

April 2013

SITE MANAGEMENT PLAN

**Coral Island Shopping Center
1650 Richmond Avenue
Staten Island, Richmond County, New York
NYSDEC BCP Number: C243033**

Prepared for:

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1.0 INTRODUCTION

This document is required for fulfillment of Remedial Action at the Coral Island Shopping Center, an approximately 3.9 acre property located at 1650 Richmond Avenue, Staten Island, Richmond County, New York (hereafter referred to as the “Site” or “Controlled Property”, Figure 1) under the New York State (“NYS”) Brownfield Cleanup Program (“BCP”) administered by New York State Department of Environmental Conservation (“NYSDEC”). The Site was remediated in accordance with the Brownfield Cleanup Agreement (“BCA”) Index #W2-1040-05-01, Site #C243033, which was issued March 2005.

WWP Associates, LLP (“WWP”) entered into a BCA with the NYSDEC to address an area of impacted soil and groundwater that resulted from historic releases associated with a dry cleaner at the Site. This BCA required WWP, to investigate and remediate contaminated media at the Site.

Following completion of the remedial work described in the Remedial Action Work Plan between August 20, 2007 and September 10, 2007, some contamination was left in the subsurface at this Site, which is hereafter referred to as ‘residual contamination.’ This Site Management Plan (“SMP”) was prepared to manage residual contamination at the Site in perpetuity or until extinguishment of the Environmental Easement in accordance with 6 NYCRR Part 375.

- This SMP defines Site-specific implementation procedures as required by the Environmental Easement. The penalty for failure to implement the SMP is revocation of the Certificate of Completion (“COC”).
- The Brownfield Cleanup Agreement (Index #W2-1040-05-01; Site #C243033) for the Site requires conformance with this SMP and, therefore, serves as a contractual, binding authority under which this SMP is to be implemented.

This Site Management Plan was prepared on behalf of WWP, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated December 25, 2002 and the guidelines provided by NYSDEC. This SMP addresses the means for implementation of Institutional Controls (“ICs”) and Engineering Controls (“ECs”), which are required by the Environmental Easement for the Site and includes an “Engineering and

Institutional Control Plan” found in Section 2.0, a “Monitoring Plan” found in Section 3.0, and a “Site Management Reporting Plan” found in Section 5.0.

Purpose

The Site contains residual contamination left after completion of the Remedial Action performed under the BCP. ECs have been incorporated into the Site remedy to provide proper management of residual contamination in the future to ensure protection of public health and the environment. A Site-specific Environmental Easement has been recorded with the Richmond County Clerk that provides an enforceable means to ensure the continued and proper management of residual contamination and protection of public health and the environment. It requires strict adherence to all Engineering Controls and all Institutional Controls placed on this Site by NYSDEC by the grantor of the Environmental Easement and any and all successors and assigns of the grantor. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP includes all methods necessary ensure compliance with all ECs and ICs required by the Environmental Easement for residual contamination at the Site. The SMP has been approved by the NYSDEC, and compliance with this Plan is required by the grantor of the Environmental Easement and grantor’s successors and assigns. This plan is subject to change by NYSDEC.

Site management is the last phase of the remedial process and is triggered by the approval of the Final Engineering Report and issuance of the Certificate of Completion (“COC”) by NYSDEC. The SMP continues in perpetuity or until extinguished in accordance with 6NYCRR Part 375. It is the responsibility of the Environmental Easement grantor, and its successors and assigns to ensure that all Site Management responsibilities under this plan are performed.

The SMP provides a detailed description of all procedures required to manage residual contamination at the Site following the completion of the Remedial Action in accordance with the NYS BCA with the NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain all treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management

Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation. To address these needs, this SMP includes four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC.

Site Management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. Important notes regarding this SMP are as follows:

- This SMP defines Site-specific implementation procedures as required by the Environmental Easement. The penalty for failure to implement the SMP is revocation of the COC.
- The Brownfield Cleanup Agreement (No. W2-1040-05-01 Site No. C243033) for the Site requires conformance with this SMP, and therefore, serves as a contractual binding authority under which this SMP is to be implemented. The BCP law itself also requires the preparation of a SMP (formerly known as an Operation, Maintenance, and Monitoring Plan) in ECL 27-1415 and 27-1419. Therefore, the BCA is a binding contract and the BCP law is statutory authority under which this SMP is required and is to be implemented.
- At the time this report was prepared, the SMP and all Site documents related to Remedial Investigation and Remedial Action are maintained at the NYSDEC Region 2 offices in Long Island City. At the time of SMP submission April, 2013, the Site documents can also be found in the repositories established for this project, including: New York Public Library, Todt Hill-Westerleigh Branch, 2550 Victory Boulevard, Staten Island, New York 10314.

1.1 Site Description

The “Site” is the Coral Island Shopping Center and is defined, for the purposes of the BCP, as the area within the limits of the property boundary as shown on Plate 1. The Site is located at 1650 Richmond Avenue, Staten Island, Richmond County, New York (Figure 1). Furthermore, the Site is defined as Block 2236, Lot 125, at latitude 40° 36’ 27” north and longitude 74° 9’ 47” west. The Coral Island Shopping Center consists of two single story buildings, each with multiple tenants and a parking lot (Plate 1). The building at the north end of the Site

includes the Charming Cleaners (“Dry Cleaner”), the focus of the remediation. The areas of contamination exceeding unrestricted use soil cleanup objectives (“SCO”) are located under the parking lot, behind the southern building, and behind the Dry Cleaner. The latter is gravel covered (over landscaping fabric) and is approximately 15 feet wide, with the building to the south and a chain link fence on the property line to the north.

The boundary of the Site is shown on Plate 1. A metes and bounds description is included as Appendix A.

1.2 Site History

A complete description of the Site’s history, Remedial Investigation findings, and Remedial Action is presented in the following documents:

- *Remedial Investigation Work Plan*, April 18, 2005. Roux Associates, Inc.
- *Remedial Investigation Report*, February 23, 2007. Roux Associates, Inc.
- *Alternatives Analysis Report/ Remedial Action Work Plan*, August 16, 2007. Remedial Engineering, P.C.
- *Final Engineering Report*, February 2008. Remedial Engineering, P.C.

Electronic copies of these documents are presented in Appendix B. In addition, at the time this SMP was prepared, all Site documents related to Remedial Investigation and Remedial Action are maintained at the NYSDEC Region 2 offices in Long Island City and the local repository at the New York Public Library, Todt Hill-Westerleigh Branch, 2550 Victory Boulevard, Staten Island, New York 10314.

As part of the RI, Roux Associates conducted a search for records in the Staten Island Department of Buildings, as well as with the current owner of the shopping center. Based on those searches and a review of historical reports, it was determined that dry cleaning operations at the Site commenced in 1975. All dry cleaning operations were performed in the same tenant space since 1975, and no other occupants of any building at the Site that would potentially use PCEs were identified. Since 1975, there have been four operators of the Dry Cleaners at the Site. Ilio-Umberto Cleaning & Tailoring, Inc. operated the facility from 1975 to 1986. DFG Dry

Cleaning Corp., doing business as (d/b/a) Coral Lanes Cleaners, began operation in 1986. Operation of the facility transitioned to Chim Bok Chung d/b/a Charming French Cleaners between 1986 and 1993 (the exact date is unknown). In 1993, the current operator, Guyon Cleaners, Inc. d/b/a Charming Cleaners, assumed operation of the facility.

A 1994 “Hazardous Substances Survey and Report” prepared by MTS EnviroSurv reported that a majority of cleaning activities conducted by Charming Cleaners were performed offsite. In addition, MTS EnviroSurv was able to review waste manifests for verification of removal of PCE waste by Safety Kleen. There were no floor drains observed in the Dry Cleaner space during the 1991 inspection by MTS EnviroSurv. The current dry cleaning tenant, Charming Cleaners, operates fourth generation self-enclosed units, as reported in the June 17, 2004 “Phase I Environmental Site Assessment Report” (“Phase I ESA”) and in the facility audit conducted as part of RI. These units were installed at the facility after 2000. There were no floor drains observed in the Dry Cleaner space during the 2004 inspection by EBI Consultants (“EBI”) or during the RI. Waste handling manifests dating back to 2000 were reviewed by EBI as part of the Phase I ESA and to January 2007 by Roux Associates. A Compliance Audit of the facility dated February 23, 2007 was included as an appendix to the RI Report.

1.3 Sanborn Maps

Sanborn Fire Insurance Maps reviewed by EBI, as presented in the Phase I ESA, indicated that a house was located on the Site in 1917 and that between 1937 and 1950, the Site appeared vacant. Building Department records indicate that the property was used as a parking lot as early as 1949 and a bowling alley was constructed on the Site sometime between 1955 and 1958. In 1958, two pipeline easements (one liquefied natural gas and one jet fuel) were granted that cross the Site in a west to east direction approximately 30 feet south of the building. These pipelines currently exist on the Site.

In 1974, the bowling alley was converted into a strip mall-type shopping center. The building was expanded in 1995 to its current configuration (Plate 1). A separate building was constructed in the southern portion of the Site, also in 1995 (Plate 1).

1.4 Geological Conditions

The Site is located in the Embayed section of the Coastal Plain physiogeographic province. The province is characterized by areas of low relief and consists of unconsolidated Cretaceous Coastal Plain sediments overlying igneous and metamorphic bedrock.

1.4.1 Lithology

Based on a review of the RI results, the area of the Site immediately behind and beneath the Dry Cleaner (i.e., the source area) is underlain by the following generalized layers:

- A one-inch thick surface course of gravel underlain by landscaping fabric.
- Fill: Ranging from two to four-feet thick and described as a brown coarse to fine sand with brick, glass, concrete and wood fragments.
- Sand and Silt: Two to six-foot thick layer of grey to brown, coarse to fine sand and silt, with occasional variable amounts of gravel. For clarification purposes in the discussion below, this layer will be referred to as the sand layer.
- Silt: Eight to 13-foot thick layer of brown silt with some gravel and little fine sand.
- Silt and Clay: Brown silt and clay, greater than 12 feet thick, immediately beneath the Dry Cleaner.

The sand layer ranges from two to 6.5 feet in thickness beneath most of the Site, with the exception of the western portion. In the vicinity of Well Cluster MW-103S/D beneath the western portion of the Site, the sand layer dips down and increases in thickness to approximately 15 feet, and is overlain by a four-foot thick zone of primarily silt with a one-foot thick embedded sand and silt layer. The shallow silt zone was observed to the west at the MW-104S/D cluster, where it is approximately three feet thick. In the vicinity of Well Cluster MW-108S/D in the eastern portion of the Site, the sand layer is also overlain by a two-foot thick silt layer.

The eight to 13 foot-thick layer consisting of primarily silt beneath the sand layer was also identified beneath most of the Site, with the exception of the western portion, where it pinches out or grades to the coarser sand and silt layer in the vicinity of Well Cluster MW-103S/D. Deep wells screened in this silt layer beneath the Dry Cleaner (MW-101D and MW-102D) indicated impacts by VOCs.

Beneath the silt layer is a finer-grained silt and clay to clay layer. The silt and clay layer is thickest beneath the source area in the vicinity of Well Cluster MW-101S/D, where it is over 12 feet thick. Note that the bottom of the silt and clay layer was not encountered in the boring for Well Cluster MW-101S/D. The silt and clay layer decreases in thickness toward the east and west away from beneath the source area. Toward the east at MW-108S/D, the silt and clay layer is only approximately two feet thick. Toward the west at Well Cluster MW-103S/D, only a 1.5-foot thick clay layer is present. The clay layer increases again in thickness further toward the west at Well Cluster MW-104S/D, where it is over three feet thick. Note that the bottom of the clay layer at MW-104S/D was not encountered.

A sand and silt layer was observed beneath the silt and clay layer at the borings for SB-1, MW-103S/D, and MW-108S/D. The thickness of this layer is unknown and it represents the lowest unit observed at the Site.

1.5 Remedial Investigation Findings

The following is a summary of the Remedial Investigation Findings.

1.5.1 Air

Indoor air sampling in the adjacent Church and School indicated that all but one detection of tetrachloroethene (“PCE”) in indoor air were below the outdoor ambient air concentrations collected concurrently with each sampling event. Confirmation sampling suggested that the one PCE detection was an anomalous sampling event. Based on NYSDOH guidance, the concentrations of trichloroethene (“TCE”) in one indoor air sample required that, “reasonable and practical measures should be taken to identify the sources and reduce the exposure.” The remedial actions described below included those reasonable and practical measures.

1.5.2 Soil

The results of the investigation indicated that shallow soil (i.e., less than five feet deep) in the immediate vicinity of the back of the Dry Cleaner is impacted by concentrations of PCE above 6 NYCRR Subpart 375-6 Restricted Commercial SCOs. Shallow soils impacted by high concentrations of PCE were also observed in a small area immediately north of the Site on Church property.

1.5.3 Groundwater

Associated with the impacted soil is a plume of relatively high concentrations of dissolved VOCs in the underlying groundwater. The plume extends offsite toward the west-northwest beneath Church and School properties. The maximum down gradient extent of the plume is approximately 260 feet. The VOCs detected in groundwater include PCE and high concentrations of associated degradation products: TCE, cis- and trans-1,2-dichloroethene (“DCE”), and vinyl chloride. The presence of significant concentrations of degradation products indicates that natural biodegradation of the VOCs in the plume is occurring.

1.6 Summary of Remedial Action

Below is a description of the Remedial Action as described in the NYSDEC-approved Remedial Action Work Plan.

1. Onsite soils impacted with PCE and degradation products were excavated from four areas and disposed of offsite. At each area, the upper two to five feet of fill was excavated. Post-excavation samples were collected and additional excavation was conducted until Restricted Commercial Use SCOs were met or to the extent feasible based on the water table and lateral limitations of underground utilities, building foundations, and a nearby transformer. Excavations were backfilled with clean soil that meets 6 NYCRR Subpart 375-6 Track 1 Unrestricted Use SCOs.
2. Offsite soils impacted with PCE and degradation products were excavated from one area and disposed of offsite. Initially, the upper five feet of soil was excavated. Post-excavation samples were collected and additional excavation was conducted until Unrestricted Use SCOs were met. Excavations were backfilled with clean soil that meets 6 NYCRR Subpart 375-6 Track 1 Unrestricted Use SCOs.
3. Prior to backfilling, Enhanced Reductive Dechlorination (“ERD”) substrates were applied to the bottom of the open onsite and offsite excavations created during the removal of impacted soils.
4. One round of offsite ERD injections were conducted in the area of the leading edge of the 10,000 microgram per liter total volatile organic compound. The ERD substrate was injected every five feet as a row of injections. The depth of ERD injection was extend from approximately 4 ft to 8 feet bls into the groundwater (depth to groundwater is approximately 4 feet bls).
5. To assess the performance of the ERD injections, periodic groundwater monitoring will be conducted.

1.6.1 Engineering and Institutional Controls

Since contaminated soil groundwater and soil vapor remain beneath the Site, Engineering and Institutional Controls (ECs and ICs) are required to protect human health and the environment. Long-term management of EC/ICs and of residual contamination will be executed under this Site specific Site Management Plan (“SMP”).

The Controlled Property has two primary Engineering Controls as follows:

- Composite Cover System; and
- Monitored Enhanced Natural Attenuation.

A series of Institutional Controls are required to implement, maintain and monitor this Engineering Control. The Environmental Easement requires compliance with these Institutional Controls. These Institutional Controls consist of the following:

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

The Controlled Property has a series of Institutional Controls in the form of Site restrictions. Adherence to these Institutional Controls is required under the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- The Controlled Property may be used for restricted commercial use only, provided the long-term Engineering and Institutional Controls included in this SMP remain in use.

- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for the intended use.

These EC/ICs should:

- prevent ingestion of groundwater with contamination levels that exceed drinking water standards;
- prevent contact with or inhalation of volatiles from contaminated groundwater;
- restore groundwater to pre-disposal/pre-release conditions, to the extent practicable; and
- prevent contaminated groundwater from migrating off-site.

2.0 ENGINEERING AND INSTITUTIONAL CONTROL PLAN

Remedial activities completed at the Site were conducted in accordance with the NYSDEC-approved Remedial Action Work Plan (“RAWP”) dated August 16, 2007. The remedial goals included attainment of Track 4 Soil Cleanup Objectives (“SCOs”) for on-site soils for restricted commercial use and Track 1 SCOs for off-site soils.

Since residual contaminated soil and groundwater exists beneath a portion of the Site, Engineering Controls and Institutional Controls (“EC/ICs”) are required to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of all EC/ICs at the Site.

The purpose of this Plan is to provide:

- a description of all EC/ICs on the Site;
- the basic operation and intended role of each implemented EC/IC;
- a description of the key components of the ICs created as stated in the Environmental Easement;
- a description of the features that should be evaluated during each annual inspection and compliance certification period;
- a description of plans and procedures to be followed for implementation of EC/ICs, such as the implementation of the Soil Management Plan for the safe handling of residual contamination that may be disturbed during maintenance or redevelopment work on the Site; and
- any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the Site remedy, as determined by the NYSDEC.

2.1 Engineering Control (“EC”) Components

The ECs include: (1) a composite cover system and, (2) monitoring enhanced natural attenuation of groundwater on and off the Site.

2.1.1 Composite Cover System

Exposure to residual contaminated soil/fill exceeding restricted commercial use SCOs at the Site will be prevented by a cover. The current cover system is comprised of asphalt, building foundations, landscaped areas, and gravel covered landscaped areas. A Soil Management Plan

that outlines the procedures required in the event the composite cover system and underlying residual contamination are disturbed is presented as Appendix C. The monitoring and maintenance of this cover are provided in the Monitoring Plan included in Section 3 of this SMP. A figure showing the location and cross section of each cover system component is presented as Plate 3.

2.1.2 Monitored Enhanced Natural Attenuation

Groundwater monitoring activities to assess natural attenuation will continue, as determined by NYSDOH and NYSDEC, until residual groundwater concentrations are found to be below NYSDEC standards or have become asymptotic over an extended period. Monitoring will continue until permission to discontinue is granted in writing by NYSDEC and NYSDOH. The monitoring activities are outlined in the Monitoring Plan included in Section 3 of this SMP.

2.2 Institutional Controls (“ICs”) Components

The ICs are required under the RAWP to: (1) implement, maintain and monitor EC systems; (2) prevent future exposure to residual contamination by controlling disturbances of the subsurface contamination; and, (3) restrict the use of the Site to restricted commercial uses only. Adherence to these ICs on the Site is required under the Environmental Easement and will be implemented under this SMP. A copy of the Environmental Easement is presented as Appendix D.

The following are the ICs for the Site:

1. The Grantor and the Grantor’s successors must comply with the Environmental Easement and with all elements of this SMP.
2. All ECs must be operated and maintained as specified in this SMP (Section 3.0).
3. All ECs on the Site must be inspected and certified at a frequency and in a manner defined in the SMP (Section 5.0).
4. Groundwater, and other environmental or public health monitoring must be performed as defined in this SMP (Section 3.0).
5. On-Site environmental monitoring devices, including but not limited to, groundwater monitor wells must be protected and replaced as necessary to ensure continued functioning in the manner specified in this SMP.

6. ECs may not be discontinued without an amendment or the extinguishment of the Environmental Easement for the Site.
7. The following Site Restrictions apply to the Site:
 - Use of groundwater underlying the Site is prohibited without treatment rendering it safe for the intended use.
 - Vegetable gardens and farming on the Site are prohibited.
 - All future activities on the Site that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in this SMP (Appendix C).
 - The Site may be used for restricted commercial use only provided the long-term EC/ICs included in the SMP remain in use. The Site may not be used for a higher level of use, such as restricted residential use without an amendment or the extinguishment of this Environmental Easement.
 - Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Site at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable.

2.3 Objectives of Site EC/ICs

The objectives of the Site EC/IC are to:

- prevent ingestion of groundwater with contamination levels that exceed drinking water standards;
- prevent contact with or inhalation of volatiles from contaminated groundwater;
- restore groundwater to pre-disposal/pre-release conditions, to the extent practicable;
- prevent the discharge of contaminants to surface water; and
- prevent ingestion/direct contact with contaminated soil.

3.0 MONITORING PLAN

The Monitoring Plan describes the measures for evaluating the performance and effectiveness of the implemented ECs in reducing or mitigating contamination at the Site.

Monitoring of the performance of the remedy and overall reduction in contamination on-site (and off-site) was conducted on a quarterly basis for two years after the remedy was implemented through excavation and treatment in September 2007 and periodically thereafter until March 2013 when it was revised as described in greater detail below. Frequency of the groundwater monitoring will be determined by NYSDEC based upon trends in contaminant levels in groundwater in the affected areas and an assessment whether the remedy continues to be effective in achieving remedial goals. Monitoring programs are summarized in the embedded table below and outlined in detail in Sections 3.1 and 3.2.

Monitoring / Inspection Schedule

Monitoring Program	Frequency	Matrix	Analysis
Composite Cover System	Annually	—	None
Groundwater	Semiannual	Groundwater	VOCs

3.1 Engineering Control System Monitoring

3.1.1 Cover Monitoring

Several covers exist on the Site that include landscaped areas, gravel covered landscaped areas, asphalt, and building foundations. These covers limit exposure to residual contaminated soil/fill. The gravel covered landscaped areas consist of approximately two inches of gravel over a landscape fabric. A figure showing the location and cross section of each cover system is presented as Plate 3.

The composite cover system is a permanent control and the existence, quality, and integrity of this system will be inspected annually in perpetuity as described in the Reporting Plan included in Section 5 of this SMP.

3.1.2 Monitored Enhanced Natural Attenuation

As described in the Remedial Action Work Plan, natural attenuation monitoring for groundwater was performed on a quarterly basis for two years following the September 2007 excavation of the source material and application of ERD (from December 2007 to September 2009) to assess the performance of the remedy.

A network of monitoring wells has been installed to monitor both up-gradient and down-gradient groundwater conditions at the Site. The locations of on-site and off-site wells, ERD injection locations, and the groundwater flow direction are shown on Plate 2. An isoconcentration map is presented as Plate 4. Monitoring well construction logs are presented in Appendix E.

As described in the Remedial Action Work Plan, quarterly performance monitoring samples were collected from monitoring wells MW-101S, MW-101D, MW-103S, MW-103D, MW-113S, MW-113D, MW-205S, MW-205D, MW-206S, MW-206D, MW-207S, and MW-207D using low flow purging and sampling procedures during each sampling event.

After the initial two year quarterly sampling program was completed, WWP collected groundwater samples from various monitoring wells at varying intervals in support of a proposed long-term sampling frequency and monitoring well network. The NYSDEC approved a long-term monitoring plan in March 2013 that includes collecting samples from monitoring wells MW-101S, MW-103D, MW-106D, MW-107D, MW-112D and MW-205D on a semiannual basis, and from monitoring wells MW-101D, MW-108D, MW-113D, MW-203D, MW-206D, and MW-207D on an annual basis.

Prior to sample and data collection, the monitoring wells will be gauged and then purged via low-flow means using a submersible or peristaltic pump. Samples and parameter readings will be collected using a flow-through cell to prevent sample contact with atmospheric air. All well sampling activities will be recorded in a field book and a groundwater-sampling log presented. Other observations (e.g., well integrity, etc.) will be noted on the well sampling log. The well sampling log will serve as the inspection form for the groundwater monitoring well network.

All sampling and analyses will be performed in accordance with the requirements of the Quality Assurance Project Plan (“QAPP”) prepared for the Site (Appendix F). Groundwater monitoring data will be submitted following each sampling event and will be incorporated into the annual Site Management Report as discussed in Section 5.0.

The necessity for additional ERD injection will be evaluated based on a review of the groundwater analytical data presented in the annual Site Management Report. Should the NYSDEC require additional ERD injection, approximately five gallons of ERD (blackstrap molasses) will be mixed with approximately 20 gallons of water in a holding tank and then pumped under low pressure to injection points. The number and location of injection points will be determined based on the evaluation of groundwater analytical data presented in the annual Site Management Report. The network of monitoring wells and sampling frequency required following ERD injection will be determined by the NYSDEC based on the specific conditions of the data presented in the annual Site Management Report. Groundwater sampling will follow the standard sampling protocols defined above (VOCs from all monitoring wells and TOC from select monitoring wells).

In addition, should supplemental ERD injection(s) occur, baseline and post-injection soil vapor sampling will be conducted to assess the potential for degradation byproduct and end product generation as a result of ERD injection. For each event, a soil vapor sample will be collected from soil vapor points near ERD injection locations. An outdoor ambient air sample will also be collected. Soil vapor samples will be analyzed for VOCs and methane. The post-injection sampling round will be collected approximately one month following ERD injections.

3.2 Groundwater Monitoring Well Maintenance

If biofouling or silt accumulation has occurred in the on-site and/or off-site monitoring wells, as determined by significant changes in well production or depth to bottom measurements, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced in kind, if an event renders the wells unusable. Well decommissioning, for the purpose of replacement, should be reported to NYSDEC prior to performance and in the annual report. Well decommissioning without replacement in kind must receive prior approval by NYSDEC. Well abandonment will be performed in accordance with

NYSDEC's "Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be reinstalled in the nearest available location, unless otherwise approved by the NYSDEC and NYSDOH.

3.3 Inspections

Inspections of all systems installed on the Site will be conducted at the frequency specified in SMP Monitoring Plan schedule. A comprehensive Site inspection will be conducted annually. Site-wide inspection should also be performed after all severe weather conditions that may affect Engineering Controls or monitoring devices. During these inspections, an inspection form will be completed (Appendix G). The form will compile sufficient information to assess the following:

- compliance with all ICs, including Site usage;
- an evaluation of the condition and continued effectiveness of ECs;
- general Site conditions at the time of the inspection;
- the Site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection;
- confirm that any Site records are up to date; and
- changes, or needed changes, to the remedial or monitoring system.

Inspections will be conducted in accordance with the procedures set forth in the Monitoring Plan of this SMP (Section 3). The reporting requirements are outlined in the Site Management Reporting Plan (Section 5).

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the Site will be conducted to verify the effectiveness of the EC/ICs implemented at the Site by a qualified environmental professional as determined by NYSDEC.

3.4 Monitoring Reporting Requirements

Forms and any other information generated during regular monitoring events and inspections will be kept on file. All forms, and other relevant reporting formats used during the monitoring/inspection events, will be (1) subject to approval by the NYSDEC and (2) submitted

at the time of the annual Site Management Report, as specified in the Reporting Plan of the SMP. A report or letter will be prepared for submission, subsequent to each groundwater sampling event and submitted to the NYSDEC within 30 days of the receipt of the laboratory data. The report (or letter) will include, at a minimum:

- date of event;
- personnel conducting sampling;
- description of the activities performed;
- type of samples collected (e.g., groundwater, outdoor air, etc);
- copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- sampling results in comparison to appropriate standards/criteria;
- a figure illustrating sample type and sampling locations;
- copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (also to be submitted electronically in the NYSDEC-identified format);
- a copy of the laboratory certification;
- any observations, conclusions, or recommendations; and
- a determination as to whether plume conditions have changed since the last reporting event.

Data will be reported in hard copy or digital format as determined by NYSDEC. A summary of the monitoring program deliverables are summarized in the table below.

Monitoring / Inspection Deliverables

Task	Frequency	Semiannual Reporting Requirement	Annual Reporting Requirement
Groundwater Monitoring	Semiannually	Yes	Yes
Site Inspection	Annually	No	Yes

A summary of all monitoring data collected during the year will be reported to NYSDEC on an annual basis in the Periodic Review Report. The Periodic Review Report will be submitted to NYSDEC on a calendar year basis and must be submitted by March 1 of the following year. Further information on the reporting requirements is outlined in the Reporting Plan of the SMP.

3.5 Notifications

The following information is presented as an Electronic Database in Appendix B in an electronic database format:

- a Site summary;
- the name of the current Site owner and/or the remedial party implementing the SMP for the Site;
- the location of the Site;
- the current status of Site remedial activity;
- a copy of the Environmental Easement; and
- a contact name and phone number of a person knowledgeable about the Environmental Easement's requirements, in order for NYSDEC to obtain additional information, as necessary.

This information should be: 1) modified as conditions change; (2) revised in Appendix B of this document; and, (3) submitted to NYSDEC in the Annual Site Monitoring Report. Should the Environmental Easement be modified or terminated, the copy of the revised Environmental Easement will also be updated in this manner.

3.5.1 Non-Routine Notifications

Non-routine notifications are to be submitted by the property owner(s) to the NYSDEC on an as-needed basis for the following reasons:

- 60-day advance notice of any proposed changes in Site use that are consistent with the terms of the Brownfield Cleanup Agreement;
- 10-day advance notice of any proposed Site ground-intrusive activities;
- notice within 48-hours of any damage or defect to the foundation structures in the Site that reduces or has the potential to reduce the effectiveness of other Engineering Controls and likewise any action taken to mitigate the damage or defect; and

- notice within 48-hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the Site, including a summary of action taken and the impact to the environment and the public.

Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

3.6 Certification

Site inspections and sampling activities will take place as outlined above. Frequency of inspection is subject to change by NYSDEC. Inspection certification for all ICs and ECs will be submitted to NYSDEC on a calendar year basis and must be submitted by March 1 of the following year. A qualified environmental professional, as determined by NYSDEC, will perform inspection and certification. Further information on the certification requirements are outlined in the Reporting Plan of the SMP.

4.0 OPERATION AND MAINTENANCE PLAN

The Operation and Maintenance Plan describes the measures necessary to operate and maintain any components of the remedy selected for the Site. This Operation and Maintenance Plan includes groundwater monitoring well maintenance.

4.1 Groundwater Monitoring Well Maintenance

As described in Section 3, if biofouling or silt accumulation has occurred in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced in kind, if an event renders the wells unusable.

4.2 Maintenance Reporting Requirements

Maintenance reports and any other information generated during regular operations at the Site will be kept on file. All reports, forms, and other relevant information generated will be available upon request to the NYSDEC and submitted as part of the Annual Periodic Review Report, as specified in the Section 5 of this SMP.

5.0 SITE MANAGEMENT REPORTING PLAN

A comprehensive Site-wide inspection will be conducted annually. The inspections will determine and document the following:

The form will compile sufficient information to assess the following:

- compliance with all ICs, including Site usage;
- an evaluation of the condition and continued effectiveness of ECs;
- general Site conditions at the time of the inspection;
- the Site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection;
- confirm that any Site records are up to date; and
- changes, or needed changes, to the remedial or monitoring system.

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the Site will be conducted to verify the effectiveness of the EC/ICs implemented at the Site by a qualified environmental professional as determined by NYSDEC.

In case of an emergency, the site owner, WWP, can be contacted at (919) 846-4046 and the NYSDEC can be contacted at (718) 482-4897.

5.1 Reporting

An annual Periodic Review Report will be submitted to NYSDEC following the reporting period, by March 1 of the calendar year. Groundwater monitoring reports will be submitted following sample collection. Those results will also be incorporated into the annual Periodic Review Report. The Periodic Review Report will be prepared in accordance with Section 6 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation requirements. This Site Management Reporting Plan and its requirements are subject to revision by NYSDEC, will include the following:

- identification of all required EC/ICs required by the RAWP for the Site;
- an evaluation of the Engineering and Institutional Control Plan and the Monitoring Plan for adequacy in meeting remedial goals;
- assessment of the continued effectiveness of all IC/ECs for the Site;

- certification of the EC/ICs;
- results of the required periodic Site Inspections;
- all deliverables generated during the reporting period;
- all applicable inspection forms and other records generated for the Site during the reporting period;
- cumulative data summary tables and/or graphical representations of contaminants of concern by media (groundwater) which include a listing of all compounds analyzed along with the applicable standards, with all exceedances highlighted;
- results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables required for all points sampled during the calendar year (also to be submitted electronically in the NYSDEC-specified format);
- a Site evaluation, which will address the following:
 - the compliance of the remedy with the requirements of the Site-specific RAWP and FER;
 - the performance and effectiveness of the remedy;
 - the operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
 - any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored; and
 - recommendations regarding any necessary changes to the remedy and/or Monitoring Plan.
- a figure showing sampling and well locations, and significant analytical values at sampling locations; and
- comments, conclusions, and recommendations, based on an evaluation of the information included in the report, regarding EC/ICs at the Site.

The Periodic Review Report will be submitted, in hard-copy format, to the Region 2 NYSDEC offices, located at 41-40 21st Street, Long Island City, New York, and in electronic format to NYSDEC and NYSDOH.

5.2 Certification of EC/ICs

A Professional Engineer licensed to practice in New York State will sign and certify in the Annual Periodic Review Report that:

- On-Site EC/ICs are unchanged from the previous certification.
- The EC/ICs remain in place and effective.
- Nothing has occurred that would impair the ability of the controls to protect the public health and environment.
- Access is available to the Site by NYSDEC and NYSDOH to evaluate continued maintenance of the EC/ICs.
- Site usage is compliant with the environmental easement.

5.3 Non-Routine Notifications

Non-routine notifications are to be submitted by the property owner(s) to the NYSDEC on an as-needed basis for the following reasons:

- 60-day advance notice of any proposed changes in Site use that are consistent with the terms of the Brownfield Cleanup Agreement.
- 10-day advance notice of any proposed ground-intrusive activities in the Site.
- Notice within 48-hours of any damage or defect to the foundation structures in the Site that reduces or has the potential to reduce the effectiveness of other ECs and likewise any action taken to mitigate the damage or defect.
- Notice within 48-hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, including a summary of action taken and the impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

5.4 NYSDEC-Acceptable Electronic Database

The following information is presented in Appendix A in an electronic database format:

- a Site summary;
- the name of the current Site owner and/or the remedial party implementing the SMP for the Site;
- the location of the Site;

- the current status of Site remedial activity;
- a copy of the Environmental Easement; and
- a contact name and phone number of a person knowledgeable about the Environmental Easement's requirements, in order for NYSDEC to obtain additional information, as necessary.

This information should be: 1) modified as conditions change; 2) revised in Appendix A of this document; and 3) submitted to NYSDEC in the annual Periodic Review Report. Should the Environmental Easement be modified or terminated, the copy of the revised Environmental Easement will also be updated in this manner.