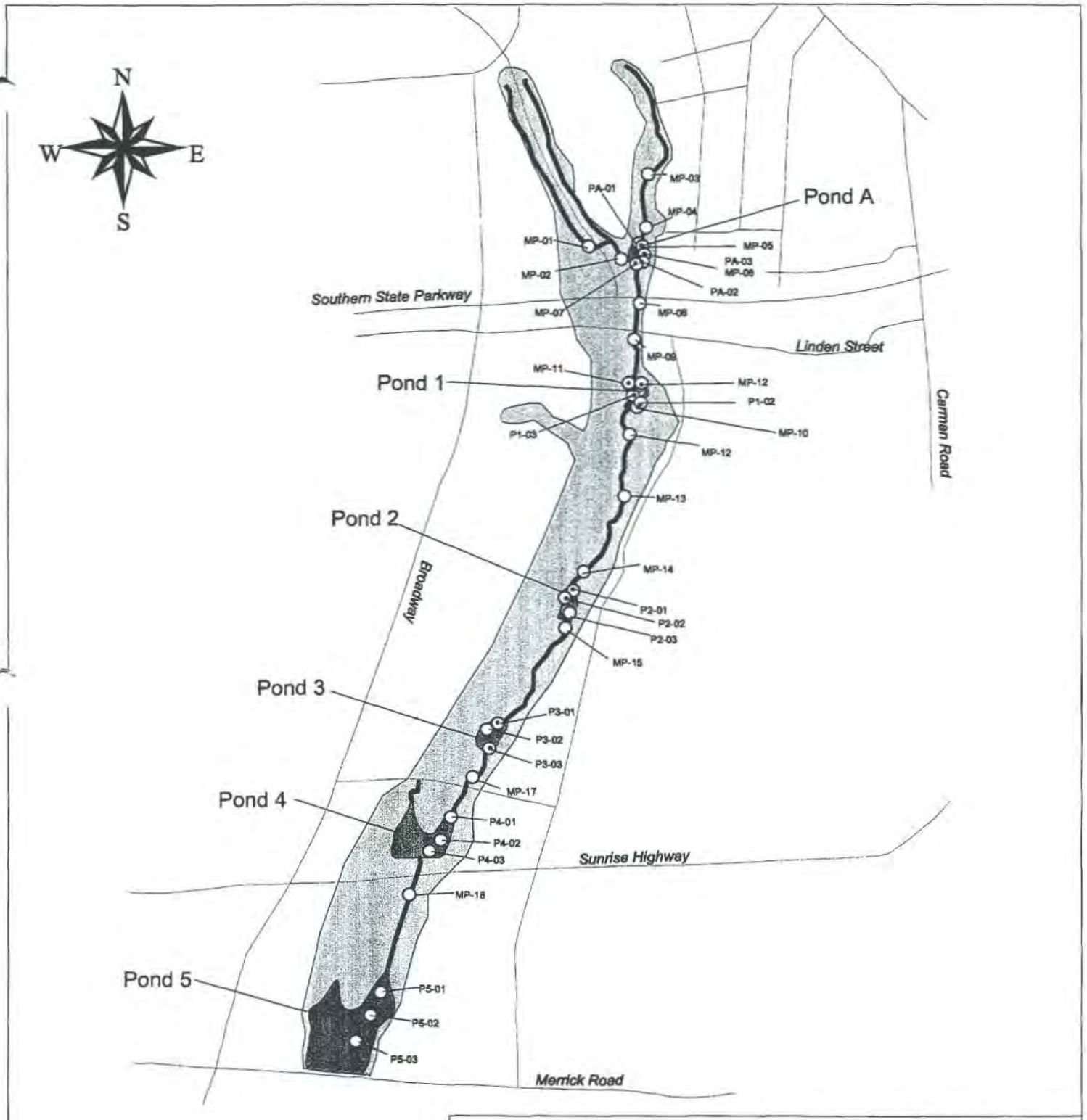
Figure 3 - Plume A/Plume B Map

ecology and environment P.C.

EXTENT OF PLUME A (METALS) AND PLUME B (PCE) IN GROUNDWATER
LIBERTY INDUSTRIAL FINISHING SITE
FARMINGDALE, NEW YORK

Figure 4 - Liberty Industrial Finishing Site Conditions Map (Pre-Remedial Action)



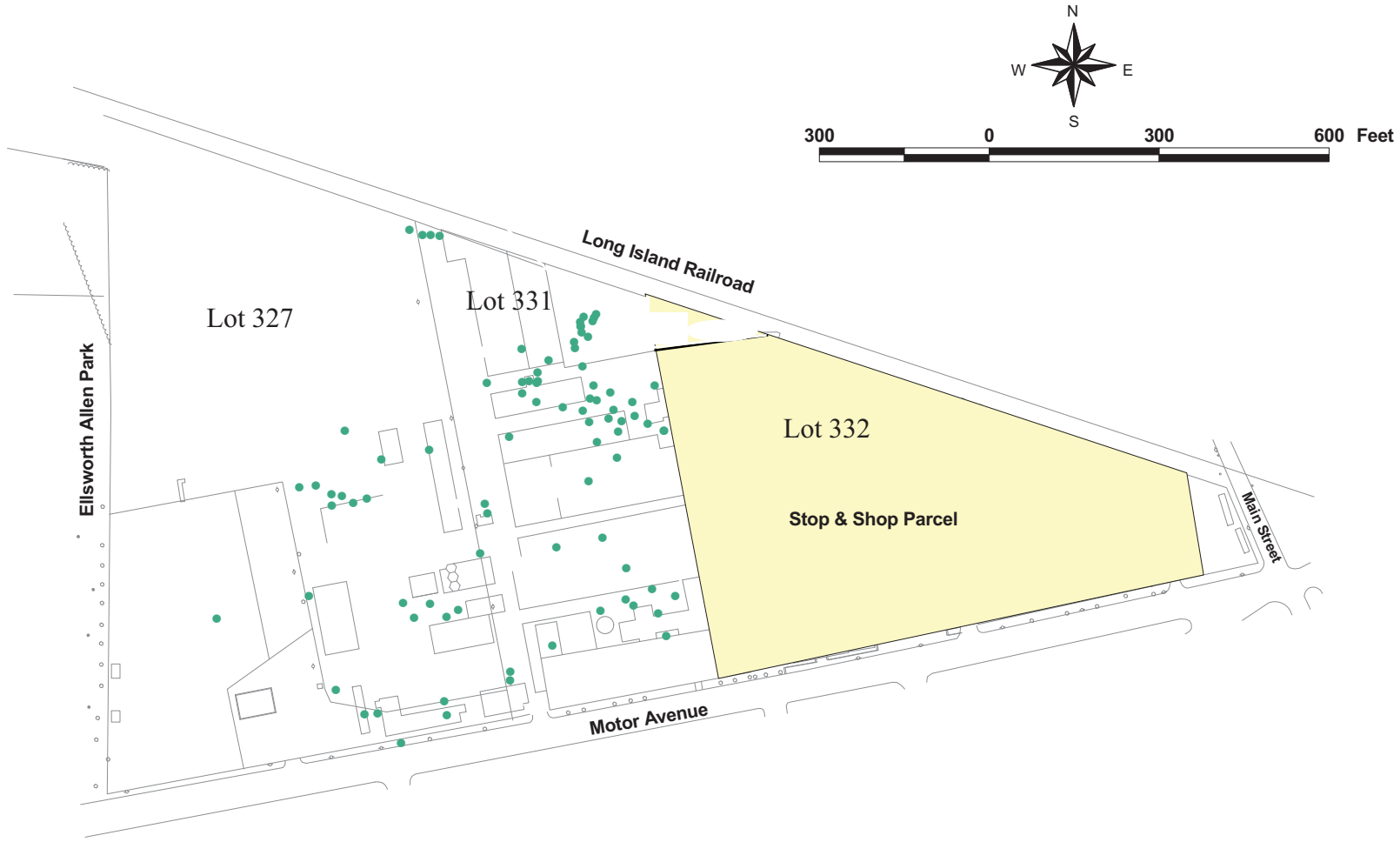


Massapequa Preserve Surface Water, Sediment, and Fish Tissue Sampling Locations

LIBERTY INDUSTRIAL FINISHING SITE
FARMINGDALE, NEW YORK

URS/Dames & Moore

AS SHOWN	M.O.	35550-001
7/19/00	M.O.	Figure 5



Explanation:

- Western Subsurface Feature Locations
- Phase I Demolition Area/Stop & Shop Parcel
- Former Building Slabs, Property Lines, Roads

Figure 6 - Phase I Demolition Area & Western Parcel and Central Parcel Subsurface Features Location Map

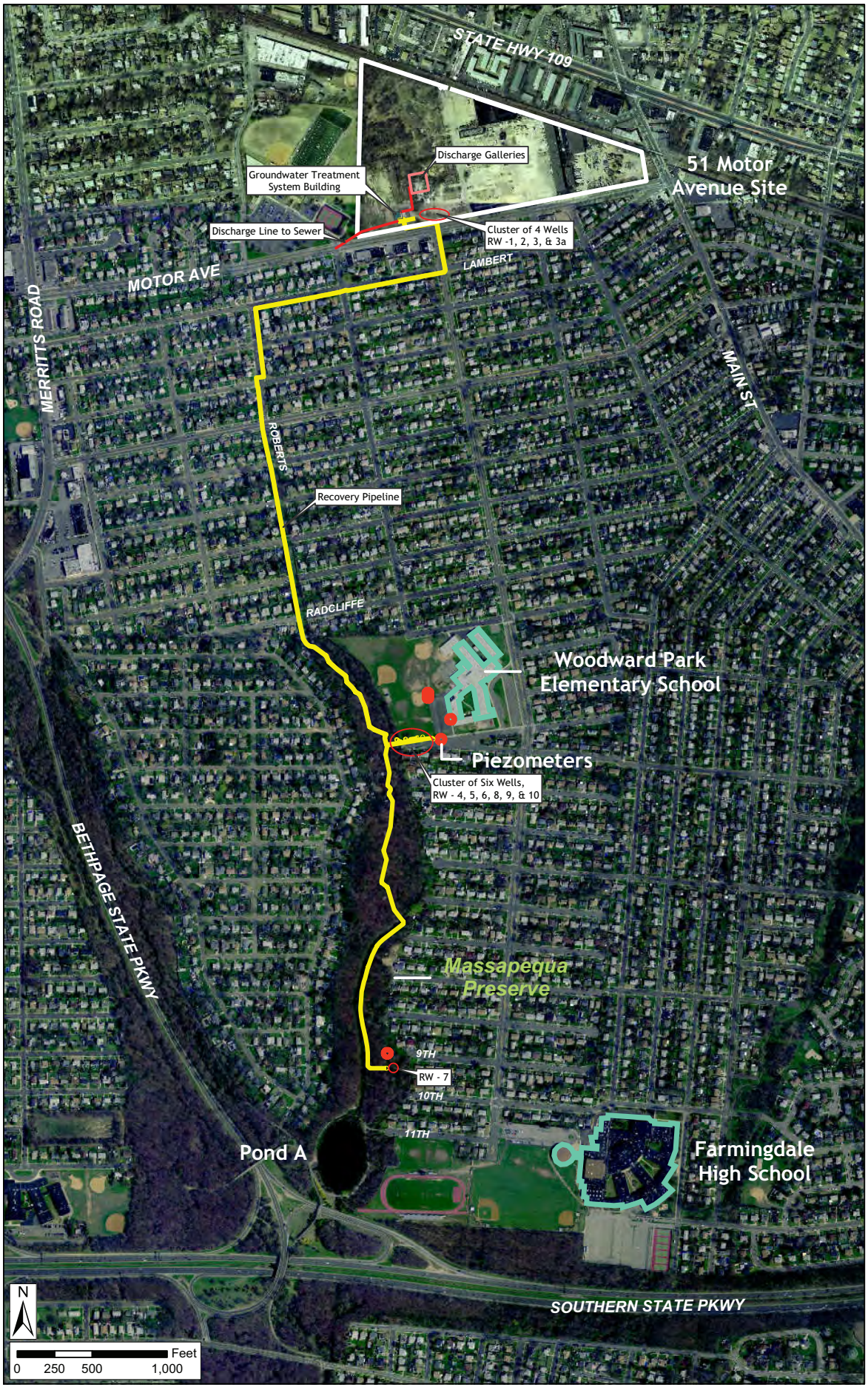


Figure 7 - Groundwater Remediation System's On-Site and Off-Site Construction Activities Layout

Legend

- Site
- Transect
- Roads

Figure 8

Farmingdale Plaza Cleaners Site Location Map

N

0 100 200 400 Feet

PREPARED FOR:
New York State Department of Environmental Conservation
Farmingdale Plaza Cleaners
Nassau County, New York

PREPARED BY:
YU & Associates, Inc.

DATE:	PROJECT NO.:
02/25/2009	08021
DRAWN BY:	CHECKED BY:
YZ	MG

overlook. If you pay for items
expenses you had in getting
aid to an attorney for a lease
local transportation expenses
roperty. You should keep a log

rimary purpose of the trip was
have a rental property at your
d the business portion and the
must have been related to the

ated over the useful life of the
t generally a repair keeps your
or substantially prolong its life.
replacing broken windows are
, or adapts it to new uses. This
This means the cost is spread
l property is spread over 27 ½

as passive activity limitations.
eduction may be reduced once
be eliminated if your modified
your modified adjusted gross

over losses in the year in which
on with an unrelated party.
les for vacation properties that
tion of your home and there are
ny questions please feel free to
ts of owning a rental will be.

1714

79402

U.S. Environmental Protection Agency Conducting First Five-Year Review of Implemented Actions at the Liberty Industrial Finishing Superfund Site, Farmingdale, Nassau County, New York

The U.S. Environmental Protection Agency (EPA) is currently conducting the first five-year review of the implemented actions at the Liberty Industrial Finishing Superfund Site, located in Farmingdale, Nassau County, New York. The purpose of this five-year review is to ensure that the remedy is functioning as intended and continues to be protective of public health and the environment. To conduct the five-year review, EPA will review site operation, maintenance, and monitoring information.

EPA welcomes public comment concerning this site, especially any concerns about the implemented remedy. Comments should be sent to the Remedial Project Manager identified below.

Once this five-year review is completed (anticipated this summer 2012), the results will be made available in the local site repository: Farmingdale Public Library, 116 Merritt Road, Farmingdale, New York 11735.

If you wish to submit comments, or if you have any questions about the Liberty Industrial Finishing Site or the five-year review process, please contact Mr. Lorenzo Thantu, Remedial Project Manager, at U.S. Environmental Protection Agency, 290 Broadway, 20th Floor, New York, NY 10007-1866, (212) 637-3966, or by email at thantu.lorenzo@epa.gov. You may also contact Cecilia Echols, Community Involvement Coordinator, at Intergovernmental and Community Affairs Branch, U.S. Environmental Protection Agency, 290 Broadway, 26th Floor, New York, NY 10007-1866, (212) 637-3678, or by email at echols.cecilia@epa.gov.

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Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: Liberty Industrial Finishing	**Date of inspection:** December 12, 2011
Location and Region: Farmingdale, NY	**EPA ID:** NYD000337295
Agency, office, or company leading the five-year review: USEPA-Region 2-ERRD/NYRB	**Weather/temperature:** Sunny and Cool in 40's

Remedy Includes: (Check all that apply)

Landfill cover/containment	Monitored natural attenuation
Access controls	Groundwater containment
XInstitutional controls	Vertical barrier walls
Groundwater pump and treatment	
Surface water collection and treatment	

Other Soil and sediment excavation and off-site disposal groundwater pump and treat

Attachments: Inspection team roster attached Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ _____ _____
   Name Title Date
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____
   _____

2. **O&M staff** _____ _____ _____
   Name Title Date
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____
   _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; Report attached _____

4. **Other interviews** (optional) Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - O&M manual — Readily available — Up to date — X N/A
   - As-built drawings — Readily available — Up to date — X N/A
   - *Maintenance logs* — *Readily available* — *Up to date* — X N/A

   Remarks

2. **Site-Specific Health and Safety Plan** — Readily available — Up to date — X N/A
   - Contingency plan/emergency response plan — Readily available — Up to date — X N/A

   Remarks

3. **O&M and OSHA Training Records** — Readily available — Up to date — X N/A

   Remarks

4. **Permits and Service Agreements**
   - Air discharge permit — Readily available — Up to date — X N/A
   - Effluent discharge — Readily available — Up to date — X N/A
   - Waste disposal, POTW — Readily available — Up to date — X N/A
   - Other permits _____ — Readily available — Up to date — X N/A

   Remarks

5. **Gas Generation Records** — Readily available — Up to date — X N/A

   Remarks

6. **Settlement Monument Records** — Readily available — Up to date — X N/A

   Remarks

7. **Groundwater Monitoring Records** — Readily available — Up to date — N/A

   Remarks All groundwater monitoring reports are submitted to EPA and kept on file by EPA

8. **Leachate Extraction Records** — Readily available — Up to date — X N/A

   Remarks

9. **Discharge Compliance Records**
   - Air — Readily available — Up to date — X N/A
   - Water (effluent) — Readily available — Up to date — X N/A

   Remarks

10. **Daily Access/Security Logs** — Readily available — Up to date — X N/A

    Remarks

IV. O&M COSTS N/A

1. **O&M Organization**
   State in-house Contractor for State
   PRP in-house Contractor for PRP
   Federal Facility in-house Contractor for Federal Facility
   Other _____

2. **O&M Cost Records**
   Readily available Up to date
   Funding mechanism/agreement in place
   Original O&M cost estimate _____ Breakdown attached

   Total annual cost by year for review period if available

   From _____ To _____ _____ Breakdown attached
   Date Date Total cost
   From _____ To _____ _____ Breakdown attached
   Date Date Total cost
   From _____ To _____ _____ Breakdown attached
   Date Date Total cost
   From _____ To _____ _____ Breakdown attached
   Date Date Total cost
   From _____ To _____ _____ Breakdown attached
   Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS X Applicable N/A

A. Fencing

1. **Fencing damaged** Location shown on site map Gates secured N/A
   Remarks Fencing around site property perimeter has high integrity

B. Other Access Restrictions

1. **Signs and other security measures** Location shown on site map N/A
   Remarks Site is all cleaned up and will soon in the future undergo park expansion development.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented — Yes — No — N/A
Site conditions imply ICs not being fully enforced — Yes — No — N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name — Title — Date — Phone no.

Reporting is up-to-date — X Yes — No — N/A
Reports are verified by the lead agency — X Yes — No — N/A

Specific requirements in deed or decision documents have been met — X Yes — No — N/A
Violations have been reported — Yes — No — N/A
Other problems or suggestions: Report attached

2. **Adequacy** — ICs are adequate — ICs are inadequate — N/A
Remarks The ICs have been implemented at the Liberty Site.

D. General

1. **Vandalism/trespassing** — Location shown on site map — X No vandalism evident
Remarks

2. **Land use changes on site** — N/A
Remarks

3. **Land use changes off site** — N/A
Remarks

VI. GENERAL SITE CONDITIONS

A. Roads — Applicable — N/A — Good Site all cleaned up ready for development

1. **Roads damaged** — Location shown on site map — Roads adequate — N/A
Remarks

B. Other Site Conditions

Remarks_____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS Applicable X N/A

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Cracks** Location shown on site map Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____
   _____

3. **Erosion** Location shown on site map Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Holes** Location shown on site map Holes not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

5. **Vegetative Cover** Grass Cover properly established No signs of stress
   Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____
   _____

6. **Alternative Cover (armored rock, concrete, etc.)** N/A
   Remarks_____
   _____

7. **Bulges** Location shown on site map Bulges not evident
   Areal extent_____ Height_____
   Remarks_____
   _____

8. **Wet Areas/Water Damage** Wet areas/water damage not evident
   - Wet areas — Location shown on site map — Areal extent_____
   - Ponding — Location shown on site map — Areal extent_____
   - Seeps — Location shown on site map — Areal extent_____
   - Soft subgrade — Location shown on site map — Areal extent_____

   Remarks_____

9. **Slope Instability** Slides — Location shown on site map — No evidence of slope instability
   Areal extent_____
   Remarks_____

B. Benches Applicable N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** — Location shown on site map — N/A or okay
   Remarks_____

2. **Bench Breached** — Location shown on site map — N/A or okay
   Remarks_____

3. **Bench Overtopped** — Location shown on site map — N/A or okay
   Remarks_____

C. Letdown Channels Applicable N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** — Location shown on site map — No evidence of settlement
   Areal extent_____ Depth_____
   Remarks_____

2. **Material Degradation** — Location shown on site map — No evidence of degradation
   Material type_____ Areal extent_____
   Remarks_____

3. **Erosion** — Location shown on site map — No evidence of erosion
   Areal extent_____ Depth_____
   Remarks_____

4. **Undercutting** Location shown on site map No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ No obstructions
Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations Applicable N/A

1. **Gas Vents** Active Passive
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance
N/A
Remarks_____

2. **Gas Monitoring Probes**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

4. **Leachate Extraction Wells**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____

5. **Settlement Monuments** Located Routinely surveyed N/A
Remarks_____

E. Gas Collection and Treatment Applicable N/A

1. **Gas Treatment Facilities**
   Flaring Thermal destruction Collection for reuse
   Good condition Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   Good condition Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   Good condition Needs Maintenance N/A
   Remarks_____

F. Cover Drainage Layer Applicable N/A

1. **Outlet Pipes Inspected** Functioning N/A
   Remarks_____

2. **Outlet Rock Inspected** Functioning N/A
   Remarks_____

G. Detention/Sedimentation Ponds Applicable N/A

1. **Siltation** Areal extent_____ Depth_____ N/A
   Siltation not evident
   Remarks_____

2. **Erosion** Areal extent_____ Depth_____
   Erosion not evident
   Remarks_____

3. **Outlet Works** Functioning N/A
   Remarks_____

4. **Dam** Functioning N/A
   Remarks_____

H. Retaining Walls Applicable N/A

1. **Deformations** Location shown on site map Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** Location shown on site map Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge Applicable N/A

1. **Siltation** Location shown on site map Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** Location shown on site map N/A
   Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** Location shown on site map Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** Functioning N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS Applicable X N/A

1. **Settlement** Location shown on site map Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   Performance not monitored
   Frequency_____ Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES X Applicable N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines Applicable N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   X Good condition All required wells properly operating Needs Maintenance N/A
   Remarks_____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   X Good condition Needs Maintenance
   Remarks_____

3. **Spare Parts and Equipment**
   X Readily available Good condition Requires upgrade Needs to be provided
   Remarks_____

B. Surface Water Collection Structures, Pumps, and Pipelines Applicable X N/A

1. **Collection Structures, Pumps, and Electrical**
   Good condition Needs Maintenance
   Remarks_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   Good condition Needs Maintenance
   Remarks_____

3. **Spare Parts and Equipment**
   Readily available Good condition Requires upgrade Needs to be provided
   Remarks_____

C. Treatment System X Applicable N/A

1. **Treatment Train** (Check components that apply)
   Metals removal Oil/water separation Bioremediation
   Air stripping X Carbon adsorbers
   *Filters*_____
   Additive (*e.g.*, chelation agent, flocculent)_____
   Others_____
   Good condition X Needs Maintenance
   Sampling ports properly marked and functional X
   Sampling/maintenance log displayed and up to date X
   Equipment properly identified X
   Quantity of groundwater treated annually 224,000,000 gallons based on 426gpm design flow rate
   Quantity of surface water treated annually N/A
   Remarks_____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   N/A X Good condition Needs Maintenance
   Remarks_____

3. **Tanks, Vaults, Storage Vessels**
   N/A X Good condition Proper secondary containment Needs Maintenance
   Remarks_____

4. **Discharge Structure and Appurtenances**
   N/A X Good condition Needs Maintenance
   Remarks_____

5. **Treatment Building(s)**
   N/A X Good condition (esp. roof and doorways) Needs repair
   Chemicals and equipment properly stored
   Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)
   X Properly secured/locked Functioning X Routinely sampled X Good condition
   X All required wells located Needs Maintenance N/A
   Remarks_____

D. Monitoring Data

1. Monitoring Data
   X Is routinely submitted on time X Is of acceptable quality

2. Monitoring data suggests:
   X Groundwater plume is effectively contained X Contaminant concentrations are declining

D. Monitored Natural Attenuation N/A

1. **Monitoring Wells** (natural attenuation remedy)
   Properly secured/locked Functioning Routinely sampled Good condition
   All required wells located Needs Maintenance N/A
   Remarks

X. OTHER REMEDIES N/A

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

-excavation and off-Site disposal of contaminated soils & removal of contaminated materials from USTs and subsurface features.
-conventional pump-and-treat system to address on-Site and off-Site groundwater contamination (designed as Plume A which is attributed to the Site), and
-excavation and off-Site disposal of Pond A sediments at Massapequa Preserve

The above remedy implemented is effective and functioning as designed.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

N/A

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.