Orangeburg Commons Site

ROCKLAND COUNTY, NEW YORK

Final Engineering Report

NYSDEC Site Number: C344073

Prepared for:

FB Orangetown, LLC
c/o RD Management Corporation
810 Seventh Avenue, 28th Floor
New York, New York 10019

Prepared by:

Landmark Consultants Corporation
528 Leonard Street
Brooklyn, New York 11222
(718) 383-6800

OCTOBER 2013

CERTIFICATIONS

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

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

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

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

I certify that any financial assurance mechanisms required by the Department pursuant to Environmental Conservation Law have been executed.

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

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

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, Richard Zaloum, of Landmark Consultants Corporation, am certifying as Owner's Designated Site Representative and I

have been authorized and designated by all site owners to sign this certification for the site.

NYS Professional Engineer #	Date	Signature

Note: include PE stamp

TABLE OF CONTENTS

LIST OF ACRONYMS

Acronym	Definition
µg/Kg	micrograms per kilogram
µg/L	micrograms per liter
µg/m^3	micrograms per cubic meter
AOC	Area of Concern
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	below ground surface
BMS	Building Management System
BTEX	benzene, toluene, ethylbenzene, and xylenes
C/D	construction and demolition
CAMP	Community Air Monitoring Plan
COC	Certificate of Completion
COCs	contaminants of concern
DCR	Declaration of Covenants and Restrictions
DER	Division of Environmental Remediation
DO	dissolved oxygen
DPI	differential pressure indicator
DSHM	Division of Solid and Hazardous Materials
DUSR	Data Usability Summary Report
EC	Engineering Control
ESA	Environmental Site Assessment
FER	Final Engineering Report
Ft	feet
HASP	Health and Safety Plan
IC	Institutional Control
MGP	Manufactured Gas Plant
ml/min	milliliters per minute
MTA	Metropolitan Transportation Authority
NYCDEP	New York City Department of Environmental Protection
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation

FINAL ENGINEERING REPORT

1.0 BACKGROUND AND SITE DESCRIPTION

FB Orangetown, LLC ("FB") and the New York State Department of Environmental Conservation ("NYSDEC") entered into a Brownfield Cleanup Agreement (the "BCA") on November 7, 2011, pursuant to which FB agreed to remediate a 15.8-acre property known as Orangeburg Commons located in Orangeburg, Rockland County, New York (the "Site"). In accordance with the BCA, the Site is to be remediated to commercial use standards and will be used for a mixed use commercial development including; a Stop and Shop store, extended stay hotels, and restaurants or other retail establishments. The Site has been remediated in accordance with the BCA and the NYSDEC-approved Remedial Action Workplan dated May 18, 2012 prepared by AKRF Engineering, P.C. (the "RAW").

The Site is located in the County of Rockland, New York and is identified as a portion of Block 754 and Lot 74.15-1-21 on the Rockland County Tax Map # 74.15. The Site is situated on an approximately 15.8-acre area bounded by Stevens Way followed by a Lowe's Home Improvement Store to the north, the Palisades Interstate Parkway to the south, New York State Route 303 and commercial properties to the east, and Greenbush Road followed by a vacant lot and then railroad tracks to the west (see Figure 1). The boundaries of the Site are fully described in Appendix A: Survey Map, Metes and Bounds.

In April 2013, a Construction Completeness Report (the "CCR") was submitted for portion of the Site prior to completion of all remediation activities pursuant to the RAW. This Final Engineering Report (FER) incorporates the CCR and provides the results of all site remediation efforts performed pursuant to the RAW for the entire Site.

An electronic copy of this FER with all supporting documentation is included as Appendix B.

2.0 SUMMARY OF SITE REMEDY

2.1 REMEDIAL ACTION OBJECTIVES

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) were identified for the Site.

2.1.1 Groundwater RAOs

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.
- Prevent inhalation of, or exposure to contaminants volatilizing from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer, to the extent practicable, to pre-disposal/pre-release conditions.
- Prevent the discharge of contaminants to surface water.
- Remove the source of ground or surface water contamination.

2.1.2 Soil RAOs

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

- Prevent impacts to biota due to ingestion/direct contact with contaminated soil that would cause toxicity or bioaccumulation through the terrestrial food chain.

2.2 DESCRIPTION OF SELECTED REMEDY

The Site has been remediated in accordance with the remedy selected in accordance with the RAW dated May 2012.

The factors considered during the selection of the remedy are those listed in 6NYCRR 375-1.8. The following are the components of the selected remedy implemented at the Site that are the subject of this FER:

1. Excavation and off-site disposal of grossly contaminated soil/fill.
2. Excavation, movement and placement of residually contaminated soil to on-site areas below soil cover systems.
3. Construction and maintenance of soil cover systems to prevent human exposure to contaminated soil/fill remaining at the Site. The soil cover system varies by location and consists of either;
    a. building foundations or impervious surfaces in paved areas, or
    b. a 15 mil high density polyethylene (HDPE) liner covered with two feet of clean fill for landscaped areas larger than 2,500 square feet in size, or
    c. a 30 mil high density polyethylene (HDPE) liner covered with two feet of clean fill below the retention basin, or
    d. two-feet of clean soil in landscaped areas smaller than 2,500 square feet in size.
    e. Utility trenches that are installed in the fill material at the Site were over-excavated and then lined with a geofabric and gravel before utilities were installed, upon which clean fill was placed and the appropriate cover system (a-d above) was constructed.

4. Construction and maintenance of vapor mitigation systems beneath the slabs of the on-site Stop and Shop building and the Residence Inn building. Both the Stop and Shop building and the Residence Inn buildings were constructed with a sub-slab vapor barrier (Stego Wrap) and passive sub-slab depressurization (SSDS) systems to prevent the potential for exposure to contaminant vapors in indoor air via soil vapor intrusion by the building occupants. The passive SSDS systems installed within the structures were constructed to allow for a future conversion to an active SSDS, if warranted. Future construction of any and all structures must be performed in accordance with the soil cover system requirements for buildings, and if applicable, the Health and Safety Plan and the Excavation Work Plan presented in the Site Management Plan (SMP).

5. Execution and recording of an Environmental Easement to restrict land use and prevent future exposure to any contamination remaining at the Site.

6. Development and implementation of a Site Management Plan for long term management of remaining contamination as required by the Environmental Easement, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;

7. All future buildings constructed on-site should contain a sub-slab vapor barrier and passive sub-slab depressurization system (SSDS) in accordance with requirements in the SMP.

8. Periodic certification of the institutional and engineering controls listed above.

3.0 OPERABLE UNITS

Site remediation and restoration is complete at the Site, where a Stop and Shop retail grocery store, Residence Inn hotel, one pad site for a second hotel, two pad sites for retail businesses, and a retention basin have been constructed, refer to Appendix A.

The selected remedies for this project (refer to Section 2.2) have been implemented at the Site including the removal and offsite disposal of grossly contaminated soils, the relocation of impacted soil below soil cover systems, and the installation of vapor mitigation systems below the Stop and Shop and Residence Inn buildings.

Institutional and engineering controls constructed on the subject portion of the Site have been incorporated into an Environmental Easement and Site Management Plan with periodic certification of the institutional and engineering controls by a New York State Professional Engineer. The Environmental Easement is provided as Appendix C and a Site Management Plan has been provided as a standalone document.

Two operable units were developed during the course of this project. Operable unit one (OU-1) consists of construction of the Stop and Shop, utility structures serving the Stop and Shop, roadways and parking areas around the Stop and Shop, and a retention basin. Operable unit two (OU-2) consists of construction of the Residence Inn hotel, utility structures serving the Residence Inn, roadways and parking areas around the Residence Inn, and pad sites for a second hotel and three retail/restaurant pad sites. Site remediation in OU-1 was completed in April 2013, and a Construction Completion Report (CCR) was submitted to the NYSDEC and NYSDOH. The NYSDEC and NYSDOH approved the CCR report on May 14, 2013. Site remediation in OU-2 is now complete and documented in this FER.

The volunteer began the site work required to remediate and to restore the property on both operable units on July 16, 2012.

The site work consists of grubbing and grading, construction of underground utility structures, construction of the Stop and Shop building, construction of the Residence Inn hotel building, construction of a hotel pad site, three retail/restaurant pad sites, and paving. Remediation has been completed at the Site.

Grossly contaminated material was removed from the Site, soil cover systems were installed, and vapor mitigation systems were installed below the Stop and Shop and Residence Inn buildings.

Fill material was re-positioned during site grading activities in support of site development. During this effort, identified grossly contaminated fill material was segregated and characterized for off-site disposal. Grossly contaminated fill material included areas where coal tar was at a higher concentration than pipe or soil materials. The grossly contaminated material was collected primarily from the area that is now the parking area east of the Stop and Shop building

Existing fill material was excavated during the construction of the retention basin, and preparation of the footprint of the Stop and Shop and Residence Inn buildings. The fill was transported to other areas on the Site for placement beneath the soil cover systems.

Utility trenches on the Site, were each approximately five feet wide, and excavated along the routes shown on Figure 10. The utility trenches were excavated to a depth of approximately 2-3 feet below the piping elevations. Geofabric was used to line these excavations and clean stone was placed in the utility trenches to bring the base of stone fill to the elevation required by the utility piping. After installation of the utility piping, the trenches were filled with clean fill to a depth two feet below grade and a visible demarcation was made using a liner. The appropriate soil cover systems were constructed over the utility trenches as required. The route and location of utility trenches are shown on Figure 10.

Soil movement occurred when the grade of the site was altered to level the property. Once site grading was achieved, the soil cover systems were installed in accordance with the approved RAW.

Gross contamination generated during the site grading was stockpiled and characterized for disposal before being transported for disposal, and disposed of at, Clean Earth of New Jersey, in accordance with all State and Federal regulations. Clean Earth of North Jersey is a RCRA Part B permitted transfer, storage and disposal facility that treats contaminated waste using solidification. Documentation for the disposal of this soil is presented in Appendix H.

Backfill that was used to create the soil cover system, and limitations on backfill that can be used at the Site in the future must comply with Part 375-6.7(d) and qualify as "clean fill".

A list of the soil cleanup objectives (SCOs) for the primary contaminants of concern (COCs) and applicable land use for this Site is provided in Table 1.

3.1 OPERABLE UNIT ONE (OU-1)

The north side of the Site contains the first operable unit and consists of construction of the Stop and Shop, utility structures serving the Stop and Shop, roadways and parking areas around the Stop and Shop, and a retention basin. The remedial activities in the area of this first operable unit were detailed in a Construction Completeness Report submitted to the Department in April 2013. The CCR report was approved on May 14, 2013.

Soils below the Stop and Shop building were excavated to a depth of 5.5 feet below grade. From this depth clean fill was placed over the historic fill to create a 2 foot thick clean working area on and through which construction workers constructed the building pilings without exposure to the historic fill material below. The Stop and Shop building was constructed using pilings that were driven through the historic fill to anchor the building foundation. Once the pilings were in place, they were cut at the level of the final foundation and the sub slab ventilation system piping was installed. This piping was hung on the pilings and then additional fill was placed in the foundation area. The vapor liner (Stego Wrap) was installed 6" above the SSDS piping and covered the entire footprint of the building. The Stego Wrap was taped along it's seams and around the penetrations to the liner that include; wood pilings, concrete foundations, and the SSDS vent risers. The Stego Wrap was brought up the sidewalls of the foundation and extended over (on-top) of concrete footings. Clean fill was then placed over the Stego Wrap to the base of the concrete floor. The concrete floor was then poured pinning the Stego Wrap below the floor and on-top of the footings. Within the concrete foundation, vapor tight manholes were installed to provide access to the sub-slab sampling ports, in accordance with Appendix K of the RAW. Sub-slab sample ports were installed within the 6" diameter pipe below the Stego Wrap as shown on Figure 11a. The SSDS vent risers were positioned along the rear wall of the building and exit through the roof of the building. Construction details and the configuration of the vapor mitigation system are shown on Figure 11a.

3.2 OPERABLE UNIT TWO (OU-2)

Since completion of site remediation on OU-1, on May 14, 2013, remediation has been completed on the south side of the Site. The south side of the Site contains the second operable unit and consists of construction of the Residence Inn hotel, utility structures serving the Residence Inn, roadways and parking areas around the Residence

Inn, and pad sites for a second hotel and three retail/restaurant pad sites. Completion of remediation at the south side of the property completes the remediation of the entire Site, refer to Appendix A.

Soils below the Residence Inn building were excavated to virgin material at a depth of approximately twenty-five (25) feet below grade. The deepest portions of the excavation below the Residence Inn building were the locations of the elevator shaft and at the indoor swimming pool. From this depth clean stone fill was installed to create infill upon which the foundations were established and the building was constructed. The Residence Inn building was constructed on concrete footings. Once the footings were installed, the piping for the vapor control system was installed below the building in the stone sub-base. The vapor liner (Stego Wrap) was installed 6" above the SSDS piping and covered the entire footprint of the building. The Stego Wrap was taped along it's seams and around all penetrations to the liner that include; concrete foundations, and the SSDS vent risers, and plumbing below the building. The Stego Wrap was brought up the sidewalls of the foundation and extended over (on-top) of concrete footings. The concrete floor was then poured pinning the Stego Wrap below the floor and on-top of the footings. Within the concrete foundation, vapor tight manholes were installed to provide access to the sub-slab sampling port, in accordance with Appendix K of the RAW. Sub-slab sample ports were installed within the 6" diameter pipe installed below the Stego as shown on Figure 11b and Figure 11c. The SSDS vent risers were positioned at three locations within the building and exit through the roof of the building. Construction details and the configuration of the vapor mitigation system are shown on Figure 11b and Figure 11c.

4.0 DESCRIPTION OF REMEDIAL ACTIONS PERFORMED

Remedial activities completed at the Site were conducted in accordance with NYSDEC-approved RAW for the Orangeburg Commons Site No. C344073, May 2012. All deviations from the RAW are noted in Section 4.10.

4.1 GOVERNING DOCUMENTS

The former Orangeburg Pipe generated off-specification pipe material that contained non-friable asbestos containing material. New York State Department of Labor issued Asbestos Variance File No. 11-1372 (the "Variance"), which permits the formerly landfilled asbestos containing off-specification piping to remain on-site below protective soil cover systems.

AKRF Engineering, P.C. prepared the RAW. This document details remedial efforts implemented at the Site. Incorporated into the RAW were a Health and Safety Plan, a Soil Management Plan, a Stormwater Pollution Prevention Plan, and a Community Air Monitoring Plan, and a Community Participation Plan. These plans are discussed below.

On January 29, 2010, the NYSDEC approved a State Pollutant Discharge Elimination System ("SPDES") General Permit for Stormwater Discharges, Permit # GP-0-10-001 for SPDES site number #NYR10P635 with its Declaration of Covenant for the Annual Inspection and Maintenance of Storm Water Control Facilities.

4.1.1 Site Specific Health & Safety Plan (HASP)

A Site Specific Health and Safety Plan ("HASP") was included as Appendix G of the NYSDEC approved RAW. The HASP assigned responsibilities, established personal protection standards, established mandatory safety practices and procedures, and provided for contingencies that could have arisen during the implementation of site remediation and restoration work. Worker safety was protected and no incidents or accident reports were generated throughout the work performed on the subject portion of the Site.

All personnel performing grossly contaminated soil removal activities completed a 40-hour training course that meets the requirements of 29 CFR Part 1910, Occupational Safety and Health Administration standards, with regular 8 hour refresher training as necessary. In addition, all personnel performing grossly contaminated soil removal activities passed an annual medical surveillance examination in accordance with 29 CFR 1910.20(f).

All remedial work performed under this RAW was in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA.

All remedial work, including invasive site activities complied with the provisions of the approved site Health and Safety Plan ("HASP").

4.1.2 Storm-Water Pollution Prevention Plan

A Stormwater Pollution Prevention Plan ("SWPPP") was included as Appendix D of the RAWP approved by the NYSDEC. The SWPPP was required for this Site because an area greater than 1 acre would be disturbed by site remediation activities and changes to site conditions would affect future stormwater disposal routes. The SWPPP presents specifications for a storm water collection network, retention basin and stormwater management system.

Leonard Jackson Associates, using hydrologic analysis and stormwater calculations they performed, prepared a NYSDEC State Pollutant Discharge Elimination System ("SPDES") General Permit for Stormwater Discharges from this Site.

A Notice of Intent ("NOI") form was submitted to the NYSDEC with the general permit application for the Site under the SPDES General Permit # GP-0-10-001. The Site was assigned SPDES number #NYR10P635. The NYSDEC approved General Permit # GP-0-10-001 on January 29, 2010. The Permit includes a Declaration of Covenant for the Annual Inspection and Maintenance of Storm Water Control Facilities. This document requires the inspection of the SWPPP on May 1 of each calendar year.

The SWPPP was constructed in accordance with the following applicable rules, regulations and guidance documents:

1) NYSDEC Stormwater Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity Permit No. GP-0-10-001 (SPDES GP-0-10-001);

2) Applicable NYSDEC Stormwater Management Design Manual under GP-02-01; and

3) NYSDEC Standards and Specifications for Erosion and Sediment Control, dated August 2005.

The objectives of this SWPPP are to:

1. Outline Owner and Contractor responsibilities to maintain compliance with SPDES GP-0-10-001, including required inspections, maintenance, forms, and certifications.

2. Outline the water quality treatment practices that will capture and treat the stormwater runoff from the sub-catchment areas associated with construction activities.

3. Outline measures to install, inspect, and maintain erosion and sediment control measures for the proposed project. The objective of these measures is to eliminate or significantly minimize pollutant discharges to the receiving water bodies during construction activities. These measures include but are not limited to:

- Perimeter Controls (i.e. silt fence and straw bales);
- Stabilized Construction Entrances and Exits;
- Inlet Protection;
- Dust Control;
- Temporary Seeding/Stabilization; and
- Temporary Sediment Basin.

FBO retained Soil Mechanics, a Qualified Inspector to inspect the construction of the SWPPP. Soil Mechanics has performed at least two site inspections per week at a

frequency no less than two inspections every seven calendar days separated by a minimum of two full calendar days between inspections.

Inspection forms generated during the construction of the SWPPP include a Construction Site Log Book/Construction Duration Inspection Form, Record of Stabilization and Construction Activities, Stormwater/Wetland Pond Construction Inspection Checklist, and Stormwater Pond Maintenance and Management Inspection Checklist. Copies of these forms are presented in Appendix E.

Based on a review of the SWPPP and the inspection logs and forms generated, the SWPPP has been constructed in accordance with design specifications, is operating properly, and has not caused a discharge to surfacewater.

The erosion and sediment controls for all remedial construction were performed in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control and the site-specific Storm Water Pollution Prevention Plan was approved by the NYSDEC on January 29, 2010 under General Permit # GP-0-10-001 and SPDES number #NYR10P635.

4.1.3 Community Air Monitoring Plan (CAMP)

A Community Air Monitoring Program ("CAMP") was developed for the protection of the surrounding community from potential releases of dust, fibers, and subsurface VOCs during remedial activities. The CAMP was written in accordance with the NYSDEC requirements presented in Appendix I A of the DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC 2010). The CAMP specified portable stations along the Site's perimeter to provide continuous monitoring for dust, fibers, and volatile organic compounds (VOCs). The measures included in the CAMP provided a level of protection for the occupants of the adjacent properties, as well as the downwind community, from potential airborne releases of site related contaminants. The CAMP set forth specific action levels for determining the monitoring frequency and the appropriate corrective actions, including work shut-down, if necessary. Monitoring of the work zone, including additional portable stations and personnel monitoring, is specified in the Health and Safety Plan (HASP).

Dust and VOC controls included the wetting of soil using spraying equipment including a water truck, covering stockpiles, and filling excavations.

Weekly and monthly CAMP reports were sent to the NYSDEC and the NYSDOH for their review. Based on the CAMP data, several short term particulate exceedances were noted and were attributed to heavy equipment movement across the site, high humidity levels, and heavy rain events. At no time during remedial activities was the work on the Site required to be stopped as a result of air quality concerns.

4.1.4 Contractors Site Operations Plans (SOPs)

Site Operations were performed in conformance with the RAW, HASP, SWPPP, and CAMP.

The Remediation Engineer reviewed all plans and submittals for this remedial project (i.e. those listed above plus contractor and subcontractor submittals) and confirmed that they were in compliance with the RAW. All remedial documents were submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

4.1.5 Community Participation Plan

Community Participation was guided by standard NYSDEC citizen participation procedures of the BCP and specifically the Citizen Participation (CP) Plan that was submitted to the NYSDEC by AKRF in January 2012. On February 10, 2012, the NYSDEC approved the CP Plan. As part of this plan, a Fact Sheet was prepared for the Site and published to the NYSDEC web site. Following the release of the Fact Sheet, 30-days were allowed to gather public comments to the RAWP. To date no public comments have been received by the NYSDEC. A fact sheet was released to interested parties announcing the start of the remedial work. Upon approval of this FER a Certificate of Completion (COC) will be issued. A COC fact sheet will be sent to the site contact list when NYSDEC issues the COC to the volunteer.

4.2 REMEDIAL PROGRAM ELEMENTS

4.2.1 Contractors and Consultants

Contractors and consultants that implemented site remediation and restoration of the subject portion of the Site were as follows:

Contractor/Consultant		
RD Management	Project Management	Construction Management
AKRF Engineering, Inc.	RAWP	Consulting Engineering
Landmark Consultants Corporation	HASP and CAMP	Consulting Engineering
JW Rufolo and Associates, Inc.	Health and Safety	Consult – OSHA Requirement for On-site Shower
Leonard Jackson Associates	SWPPP	General Permit Application
Soil Mechanics Drilling Corp.	SWPPP	Construction Oversight and Inspection
The Liner Company, Inc.	SWPPP	Change in Liner Specification
Innovative Recycling Technologies, Inc.	Disposal	Gross Contaminated Material Disposal
Clean Earth	Disposal	Gross Contaminated Material Disposal
Battal Trucking, LLC.	Disposal	Transportation of Gross Contaminated Material Disposal
York Laboratories	Analytical	Waste Classification/Clean Fill Testing
Cracolici, Inc.	Clean Fill	Transportation of Clean Fill from the Nanuet Mall
Tilcon	Backfill Material	Virgin Quarry Material

Mr. Richard Zaloum, of Landmark Consultants Corporation, is the Engineer of Record and was responsible for inspection of all work performed.

4.2.2 Site Preparation

Prior to initiating excavation work, all underground utilities present prior to construction were marked subsequent to a one-call utility markout request for the Site.

Controls specified by the SWPPP were constructed including perimeter controls and controls along the on-site stream. The perimeter controls included silt fencing and straw bales that surrounded the Site. Construction entrances that created a gap in the perimeter controls were stabilized with stone. Controls along the stream included a line of straw bales and silt fencing installed on both sides of the stream along the down gradient edge parallel to the existing and the proposed stream contour.

The perimeter of the Site was fenced with chain link fencing equipped with screening. The fence was gated at two locations, one along Greenbush Road and the other along Stevens Way. Truck washing stations were constructed at both entrances to the Site. These entrances were stabilized with clean stone to prevent the development of ruts and allow trucks to exit the Site without traveling upon site soils after exiting the truck washing stations.

On the fence near each entrance to the property were posted the NYSDEC BCP project signs consistent with NYSDEC guidance.

Site clearing and grubbing was performed using excavation equipment as the project initiated.

Prior to commencing site remediation work, all NYSDEC approvals and permits were obtained. The approvals and permits obtained include;

1. SWPPP – May 2, 2008, General Permit Approval
2. Asbestos Variance – January 26, 2012, State of New York, Department of Labor, Handling of Buried Non-friable Organically Bound ACM Pipe
3. RAWP Approval – June 6, 2012

4. Gross Contaminated Coal Tar and Monitoring Well Decommissioning – July 31, 2012 proposal, Approved August 6, 2012.

A pre-construction meeting was held with NYSDEC and all contractors on July 16, 2012.

Documentation of agency approvals required pursuant to the RAW is included in Appendix D. Other non-agency permits relating to the remediation project are provided in Appendix E.

All SEQRA requirements and all substantive compliance requirements for attainment of applicable natural resource or other permits were achieved during this Remedial Action.

A NYSDEC-approved project sign was erected at the project entrance and remained in place during all phases of the Remedial Action.

4.2.3 General Site Controls

Equipment and procedures were put in place to manage site access and provide security. The property as a whole was surrounded by a chain link fence with a privacy screen. Two locked gated entrances, one on Stevens Way and one on Greenbush Road, provided access for labor and equipment to enter or exit the property. In addition, office trailers were located in a separately fenced and gated area opposite Greenbush Road. Site control consisted of locking gates, a sign prohibiting site access as well as a sign in log for all visitors to the Site.

Site workers accessed the Site from the Greenbush Road entrance only. A decontamination trailer was stationed near the Greenbush Road entrance and contained a room in which to remove personnel protective equipment, and a room with facilities to wash hands and face prior to exiting the job site.

A truck wash was placed at both entrances to the Site. All vehicles exiting the Site were inspected for sediments from the job site. Any sediments identified on the tires, undercarriage, or surface of the vehicles were removed from the vehicle using brooms and a pressure washer to prevent tracking soil from the site to local roadways. Trucks entering or exiting the Site were tarped to limit dust and prevent the distribution of dust from materials exiting the Site.

During site remediation and restoration efforts grossly contaminated material was removed from the Site and clean fill was brought to the Site for re-grading and for use with soil cover systems installed at the Site. Due to the movement of soil on the Site, a SWPPP was implemented to control dust and sediments, refer to Sections 4.1.2.

Stockpiles were generated for gross contaminated material and clean fill materials brought to the Site.

One stockpile of grossly contaminated material was temporarily positioned at the northeast corner of the Site until it was characterized for disposal and disposed off-site. This pile was placed on 6 mil polyethylene sheeting and covered with 6 mil polyethylene sheeting. The polyethylene sheeting was weighted by straw bales that lined the perimeter of the stockpile.

Several stockpiles were generated for clean fill materials. These stockpiles were staged in the lot opposite Greenbush Road. The stockpiles were segregated by their origin. Stone materials from Tilcon were stockpiled in one area, recycled fill obtained from the Rockland County Solid Waste Management Authority was stockpiled in another, and clean fill from the Nanuet Mall was stockpiled in another location.

4.2.4 Nuisance controls

During the course of site remediation and restoration activities, a truck wash and egress (site exit) housekeeping station were in place to prevent the migration of soil from the Site to the neighborhood. The truck route had little impact on the neighborhood and surrounding properties. Dust, and odor was monitored throughout the course of on-site construction activities. No complaints related to nuisance conditions associated with the truck wash, egress housekeeping, dust control, odor control, and truck routing were reported.

At each truck washing station, vehicles exiting the Site were cleaned to remove bulk soils using brooms, and then washed to remove finer soils using a pressure washer. Water generated from the truck wash operations was allowed to drain naturally back onto the property. No aqueous or soil wastes were generated from the truck washing stations.

Dust generation was prevented by prohibiting the handling of dry fill material. All fill material was loaded damp or wetted. Trucks entering the site were covered with solid tarp covers to prevent dust.

4.2.5 CAMP results

Data generated by the CAMP was tabulated and compared to action limits established for the site. Results of the CAMP monitoring data were submitted to the NYSDEC and the NYSDOH in weekly and monthly reports. Based on the CAMP data, several short term particulate exceedances were noted and were attributed to heavy equipment movement across the site, high humidity levels, and heavy rain events. At no time during remedial activities was the work on the Site stopped as a result of air quality concerns.

In addition, asbestos air monitoring sampling was performed. The results of asbestos air monitoring are presented in Appendix I. Analysis of asbestos air monitoring was performed using phase contract microscopy (PCM). The range of asbestos concentrations were none detected (ND) through less than 0.002 to 0.009 particles per cubic centimeter of air (p/cc). At no time did the airborne asbestos concentration exceed health based standards.

Copies of all field data sheets relating to the CAMP are provided in electronic format in Appendix I.

4.2.6 Reporting

A daily log was maintained in the office trailer and was updated hourly. The daily log provided information regarding significant weather conditions, and summarized site activities. The daily log also identified any issues related to the CAMP, and health and safety concerns.

Daily logs were used to prepare monthly reports to the NYSDEC regarding the progress of site remediation activities. The make, model, and calibration records for all monitoring equipment, and the make and model of remediation equipment were also logged.

A truck log listing license plate number and arrival/departure times and a site sketch showing the excavation areas and stockpile locations were also prepared.

A log book also identified the names and companies for all visitors to the site.

Inspection forms generated for the SWPPP include;

1 - A Construction Site Log Book, and

2 - Construction Duration Inspection Forms, and

3 – Record of Stabilization and Construction Activities, and

4 – Stormwater/Wetland Pond Construction Inspection Checklist, and

5 – Stormwater Pond Maintenance and Management Inspection Checklist.

Copies of these forms are presented in Appendix F.

All daily and monthly reports are included in electronic format in Appendix F.

The digital photo log required by the RAWP is included in electronic format in Appendix G.

4.3 CONTAMINATED MATERIALS REMOVAL

Contaminated media at the Site includes soil, soil gas and groundwater. The Site was vacant and did not contain structures, or underground storage tanks, therefore, demolition debris was not generated during the remediation of this Site.

Contaminated groundwater was not generated during the remediation of the subject portion of the Site. The former groundwater monitoring well network was removed to allow site remediation work to proceed. A modified groundwater monitoring well network has been installed following completion of all remediation activities at the Site. Groundwater monitoring will proceed as specified in the Site Management Plan for the Site.

The contaminated soil will remain on-site below soil cover systems; however, during site remediation efforts areas of grossly contaminated soil material was discovered at the Site. These grossly contaminated materials consisted of coal tar material. This

material was segregated, stockpiled on-site, characterized for proper disposal and later disposed off-site, (refer to the discussion of contaminated soil removal in Section 4.3.1).

A list of the soil cleanup objectives (SCOs) for the contaminants of concern for this project is provided in Table 1.

A figure depicting the location of original sources and areas where excavations were performed is shown in Figure 3.

4.3.1 Grossly Contaminated Coal Tar Material

The Site was once a portion of the Orangeburg Pipe property which manufactured pipe with coal tar pitch and a paper/asbestos mixture. After pipe manufacturing ceased in 1973, the facility was destroyed by fire with the structures reportedly demolished and deposited at the project site. As a result, the top 5 to 15 feet of material over most of the Site is a mixture of fill containing topsoil, sand and gravel, and varying amounts of Construction and Demolition (C&D) debris. The C&D debris includes brick, glass fragments, and pieces of Orangeburg pipe. The Orangeburg pipe contains coal tar and asbestos.

The RAW proposed the removal of gross contamination as part of the remedy for soil remediation. Residually contaminated soils were placed below soil cover systems at the Site, as described in Section 4.7. During the re-positioning of existing fill material, visibly gross contamination (ie. containing coal tar at a concentration that was higher than the concentration of pipe or soil materials) was segregated for disposal.

On July 31, 2012, Landmark submitted correspondence to the NYSDEC describing the presence of visibly contaminated coal tar materials at the Site, and presented an approach for the handling this grossly contaminated coal tar material. The approach was to segregate visible gross contamination from soils typical of the site conditions, and prepare the material for disposal. Based on site observations, the soil was generally not grossly contaminated with coal tar. Discrete areas of visibly gross contaminated material were raked up and stockpiled for disposal. The stockpile was set upon six mil poly and covered by six mil poly. The subject materials were viscous in texture but may contain Asbestos Containing Material (ACM). Accordingly, the stockpiled materials were handled by appropriately trained workers using wet methods. Figure 9 depicts the areas from which the grossly contaminated materials were collected. Figure 9 also shows the location of the stockpile where the materials were staged for disposal. The NYSDEC approved of this approach in on August 6, 2012, (refer to Appendix D).

The grossly contaminated material was collected primarily from the area that is now the parking area east of the Stop and Shop building, and in the parking area east of the Residence Inn. This material was stockpiled on-site. The stockpile was covered to limit nuisance dust conditions and prevent erosion and/or migration of the material from the stockpile area.

Contour maps of estimated cut and fill thicknesses for remedial activities at the site are included in Figures 4, 4A, 4B, 4C and 4D.

4.3.1.1 Disposal Details

Landmark collected two samples, laboratory sample ID's 12I0226-01 and 12I0226-02, from the stockpile of gross contamination material and sent the sample to York Analytical Laboratories to be analyzed for waste characterization.

Innovative Recycling Technologies, Inc. (IRT) facilitated the disposal of the coal tar waste, using the analytical data for the waste characterization sample to prepare a waste profile. The waste characterization form is presented in Appendix H.

The waste profile was used to determine the appropriate disposal location for the material. The coal tar was disposed to Clean Earth of North Jersey, Inc., 105 Jacobus Avenue, Kearny, New Jersey 07032. On January 30, 2013, Clean Earth provided approval number 133080116 to dispose of the coal tar as an ID27 waste at their facility.

Clean Earth provided an acceptance letter for the Coal Tar on January 30, 2013. Clean Earth also provided a Hazardous Waste Facility Permit demonstrating that the facility can accept the material for disposal, refer to Appendix H.

On February 14, 2013, two truckloads of grossly contaminated material were loaded using wetting methods.. The material was shipped via Battal Trucking, LLC, to Clean Earth under Non-Hazardous Material Manifest numbers 507301 and 507302. The total volume of material disposed was 102,140 pounds or 51.07 tons. Manifests indicate that the material was received by the facility on February 14, 2013.

Table 2 shows the total quantities of each category of material removed from the site and the disposal locations. A summary of the samples collected to characterize the waste, and associated analytical results are summarized on Table 3.

Letters from FB Orangetown to disposal facility owners and acceptance letters from disposal facility owners are attached in Appendix H.

Manifests and bills of lading are included in electronic format in Appendix H.

4.3.2.2 On-Site Reuse

Residually impacted soil was identified during previous investigation of the property. The NYSDEC approved RAWP describes the process of managing this soil below soil cover systems on-site under institutional and engineering controls. The residually impacted soil contains Construction and Demolition (C&D) debris. The C&D debris includes brick, glass fragments, and pieces of Orangeburg pipe. The Orangeburg pipe contains coal tar and asbestos. The New York State Department of Labor issued an Asbestos Variance File No. 11-1372 (the Variance), which permits the formerly landfilled asbestos containing off-specification piping to remain on-site below protective soil cover systems.

Residually impacted soil contains contamination above the restricted commercial soil cleanup objectives (SCO's) at historic sample locations; TP-4, TP-5, TP-6YA, TP-7, TP-8, TP-9, TP-10, TP-11A, TP-12, TP-13, TP-14, and TP-15. The concentration of contamination at these sample locations are shown on Table 7. The location of each sample is shown on Figure 5. Generally, the soil contamination identified at the Site was found consistently throughout the Site in a layer of fill that is 5-15 feet thick.

The residually impacted soil was relocated during site remediation and renovation activities. The soil was cut from areas where the elevation of the Site was elevated and used to fill areas that were lower in elevation. The entire property has been covered by soil cover systems described in Section 2.2. Figures 4, 4A, 4B, and 4C show the Site and cross sections of the Site that identify where soil was cut and where soil was filled. Soil re-use is managed under a Site Management Plan that prevents disturbance of fill below the soil cover systems in accordance with the Soil Management Plan.

4.4 REMEDIAL PERFORMANCE/DOCUMENTATION SAMPLING

Remedial performance documentation and sampling includes the collection of groundwater samples, and the collection of indoor air, and sub-slab soil gas samples in the Stop and Shop, and Residence Inn hotel buildings, which are the only buildings constructed at the Site upon completion of site remediation.

Stop and Shop

Indoor air, and sub-slab soil gas samples were all collected at the Stop and Shop building on April 16, 2013, using Summa Canisters. Summa canisters are stainless steel vessels containing a negative pressure or vacuum. The Summa Canisters are connected to regulators that allow air to enter summa canisters at a fixed rate. The regulator can be attached to a soil gas probe, if applicable, or allowed to draw air directly from the environment into the vessel.

Sub-slab samples were collected from three permanent sampling points installed through the concrete floor in the Stop and Shop building in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Specifications for soil gas point installation are included in Appendix N – Vapor System of the RAWP. The location of sub-slab soil gas sample ports is shown on Figure 11a. Summa canisters were connected to the sub-slab soil gas sample ports using Teflon tubing. Photoionization detector readings were measured through the Teflon tubing at each sample port prior to sample collection. The Photoionization detector was allowed to draw gas through the Teflon tubing which purged the tubing prior to sampling. The Teflon tubing was then used to connect the soil gas sample ports to the Summa Canisters. The 30 minute regulators were used when collecting the sub-slab soil gas samples from the soil gas sample ports. The regulators allowed air from beneath the building slab to fill the vessel over a 30 minute period of time.

One indoor air sample was collected from the breathing zone within the Stop and Stop structure. The indoor air sample was collected when the sub-slab samples were collected and picked up the next day. The sample location is shown on Figure 11a. The Summa Canister vessel was connected to a 24 hour regulator and allowed to draw air directly from the interior environment of the building.

Summa canisters were delivered to Phoenix Analytical Laboratory, a NYSDOH-certified laboratory, for analysis by United States Environmental Protection Agency Method TO-15 (EPA Method TO-15) for volatile organic compounds. The laboratory used an MGP specific list to include coal tar related compounds during testing.

Analytical results of three soil gas, and one indoor air samples are presented in Table 4.

A comparison of indoor air data to sub-slab soil vapor concentrations indicate that soil vapor intrusion is not currently occurring at the Shop and Shop structure. Sampling results indicate that the levels of volatile organic compounds (VOCs) detected in indoor air are commonly found in similar structures and do not represent a health concern. Several of the VOCs detected in the indoor air may be attributed to construction activities within the building (e.g. painting, installation of store infrastructure, etc).

Residence Inn

Indoor air, and sub-slab soil gas samples were all collected at the Residence Inn building on August 19, 2013, using Summa Canisters. The first round of indoor air and sub-slab soil gas samples were collected during building construction activities. Therefore, it is difficult to determine whether elevated levels of several compounds detected in the first round of sub-slab soil gas samples and the indoor air samples are the result of products and materials containing volatile organic compounds used in the construction of the building or as a result of soil vapor intrusion. Because the first round of samples were inconclusive, a second round of indoor air and sub-slab soil gas samples were collected at the Residence Inn building. On October 9, 2013, sub-slab soil gas samples were collected. An indoor air sample was also collected on October 9, 2013, however, a regulator malfunction caused the 24 hour Summa Canister to reach a pressure of zero prior to collection of the sample within the 24 hour sampling period. The initial sample was not analyzed due to data validation concerns. On October 14, 2013, an indoor air sample was collected at the Residence Inn building. Building construction activities were still ongoing during the second round of indoor air and sub-slab soil gas sampling.

Sub-slab samples were collected from two permanent sampling points installed through the concrete floor in the Residence Inn building in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Specifications for soil gas point installation are included in Appendix N – Vapor System of the RAWP. The location of sub-slab soil gas sample ports is shown on Figure 11b and

Figure 11c. Summa canisters were connected to the sub-slab soil gas sample ports using Teflon tubing. Photoionization detector readings were measured through the Teflon tubing at each sample port prior to sample collection. The Photoionization detector was allowed to draw gas through the Teflon tubing which purged the tubing prior to sampling. The Teflon tubing was then used to connect the soil gas sample ports to the Summa Canisters. The 30 minute regulators were used when collecting the sub-slab soil gas samples from the soil gas sample ports. The regulators allowed air from beneath the building slab to fill the vessel over a 30 minute period of time.

Indoor air samples were collected from the breathing zone within the Residence Inn structure. The sample locations are shown on Figure 11b and Figure 11c. The Summa Canister vessel was connected to a 24 hour regulator and allowed to draw air directly from the interior environment of the building.

Summa canisters were delivered to Phoenix Analytical Laboratory, a NYSDOH-certified laboratory, for analysis by United States Environmental Protection Agency Method TO-15 (EPA Method TO-15) for volatile organic compounds. The laboratory used an MGP specific list to include coal tar related compounds during testing.

Analytical results of sub-slab soil gas, and indoor air samples collected at both the Stop and Shop and Residence Inn buildings are presented in Table 4.

A comparison of indoor air data to sub-slab soil vapor concentrations in the second round of sampling indicate that soil vapor intrusion is not currently occurring at the Residence Inn structure. Sampling results indicate that the levels of volatile organic compounds (VOCs) detected in indoor air are commonly found in similar structures and do not represent a health concern. Several of the VOCs detected in the indoor air may be attributed to construction activities within the building (e.g. painting, installation of infrastructure, etc).

A table and figure summarizing all sub-slab soil vapor, and indoor air sampling is included in Table 4 and Figures 11a,11b, and 11c respectively.

Groundwater

Groundwater below the property is not used for drinking water purposes. Potable water is provided to the project site and surrounding area by United Water.

The analytical results of historical groundwater samples have been compared to the Groundwater Limitations listed in 6 NYCRR Part 703 and the Technical and Operational Guidance Series 1.1.1 (TOGS).

Historical groundwater samples have identified the following volatile organic compounds (VOC): benzene, toluene, ethylbenzene, and xylene (BTEX) which are petroleum-related compounds in addition to methyl-tertiary-butyl-ether (MTBE), and tetrachloroethylene (PCE). These VOCs were reported above laboratory detection limits in six monitoring wells located in the northern and eastern sides of the project site. Xylenes in monitoring well MW-8 (6.4 µg/l) exceeded the NYSDEC GA Ambient Water Quality Value (AWQV) of 5 µg/l. The remaining concentrations of VOCs were below their respective AWQV. Additionally, twenty one SVOCs were detected at concentrations ranging from 1 to 2,300 µg/l. The majority of these SVOCs were found in wells located on the northern and eastern sides of the property (MW-2, MW-3, MW-7, and MW-8). The highest SVOC detections were noted in MW-8, which is located in the area of the former lagoon discharge (northern portion of the site). Naphthalene was detected in monitoring well MW-8 at a concentration of 2,300 µg/l. The remaining concentrations, which included the following compounds, 2-methylnapthalene, acenapthene, dibenzorufan, fluorene, phenanthrene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, fluoranthene, pyrene, and carbazole, ranged from 34 to 430 µg/l.

The historical analytical results demonstrate that groundwater conditions have remained consistent over time.

The monitoring well network installed and used in the collection of historic groundwater data was removed to allow for the remediation of the Site. A Monitoring Well Decommissioning Report was submitted to the Department in February 2013, refer to Appendix N. The monitoring well network was replaced during remedial activities. On August 30-31, 2013, seven monitoring wells were installed as shown on Figure 12. Monitoring well sampling will be performed during site management activities.

The SMP includes a plan for future groundwater monitoring at the property. The plan includes groundwater monitoring for the purpose of establishing a post remediation baseline of groundwater contamination level below the Site. The post remediation baseline contamination level will be established by collecting groundwater samples from the replaced monitoring well network installed at the property for four consecutive quarters, followed by two semi-annual sampling events. The results of such monitoring activities will be submitted to the NYSDEC and NYSDOH after the fourth and eighth

quarters of monitoring. If the monitoring data reveals that residual groundwater concentrations are found to be consistently below NYSDEC standards or have become asymptotic at an acceptable level over an extended period, then no further groundwater monitoring would be required. A determination of such acceptable level can be achieved using a risk based analysis and/or fate and transport modeling.

An environmental easement (Appendix C) has been recorded to (1) implement, maintain and monitor the Engineering Controls; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the Site to commercial uses only.

Data Usability Summary Reports (DUSRs) were prepared for all data generated in this remedial performance evaluation program. These DUSRs are included in Appendix M, and associated raw is provided electronically in Appendix J.

4.5 IMPORTED BACKFILL

Backfill was used during the re-grading and as part of the soil cover systems installed at the property in the subject portion of the site. For the subject portion of the site, backfill was obtained from the following sources;

- The Rockland County Solid Waste Management Authority;
- Tilcon Quarry;
- Nanuet Mall;
- Tice Farm;
- West Nyack Dam Fill; and
- West Nyack Dam Topsoil

A letter was sent from the Rockland County Solid Waste Management Authority to Mr. Birdoff of RD Management LLC confirming the use of 6,000 cubic yards of recycled glass for the project in Orangeburg on June 25, 2012. Because this material is a recycled product of inert material sampling of the glass was not required or performed.

A letter was sent from Tilcon on October 12, 2012, documenting that the stone used at the Site was generated from virgin traprock at their West Nyack location and is clean and free of contaminants.

Landmark submitted a Request for Approval of Imported Soil to the NYSDEC for multiple sources. Each request letter contained analytical data for stockpile samples collected per the RAWP. The analytical data was compared to the NYSDEC Part 375 Soil Cleanup Objectives. This correspondence is provided in Appendix L. Soil found to be acceptable for use at the Site was issued an approval letter by the NYSDEC. The following approval letters were obtained;

1. September 25, 2012, West Nyack Dam Fill (6,000 cubic yards);
2. September 21, 2012, West Nyack Dam Topsoil (3,000 cubic yards);
3. November 13, 2012, Nanuet Mall (5,000 cubic yards);
4. October 11, 2012, Tice Farms (9,000 cubic yards);

The recycled glass, stone, and clean fill was staged in the fenced off-site lot opposite Greenbush Road, and transported across the street to the project site as needed.

A table of all sources of imported backfill with quantities for each source is shown in Table 5. Tables summarizing chemical analytical results for backfill, in comparison to allowable levels, are provided in Table 6. A figure showing the site locations where backfill was used at the site is shown in Figure 4.

4.6 CONTAMINATION REMAINING AT THE SITE

Fill material originating from the Orangeburg Pipe operations exists on the Site. A 5-15 foot thick layer of existing fill material has been identified at the Site. The majority of this material contains chemical constituents in excess of the Track 1 Unrestricted SCOs. For this reason, all existing fill material on the Site is anticipated to exceed the Track 1 Unrestricted SCOs. The existing fill material and the residual soil contamination will remain on-site below soil cover systems described in Section 4.7, and will be addressed using the EC and ICs implemented at the Site.

Construction and renovation of the previously vacant property has incorporated engineering controls (including a SSDS and Stego Wrap liner) that protect building spaces from residual contamination. Institutional controls will require maintenance of these engineering controls to protect human health and the environment.

Table 7 and Figure 5 summarize the results of all soil samples remaining at the site after completion of Remedial Action that exceed the Track 1 (unrestricted) SCOs.

Figure 6 summarizes the location where residual contamination remains at the Site after completion of the remedial action.

Since contaminated soil and groundwater/soil vapor remains beneath the Site after completion of the Remedial Action, Institutional and Engineering Controls are required to protect human health and the environment. These Engineering and Institutional Controls (ECs/ICs) are described in the following sections. Long-term management of these EC/ICs and residual contamination will be performed under the Site Management Plan (SMP) approved by the NYSDEC.

4.7 SOIL COVER or CAP SYSTEM

Isolation of Historic Fill with Engineering and Institutional Controls was accomplished by installing a variety of soil cover systems over the entire footprint of the site, essentially capping the entire site.

Exposure to residual contamination in soil/fill at the Site is prevented by a soil cover system placed over the Site. This cover system is comprised of a minimum of 24 inches of clean soil in landscaped areas, asphalt pavement, concrete-covered sidewalks, and concrete building foundations, and the retention basin. The soil cover system in the subject portion of the Site varies by location and consists of either;

a. building foundations or impervious surfaces in paved areas, or

b. a 15 mil high density polyethylene (HDPE) liner covered with two feet of clean fill for landscaped areas larger than 2,500 square feet in size, or

c. a 30 mil high density polyethylene (HDPE) liner covered with two feet of clean fill below the retention basin, or

d. two-feet of clean soil in landscaped areas smaller than 2,500 square feet in size.

Figure 8 shows the as-built cross sections for each remedial cover type used on the Site. Figure 7 shows the location of each cover type built at the Site. An Excavation Work Plan, which outlines the procedures required in the event the cover system and/or underlying residual contamination are disturbed, is provided in Appendix B of the SMP.

4.8 OTHER ENGINEERING CONTROLS

Since remaining contaminated soil, and groundwater/soil vapor, exists beneath the Site, Engineering Controls (EC) are required to protect human health and the

environment. The Site has the following primary Engineering Controls, as described in the following subsections.

4.8.1 Vapor Mitigation System

Based upon the presence of naturally occurring methane and low concentrations of certain VOCs in soil gas sporadically located about the Site, Vapor Mitigation Systems were installed at the Site including;

- For landscaped areas above 2,500 square feet, exclusive of the islands in the parking lot, the fill were capped with a high density polyethylene (HDPE) liner, and then covered with two feet of clean fill.
- The stormwater basin was capped with a 30 mil high density polyethylene (HDPE) liner, and then covered with two feet of clean fill.
- A vapor barrier consisting of Stego Wrap has been installed below each of the buildings to prevent potential soil vapor intrusion. During installation, all joints are wrapped and taped using Stego Tape, in accordance with the manufacturer's specifications. All penetrations are sealed with Stego Tape and/or Mastic.
- A passive SSDS system has been installed below the vapor barrier at each of the buildings. The system consists of an underground manifold of slotted piping, to capture potential vapors below the building slab, which is vented above the roof of each respective building. The vent risers above the roof are fitted with a wind driven turbine ventilator. The construction of the vent risers is designed to allow for installation of a vacuum blower and conversion to an active SSDS system if and to the extent necessary and appropriate.

The design for the vapor mitigation system is provided in Appendix K.

Procedures for operating and maintaining the SSDS are documented in the Operation and Maintenance Plan (Section 4 of the SMP). Procedures for monitoring the system are included in the Monitoring Plan (Section 3 of the SMP). In addition, the Monitoring Plan also addresses severe condition inspections in the event that an emergency situation or condition occurs, which may affect the ICs and EC s at the Site.

4.8.1.1 Stego Wrap Liner

The vapor barrier will be a permanent control which will be installed beneath the proposed on-site structures as an added precaution to prevent any potential soil gas

vapors from entering the structures in the future. The vapor barrier will be placed above the layer containing the SSDS. There is no routine maintenance associated with the vapor barrier. Monitoring of the vapor barrier is described in Section 3.2.2 of the SMP.

4.8.1.2 Sub-slab Depressurization System

In addition to the Stego Wrap liner described in Section 4.8.1.1, a passive SSD system has been constructed below the Shop and Stop, and Residence Inn hotel buildings to prevent the potential for soil vapor intrusion to impact indoor air quality. The passive SSDS system is constructed to allow for a future conversion to an active SSDS, if warranted.

Following construction and prior to occupation of site buildings, sub-slab and indoor air samples were collected to demonstrate that the vapor mitigation systems installed below the buildings are effective, refer to Section 4.4.

Based on and laboratory sampling results, conversion of the passive SSDS to an active vapor mitigation system is not currently warranted for the Stop and Shop structure or the Residence Inn structure. Similarly, following construction and prior to occupation of future site buildings sub-slab and indoor air samples shall be collected and evaluated by the NYSDEC and NYSDOH to demonstrate that the vapor mitigation system is effective.

ICs require monitoring of the passive SSDS. In the event that future monitoring and or sampling events demonstrate that the passive SSDS system has not prevented the indoor air quality from being affected by the soil vapor contamination beneath the sampled structure, the passive system will be converted to an active SSDS. In addition, follow up sub-slab soil vapor and indoor air sampling will be required to demonstrate the effectiveness of the active SSDS. Based on a review and evaluation of the follow up sampling data, additional actions may be warranted if the passive SSDS is converted to an active SSDS, additional actions may be warranted. Also, should it become necessary for the passive SSDS to be converted to an active SSDS, the active SSDS will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH. In the event that monitoring data indicates that the operation of the SSDS is no longer required, a proposal to discontinue the operation of the SSDS would be submitted by the property owner to the NYSDEC and NYSDOH.

Procedures for monitoring, operating and maintaining the soil cover system, and vapor mitigation system are provided in the Operation and Maintenance Plan in Section 4

of the Site Management Plan (SMP). The Monitoring Plan also addresses inspection procedures that must occur after any severe weather condition has taken place that may affect on-site ECs.

4.9 INSTITUTIONAL CONTROLS

The site remedy requires that an environmental easement be placed on the property to (1) implement, maintain and monitor the Engineering Controls; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the Site to commercial uses only.

These Institutional Controls are:

- Compliance with the Environmental Easement and the Site Management Plan (SMP) by the Grantor and the Grantor's successors and assigns;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- All Engineering Controls on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP.
- Groundwater, soil vapor and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP.

Institutional Controls identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement.

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

- The Site may only be used for commercial use provided that the long-term Engineering and Institutional Controls included in this SMP are employed.
- The Site may not be used for a higher level of use, such as unrestricted restricted residential use without additional assessment and, if necessary, remediation and amendment of the Environmental Easement, as approved by the NYSDEC;

- All future activities on the Site that will disturb residual contaminated material must be conducted in accordance with this SMP;
- The use of the groundwater underlying the Site is prohibited without treatment rendering it safe for intended use;
- The potential for vapor intrusion must be evaluated for any buildings developed anywhere on the Site, and any potential impacts that are identified must be monitored or mitigated.
- Vegetable gardens and farming on the Site are prohibited;
- The site owner, including any subsequent site owner, will submit to NYSDEC annually a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually unless and until an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable.

The environmental easement for the site was executed by the Department on September 30th, 2013 and filed with the Rockland County Clerk on October 15th, 2013. The County Recording Identifier number for this filing is 8712-00652. A copy of the easement and proof of filing is provided in Appendix C.

4.10 DEVIATIONS FROM THE REMEDIAL ACTION WORK PLAN

Deviations from the RAWP were related to; (i)a need to upgrading the liner used in the retention basin, (ii) removal of the original groundwater monitoring well network to allow site grading, and (iii) the discovery of Grossly Contaminated material.

During the installation of the retention basin it was discovered that the proposed liner was too thin for the application. The original liner specification proposed a 20 mil High Density Polyethylene material as a liner for the retention basin. The 20 mil liner was not suitable for the project because it did not offer the ability to stretch over rock along the base of the retention basin; therefore, a 30 mil PVC liner was used during

retention basin construction. The liner was replaced with a thicker variety that is more stringent in specifications than the initially proposed liner. Specifications for the thicker liner are provided in Appendix K. The change in the liner has had a beneficial effect on the overall site remediation.

The initial design of the retention basin were additionally altered due to concerns about erosion and sliding over the liner. The liner for the retention basin was initially installed to an elevation of 76 feet above mean sea level while alterations to the design of the retention basin were made. Corrective measures designed for the retention basin meet the requirements of the RAWP and the SWPPP. The sidewall of the retention basin maintains a 2:1 slope, however, the construction of the liner below this slope was benched to reliably stabilize the slope, prevent erosion, and prevent sliding over the liner. The liner installation continued from an elevation of 76 feet, onto the benches (both horizontal and vertical surfaces) up to the grade. The initial design of the retention basin allowed runoff to travel from the paved surfaces at the restaurant pad to the westerly slope of the retention basin, where an erosion concern was identified. The design was changed by adding a piped drainage system along the existing curb line along the restaurant pad to collect and convey surface runoff to the existing headwall of the basin. The appropriate barrier was installed beneath the previously installed curb line in accordance with the RAWP. After backfill was placed on the liner, the final grading was performed to provide two feet of cover and the required landscaping along the retention basin, per the RAWP and SWPPP. These changes to the retention wall design eliminated sliding on the liner, and eliminated a spillway down the slope of the retention basin, thereby improving the design. The changes were proposed in a May 2, 2013, email to the NYSDEC and approved in the May 14, 2013, CCR approval.

The proposed site remediation changed the grade of the property a minimum of two feet in elevation. The pre-existing monitoring well network could not be made to adjust to the re-grading of the site; therefore, the pre-existing monitoring well network was removed.

Grossly contaminated material was identified during site remediation. The grossly contaminated material was identified as coal tar at a concentration greater than

the soil or piping material in which it was discovered. This grossly contaminated material was addressed in accordance with Appendix E of the RAWP, Specification for Grossly Contaminated Soil.

On July 31, 2012, Landmark Consultants Corporation submitted correspondence to the NYSDEC discussing the pre-existing monitoring well network and the grossly contaminated material identified during site grading activities. A proposal was made to decommission the pre-existing monitoring well network; replacing the monitoring well network once the site work was sufficiently advanced. Also, this correspondence presented a proposal to collect and dispose of grossly contaminated material, or coal tar. On August 6, 2012, the NYSDEC approved the proposal for addressing pre-existing monitoring wells and the grossly contaminated material.

The disposal of grossly contaminated material is discussed in Section 4.3.1.

Monitoring wells were removed from the site on August 13, 2012, and a Monitoring Well Decommissioning Report was submitted to the NYSDEC in February 2013, and is attached in Appendix N. The monitoring well network has been replaced and groundwater sampling has been initiated in accordance with the monitoring plan incorporated into the SMP at Section 2.2.2.4. The location of the replacement wells are shown on Figure 12. Groundwater sampling is discussed in Section 4.4.

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Appendix A - Survey Map, Metes and Bounds

Appendix B - Digital Copy of the CCR and FER (CD)

Appendix C – Environmental Easement

Appendix D - NYSDEC Approvals of Substantive Technical Requirements

Appendix E - Remediation- Related Permits

Appendix F - Daily and Monthly Reports (CD)

Appendix G - Project Photo Log (CD)

Appendix H - Soil /Waste Characterization Documentation

Appendix I - CAMP Field Data Sheets and Air Monitoring Data (Incl. CD)

Appendix J - Raw Analytical Laboratory Data (Incl. CD)

Appendix K – Environmental Controls As-Built Drawings, Documentation and Drawings

Appendix L - Imported Materials Documentation

Appendix M - DUSRs for All Endpoint Samples (Incl CD)

Appendix N – Well Decommissioning Report

TABLES

TABLE 1

Soil Cleanup Objectives

TABLE 2

Total Quantity of Material Disposed

Table 2

Total Quantities of Material Removed from the Site

Material Removed	Quantity of Material	Disposal Location
Gross Contamination Coal Tar	51.07 Tons	Clean Earth of North Jersey, Inc. 105 Jacobus Ave Kearny, NJ 07032

TABLE 3

Analytical Waste Characterization of Material Disposed

TABLE 4

Remedial Performance/Documentation Sampling Results

TABLE 5

Total Quantity of Backfill and Sources of Backfill

TABLE 6

Analytical Results for Imported Material

TABLE 7

Soils Exceeding Unrestricted SCOs After the Remedial Action

FIGURES

FIGURE 1

Project Site Map

FIGURE 2

Site Plan

FIGURE 3

Areas Where Excavations Were Performed

FIGURE 4

Contour Maps of Cut and Fill Thicknesses/Backfill Placement Locations

FIGURE 5

Exceedances of Unrestricted SCO's After Remedy

FIGURE 6

Residual Contamination Locations

FIGURE 7

Site Wide Cover System Plan

FIGURE 8

Typical Cover Detail for All Cover Types

FIGURE 9

Soil Stockpile Locations/Air Monitoring Station Locations

FIGURE 10

Route of Underground Utilities

FIGURE 11

Passive Vapor Mitigation System

FIGURE 12

Monitoring Well Network

APPENDIX

APPENDIX A

Survey Map with Metes and Bounds

APPENDIX B

Digital Copy of CCR and FER

(Included In the CD Attached)

APPENDIX C

Environmental Easement

APPENDIX D

NYSDEC Approvals

APPENDIX E

Remediation Related Permits

(Included In the CD Attached)

APPENDIX F

Daily and Monthly Reports

(Included In the CD Attached)

APPENDIX G

Project Photo Log

APPENDIX H

Soil Waste Characterization Documentation

APPENDIX I

CAMP Field Data Sheets

(Included In the CD Attached)

APPENDIX J

Raw Analytical Data

(Included In the CD Attached)

APPENDIX K

Environmental Controls – As-Built Drawings and Documentation

APPENDIX L

Imported Materials Documentation

(Included In the CD Attached)

APPENDIX M

DUSRs for All Endpoint Samples

APPENDIX N

Monitoring Well Decommissioning Report

APPENDIX O

Remediation and Costs