Williamsburg Bridgeview Apartment

337 Berry Street

BROOKLYN, NEW YORK

Remedial Action Work Plan

NYC BCP Project Number C244233

Prepared For:

LPC Development Group LLC

456 E. 173rd St.

Bronx, NY 10457

Prepared By:

Equity Environmental Engineering LLC

500 International Drive, Suite 150

Mt. Olive, NJ 07828

November 2016

REMEDIAL ACTION WORK PLAN
TABLE OF CONTENTS

FIGURES

APPENDICES

LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AS/SVE	Air Sparging/Soil Vapor Extraction
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
C&D	Construction and Demolition
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering Controls and Institutional Controls
ELAP	Environmental Laboratory Accreditation Program
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IRM	Interim Remedial Measure
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYS DEC	New York State Department of Environmental Conservation
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYC VCP	New York City Voluntary Cleanup Program
NYCRR	New York Codes Rules and Regulations
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation

NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
ORC	Oxygen-Release Compound
OSHA	United States Occupational Health and Safety Administration
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photo Ionization Detector
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RD	Remedial Design
RI	Remedial Investigation
RMZ	Residual Management Zone
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
USGS	United States Geological Survey
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VOC	Volatile Organic Compound

CERTIFICATION

I, Peter Jaran, am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for designing the remedial program for the 337 Berry Street site, site number C244233. I certify to the following:

- I have reviewed this document and the Stipulation List, to which my signature and seal are affixed.
- Engineering Controls developed for this remedial action were designed by me or a person under my direct supervision and designed to achieve the goals established in this Remedial Action Work Plan for this site.
- The Engineering Controls to be constructed during this remedial action are accurately reflected in the text and drawings of the Remedial Action Work Plan and are of sufficient detail to enable proper construction.
- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

Peter Jaran
Name

#066090
PE License Number

Signature

November 23, 2016
Date

I, Robert Jackson, am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for the 337 Berry Street site, site number C244233. I certify to the following:

- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

Robert L. Jackson, P.E.
QEP Name

QEP Signature

November 23, 2016
Date

EXECUTIVE SUMMARY

LPC Development Group LLC (LPC) is working with the New York State Department of Environmental Conservation ("NYSDEC" or "Department") as a "Volunteer" under the NYS Brownfield Cleanup Program, Article 27, Title 14 of the NYS Environmental Conservation Law ("ECL"). In the past, during investigation activities at the property, the Volunteer coordinated efforts with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program. The Volunteer has undertaken to investigate and remediate a 15,250 square foot site located at 337 Berry Street in Brooklyn, New York ("the Site"). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). An RI Report has been submitted for final approval to the NYSDEC. An Interim RAWP has been approved by the NYSDEC with regard to the removal of contaminated soil from the Site and that interim action has been implemented. The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms to applicable laws and regulations.

Site Location and Background

The Site is located at 337 Berry Street in the Williamsburg section in Brooklyn, New York and is identified as Block 2443 and Lot 6 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 15,420-square feet and is bounded by residential/commercial sites to the north, a site under construction and S 5th St. to the south, the commercial building to the east, and Berry St. to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is vacant with the former, approximately 10,000-square foot one-story commercial warehouse building on the north side of the site being demolished in July 2016.

Summary of Redevelopment Plan

The proposed future use of the Site will consist of an affordable housing residential building and parking lot. Layout of the proposed site development is presented in Figure 3. The current zoning designation is M1-2/R6 which includes manufacturing and residential use. The proposed use is consistent with existing zoning for the property.

The development project consists of a new 11 story, 68,625 gross square foot building, including residential, retail, a roof garden for residents and community facility. The building will be approximately 168 feet tall. The project will be 100% affordable residential housing for families making no more than 60% of the area median income. The 55 apartment units will consist of (12) Studios, (15) 1BRs, (27) 2BRs, and (1) 3BR. The ground floor will include frontage on South 5th Street with 3,823 square foot of retail space and a 1,053 square foot community facility. Areas of the property not improved by the building will be improved either with a paved parking lot or landscaping. The building will occupy approximately 8,300 feet of the approximately 15,420 square foot site. The building will have a full cellar in the northeast corner only.

The proposed development will include parking with an entrance from Berry St. and several small planting areas at each end of the parking area and one recreation area approximately 370 square feet in size at grade at the northeast corner of the proposed building.

The estimated depth of excavation is 13 feet below grade and will not go below the water table. The excavation will be for the installation of the foundation, utilities, and the small basement. Approximately 3,750 cubic yards of soil (275 for the parking area and 3,480 for the building) will be excavated for the proposed development.

Demolition of the existing building will be required for the proposed development. The demolition will be conducted in accordance with appropriate rules and regulation in New York City and State.

Summary of Surrounding Property

The area surrounding the Site is relatively flat and consists of primarily residential and commercial or mixed use properties. Many of the lots are developed with multi-family buildings. The Williamsburg

Bridge is immediately across South 5th and there is currently construction on the adjacent lot at the corner of Berry and S 5th streets as well as north across Berry St.

Summary of Past Site Uses and Areas of Concern

The historical use of the subject property has been for both residential and commercial/government use. Dating back to 1887, the northern portion of the Site has been used for a wagon and auto shed, owned or operated by the Water Purveyors Bureau and Dept. City Works, storage, and the City of N.Y. Dept. of Correction Garage, and the City of New York Landmark's Preservation Commission Salvage Warehouse. The southern portion of the Site has been used as residential, warehouse, and an auto body shop since 1887. The property is currently owned by the City of New York.

There were no AOCs identified on the subject property in the most recent Phase I Environmental Site Assessment completed in 2013.

Summary of Work Performed under the Remedial Investigation

The Remedial Investigation (RI) was completed in multiple phases in October 2015, December 2015/January 2016, and July 2016. The RI consisted of the following activities:

- Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
- Conducted a surface geophysical survey of the Site to identify any buried objects (tanks, foundation walls, utilities, etc.)
- Installed seven (7) soil borings, and collected fourteen (14) soil samples during Phase I and installed five (5) additional soil borings, and collected five (5) soil samples during Phase 2 of the RI for chemical analysis from the soil borings to evaluate soil quality. Installed an additional five (5) soil borings and collected five (5) soil samples to evaluate contaminant presence specifically at 6-7 feet below grade in the area of the proposed building and three (3) waste classification composite samples in July 2016.
- Installed four (4) permanent groundwater monitoring wells and collected four (4) groundwater samples during Phase 2 of the RI for chemical analysis to evaluate groundwater quality;

- Installed six (6) soil vapor probes and collected six (6) soil vapor during Phase 1and installed five (5) additional soil vapor probes and collected five (5) sub-slab soil vapor samples during Phase 2 of the RI for chemical analysis and;
- Collected Quality Assurance, Quality Control (QA/QC) samples in the form of duplicate and field blank samples for soil and groundwater. Trip blanks were collected for groundwater.

Summary of Findings of Remedial Investigation

The following is a summary of the findings of the RI regarding hydrogeology and the nature and extent of contamination at the Site.

1. Elevation of the property is approximately 45 feet above mean sea level and is relatively flat.
2. Depth to groundwater is approximately 45 feet bgs at the Site.
3. Groundwater flow is generally west beneath the Site.
4. Depth to bedrock is at approximately 40 feet bgs.
5. The stratigraphy of the site, from the surface down, consists of 2-11 feet of urban fill material underlain by varying thicknesses of well graded sand/silt (fine to medium sand) and well graded fine grain sand. Several of the borings; SB-1, SB-4, SB-5, and SB-7 contained medium grain sand and gravel. In borings SB-4 through SB-7, refusal was encountered at approximately 20 feet.
6. Soil/fill samples collected during the RI were compared to New York State Department of Environmental Conservation (NYSDEC) Part 375 Table 375-6.8 Unrestricted Use, Restricted Residential Use, and Protection of Groundwater Soil Cleanup Objectives (SCOs). Several Volatile Organic Compounds (VOCs) were detected. Tetrachloroethene (PCE) and trichloroethene (TCE) were each detected in the shallow (0-2 foot interval) soil samples under the existing building with PCE detected at a maximum concentration of 0.0031 milligrams per kilogram [mg/kg] and TCE detected at a maximum concentration of 0.0073 mg/kg, both below the Unrestricted Use SCOs. The additional shallow soil sampling performed in the existing building showed PCE detected at a

maximum of 0.0037 mg/kg and TCE detected at a maximum of 0.0081 mg/kg. Acetone, methylene chloride, and benzene in two shallow soil samples, and toluene in one deep soil sample were also detected but below Unrestricted Use SCOs. Several Semi-Volatile Organic Compounds (SVOCs) were detected in the samples; however, the only SVOCs detected above the Restricted Residential Use SCOs were benzaldehyde (maximum [max] 1.39 mg/kg), benzo(a)anthracene (max 1.25 mg/kg), benzo(a)pyrene (max 1.62 mg/kg), and indeno(1,2,3-cd)pyrene (max 0.957 mg/kg) in two shallow soil (0-2 foot interval) samples. The pesticides dieldrin (max. 0.0092 mg/kg), 4,4'-DDD (0.0038 mg/kg), and 4,4'-DDT (max 0.0369 mg/kg) were only detected within shallow (0-2 foot interval) soil samples above Unrestricted Use SCOs. Total PCBs were detected in one shallow (0-2 foot interval) soil sample at 0.496 mg/kg, above Unrestricted Use SCO but below the Restricted Residential Use SCO. The metals copper (max. 50.4 mg/kg), iron (max. 23,100 mg/kg), lead (max. 392 mg/kg), mercury (max. 0.97 mg/kg) and zinc (max. 184 mg/kg) were detected above Unrestricted Use SCOs. Of these metals, mercury exceeded Restricted Residential SCO in one shallow (0-2 foot) soil sample at SB-1.

Three samples contained concentrations of contaminants above the Protection to Groundwater criteria. Benzo(a)anthracene and chrysene were detected above the criteria of 1.0 mg/kg in SB-5 and SB-7 at the 0-2 foot interval. The maximum concentration of both SVOCs was detected in SB-5 at 1.39 and 1.31 mg/kg respectively. Mercury was detected in SB-1 from 0-2 feet at 0.97 mg/kg and the criteria is 0.73.

The samples collected in July 2016, did not contain any contaminants above the various regulatory criteria used to evaluate soil onsite. Waste classification soil samples collected indicated several SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd) pyrene above the unrestricted and/or restricted residential criteria in WC-1. WC-1 contained dieldrin and 4,4"DDT above the unrestricted criteria. WC-1 contained lead, mercury and zinc and WC-2 contained lead above the unrestricted criteria.

7. Groundwater samples collected during the RI were compared to the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (GQS) for Class GA (drinking water). The VOC PCE (max. 71.4 micrograms per liter [µg/L])

was detected above GQS in all four groundwater samples and TCE (max. 27.2 µg/L) was detected above GQS in three groundwater samples. One SVOC, bis(2-ethylhexyl)phthalate (max. 3.8 µg/L) was detected in the groundwater, but at a concentration below GQS. The metals iron, manganese, selenium, and sodium were detected at concentrations above the GQS in the unfiltered samples with manganese (max. 0.849 mg/L), sodium (max. 122 mg/L), and selenium (0.012 mg/L) detected at concentrations above the GQS in the filtered samples. No PCBs or pesticides were detected. Groundwater was encountered at approximately 45 feet deep. As noted in Section 5 below, the source of contamination detected in the groundwater appears to be from an up-gradient source.

8. Soil vapor samples collected at a depth of 10 feet below grade during the RI were compared to the New York State Department of Health (NYSDOH) Final Guidance on Soil Vapor Intrusion (October 2006) Matrix 1 and Matrix 2 values. The samples indicted the presence of petroleum related VOCs and chlorinated VOCs. Petroleum-related VOCs (BTEX) were detected at a maximum concentration of 79 micrograms per cubic meter [µg/m^3] in SG-5. Overall the highest reported concentration was for acetone (208 µg/m^3), 1,1-dichloroethylene (181 µg/m^3), cis-1,2-dichloroethylene (233 µg/m^3), heptane (142 µg/m^3), hexane (277 µg/m^3), propylene (3,990 µg/m^3), 2,2,4-trimethylpentane (377 µg/m^3), and trichlorofluoromethane (116 µg/m^3). Carbon tetrachloride was detected in two samples at a maximum concentration of 2.6 µg/m^3. 1,1,1-trichloethane (TCA) was detected in all six soil vapor samples and exceeded the guidance value at two locations with concentrations of 213 µg/m^3 and 278 µg/m^3. Trichloroethene (TCE) was detected in all of the soil vapor samples and exceeded the guidance value at all locations with concentrations of 21 µg/m^3, 21 µg/m^3, 135 µg/m^3, 688 µg/m^3, 1,980 µg/m^3, and 3,510 µg/m^3. Tetrachloroethene (PCE) was also detected in all soil vapor samples and exceeded the guidance value at four locations with concentrations of 142 µg/m^3, 656 µg/m^3, 739 µg/m^3, and 2,870 µg/m^3. The TCA, TCE, and PCE concentrations in soil vapor were above the monitoring level ranges established within the NYSDOH Final Guidance on Soil Vapor Intrusion.

The five additional sub-slab soil vapor samples taken within the existing building at a depth of 0-2 feet and detected PCE at a maximum concentration of 5.8 $\mu g/m^3$ and TCE detected above the guidance value with a maximum concentration of 31 $\mu g/m^3$. TCA was not detected in the sub-slab soil vapor samples. None of the soil vapor samples preclude the contemplated redevelopment of the Site but do result in the recommendation to implement soil vapor mitigation measures as part of redevelopment activity.

Summary of the Remedial Action

The Interim Remedial Measure (IRM) implemented onsite included the removal of the contaminated soil and soil required for construction of the proposed building and parking lot.

The Remedial Action includes the installation of Engineering Controls required for a Track 4 Site Specific cleanup. A concrete slab covering the entire site and waterproofing membrane would be installed as part of standard building development. Additional soil vapor management would be required including an active SSDS and a Soil Vapor Extraction (SVE) System to address soil vapor contamination. Use restrictions will be imposed on the site and the Site would continue to be encumbered with an Environmental Easement as required under the BCP.

The proposed remedial action achieves protection of public health and the environment for the intended use of the property. The proposed remedial action achieves all of the remedial action objectives established for the project and addresses applicable standards, criterion, and guidance; is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants; is cost effective and implementable; and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Additional Vapor Intrusion Investigation (VII) at two offsite locations adjacent to the subject property. The VII will consist of the collection of sub-slab and indoor air samples are 333 Berry St. and 345 Berry St. The vapor samples will be collected in accordance with the 2006 NYSDOH guidance.

2. Two (2) permanent monitoring wells will be installed to monitor groundwater downgradient of the subject property. Groundwater samples collected from the wells will be analyzed for TCL VOCs and SVOCs, pesticides, PCBs, and total and dissolved TAL metals. The final location of the wells will be coordinated with DEC.
3. Preparation and submission of an addendum to the RIR to the DEC documenting the results of the VII and groundwater monitoring. Updating of this RAWP, if required based on the results of the additional sampling.
4. Continuance of the DEC approved Citizen Participation Plan.
5. Continuance of the Community Air Monitoring Program (CAMP) for particulates and volatile organic compounds when disturbing onsite soils.
6. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
7. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
8. Figures showing the engineered composite cover are provided in Appendix 1. It will consist of concrete building slab with sub-base beneath all building areas; concrete sidewalk; asphalt parking area; and two feet of clean soil in all open space and landscaped areas.
9. Installation of a vapor barrier system consisting of vapor barrier beneath the building slab and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of at least a 20 -mil vapor barrier provided by Cetco Liquid Boot, WR Grace 160Ror Stego Wrap, below the slab throughout the full building area and outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration. The vapor barrier system is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the vapor barrier system was designed and properly installed to mitigate soil vapor migration into the building.
10. Installation of a Sub-Slab Depressurization System (SSDS) consisting of a network of horizontal pipe set in the middle of a gas permeable layer immediately beneath the building slab and vapor barrier system. The horizontal piping will consist of fabric wrapped, perforated schedule 40, 4-inch PVC pipe connected to a 4 or 6-inch cast iron or

steel riser pipe that penetrates the slab and travels through the building to the roof. The gas permeable layer will consistent of a 6-inch thick layer of 2-inch trap rock stone. The pipe will be finished at the roof line with a 4 or 6-inch goose neck pipe to prevent rain infiltration. The active SSDS will be hardwired and will include a blower installed on the roof line and a pressure gauge and alarm located in an accessible area in the basement. The manufacture and model of the blower will be determined at a later time. The active SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the active SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building.

11. Construction and operation of a SVE system, to be designed, for implementation in the street level parking area to address the potential, if any, of migration of vapors from the Site to adjoining property. SVE design will be completed upon completion of the offsite VII.
12. Groundwater monitoring of the new monitoring wells.
13. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
15. Submission of an approved Site Management Plan (SMP) in the Remedial Action Plan (RAP) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
16. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.
17. The property will continue to be registered with an E-Designation at the NYC Buildings Department and will also have an Environmental Easement with regard to restrictions on the Site. Establishment of Engineering Controls and Institutional Controls in this RAWP

and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without appropriate approval.

COMMUNITY PROTECTION STATEMENT

The NYC Office of Environmental Remediation (OER) provides governmental oversight for the cleanup of contaminated property in NYC and, in this case, has transferred the lead for oversight of the investigation and cleanup of the property to the NYSDEC. This Remedial Action Work Plan ("cleanup plan") describes the findings of prior environmental studies, shows the location of identified contamination at the site, and describes the plans to clean up the site to protect public health and the environment.

This cleanup plan provides a high level of protection for neighboring communities and also includes many other elements that address common community concerns, such as community air monitoring, odor, dust and noise controls, hours of operation, good housekeeping and cleanliness, truck management and routing, and opportunities for community participation. The purpose of this Community Protection Statement is to explain these community protection measures in non-technical language to simplify community review.

Project Information:

- Site Name: Williamsburg Bridgeview Apartments
- Site Address: 337 Berry Street, Brooklyn, NY
- NYS Brownfield Cleanup Program Project Number: C244233

Project Contacts:

- NYSDEC Project Manager: Melissa Sweet, 518-402-9614
- Site Project Manager: Mario Procida 718-299-7000

- Site Safety Officer: To be determined
- Online Document Repository: http://www.nyc.gov/html/oer/html/repository/RBrooklyn.shtml

Remedial Investigation and Cleanup Plan: Under the oversight of the NYCDEC, a thorough study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils and soil vapor, and to identify contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

Identification of Sensitive Land Uses: Prior to selecting a cleanup, the neighborhood was evaluated to identify sensitive land uses nearby, such as schools, day care facilities, hospitals and residential areas. The subject property is within a residential area. No other sensitive uses were identified in the immediate area.

Qualitative Human Health Exposure Assessment: A part of the cleanup planning for the Site is a study to find all of the ways that people might come in contact with contaminants at the Site now or in the future. This study is called a Qualitative Human Health Exposure Assessment (QHHEA). A QHHEA was performed for this project. This assessment has considered all known contamination at the Site and evaluated the potential for people to come in contact with this contamination. All identified public exposures will be addressed under this cleanup plan.

Health and Safety Plan: This cleanup plan includes a Construction Health and Safety Plan (CHASP) that is designed to protect community residents and on-Site workers. The elements of this RAWP are in compliance with applicable safety requirements of the United States Occupational Safety and Health Administration (OSHA). This RAWP includes many protective elements including those discussed below.

Site Safety Coordinator: This project has a designated Site safety coordinator to implement the CHASP. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is identified at the beginning of this Community Protection Statement.

Worker Training: Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour hazardous waste operators training course and to take annual refresher training. This pertains to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas.

Community Air Monitoring Plan: Community air monitoring will be performed during this cleanup project to ensure that the community is properly protected from contaminants, dust and odors. Air samples will be tested in accordance with a detailed plan called the Community Air Monitoring Plan or CAMP. Results will be regularly reported to the NYSDEC. This cleanup plan also has a plan to address any unforeseen problems that might occur during the cleanup (called a 'Contingency Plan').

Odor, Dust and Noise Control: This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with applicable NYC noise control standards. If you observe problems in these areas, please contact the onsite Project Manager or DEC Project Manager listed on the first page of this Community Protection Statement document.

Quality Assurance: This cleanup plan requires that evidence be provided to illustrate that all cleanup work required under the plan has been completed properly. This evidence will be summarized in the final report, called the Remedial Action Report. This report will be submitted to the DEC and will be thoroughly reviewed.

Stormwater Management: To limit the potential for soil erosion and discharge, this cleanup plan has provisions for stormwater management. The main elements of the stormwater management include physical barriers such as tarp covers and erosion fencing, and a program for frequent inspection.

Hours of Operation: The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. For this cleanup project, the hours of operation will conform to requirements of the NYC Department of Buildings.

Signage: While the cleanup is in progress, a placard will be prominently posted at the main entrance of the property with a laminated project Fact Sheet that states that the project is in the NYS DEC Brownfield Cleanup Program (BCP) and provides project contact names and numbers, and a link to the document repository where project documents can be viewed.

Complaint Management: The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager or the DEC Project Manager listed on the first page of this Community Protection Statement document, or call 311 and mention the Site is in the NYC BCP.

Utility Mark-outs: To promote safety during excavation in this cleanup, the contractor is required to first identify all utilities and must perform all excavation and construction work in compliance with NYC Department of Buildings regulations.

Soil and Liquid Disposal: If additional soil and/or liquid material must be removed from the Site as part of the cleanup, it will be transported and disposed of in accordance with all applicable City, State and Federal regulations, and required permits will be obtained.

Soil Chemical Testing and Screening: If necessary, all excavations will be supervised by a trained and properly qualified environmental professional. In addition to extensive sampling and chemical testing of soils on the Site, excavated soil will be screened continuously using hand-held instruments, by sight, and by smell to ensure proper material handling and management, and community protection.

Trucks and Covers: If necessary, loaded trucks leaving the Site will be covered in compliance with applicable laws and regulations to prevent dust and odor. Trucks will be properly recorded in logs and records and placarded in compliance with applicable City, State and Federal laws, including those of the New York State Department of Transportation. If loads contain wet material that can leak, truck liners will be used. All transport of materials will be performed by licensed truckers and in compliance with applicable laws and regulations.

Imported Material: All fill materials proposed to be brought onto the Site will comply with rules outlined in this cleanup plan and will be inspected and approved by a qualified worker located on the Site. Waste materials will not be brought onto the Site. Trucks entering the Site with imported clean materials will be covered in compliance with applicable laws and regulations.

Equipment Decontamination: All equipment used for cleanup work will be inspected and washed, if needed, before it leaves the Site. Trucks will be cleaned at a truck inspection station on the property before leaving the Site.

Housekeeping: Locations where trucks enter or leave the Site will be inspected every day and cleaned regularly to ensure that they are free of dirt and other materials from the Site.

Truck Routing: Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the

property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

Final Report: The results of all cleanup work will be fully documented in a final report (called the Remedial Action Report) that will be available for public review online. A link to the online document repository and the public library with Internet access nearest the Site are listed on the first page of this Community Protection Statement document

Long-Term Site Management: If long-term protection is needed after the cleanup is complete, the property owner will be required to comply with a Site Management Plan (SMP) that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the DEC. Requirements that the property owner must comply with are defined in the SMP which will be attached to the Final Engineering Report ("FER") that will summarize all of the investigation and remedial action implemented and required at the BCP Site. . A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

REMEDIAL ACTION WORK PLAN

1.0 Project Background

LPC is working with the DEC in the New York BCP.LPC is a Volunteer in the program. A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, and complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 Site Location and Background

The Site is located at 337 Berry Street in the Williamsburg section in Brooklyn, New York and is identified as Block 2443 and Lot 6 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 15,420-square feet and is bounded by residential/commercial sites to the north, a site under construction and S 5th St. to the south, the commercial building to the east, and Berry St. to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is vacant with the former, approximately 10,000-square foot one-story commercial warehouse building on the north side of the site being demolished in July 2016.

1.2 Redevelopment Plan

The proposed future use of the Site will consist of an affordable housing residential building and parking lot. Layout of the proposed site development is presented in Figure 3. The current zoning designation is M1-2/R6 which includes manufacturing and residential use. The proposed use is consistent with existing zoning for the property.

The development project consists of a new 11 story, 68,625 gross square foot building, including residential, retail, a roof garden for residents and community facility. The building will be approximately 168 feet tall. The project will be 100% affordable residential housing for families making no more than 60% of the area median income. The 55 apartment units will consist of

(12) Studios, (15) 1BRs, (27) 2BRs, and (1) 3BR. The ground floor will include frontage on South 5th Street with 3,823 square foot of retail space and a 1,053 square foot community facility. Areas of the property not improved by the building will be improved either with a paved parking lot or landscaping. The building will occupy approximately 8,300 feet of the approximately 15,420 square foot site. The building will have a full cellar in the northeast corner only.

The proposed development will include parking with an entrance from Berry St. and several small planting areas at each end of the parking area and one recreation area approximately 370 square feet in size at grade at the northeast corner of the proposed building.

The estimated depth of excavation for the vast majority of the site is 13 feet below grade and will not go below the water table. The elevator pit area will be excavated to a maximum depth of 17 feet bgs. The parking area will be excavated to a depth of 1-foot bgs. The areas adjacent to the existing buildings to the southwest and northeast will vary between 4-5 feet and 10 feet bgs respectively. The excavation will be for the installation of the foundation, utilities, and the small basement. Approximately 3,750 cubic yards of soil (275 for the parking area and 3,480 for the building) will be excavated for the proposed development.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

1.3 Description of Surrounding Property

The area surrounding the Site is relatively flat and consists of primarily residential and commercial or mixed use properties. Many of the lots are developed with multi-family buildings. The Williamsburg Bridge is immediately across South 5th and there is currently construction on the adjacent lot at the corner of Berry and S 5th streets as well as north across Berry St. Figure 4 shows the surrounding land usage within a 500 foot radius of the Site. According to OER's *SPEED* application, no schools, hospitals, or day care facilities are located within a 500-foot radius of the Site.

1.4 Summary of Past Site Uses and Areas of Concern

The historical use of the subject property has been for both residential and commercial/government use. Dating back to 1887, the northern portion of the Site has been used for a wagon and auto shed, owned or operated by the Water Purveyors Bureau and Dept. City Works, storage, and the City of N.Y. Dept. of Correction Garage, and the City of New York Landmark's Preservation Commission Salvage Warehouse. The southern portion of the Site has been used as residential, warehouse, and an auto body shop since 1887.

There were no AOCs identified on the subject property in the most recent Phase I Environmental Site Assessment completed in 2013.

1.5 Summary of Work Performed under the Remedial Investigation

The Remedial Investigation (RI) was completed in multiple phases in October 2015, December 2015/January 2016, and July 2016. The RI consisted of the following activities:

1. Installed seven (7) soil borings, and collected fourteen (14) soil samples during Phase I and installed five (5) additional soil borings, and collected five (5) soil samples during Phase 2 of the RI for chemical analysis from the soil borings to evaluate soil quality. Installed an additional five (5) soil borings and collected five (5) soil samples to evaluate contaminant presence specifically at 6-7 feet below grade in the area of the proposed building and three (3) waste classification composite samples in July 2016.

2. Installed four (4) permanent groundwater monitoring wells and collected four (4) groundwater samples during Phase 2 of the RI for chemical analysis to evaluate groundwater quality;

3. Installed six (6) soil vapor probes and collected six (6) soil vapor during Phase 1and installed five (5) additional soil vapor probes and collected five (5) sub-slab soil vapor samples during Phase 2 of the RI for chemical analysis and;

4. Collected Quality Assurance, Quality Control (QA/QC) samples in the form of duplicate and field blank samples for soil and groundwater. Trip blanks were collected for groundwater.

1.6 Summary of Findings of Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called "Remedial Investigation Report, 337 Berry Street", dated November 2015 (RIR).

The following is a summary of the findings of the RI regarding hydrogeology and the nature and extent of contamination at the Site.

1. Elevation of the property is approximately 45 feet above mean sea level and is relatively flat.

2. Depth to groundwater is approximately 45 feet bgs at the Site.

3. Groundwater flow is generally west beneath the Site.

4. Depth to bedrock is at approximately 40 feet bgs.

5. The stratigraphy of the site, from the surface down, consists of 2-11 feet of urban fill material underlain by varying thicknesses of well graded sand/silt (fine to medium sand) and well graded fine grain sand. Several of the borings; SB-1, SB-4, SB-5, and SB-7 contained medium grain sand and gravel. In borings SB-4 through SB-7, refusal was encountered at approximately 20 feet.

6. Soil/fill samples collected during the RI were compared to New York State Department of Environmental Conservation (NYSDEC) Part 375 Table 375-6.8 Unrestricted Use, Restricted Residential Use, and Protection of Groundwater Soil Cleanup Objectives (SCOs). Several Volatile Organic Compounds (VOCs) were detected. Tetrachloroethene (PCE) and trichloroethene (TCE) were each detected in the shallow (0-2 foot interval) soil samples under the existing building with PCE detected at a maximum concentration of 0.0031 milligrams per kilogram [mg/kg] and TCE detected at a maximum concentration of 0.0073 mg/kg, both below the Unrestricted Use SCOs. The additional shallow soil sampling performed in the existing building showed PCE detected at a maximum of 0.0037 mg/kg and TCE detected at a maximum of 0.0081 mg/kg. Acetone, methylene chloride, and benzene in two shallow soil samples, and toluene in one deep soil sample were also detected but below Unrestricted Use SCOs. Several Semi-Volatile

Organic Compounds (SVOCs) were detected in the samples; however, the only SVOCs detected above the Restricted Residential Use SCOs were benzaldehyde (maximum [max] 1.39 mg/kg), benzo(a)anthracene (max 1.25 mg/kg), benzo(a)pyrene (max 1.62 mg/kg), and indeno(1,2,3-cd)pyrene (max 0.957 mg/kg) in two shallow soil (0-2 foot interval) samples. The pesticides dieldrin (max. 0.0092 mg/kg), 4,4'-DDD (0.0038 mg/kg), and 4,4'-DDT (max 0.0369 mg/kg) were only detected within shallow (0-2 foot interval) soil samples above Unrestricted Use SCOs. Total PCBs were detected in one shallow (0-2 foot interval) soil sample at 0.496 mg/kg, above Unrestricted Use SCO but below the Restricted Residential Use SCO. The metals copper (max. 50.4 mg/kg), iron (max. 23,100 mg/kg), lead (max. 392 mg/kg), mercury (max. 0.97 mg/kg) and zinc (max. 184 mg/kg) were detected above Unrestricted Use SCOs. Of these metals, mercury exceeded Restricted Residential SCO in one shallow (0-2 foot) soil sample at SB-1.

Three samples contained concentrations of contaminants above the Protection to Groundwater criteria. Benzo(a)anthracene and chrysene were detected above the criteria of 1.0 mg/kg in SB-5 and SB-7 at the 0-2 foot interval. The maximum concentration of both SVOCs was detected in SB-5 at 1.39 and 1.31 mg/kg respectively. Mercury was detected in SB-1 from 0-2 feet at 0.97 mg/kg and the criteria is 0.73.

The samples collected in July 2016, did not contain any contaminants above the various regulatory criteria used to evaluate soil onsite. Waste classification soil samples collected indicated several SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd) pyrene above the unrestricted and/or restricted residential criteria in WC-1. WC-1 contained dieldrin and 4,4"DDT above the unrestricted criteria. WC-1 contained lead, mercury and zinc and WC-2 contained lead above the unrestricted criteria.

7. Groundwater samples collected during the RI were compared to the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (GQS) for Class GA (drinking water). The VOC PCE (max. 71.4 micrograms per liter [µg/L]) was detected above GQS in all four groundwater samples and TCE (max. 27.2 µg/L) was detected above GQS in three groundwater samples. One SVOC, bis(2-ethylhexyl)phthalate (max. 3.8 µg/L) was detected in the groundwater, but at a

concentration below GQS. The metals iron, manganese, selenium, and sodium were detected at concentrations above the GQS in the unfiltered samples with manganese (max. 0.849 mg/L), sodium (max. 122 mg/L), and selenium (0.012 mg/L) detected at concentrations above the GQS in the filtered samples. No PCBs or pesticides were detected. Groundwater was encountered at approximately 45 feet deep. As noted in Section 5 below, the source of contamination to the groundwater appears to be from an up-gradient source.

8. Soil vapor samples collected at a depth of 10 feet below grade during the RI were compared to the New York State Department of Health (NYSDOH) Final Guidance on Soil Vapor Intrusion (October 2006) Matrix 1 and Matrix 2 values. The samples indicted the presence of petroleum related VOCs and chlorinated VOCs. Petroleum-related VOCs (BTEX) were detected at a maximum concentration of 79 micrograms per cubic meter [$\mu g/m^3$] in SG-5. Overall the highest reported concentration was for acetone (208 $\mu g/m^3$), 1,1-dichloroethylene (181 $\mu g/m^3$), cis-1,2-dichloroethylene (233 $\mu g/m^3$), heptane (142 $\mu g/m^3$), hexane (277 $\mu g/m^3$), propylene (3,990 $\mu g/m^3$), 2,2,4-trimethylpentane (377 $\mu g/m^3$), and trichlorofluoromethane (116 $\mu g/m^3$). Carbon tetrachloride was detected in two samples at a maximum concentration of 2.6 $\mu g/m^3$. 1,1,1-trichloethane (TCA) was detected in all six soil vapor samples and exceeded the guidance value at two locations with concentrations of 213 $\mu g/m^3$ and 278 $\mu g/m^3$. Trichloroethene (TCE) was detected in all of the soil vapor samples and exceeded the guidance value at all locations with concentrations of 21 $\mu g/m^3$, 21 $\mu g/m^3$, 135 $\mu g/m^3$, 688 $\mu g/m^3$, 1,980 $\mu g/m^3$, and 3,510 $\mu g/m^3$. Tetrachloroethene (PCE) was also detected in all soil vapor samples and exceeded the guidance value at four locations with concentrations of 142 $\mu g/m^3$, 656 $\mu g/m^3$, 739 $\mu g/m^3$, and 2,870 $\mu g/m^3$. The TCA, TCE, and PCE concentrations in soil vapor were above the monitoring level ranges established within the NYSDOH Final Guidance on Soil Vapor Intrusion.

   The five additional sub-slab soil vapor samples taken within the existing building at a depth of 0-2 feet and detected PCE at a maximum concentration of 5.8 $\mu g/m^3$ and TCE detected above the guidance value with a maximum concentration of 31 $\mu g/m^3$. TCA was not detected in the sub-slab soil vapor samples.

Based on an evaluation of the data and information from the RIR and this RAWP, disposal of hazardous waste is not suspected at this site.

2.0 Remedial Action Objectives

Based on the results of the RI, the following Remedial Action Objectives (RAOs) have been identified for this Site:

Soil

- Prevent direct contact with contaminated soil.
- Prevent exposure to contaminants volatilizing from contaminated soil.

Groundwater

- Groundwater will be investigated to determine which of the following RAOs apply:
    - Remove contaminant sources causing impact to groundwater.
    - Prevent direct exposure to contaminated groundwater.
    - Prevent exposure to contaminants volatilizing from contaminated groundwater.

Soil Vapor

- Prevent exposure to contaminants in soil vapor.
- Prevent migration of soil vapor into dwelling and other occupied structures.

3.0 Remedial Alternatives Analysis

The goal of the remedy selection process is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedance of applicable standards, criteria and guidance values (SCGs). Remedial alternatives are then developed and evaluated based on the following ten criteria:

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

Excavation of contaminated soil and soil required for construction was completed as part of the IRM for the site. The IRM was implemented under the oversight of the NYSDEC. No further excavation is planned for the Site.

The final remedial alternative is as follows:

- Remedial action to Track 4 SCOs:
- Vapor Intrusion Investigation (VII) of the two adjacent properties will be conducted to determine if soil vapors are migrating offsite. A sub-slab and indoor air sample will be collected from both properties for analysis to determine the extent of contamination potentially migrating offsite.

- Placement of a composite cover system over the entire Site to prevent exposure to remaining soil. The engineered composite cover would consist of a five-inch thick concrete building slab with an 6 to 8-inch clean granular sub-base beneath all building areas; 4-inch poured concrete on a 6-inch sub-base in sidewalk areas; 10 inches of base course material and 1-1/2 inches of asphalt in the parking area; and two feet of clean soil in all open space and landscaped areas. Parking areas would be covered with asphalt.
- Installation of a vapor barrier (or) waterproofing/vapor barrier system beneath the building slab and along foundation side walls to prevent potential exposures from soil vapor;
- Installation of an active Sub Slab Depressurization System (SSDS) under the proposed building;
- Installation of a soil vapor extraction (SVE) system under the proposed parking area to be operated in the event soil vapors are migrating from the Site;
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of restricted Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without DEC approval;
- Establishment of an approved Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended. The SMP will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- The filing of an Environmental Easement in accordance with Article 71, Title 36 of the ECL; and
- The property will continue to be registered with an E-Designation at the NYC Buildings Department.

3.1 Threshold Criteria

Protection of Public Health and the Environment

This criterion is an evaluation of the remedy's ability to protect public health and the environment, and an assessment of how risks posed through each existing or potential pathway of exposure are eliminated, reduced or controlled through removal, treatment, and implementation of Engineering Controls or Institutional Controls. Protection of public health and the environment must be achieved for all approved remedial actions.

The remedial alternative will achieve comparable protections of human health and the environment by excavation and removal of most of the historic fill at the Site and by ensuring that remaining soil/fill on-Site meets Track 4 Site-Specific SCO's, as well as by placement of Institutional and Engineering Controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. Implementing Institutional Controls including a Site Management Plan and continuing the E-designation a deed notice on the property would ensure that the composite cover system remains intact and protective of public health. Establishment of Track 4 Site-Specific SCO's would minimize the risk of contamination leaching into groundwater.

The alternative will minimize potential exposure to contaminated soils or groundwater during construction by implementing a Construction Health and Safety Plan, an approved Soil/Materials Management Plan, and Community Air Monitoring Plan (CAMP). Potential contact with contaminated groundwater would be prevented as its use is prohibited by city laws and regulations. Potential future migration of off-Site soil vapors into the new building would be prevented by installing a vapor barrier and SSDS below the building slab and outside foundations walls below grade and a SVE system below the parking area.

3.2 Balancing Criteria

Compliance with Standards, Criteria and Guidance (SCGs)

This evaluation criterion assesses the ability of the remedial alternative to achieve applicable standards, criteria and guidance.

The alternative would achieve compliance with the remedial goals, chemical-specific SCG's and RAOs for soil through removal of soil to meet Track 4 Site-Specific SCO's. Compliance with SCG's for soil vapor would also be achieved by installing a vapor barrier and active SSDS system below the new building's basement slab and continuing the vapor barrier outside of subgrade foundation walls. A SVE system would be installed under the proposed parking area. A Site Management Plan would ensure that these controls remained protective for the long term.

A Site Management Plan (SMP) would ensure that these controls remained protective for the long term. Health and safety measures contained in the CHASP and Community Air Monitoring Plan (CAMP) will be implemented during Site redevelopment under this RAWP. The alternative focuses attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs. These measures will protect on-site workers and the surrounding community from exposure to Site-related contaminants.

Short-Term Effectiveness and Impacts

This evaluation criterion assesses the effects of the alternative during the construction and implementation phase until remedial action objectives are met. Under this criterion, alternatives are evaluated with respect to their short term effects during the remedial action on public health and the environment during implementation of the remedial action, including protection of the community, protection of onsite workers and environmental impacts.

The remedial alternative may result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic. However, focused attention to

means and methods during any additional removal action, including community air monitoring and appropriate truck routing, would minimize the overall impact of these activities.

An additional short-term adverse impact and risks to the community associated with both remedial alternatives is increased truck traffic. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flag persons will be used to protect pedestrians at Site entrances and exits.

The potential adverse impact to the community, workers and the environment for both alternatives would be minimized through implementation of control plans including a Construction Health and Safety Plan, a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-Site soil disturbance activities and would minimize the release of contaminants into the environment. Both alternatives provide short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. Construction workers operating under appropriate management procedures and a Construction Health and Safety Plan (CHASP) would provide protection from on-Site contaminants by using personal protective equipment would be worn consistent with the documented risks within the respective work zones.

Long-term effectiveness and permanence

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have been met, such as permanence of the remedial alternative, magnitude of remaining contamination, adequacy of controls including the adequacy and suitability of Engineering Controls/Institutional Controls (ECs/ICs) that may be used to manage contaminant residuals that remain at the Site and assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of ECs.

The remedial alternative will provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-Specific SCOs; installing a composite cover system

across the Site; maintaining use restrictions; establishing an SMP to ensure long-term management of ICs and ECs; and maintaining registration as an E-designated property to memorialize these controls for the long term. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended, assuring that protections designed into the remedy continue to provide the required level of protection.

Reduction of toxicity, mobility, or volume of contaminated material

This evaluation criterion assesses the remedial alternative's use of remedial technologies that permanently and significantly reduce toxicity, mobility, or volume of contaminants as their principal element. The following is the hierarchy of source removal and control measures that are to be used to remediate a Site, ranked from most preferable to least preferable: removal and/or treatment, containment, elimination of exposure and treatment of source at the point of exposure. It is preferred to use treatment or removal to eliminate contaminants at a Site, reduce the total mass of toxic contaminants, cause irreversible reduction in contaminants mobility, or reduce of total volume of contaminated media.

The IRM will have removed all of the of the historic fill at the Site, and all remaining on-Site soil beneath the new building and soil/fill below the parking lot will meet Track 4 Site-Specific SCO's.

Implementability

This evaluation criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation, including technical feasibility of construction and operation, reliability of the selected technology, ease of undertaking remedial action, monitoring considerations, administrative feasibility (e.g. obtaining permits for remedial activities), and availability of services and materials.

The techniques, materials and equipment to implement the alternative are readily available and have been proven to be effective in remediating the contaminants present on the Site. They use standard equipment and technologies that are well established in the industry. The reliability of each remedy is also high. There are no special difficulties associated with any of the activities proposed.

Cost effectiveness

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, and disposal costs, engineering expenses) and site management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

Historic fill at the Site was found to extend to a depth of approximately 2 feet below grade during the RI, and the new building requires excavation of the Site within the building footprint to a depth of approximately 13 feet and the parking area requires excavation to approximately 1 foot. The IRM will have addressed the excavation and removal of these soils. Further excavation and soil removal will incur additional costs for additional shoring/underpinning, disposal of additional soil, and import of clean soil for backfill.

Community Acceptance

This evaluation criterion addresses community opinion and support for the remedial action. Observations here will be supplemented by public comment received on the RAWP.

This RAWP will be subject to a public review under the DEC BCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedy. This public comment will be considered by DEC prior to approval of this plan. The Citizen Participation Plan for the project is provided in Appendix 2. Observations here will be supplemented by public comment received on the RAWP. Under both alternatives, the overall goals of the remedial program, to protect public health and the environment and eliminate potential contaminant exposures, have been broadly supported by citizens in NYC communities.

Land use

This evaluation criterion addresses the proposed use of the property. This evaluation has considered reasonably anticipated future uses of the Site and takes into account: current use and historical and/or recent development patterns; applicable zoning laws and maps; NYS Department of State's Brownfield Opportunity Areas (BOA) pursuant to section 970-r of the general municipal law; applicable land use plans; proximity to real property currently used for residential use, and to commercial, industrial, agricultural, and/or recreational areas; environmental justice impacts, Federal or State land use designations; population growth patterns and projections; accessibility to existing infrastructure; proximity of the site to important cultural resources and natural resources, potential vulnerability of groundwater to contamination that might emanate from the site, proximity to flood plains, geography and geology; and current Institutional Controls applicable to the site.

The current, intended, and reasonably anticipated future land use of the Site and its surroundings are compatible with the selected remedy of soil remediation. The proposed future use of the Site includes an eleven story affordable housing project to provide 55 dwelling units and commercial and community use establishments at grade. Following remediation, the Site will meet Track 4 SCOs, [although in many locations the remedial action will achieve Track 1 SCOs], which are protective of public health and the environment for its planned residential use. The proposed use is compliant with the property's zoning and is consistent with recent development patterns. The areas surrounding the site is urban and consists of predominantly mixed light manufacturing, residential, and commercial buildings in zoning districts designated for commercial and residential uses. The development would remediate a vacant contaminated lot and provide a modern residential building. The proposed development would clean up the property and make it safer, create new employment opportunities, living space for affordable housing and associated societal benefits to the community, and other economic benefits from land revitalization.

Temporary short-term project impacts are being mitigated through site management controls and truck traffic controls during remediation activities. Following remediation, the Site will meet either Track 1 Unrestricted Use SCOs or Track 4 Site-Specific SCOs, both of which are protective of public health and the environmental for its planned use.

The Site is not in close proximity to important cultural resources, including federal or state historic or heritage sites or Native American religious sites, natural resources, waterways, wildlife refuges, wetlands, or critical habitats of endangered or threatened species. The Site is located in an urban area and not in proximity to fish or wildlife and neither alternative would result in any potential exposure pathways of contaminant migration affecting fish or wildlife. The remedial action is also protective of groundwater natural resources. The Site does not lie in a Federal Emergency Management Agency (FEMA)-designated flood plain. Both alternatives are equally protective of natural resources and cultural resources. Improvements in the current environmental condition of the property achieved by both alternatives considered in this plan are consistent with the City's goals for cleanup of contaminated land.

Sustainability of the Remedial Action

This criterion evaluates the overall sustainability of the remedial action alternatives and the degree to which sustainable means are employed to implement the remedial action including those that take into consideration NYC's sustainability goals defined in PlaNYC: A Greener, Greater New York. Sustainability goals may include: maximizing the recycling and reuse of non-virgin materials; reducing the consumption of virgin and non-renewable resources; minimizing energy consumption and greenhouse gas emissions; improving energy efficiency; and promotion of the use of native vegetation and enhancing biodiversity during landscaping associated with Site development.

The remedial alternative will result in increased energy usage based on the continuous operation of the SSDS and SVE systems. The remedial plan will take into consideration the shortest trucking routes during off-Site disposal of soil, which would reduce greenhouse gas emissions and conserve energy used to fuel trucks. The New York City Clean Soil Bank program is available for reuse of any clean native soils under either alternative.

SELECTION OF THE PREFERRED REMEDY

The preferred remedy for the site is to meet the Track 4 SCOs. A concrete slab covering the entire site and waterproofing membrane would be installed as part of standard building

development. Additional soil vapor management would be required including an active SSDS and a Soil Vapor Extraction (SVE) System to address soil vapor contamination. Use restrictions will be imposed on the site (including prohibitions on any use higher than Restricted Residential, e.g. the use of groundwater from the Site; prohibitions of restricted Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without NYSDEC approval). The Site would continue to be encumbered with an Environmental Easement and E-designation for hazardous material.

4.0 Remedial Action

4.1 Summary of Preferred Remedial Action

Since the remedy at this site includes installation and operation of an active SSDS and a SVE system, and contaminated groundwater migrates onto the Site from up-gradient, a Track 1 remedy is not selected. Therefore, the preferred remedial action alternative is the Track 4 remedial action. The preferred remedial action achieves protection of public health and the environment for the intended use of the property. The preferred remedial action will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Additional Vapor Intrusion Investigation (VII) at two offsite locations adjacent to the subject property. The VII will consist of the collection of sub-slab and indoor air samples are 333 and 345 Berry St. The vapor samples will be collected in accordance with the 2006 NYSDOH guidance.
2. Two (2) permanent monitoring wells will be installed to monitor groundwater downgradient of the subject property. Groundwater samples collected from the wells will be analyzed for TCL VOCs and SVOCs, pesticides, PCBs, and total and dissolved TAL metals. The final location of the wells will be coordinated with DEC.

3. Preparation and submission of an addendum to the RIR tothe DEC documenting the results of the VII and groundwater monitoring. Updating of this Remedial Action Work Plan (RAWP), if required based on the results of the additional sampling.
4. Continuance of the DEC approved Citizen Participation Plan.
5. Continuance of the Community Air Monitoring Program for particulates and volatile organic carbon compounds when disturbing onsite soils.
6. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
7. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
8. Figures showing the engineered composite cover are provided in Appendix 1. It will consist of concrete building slab with sub-base beneath all building areas; concrete sidewalk; asphalt parking area; and two feet of clean soil in all open space and landscaped areas.
9. Installation of a vapor barrier system consisting of vapor barrier beneath the building slab and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of at least a 20 -mil vapor barrier provided by Cetco Liquid Boot, WR Grace 160Ror Stego Wrap, below the slab throughout the full building area and outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration. The vapor barrier system is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the vapor barrier system was designed and properly installed to mitigate soil vapor migration into the building.
10. Installation of a sub-slab depressurization system (SSDS) consisting of a network of horizontal pipe set in the middle of a gas permeable layer immediately beneath the building slab and vapor barrier system. The horizontal piping will consist of fabric wrapped, perforated schedule 40, 4-inch PVC pipe connected to a 4 or 6-inch cast iron or steel riser pipe that penetrates the slab and travels through the building to the roof. The gas permeable layer will consistent of a 6-inch thick layer of 2-inch trap rock stone. The pipe will be finished at the roof line with a 4 or 6-inch goose neck

pipe to prevent rain infiltration. The active SSDS will be hardwired and will include a blower installed on the roof line and a pressure gauge and alarm located in an accessible area in the basement. The manufacture and model of the blower will be determined at a later time. The active SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the active SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building.

11. Construction of a SVE system, to be designed, for the street level parking area. SVE design will be completed upon completion of the offsite VII and, based upon that data, will be considered for active operation.
12. Groundwater monitoring of the new monitoring wells.
13. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
15. Submission of an approved Site Management Plan (SMP) in the Remedial Action Plan (RAR) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
16. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.
17. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual

contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without appropriate approval.

4.2 Soil Cleanup Objectives and Soil/ Fill Management

The following Track 4 Site-Specific SCO's will be utilized for this project:

Contaminant	Site-Specific SCO's
PCE, TCE, 1,1,1-TCA	Groundwater Protection Standards
Mercury	2.5 ppm
Total SVOCs	250 ppm

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix 3. Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

End-point Sampling

There is no proposed soil/fill excavation and removal planned for the remedial action that will require end-point sampling.

If either LNAPL and/or DNAPL are detected, appropriate samples will be collected for characterization and "finger print analysis" and required regulatory reporting (i.e. spills hotline) will be performed.

Quality Assurance/Quality Control

IFany End-point sampling is required, the fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision, and completeness requirements will be addressed by the laboratory for all data generated. Samples will be collected in appropriate sample containers that are pre-preserved as required. Samples will be collected and

shipped via courier to the ELPA las so as to no miss analytical method required holding times. Typical EPA SW-846 analytical methods will be used and the standards used for comparison clearly stated.

One blind duplicate sample for every 20 samples collected will be submitted to the approved laboratory for analysis of the same parameters. Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs. One trip blank will be submitted to the laboratory with each shipment of soil or groundwater samples. Trip blanks will not be used for samples to be analyzed for metals, SVOCs, or pesticides. The lab will report the results of the lab blanks taken during the analytical program.

Collected samples will be appropriately packaged, placed in coolers, and shipped to the analytical laboratory by field personnel or lab courier. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or cold-packs to maintain a temperature of $4^{o}C$.

Dedicated disposable sampling materials will be used for the collection of endpoint samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected. Decontamination of the non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil
- Rinse with tap water
- Wash with alconox detergent solution and scrub
- Rinse with tap water
- Rinse with distilled or deionized water

Field blanks will be prepared by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers.

Import of Soils

Import of soils onto the property will be performed in conformance with the Soil/Materials Management Plan in Appendix 3. Imported soil will meet, based upon the requirement and approval of the NYSDEC:

- Track 4 Restricted Residential Use SCO's, or
- Groundwater Protection Standards in Part 375-6.8.

The estimated quantity of soil to be imported into the Site for backfill and cover soil is approximately 600 cubic yards or 900 tons. The area requiring the backfill is at the entrance to the site along S 5th Street.

Reuse of Onsite Soils

Soil reuse is not planned on this project.

4.3 Engineering Controls

Engineering Controls will be employed in the remedial action to address residual contamination remaining at the site. The Site has 4 primary Engineering Control Systems. These are:

(1) Composite Cover System
(2) Soil Vapor Barrier System
(3) Active Sub-Slab Depressurization System for the building
(4) SVE system for the parking area

Composite Cover System

Exposure to residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. This composite cover system for the site is shown on the figures provided in Appendix 1.

The composite cover system will be a permanent engineering control. The system will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite

cover system and underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the Site Management Plan in the Remedial Action Report.

Vapor Barrier System

Migration of soil vapor from onsite or offsite sources into the building will be mitigated with a combination of building slab and vapor barrier. The vapor barrier will extend throughout the area occupied by the footprint of the new building and up the foundation sidewalls and will be installed in accordance with manufacturer specifications. Vendor specifications for the potential vapor barrier is provided in Appendix 4.

Figures showing the location of the proposed vapor barrier system and typical design sections for the vapor barrier on slab and sidewalls are provided in Appendix 6. Product specification sheets are provided in Appendix 4. The Remedial Action Report will include as-built drawings and diagrams; manufacturer documentation; and photographs.

The Remedial Action Report will include a PE-certified letter (on company letterhead) from the primary contractor responsible for installation oversight and field inspections and a copy of the manufacturer's certificate of warranty.

The Vapor Barrier System is a permanent engineering control and will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying vapor barrier system is disturbed after the remedial action is complete. Maintenance of these systems will be described in the Site Management Plan in the Remedial Action Report.

Sub-Slab Depressurization System

Migration of soil vapor into the building will be mitigated with the construction of an active Sub-Slab Depressurization System (SSDS). The SSDS will consist of 6-inch permeable layer of 1-2 inch crushed stone, a series of horizontal, perforated PVC pipe or venting mat to collect vapors

sub-slab, 4-inch cast iron or steel vertical piping above the slab that travels up through or outside the building to the roof where in-line exhaust fans will be installed. The appropriate vacuum gauges and alarms will be installed on each individual unit and hard wired into the building by a NY certified electrician. One unit will be installed per approximately every 2,000 square feet of the building footprint. The specific design details, including brand of the various components will be provided to DEC for approval prior to construction.

The SSDS is a permanent engineering control. The system will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. Maintenance of this SSDS will be described in the Site Management Plan in the Remedial Action Report. Figure 4 shows the proposed location and layout of the SSDS and Figure 5 shows the typical details of the system.

Soil Vapor Extraction System

Mitigation of soil vapors underneath the parking area will be controlled with SVE system. The SVE system will consist of a skid mounted or package plant with blower, knockout pot for moisture, granular activated carbon (GAC) unit, pipe manifold, horizontal PVC header, and extraction points that consist of perforated PVC vertical pipe to collect the vapors. The size, brand, etc. of the package plant will be determined upon the results of the additional sampling.

4.4 Institutional Controls

A series of Institutional Controls (IC's) are required under this Remedial Action to assure permanent protection of public health by elimination of exposure to residual materials. These IC's define the program to operate, maintain, inspect and certify the performance of Engineering Controls and Institutional Controls on this property. Institutional Controls would be implemented in accordance with a Site Management Plan included in the final Remedial Action Report (RAR). Institutional Controls would be:

- Continued registration of the E-Designation for the property. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the SMP which will

note that the property owner and property owner's successors and assigns must comply with the approved SMP;

- Submittal of a SMP in the RAR for approval by DEC that provides procedures for appropriate operation, maintenance, inspection, and certification of ECs and IC's. SMP will require that the property owner and property owner's successors and assigns will submit to DEC a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by DEC; 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. DEC retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted at a frequency to be determine by DEC in the SMP and will comply with RCNY §43-1407(l)(3).
- Vegetable gardens and farming on the Site are prohibited in contact with residual soil materials;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for mixed residential and commercial use and will not be used for a higher level of use without prior approval by DEC.

4.5 Qualitative Human Health Exposure Assessment

The objective of the qualitative exposure assessment is to identify potential receptors and pathways for human exposure to the contaminants of concern (COC) that are present at, or migrating from, the Site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur.

Data and information reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA) for this project. As part

of the VCP process, a QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI were evaluated to determine whether there is any health risk under current and future conditions by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

Known and Potential Contaminant Sources

The onsite soils consist of approximately 2-feet of historic fill material followed by varying thicknesses of well graded sand/silt (fine to medium sand) and well graded fine grain sand. Based on the results of the RIR, the contaminants of concern are:

Soil: SVOCs including benzaldehyde, benzo(a) anthracene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene and mercury were detected above the Restricted Residential SCOs. All of the exceedances were in the shallow soil samples from 0-2 feet.

Soil Vapor: The primary contaminants of concern (COCs) in soil vapor are PCE, TCE, and 1,1,1-TCA. They were detected at maximum concentrations of 2,870, 3,510, and 278 micrograms/cubic meter respectively. These concentrations were at least an order of magnitude higher than the levels established NYSDOH soil vapor guidance matrix.

Nature, Extent, Fate and Transport of Contaminants

Soil: The various soil contaminants listed above were detected in the surficial samples; immediately under the slab of the existing building if collected inside. There is no readily available transport mechanism for these contaminants to migrate offsite or into groundwater which is estimated to be at 45+ feet deep.

Soil Vapor: VOCs PCE, TCE, and 1,1,1-TCA were detected in the soil vapor samples, particularly under the existing building where the proposed parking area is. No specific source

on the Site has been discovered for the soil vapor detections. Contaminated groundwater does migrate across the Site from an upgradient source location that has not been identified.

Receptor Populations

On-Site Receptors: The site is currently vacant. The Site is secured with an 8-foot high construction fence and locked gates. Onsite receptors are limited to the property owner, LPC and its consultants and contractors, visitors granted access to the property, and trespassers. During construction, potential on-site receptors include construction workers, site representatives, and visitors. Under proposed future conditions, potential on-site receptors include adult and child building residents, workers, and visitors.

Off-Site Receptors: Potential off-site receptors within a 500 foot radius of the Site include adult and child residents; commercial and construction workers; pedestrians; and trespassers based on the following land uses within 500 feet of the Site:

1. Commercial Businesses – existing and future
2. Residential Buildings – existing and future
3. Building Construction/ Renovation – existing and future
4. Pedestrians, Trespassers, Cyclists – existing and future

Potential Routes of Exposure

Three potential primary routes exist by which chemicals can enter the body: ingestion, inhalation, and dermal absorption. Exposure can occur based on the following potential media:

- Ingestion and dermal absorption of fill/ soil;
- Inhalation of vapors or particulates; and

Potential Exposure Points

Current Conditions: The site is currently vacant and there is the potential exposure pathways based on ingestion, inhalation, or dermal absorption of soil/ fill. Groundwater is not exposed at the site. The site is served by the public water supply and groundwater is not used at the site for potable supply and there is no potential for exposure. In the areas where the Site is undeveloped, there is no potential for soil vapor to accumulate on site.

During construction the site will be monitored for VOC emissions until such time as the vapor barrier, SSDS, and SVE systems are installed and operational. These systems will mitigate the exposure potential.

Construction/ Remediation Conditions: During the remedial action, onsite workers will come into direct contact with surface and subsurface soils as a result of on-Site construction and excavation activities. On-Site construction workers potentially could ingest, inhale or have dermal contact with exposed impacted soil and fill. Similarly, off-Site receptors could be exposed to dust and vapors from on-Site activities. Due to the depth of groundwater, direct contact with groundwater is not expected. During construction, on-Site and off-Site exposures to contaminated dust from on-Site will be addressed through the Soil/Materials Management Plan, dust controls, and through the implementation of the CAMP and a CHASP.

Proposed Future Conditions: Under future remediated conditions, all soils in excess of Track 4 SCOs will be removed. The site will be fully capped with the exception of several small landscaped areas which will have clean fill placed on the top 2-feet at grade, preventing potential direct exposure to soil and groundwater remaining in place, and engineering controls (vapor barrier, SSDS, and SVE) will prevent any potential exposure due to inhalation by preventing soil vapor intrusion. The site is served by the public water supply, and groundwater is not used at the site. There are no plausible unaddressed off-site pathways for oral, inhalation, or dermal exposure to contaminants derived from the site.

Overall Human Health Exposure Assessment

There are potential complete exposure pathways for the current site condition. There are potential complete exposure pathways that require mitigation during implementation of the remedy. There are no complete exposure pathways under future conditions after the site is developed. This assessment takes into consideration the reasonably anticipated use of the site, which includes a residential structure, site-wide surface cover, and a subsurface vapor barrier, SSDS system for the building and SVE system for the parking area. Under current conditions, on-Site exposure pathways exist for those with access to the Site and trespassers. During

remedial construction, on-Site and off-Site exposures to contaminated dust from historic fill material will be addressed through dust controls, and through the implementation of the CAMP, the SMMP, and a CHASP. Potential post-construction use of groundwater is not considered an option because groundwater in this area of New York City is not used as a potable water source. There are no surface waters in close proximity to the Site that could be impacted or threatened.

Environmental Media & Exposure Route	**Human Exposure Assessment for Proposed Remedial Action**
Direct contact with surface and subsurface soils	• There is no direct contact with soil because the site will be completely covered with an engineered composite cover. Future contact with contaminated soil will be prevented by the implementation of a SMP and SMP for any future ground intrusive work
Ingestion of groundwater	• The area is served by an offsite water supply and groundwater is not being used for potable water supply. Groundwater use for potable supply onsite is prohibited by municipal law.
Direct contact with groundwater	• There is no direct contact with groundwater because the site will be completely covered with an engineered composite cover and groundwater is reportedly 40+ feet deep. Future contact with groundwater will be prevented by the implementation of a Site Management Plan and Soil and Materials Management Plan for any

	future ground intrusive work
Direct contact with soil vapor	• Soil vapor is impacted at the site Contact with impacted soil vapor will be prevented by a soil vapor barrier, and an active sub-slab depressurization system. • Contact with soil vapor will also be prevented with a SVE system to be located in the parking area which will be paved.

5.0 Remedial Action Management

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Mario Procida/Project Manager. The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Peter Jaran, P.E. and Robert Jackson, P.E. For the vapor barrier, SSDS, and SVE system installations, Peter Jaran will provide oversight. For the remaining components of the RAWP, Robert Jackson will provide oversight.

5.2 Site Security

Site access will be controlled by a NYCDOB approved construction fence and site management.

5.3 Work Hours

The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. The hours of operation will be conveyed to DEC during the pre-construction meeting.

5.4 Construction Health and Safety Plan

The Health and Safety Plan is included in Appendix 5. The Site Safety Coordinator will be determined prior to construction. Remedial work performed under this RAWP will be in full

compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial construction work will ensure that performance of work is in compliance with the HASP and applicable laws and regulations. The HASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Completion.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, such as 40-hour hazardous waste operator training and annual 8-hour refresher training. Site Safety Officer will be responsible for maintaining workers training records.

Personnel entering any exclusion zone will be trained in the provisions of the HASP and will comply with all requirements of 29 CFR 1910.120. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed. Emergency telephone numbers will be posted at the site location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

An emergency contact sheet with names and phone numbers is included in the CHASP. That document will define the specific project contacts for use in case of emergency.

5.5 Community Air Monitoring Plan

Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection, for instance, will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedances of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the DEC Project Manager and included in the Daily Report.

VOC Monitoring, Response Levels, and Actions

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

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume

provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

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

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

Particulate Monitoring, Response Levels, and Actions

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

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for DEC personnel to review.

5.6 Agency Approvals

Unless otherwise exempted by law, all permits or government approvals required for remedial construction have been or will be obtained prior to the start of remedial construction.

5.7 Site Preparation

Pre-Construction Meeting

DEC will be invited to attend the pre-construction meeting at the Site with all parties involved in the remedial process prior to the start of remedial construction activities.

Mobilization

Mobilization will be conducted as necessary for each phase of work at the Site. Mobilization includes field personnel orientation, equipment mobilization (including securing all sampling equipment needed for the field investigation), marking/staking sampling locations and utility mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures.

Utility Marker Layouts, Easement Layouts

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed incompliance with applicable laws and regulations including NYC Building Code to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Mark-Out Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

Proper safety and protective measures pertaining to utilities and easements, and compliance with all laws and regulations will be employed during invasive and other work contemplated under this RAWP. The integrity and safety of on-Site and off-Site structures will be maintained during all invasive, excavation or other remedial activity performed under the RAWP.

Dewatering

Dewatering is not anticipated during remediation and construction.

Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations and manufacturer's requirements.

Stabilized Construction Entrance

Steps will be taken to ensure that trucks departing the site will not track soil, fill or debris off-Site. Such actions may include use of cleaned asphalt or concrete pads or use of stone or other aggregate-based egress paths between the truck inspection station and the property exit. Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and clean water will be utilized for the removal of soil from vehicles and equipment, as necessary.

Extreme Storm Preparedness and Response Contingency Plan

Damage from flooding or storm surge can include dislocation of soil and stockpiled materials, dislocation of site structures and construction materials and equipment, and dislocation of support of excavation structures. Damage from wind during an extreme storm event can create unsafe or unstable structures, damage safety structures and cause downed power lines creating dangerous site conditions and loss of power. In the event of emergency conditions caused by an

extreme storm event, the enrollee will undertake the following steps for site preparedness prior to the event and response after the event.

Storm Preparedness

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; loose materials will be secured to prevent dislocation and blowing by wind or water; heavy equipment such as excavators and generators will be removed from excavated areas, trenches and depressions on the property to high ground or removed from the property; an inventory of the property with photographs will be performed to establish conditions for the site and equipment prior to the event; stockpile covers for soil and fill will be secured by adding weights such as sandbags for added security and worn or ripped stockpile covers will be replaced with competent covers; stockpiled hazardous wastes will be removed from the property; stormwater management systems will be inspected and fortified, including, as necessary: clean and reposition silt fences, hay bales; clean storm sewer filters and traps; and secure and protect pumps and hosing.

Extreme Storm Preparedness and Response Plan

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. A site inspection report will be submitted to NYSDEC at the completion of site inspection and after the site security is assessed. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. Damage from storm conditions that result in acute public safety threats, such as downed power lines or imminent collapse of buildings, structures or equipment will be reported to public safety authorities via appropriate means such as calling 911. Petroleum spills will be reported to NYS DEC within 2 hours of identification and consistent with State regulations. Emergency and spill conditions will also be reported to NYSDEC. Public safety structures, such as construction security fences will be repaired promptly to eliminate public safety threats. Debris will be collected and removed. Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and

appropriately managed. Support of excavation structure will be inspected and fortified as necessary. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Stormwater control systems and structures will be inspected and maintained as necessary. If soil or fill materials are discharged off site to adjacent properties, property owners and NYSDEC will be notified and corrective measure plan designed to remove and clean dislocated material will be submitted to NYSDEC and implemented following approval by NYSDEC and granting of site access by the property owner. If onsite petroleum spills are identified, a qualified environmental professional will determine the nature and extent of the spill and report to NYS DEC's spill hotline at DEC 800-457-7362 within statutory defined timelines. If the source of the spill is ongoing and can be identified, it should be stopped if this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYS DEC.

Storm Response Reporting

A site inspection report will be submitted to NYSDEC at the completion of site inspection. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. The site inspection report will be sent to the NYSDEC project manager and will include the site name, address, tax block and lot, site primary and alternate contact name and phone number. Damage and soil release assessment will include: whether the project had stockpiles; whether stockpiles were damaged; photographs of damage and notice of plan for repair; report of whether soil from the site was dislocated and whether any of the soil left the site; estimates of the volume of soil that left the site, nature of impact, and photographs; description of erosion damage; description of equipment damage; description of damage to the remedial program or the construction program, such as damage to the support of excavation; presence of onsite or offsite exposure pathways caused by the storm; presence of petroleum or other spills and status of spill reporting to NYS DEC; description of corrective actions; schedule for corrective actions. This report should be completed and submitted to NYSDEC project manager with photographs within 24 hours of the time of safe entry to the property after the storm event.

5.8 Traffic Control

Drivers of trucks leaving the Site with soil will be instructed to proceed without stopping in the vicinity of the Site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site. The trucking route will be developed to create a loop, if possible, whereby the trucks enter the site on either Berry or S. 5th Street and exit via the other street. The alternative is to stage trucks along S. 5th Street adjacent to the Williamsburg Bridge to minimize neighborhood impacts. The route will consist of the most direct path to and from the Brooklyn-Queens Expressway (BQE) or Route 278.

5.9 Demobilization

Demobilization will include:

- As necessary, restoration of temporary access areas and areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management areas, and access area);
- Removal of sediment from erosion control measures and truck wash and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination, and;
- General refuse disposal.

Equipment will be decontaminated and demobilized at the completion of all field activities. Investigation equipment and large equipment (e.g., soil excavators) will be washed at the truck inspection station as necessary. In addition, all investigation and remediation derived waste will be appropriately disposed.

5.10 Reporting and Record Keeping

Daily reports

Monthly reports providing a general summary of activities for active remedial work will be emailed to the NYSDEC Project Manager. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of excavation and other remedial work performed;

- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP results noting all excursions. CAMP data may be reported;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with NYSDEC project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to NYSDEC of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be communicated directly to the NYSDEC project manager by personal communication.

Record Keeping and Photo Documentation

Job-site record keeping for all remedial work will be performed. These records will be maintained on-Site during the project and will be available for inspection by NYSDEC staff. Representative photographs will be taken of the Site prior to any remedial activities and during major remedial activities to illustrate remedial program elements and contaminant source areas. Photographs will be submitted at the completion of the project in the RAR in digital format (i.e. jpeg files).

5.11 Complaint Management

Complaints will be addressed and outcomes will also be reported to NYSDEC. Notices will include the nature of the complaint, the party providing the complaint, and the actions taken to resolve any problems.

5.12 Deviations from the Remedial Action Work Plan

All changes to the RAWP will be reported to, and approved by the NYSDEC Project Manager and will be documented and reported in the Remedial Action Report. The process to be followed

if there are any deviations from the RAWP will include a request for approval for the change from NYSDEC noting the following:

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy; and
- Determination with basis that the remedial action with the deviation(s) is protective of public health and the environment.

6.0 Remedial Action Report

A Remedial Action Report (RAR) will be submitted following implementation of the remedial action defined in this RAWP. The RAR will document that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The RAR will include:

- Information required by this RAWP;
- Text description with thorough detail of all engineering and institutional controls (if Track 1 remedial action is not achieved)
- As-built drawings for all constructed remedial elements;
- Manifests for al soil or fill disposal;
- Photographic documentation of remedial work performed under this remedy;
- Site Management Plan (if Track 1 remedial action is not achieved);
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all soil or fill material removed from the Site including a map showing the location of these excavations and hotspots, tanks or other contaminant source areas;
- Full accounting of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material;

- Account of the origin and required chemical quality testing for material imported onto the Site;
- Continue registration of the property with an E-Designation by the NYC Department of Buildings (if Track 1 remedial action is not achieved);
- The RAWP and Remedial Investigation Report will be included as appendices to the RAR;
- Reports and supporting material will be submitted in digital form and final PDF's will include bookmarks for each appendix.

Remedial Action Report Certification

I, Peter Jaran, am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for implementation of the remedial program for the Williamsburg Bridgeview Apartments, 337 Berry Street, Brooklyn, BCP site number C244233. I certify to the following:

- I have reviewed this document, to which my signature and seal are affixed.
- Engineering Controls implemented during this remedial action were designed by me or a person under my direct supervision and achieve the goals established in the Remedial Action Work Plan for this site.
- The Engineering Controls constructed during this remedial action were professionally observed by me or by a person under my direct supervision and (1) are consistent with the Engineering Control design established in the Remedial action Work Plan and (2) are accurately reflected in the text and drawings for as-built design reported in this Remedial Action Report.
- The DEC-approved Remedial Action Work Plan dated date were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

Peter Jaran
Name

PE License Number

Signature

Date

I, Robert Jackson, am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for the Williamsburg Bridgeview Apartments, 337 Berry Street, Brooklyn, BCP site number C244233. I certify to the following:

- The DEC-approved Remedial Action Work Plan dated (date) in a letter dated (date) were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

Robert L. Jackson, P.E.
QEP Name

QEP Signature

Date

7.0 Schedule

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to DEC. Currently, an approximately five month remediation period is anticipated.

Schedule Milestone	**Weeks from Remedial Action Start**	**Duration (weeks)**
DEC Approval of RAWP	0	-
Fact Sheet 2 announcing start of remedy	0	-
Mobilization	2	1
Remedial Excavation	3	4
Design vapor barrier, SSDS and SVE systems	1	1
Installation of the vapor barrier, SSDS, and SVE systems	8	6
Demobilization	15	1
Submit Remedial Action Report	16	3

APPENDIX 1

PROPOSED DEVELOPMENT PLANS

APPENDIX 2

CITIZEN PARTICIPATION PLAN

APPENDIX 3

SUSTAINABILITY STATEMENT

This Sustainability Statement documents sustainable activities and green remediation efforts planned under this remedial action.

Reuse of Clean, Recyclable Materials and Reduced Consumption of Non-Renewable Resources: Reuse of clean, locally-derived recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction.

An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

Reduced Energy Consumption and Promotion of Greater Energy Efficiency: Reduced energy consumption lowers greenhouse gas emissions, improves local air quality, lessens in-city power generation requirements, can lower traffic congestion, and provides substantial cost savings.

Best efforts will be made to quantify energy efficiencies achieved during the remediation and will be reported in the Remedial Action Report (RAR). Where energy savings cannot be easily quantified, a gross indicator of the amount of energy saved or the means by which energy savings was achieved will be reported.

Conversion to Clean Fuels: Use of clean fuel improves NYC's air quality by reducing harmful emissions.

Natural gas will be utilized for fuel in the new building. An estimate of the volume of clean fuels used during remedial activities will be quantified and reported in the RAR.

Recontamination Control: Recontamination after cleanup and redevelopment is completed undermines the value of work performed, may result in a property that is less protective of public health or the environment, and may necessitate additional cleanup work later or impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site.

An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

Stormwater Retention: Stormwater retention improves water quality by lowering the rate of combined stormwater and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters.

An estimate of the enhanced stormwater retention capability of the redevelopment project will be included in the RAR.

Linkage with Green Building: Green buildings provide a multitude of benefits to the city across a broad range of areas, such as reduction of energy consumption, conservation of resources, and reduction in toxic materials use.

The number of Green Buildings that are associated with this brownfield redevelopment property will be reported in the RAR. The total square footage of green building space created as a function of this brownfield redevelopment will be quantified for residential, commercial and industrial/manufacturing uses.

Low-Energy Project Management Program: LPC is participating in a low-energy project management program. Under this program, whenever possible, meetings are held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation.

Trees and Plantings: Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance.

An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

APPENDIX 4

SOIL/MATERIALS MANAGEMENT PLAN

1.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the final remedial report. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of final signoff by DEC.

1.2 Stockpile Methods

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by DEC. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible. Hay bales or equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

1.3 Characterization of Excavated Materials

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Soils proposed for reuse on-Site will be managed as defined in this plan.

1.4 Materials Excavation, Load-Out, and Departure

The PE/QEP overseeing the remedial action will:

- oversee remedial work and the excavation and load-out of excavated material;
- ensure that there is a party responsible for the safe execution of invasive and other work performed under this work plan;
- ensure that Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAWP;
- ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this plan are properly addressed by appropriate parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site;
- ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

Locations where vehicles exit the Site shall be inspected daily for evidence of soil tracking off premises. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

Open and uncontrolled mechanical processing of historical fill and contaminated soil on-Site is not planned and will not be performed without prior DEC approval.

1.5 Off-Site Materials Transport

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with

applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on-Site, when possible in order to minimize off Site disturbance. Off-Site queuing will be minimized.

Outbound truck transport routes are described in the remedial report. This routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

1.6 Materials Disposal Off-Site

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) a letter from the PE/QEP or Enrollee to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in New York City under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the final remedial report.

The Remedial Action Report will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the final remedial report.

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the final remedial report. A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the final remedial report. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), including transport to a Part 360-16 Registration Facility, a formal request will be made for approval by DEC with an associated plan compliant with 6NYCRR Part 360-16. This request and plan will include the location, volume and a description of the material to be recycled, including verification that the material is not impacted by site uses and that the material complies with receipt requirements for recycling under 6NYCRR Part 360. This material will be appropriately handled on-Site to prevent mixing with impacted material.

1.7 Materials Reuse On-Site

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site.

1.8 Demarcation

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the

SMP; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the remedy is complete. Demarcation may be established by one or any combination of these three methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the RAR.

This demarcation will constitute the top of the site management horizon. Materials within this horizon require adherence to special conditions during future invasive activities as defined in the Site Management Plan.

1.9 Import of Backfill Soil from Off-Site Sources

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet DEC-approved backfill and cover soil quality objectives for this Site. The backfill and cover soil quality objectives are listed in Section 4.2. Imported soils will not exceed groundwater protection standards established in Part 375. Imported soils for Track 1 remedial action projects will not exceed Track 1 SCO's.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site. The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC.

- All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this remedial plan. The final remedial report will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.
- All material will be subject to source screening and chemical testing.
- Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:
- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the final remedial report. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

1.10 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

1.11 Stormwater Pollution Prevention

Applicable laws and regulations pertaining to stormwater pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this remedial plan (silt fences and barriers, and hay bale checks) will be installed around the entire perimeter of the remedial construction area and inspected once a week and after every storm event to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by DEC. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

1.12 Contingency Plan for Unknown Contamination Sources

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to DEC's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to DEC. Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

1.13 Odor, Dust, and Nuisance Control

Odor Control

All necessary means will be employed to prevent on- and off-Site odor nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) use of foams to cover exposed odorous soils. If odors develop and cannot otherwise be controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; and (e) use of chemical odorants in spray or misting systems.

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. DEC will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP's certifying this remedial plan.

Dust Control

Dust management during invasive on-Site work will include, at a minimum:

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.

- Use of properly anchored tarps to cover stockpiles.
- Exercise extra care during dry and high-wind periods.
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. DEC will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying this remedial plan.

Other Nuisances

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.

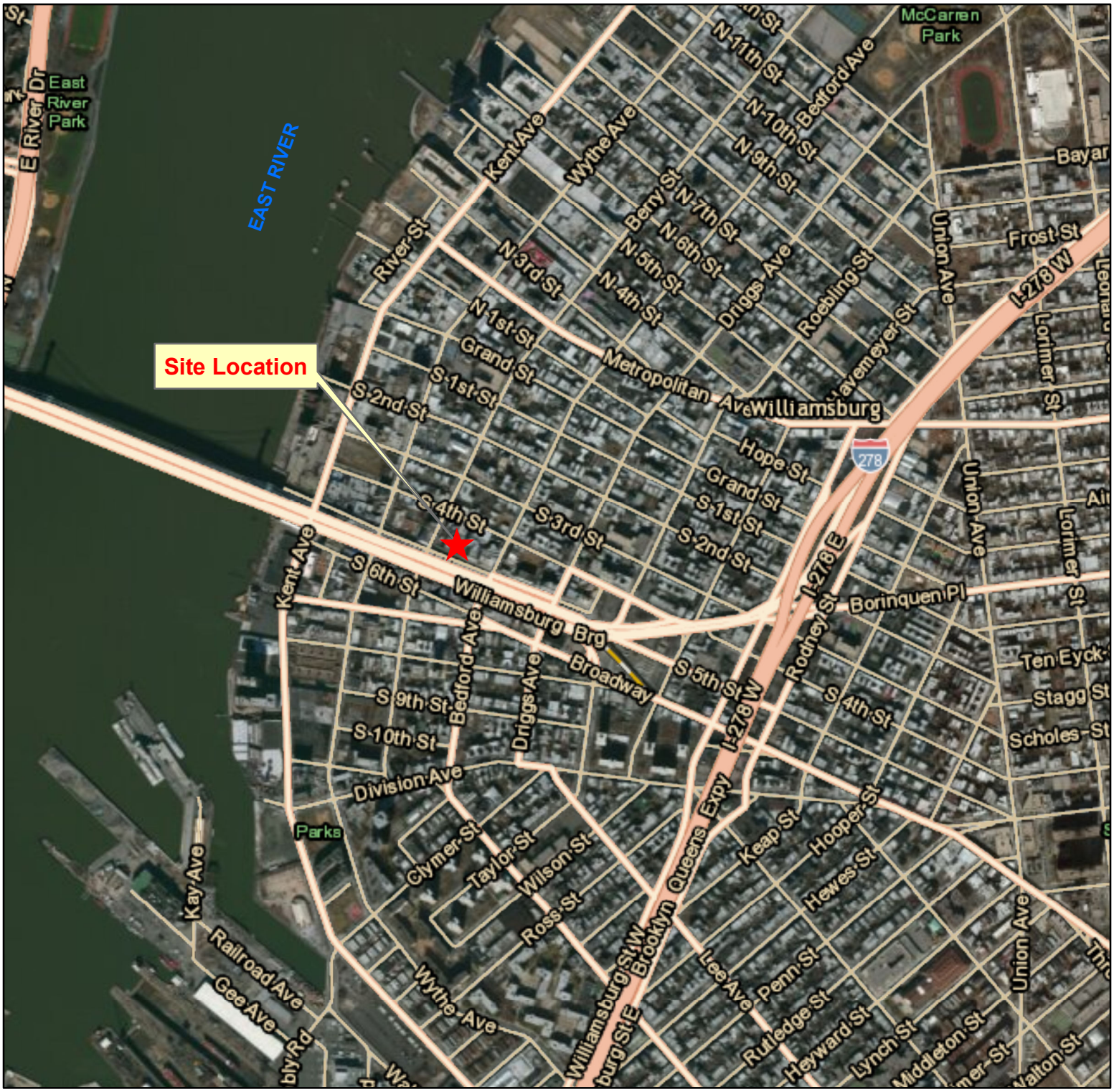
Rodent control will be provided during Site clearing and grubbing and during the remedial program, as necessary, to prevent nuisances.

APPENDIX 5

CONSTRUCTION HEALTH AND SAFETY PLAN

APPENDIX 6
VENDOR INFORMATION

FIGURES



Notes: Aerial basemap provided by Esri, HERE, DeLorme, TomTom, MapmyIndia, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo;
Copyright:© OpenStreetMap contributors, and the GIS user community

N

0 350 700 1,400 2,100 2,800 Feet

1 inch = 1,250 feet

FIGURE 1
SITE LOCATION MAP

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lots 6, 37, 41)
Brooklyn, New York

equity environmental engineering
227 Route 206, Suite 6, Flanders, NJ 07836, (973) 527-7451

DRAWN BY/ DATE	CHK/DATE	DRAWING NUMBER
NG / 04-14-15		2014074-01

0 40 80 160 240 320 Feet

1 inch = 208 feet

Notes:
Imagery basemap provided by ESRI;
Copyright:© 2011 / USA TOPOMAPS
National Geographic Society

FIGURE 2
SITE MAP

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

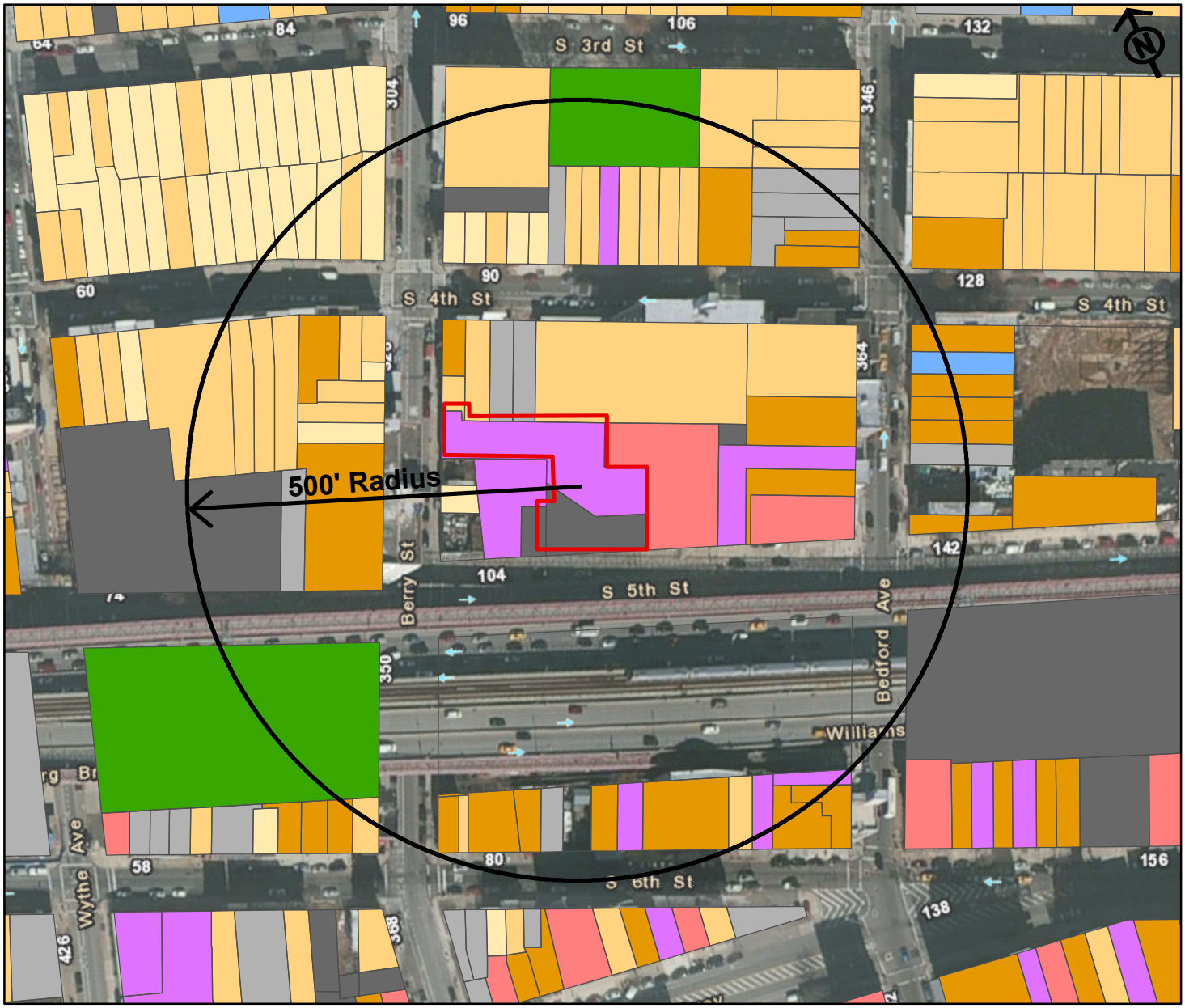
DRAWN BY / DATE	CHK / DATE	DRAWING NUMBER
NG / 10-28-15		2015059-02

FIGURE 3
SITE REDEVELOPMENT PLAN

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lots 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mt. Olive, NJ 07828
Office (973) 527-7451 / Fax (973) 858-0280

DRAWN BY/ DATE	CHK/DATE	DRAWING NUMBER
FU / 02-10-2015		2015059-05



Notes:
Imagery basemap provided by ESRI;
Copyright© 2011 / USA TOPOMAPS
National Geographic Society

0 37.5 75 150 225 300 Feet

1 inch = 204 feet

Legend

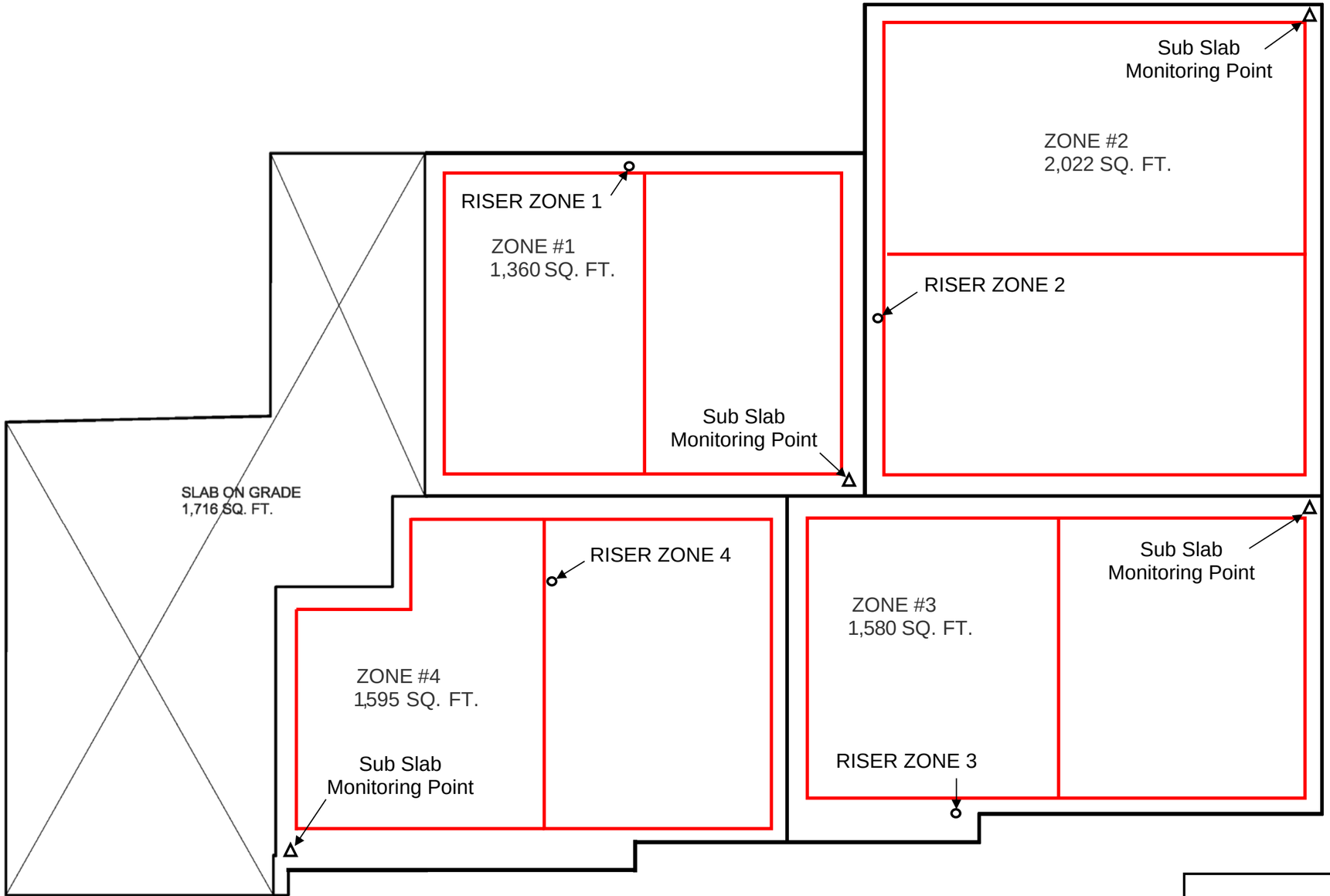
- Property Boundary
- Vacant Land
- Parking
- Public Facility / Institution
- Industrial / Manufacturing
- Commercial / Office
- Mixed Residential & Commercial
- Multi-Family Residential
- One & Two Family Residential
- Parks & Recreation

FIGURE 4
LAND USE MAP

337 Berry St. & 99-105 South 5th St.
(Block 2443 / Lot 6, 37, 41)
Brooklyn, New York

equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

DRAWN BY / DATE	CHK / DATE	DRAWING NUMBER
NG / 10-28-15		2015059-03



SSDS ZONE PLAN TOTAL FOOTPRINT 6,557 SQ. FT.

Legend

- Building Footprint
- Geo Vent
- Riser Zone
- Sub Slab Monitoring Point

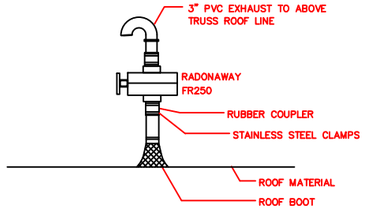
FIGURE 5
SSDS Plan View

337 Berry Street
Brooklyn, New York

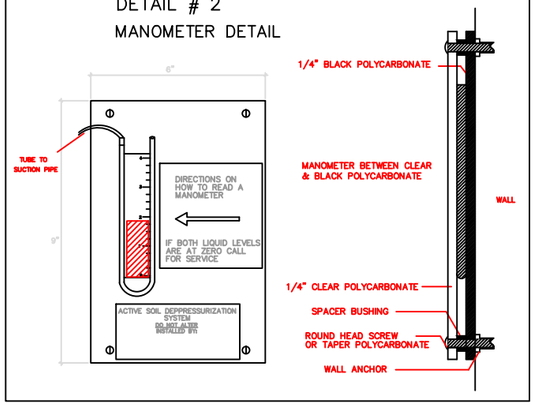
equity environmental engineering
500 International Drive, Suite 150, Mount Olive, NJ 07828
Office: (973) 527-7451 / Fax: (973) 858-0280

DRAWN BY / DATE	CHK / DATE	DRAWING NUMBER
JV / 11142016		2015059-05

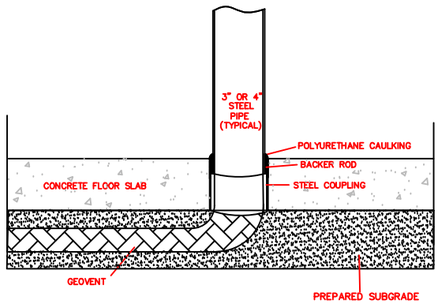
DETAIL # 1
ROOF MOUNTED RADON–AWAY
FR250 BLOWER AND
SUPPORT DETAIL (OTHER TYP. DETAIL)



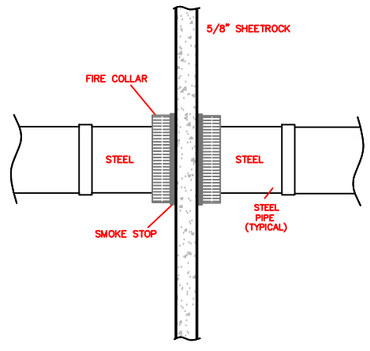
DETAIL # 2
MANOMETER DETAIL



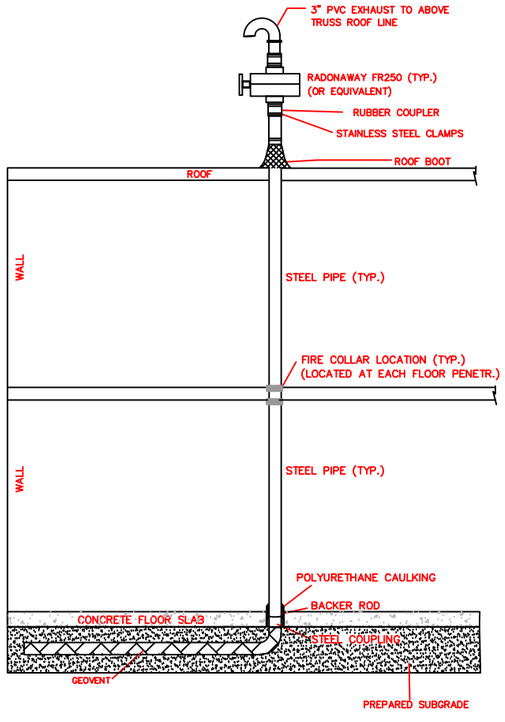
DETAIL # 3
SUCTION POINT (TYP.)



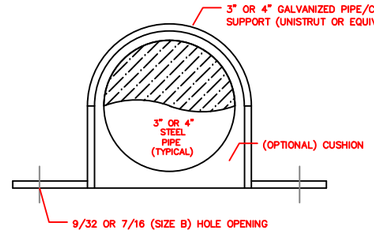
DETAIL # 4
HORIZONTAL WALL PENETRATION (TYP.)
& FIRE COLLAR DETAIL (TYP.)



DETAIL # 5
COMPLETE SYSTEM INSTALLATION
& ROOF PENETRATION



DETAIL # 6
PIPE HANGER DETAIL



DETAIL # 7
BELOW GRADE BEAM PIPING

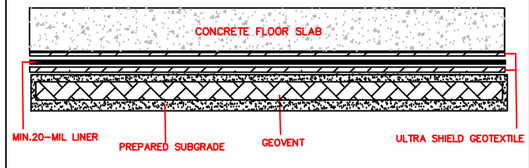


FIGURE 6

VAPOR MITIGATION SYSTEM
337 BERRY STREET
BROOKLYN, NEW YORK
DETAIL SHEET

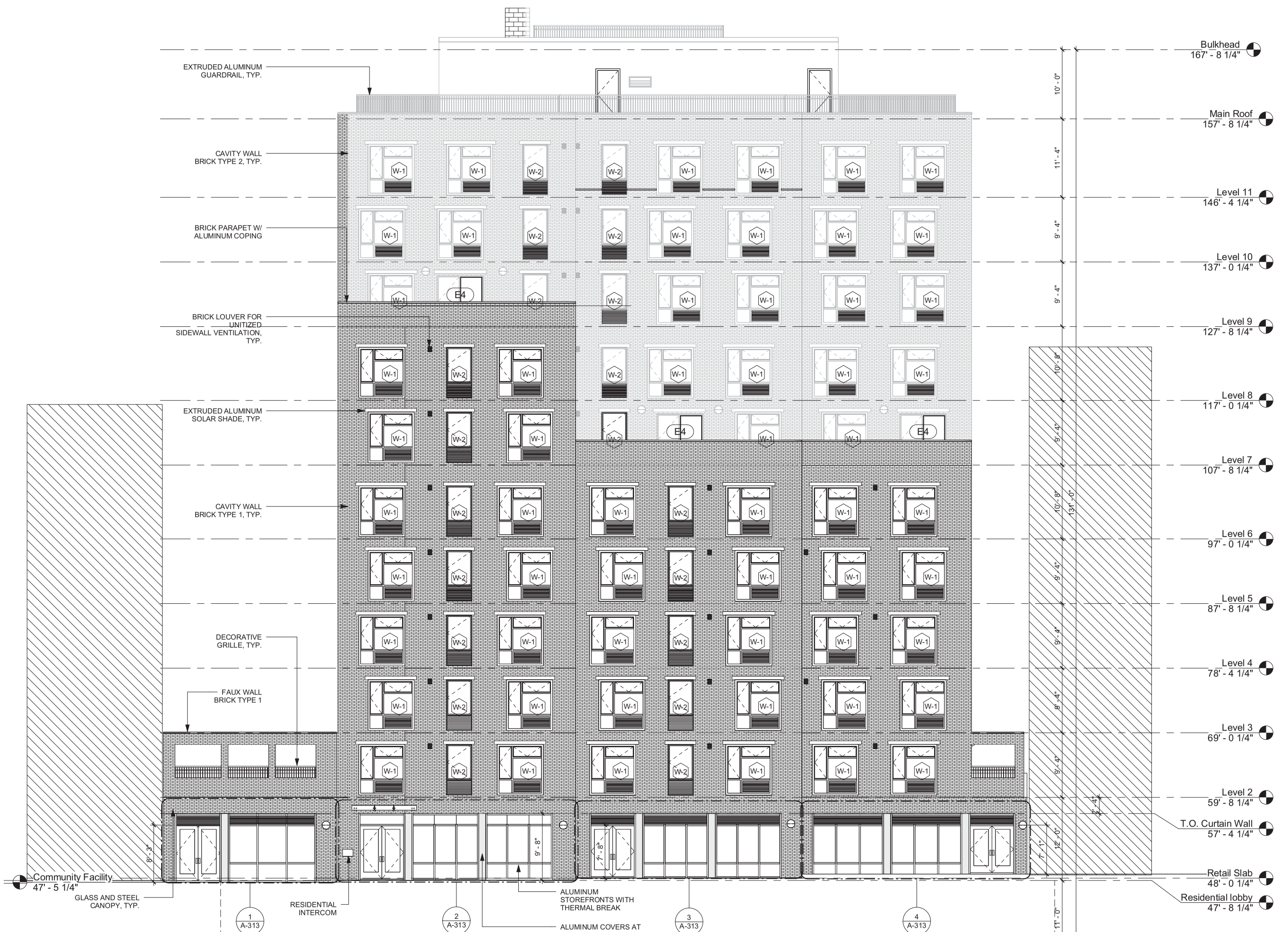
Equity Environmental Engineering LLC
500 International Drive, Suite 150
Mt. Olive, NJ 07828
Phone: (973) 527-7451

DATE	DWG BY	REV	CHK
11082016	TAF	FU	

APPENDICES

APPENDIX 1

PROPOSED DEVELOPMENT PLANS



105 South 5th Street

Williamsburg, Brooklyn, N.Y.

Procida Construction Corp.
456 E. 173rd Street
Bronx, NY 10457

DattnerArchitects
1385 Broadway, 15th Floor
New York, NY 10018
tel 212 247 2660
info@dattner.com

Structural Engineers
De Nardis Engineering, LLC
15 Reservoir Road
White Plains, New York 10603

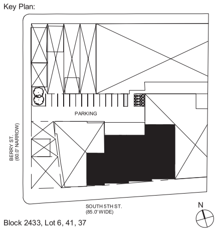
Mechanical/Electrical/Plumbing Engineers
Ettinger Engineering Associates
505 Eighth Avenue, 24th Floor
New York, New York 10018

Sustainability Modeling
Bright Power Inc.
11 Hanover Square, 21st Floor
New York, New York 10005

Revisions:

Issue: Progress Set

Key Plan:



Block 2433, Lot 6, 41, 37

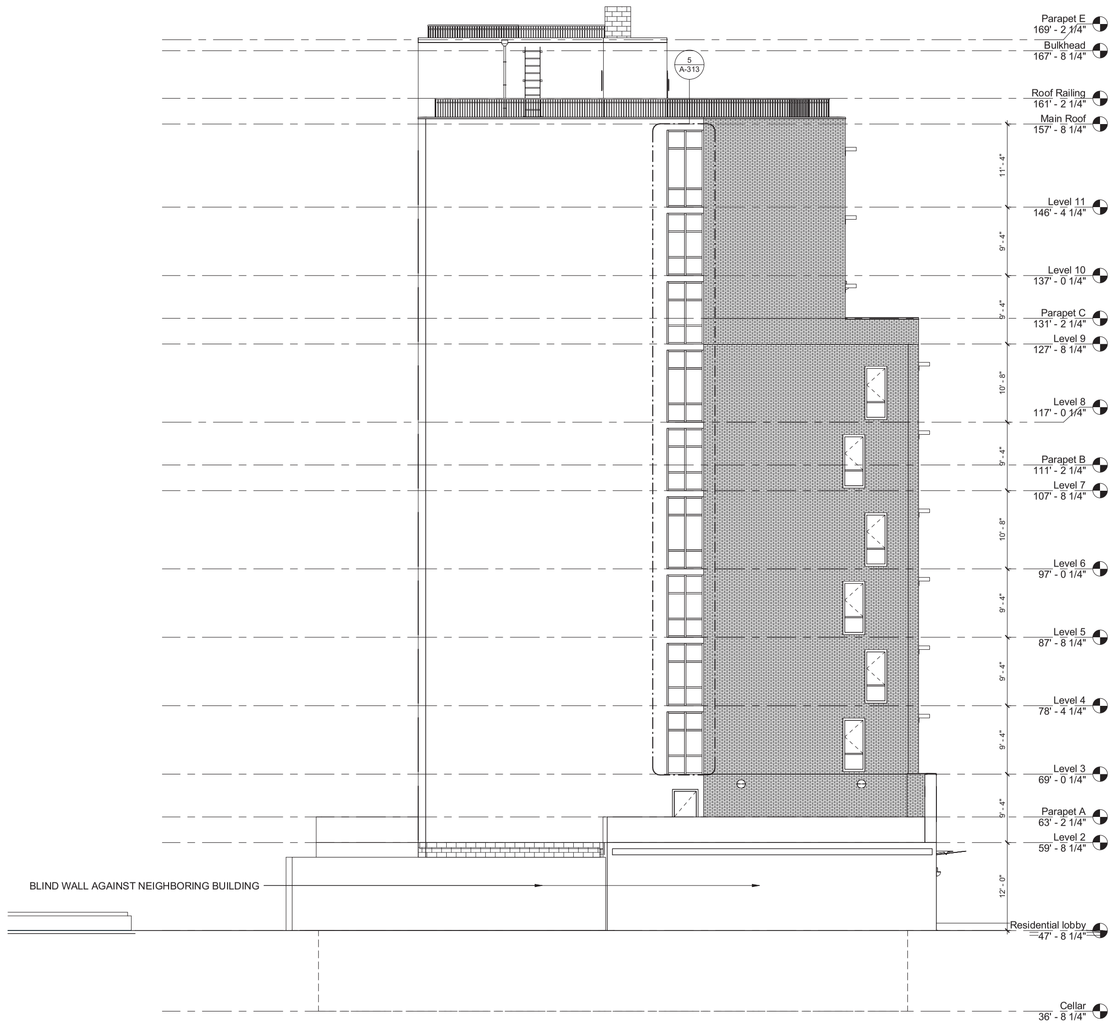
Key Plan

Building Elevation - South

Date	1/22/2015
Scale	1/8" = 1'-0"
Drawn By	AJ
Checked By	BH,JW
Project No.	1335
Sheet No.:	A-201.00

Seal

46 of 65



105 South 5th Street

Williamsburg, Brooklyn,
N.Y.

Procida Construction Corp.
456 E. 173rd Street
Bronx, NY 10457

DattnerArchitects
1385 Broadway, 15th Floor
New York, NY 10018
tel 212 247 2660
info@dattner.com

Structural Engineers
De Nardis Engineering, LLC
15 Reservoir Road
White Plains, New York 10603

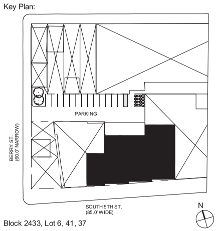
Mechanical/Electrical/Plumbing Engineers
Ettinger Engineering Associates
505 Eighth Avenue, 24th Floor
New York, New York 10018

Sustainability Modeling
Bright Power Inc.
11 Hanover Square, 21st Floor
New York, New York 10005

Revisions:

Issue: Progress Set

Key Plan:



Block 2433, Lot 6, 41, 37

Key Plan

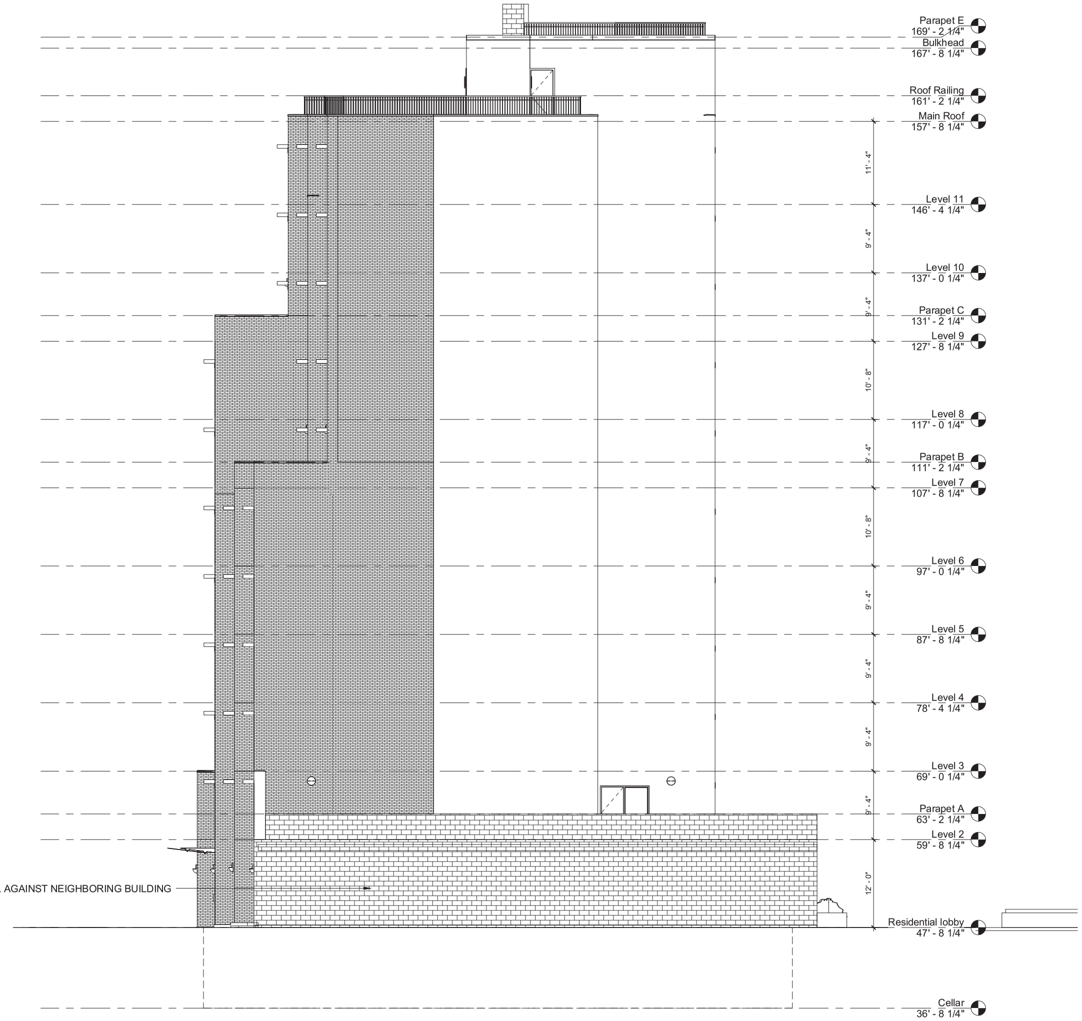
Building Elevation - West

Date	1/22/2015
Scale	1/8" = 1'-0"
Drawn By	AJ
Checked By	BH,JW
Project No.	1335
Sheet No.:	A-202.00

Seal

47 of 65

Plotted: 1/22/2015 11:11:42 AM



105 South 5th Street

Williamsburg, Brooklyn,
N.Y.

Procida Construction Corp.
456 E. 173rd Street
Bronx, NY 10457

DattnerArchitects
1385 Broadway, 15th Floor
New York, NY 10018
tel 212 247 2660
info@dattner.com

Structural Engineers
De Nardis Engineering, LLC
15 Reservoir Road
White Plains, New York 10603

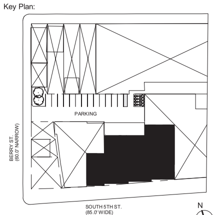
Mechanical/Electrical/Plumbing Engineers
Ettinger Engineering Associates
505 Eighth Avenue, 24th Floor
New York, New York 10018

Sustainability Modeling
Bright Power Inc.
11 Hanover Square, 21st Floor
New York, New York 10005

Revisions:

Issue: Progress Set

Key Plan:



Block 2433, Lot 6, 41, 37

Key Plan

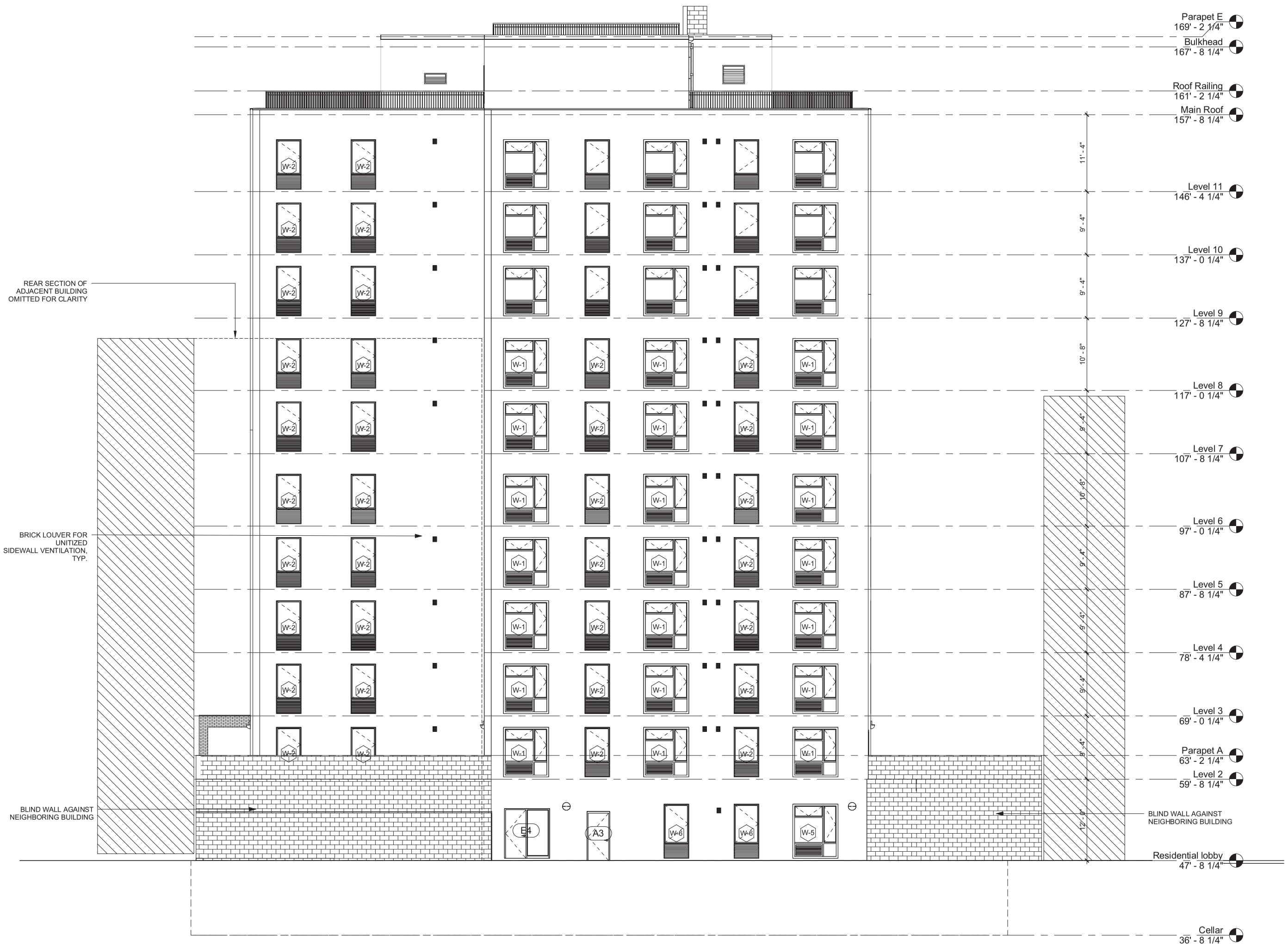
Building Elevation - East

Date	1/22/2015
Scale	1/8" = 1'-0"
Drawn By	AJ
Checked By	BH,JW
Project No.	1335
Sheet No.:	A-203.00

Seal

48 of 65

Plotted: 1/22/2015 11:11:54 AM



105 South 5th Street

Williamsburg, Brooklyn,
N.Y.

Procida Construction Corp.
456 E. 173rd Street
Bronx, NY 10457

DattnerArchitects
1385 Broadway, 15th Floor
New York, NY 10018
tel 212 247 2660
info@dattner.com

Structural Engineers
De Nardis Engineering, LLC
15 Reservoir Road
White Plains, New York 10603

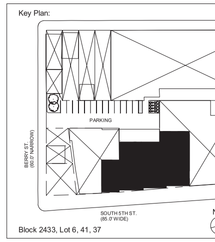
Mechanical/Electrical/Plumbing Engineers
Ettinger Engineering Associates
505 Eighth Avenue, 24th Floor
New York, New York 10018

Sustainability Modeling
Bright Power Inc.
11 Hanover Square, 21st Floor
New York, New York 10005

Revisions:

Issue: Progress Set

Key Plan:



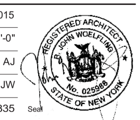
Block 2433, Lot 6, 41, 37

Key Plan

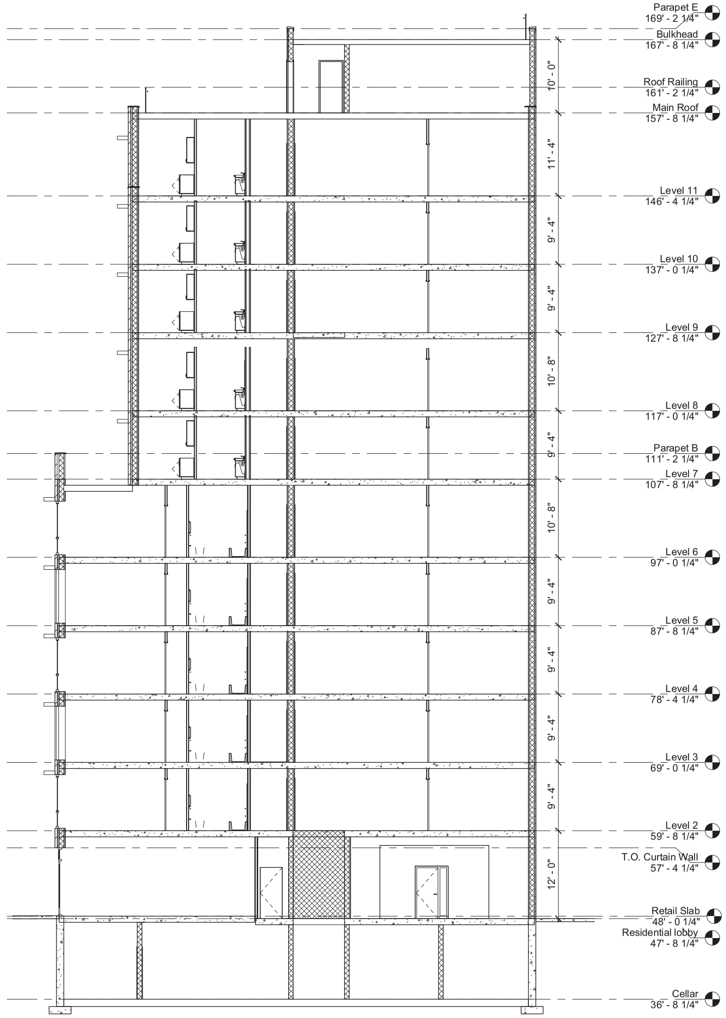
Building Elevation - North

Date	1/22/2015
Scale	1/8" = 1'-0"
Drawn By	AJ
Checked By	BH,JW
Project No.	1335
Sheet No.:	A-204.00

Seal



Plotted: 1/22/2015 11:12:02 AM



105 South 5th Street

Williamsburg, Brooklyn,
N.Y.

Procida Construction Corp.
456 E. 173rd Street
Bronx, NY 10457

DattnerArchitects
1385 Broadway, 15th Floor
New York, NY 10018
tel 212 247 2660
info@dattner.com

Structural Engineers
De Nardis Engineering, LLC
15 Reservoir Road
White Plains, New York 10603

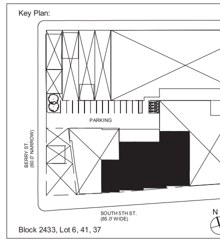
Mechanical/Electrical/Plumbing Engineers
Ettinger Engineering Associates
505 Eighth Avenue, 24th Floor
New York, New York 10018

Sustainability Modeling
Bright Power Inc.
11 Hanover Square, 21st Floor
New York, New York 10005

Revisions:

Issue: Progress Set

Key Plan:



Block 2433, Lot 6, 41, 37

Key Plan

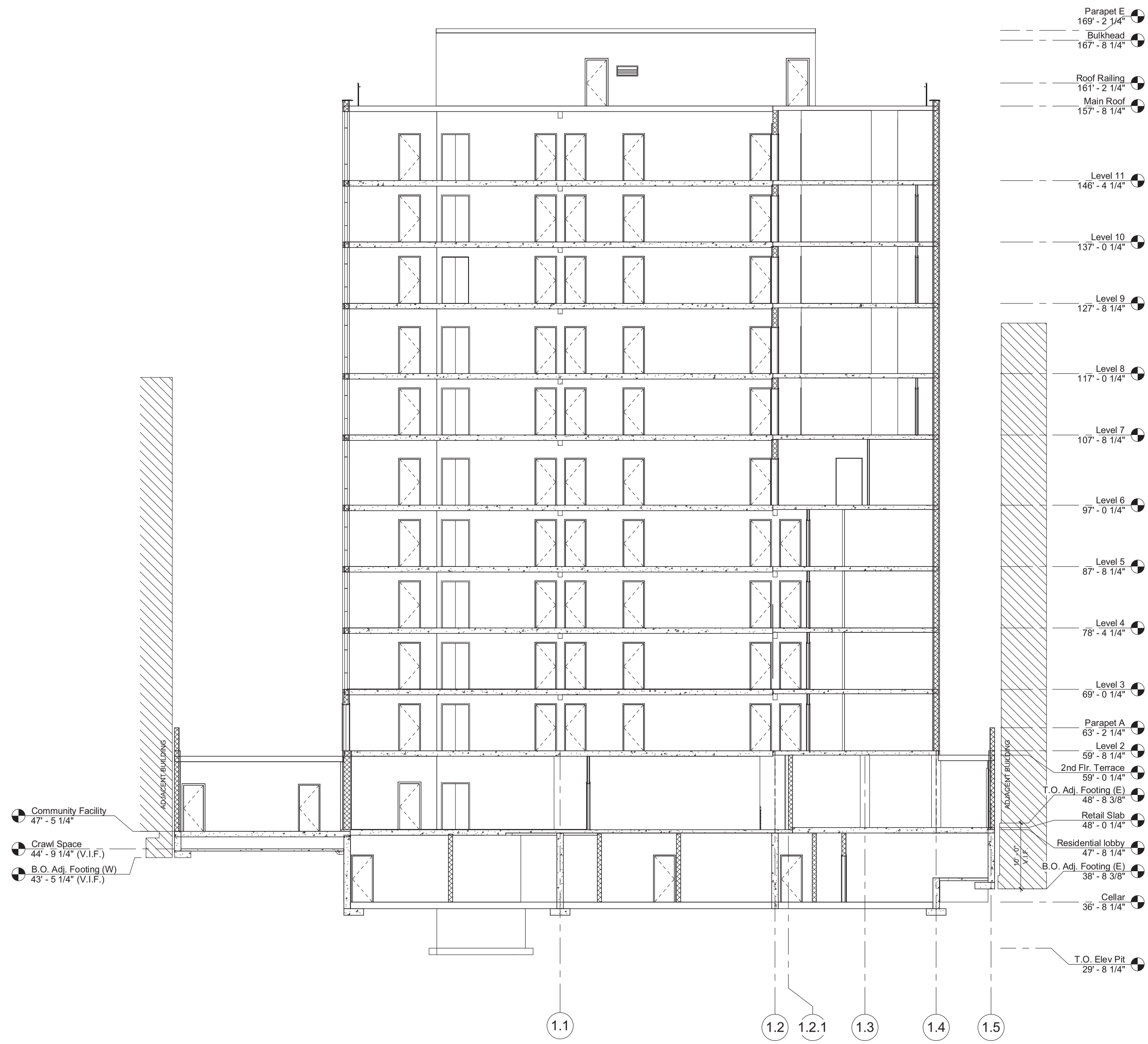
Building Section North - South

Date	1/22/2015
Scale	1/8" = 1'-0"
Drawn By	AJ
Checked By	BH,JW
Project No.	1335
Sheet No.:	A-211.00

Seal

50 of 65

Plotted: 1/22/2015 11:12:07 AM



105 South 5th Street

Williamsburg, Brooklyn,
N.Y.

Procida Construction Corp.
456 E. 173rd Street
Bronx, NY 10457

DattnerArchitects
1385 Broadway, 15th Floor
New York, NY 10018
tel 212 247 2660
info@dattner.com

Structural Engineers
De Nardis Engineering, LLC
15 Reservoir Road
White Plains, New York 10603

Mechanical/Electrical/Plumbing Engineers
Ettinger Engineering Associates
505 Eighth Avenue, 24th Floor
New York, New York 10018

Sustainability Modeling
Bright Power Inc.
11 Hanover Square, 21st Floor
New York, New York 10005

Revisions:

Issue: Progress Set

Key Plan:

PARKING
BERRY ST. (60.0' NARROW)
SOUTH 5TH ST. (60.0' WIDE)
N

Block 2433, Lot 6, 41, 37

Key Plan

Building Section East - West

Date	1/22/2015
Scale	1/8" = 1'-0"
Drawn By	AJ
Checked By	BH,JW
Project No.	1335
Sheet No.:	A-212.00

Seal: REGISTERED ARCHITECT · JOHN WOELFLING · NO. 025988 · STATE OF NEW YORK

51 of 65

Plotted: 1/22/2015 11:12:12 AM

APPENDIX 2

CITIZEN PARTICIPATION PLAN

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan

for

Williamsburg Bridgeview Apartments

NYSDEC BCP Number C224233

105 South 5th Street/337 Berry Street

Brooklyn, NY 11249

October 2016

Table of Contents

Section **Page Number**

List of Appendices

*** * * ***

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the Site's investigation and cleanup process.

Applicant: **LPC Development Group, LLC**
Site Name: **Williamsburg Bridgeview Apartments ("Site")**
Site Address: **105 South 5th Street / 337 Berry Street, Brooklyn, NY 11249**
Site County: **Kings**
Site Number: **C224233**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at: http://www.dec.ny.gov/chemical/8450.html.

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision-makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment;
- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process;
- Providing citizens with early and continuing opportunities to participate in NYSDEC's site

investigation and cleanup process;
- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community; and
- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision-making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the Site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the Site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the Site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC website. If this occurs, NYSDEC will inform the public in fact sheets distributed about the Site and by other means, as appropriate.

Site Contact List

Appendix B contains the Site contact list. This list has been developed to keep the community informed about, and involved in, the Site's investigation and cleanup process. The Site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the Site (such as fieldwork), as well as availability of project documents and announcements about public comment periods. The Site contact list includes, at a minimum:

- Chief executive officer and planning board chairperson of each county, city, town and village in which the Site is located;
- Residents, owners, and occupants of the Site and properties adjacent to the Site;
- The public water supplier which services the area in which the Site is located;
- Any person who has requested to be placed on the Site contact list;
- The administrator of any school or day care facility located on or near the Site for purposes of posting and/or dissemination of information at the facility;
- Location(s) of reports and information.

The Site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the Site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the Site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first Site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county list serve to receive future notifications about the Site. See http://www.dec.ny.gov/chemical/61092.html.

Subsequent fact sheets about the Site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive Site information in paper form. Please advise the NYSDEC Site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the Site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.
- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the Site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the Site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the Site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the Site, as described in Section 5.

If the Site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the Site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the Site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the Site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, the significant threat determination for the Site had not yet been made.

To verify the significant threat status of the Site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at http://www.dec.ny.gov/regulations/2590.html

Note: The table identifying the citizen participation activities related to the Site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare Site contact list • Establish document repository(ies) • Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local • Mail above ENB content to Site contact list • Conduct 30-day public comment period	At time of preparation of application to participate in the BCP. When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the Site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to Site contact list	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public

Citizen Participation Activities	Timing of CP Activity(ies)
about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to Site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to Site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to Site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to Site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to Site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the Site. Additional major issues of public concern may be identified during the course of the Site's investigation and cleanup process. In addition, there may be noise, odor or truck traffic impacts.

The Site is located in an Environmental Justice Area. Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities. The Site is located in a neighborhood with a sizable Hispanic-American community nearby. Therefore, all future fact sheets will be translated into Spanish.

Based on the results of prior environmental investigations and remedial activities, contamination of soil, soil vapor and groundwater at the Site is confirmed. For more information on the contaminant compounds and concentrations please contact the designated NYSDEC Project Manager, or refer to the provided environmental investigations at the repository, as described in Appendix A. This may present a public health risk to adjacent/neighboring property owners and residents if they were to come into contact with contaminated soil, soil vapor and/or groundwater.

It should be noted that during the proposed redevelopment activities, contaminants known to be present in the soils, especially Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs) and metals may become airborne and pose potential health risks to on-site workers and occupants on adjacent properties. However, a NYSDEC Community Air Monitoring Program (CAMP) is in place for the proposed development activities and will be followed to safeguard the workers and other occupants against any potential exposures.

4. Site Information

Site Description

The Site is located at 105 S. 5th Street/337 Berry Street in Williamsburg, Brooklyn, and is identified as Block 2443 and Lot 6 (formerly Lots 6, 37, and 41) on the New York City Tax Map. The Site is approximately 15,420 square feet and is bounded by residential/commercial sites to the north, South 5th Street and the Williamsburg Bridge to the south, a 7-story commercial building to the east, and Berry Street followed by residential and commercial buildings to the west.

Currently, the Site consists of a vacant, approximately 10,000- square foot one- story commercial warehouse building on the north side of the Site with a small basement in the northwest corner and undeveloped vegetated land on the south side of the Site.

The Site is located within an urban area that is primarily characterized by residential and commercial or mixed-use properties with many of the lots developed with multi-family buildings. Current uses of the adjoining properties were observed as follows:

North: The Site is bordered to the north by 4-story, 3-story, and 7-story residential buildings as well as a 1-story commercial building.

South: The Site is bordered to the south by South 5th Street followed by the Williamsburg Bridge.

East: The Site is bordered to the east by a 7-story commercial building.

West: The Site is bordered to the west by a vacant 3-story industrial/manufacturing building, a lot currently under construction at the corner of South 5th Street and Berry Street, and a 2-story family home.

According to New York City Office of Environmental Remediation (OER's) online Searchable Property Environmental E-Database (SPEED) application, there are no hospitals, schools, or day care facilities within a 500-foot radius of the Site. This building is scheduled to be demolished in July 2016.

The proposed future use of the Site will consist of an affordable housing building with 55 units of government subsidized affordable housing and an asphalt-paved parking lot. The proposed 11-story building is intended mainly for residential uses with mixed commercial retail uses on the first floor. The 68,625 gross square foot building will be approximately 168 feet tall and will be 100% affordable residential housing for families making no more than 60% of the area median income. The 55 apartment units will consist of (12) Studios, (15) 1BRs, (27) 2BRs, and (1) 3BR. The ground floor will include frontage on South 5th Street with 3,823 square feet of retail space and a 1,053-square- foot community facility. The building will also include a small basement in the northeast corner only.

The building will occupy approximately 8,300 feet of the approximately 15,420 square foot Site. Areas of the property not improved by the building will be improved either with a paved parking lot or landscaping. The proposed development will include parking with an entrance from Berry St. and several small planting areas at each end of the parking area and one recreation area approximately 370 square feet in size at grade at the northeast corner of the proposed building. The proposed Site re-development plan will require the demolition of the 1-story building with a footprint of 10,000 square feet and will be conducted in accordance with appropriate rules and regulation in New York City and State.

Appendix C contains a map identifying the location of the Site.

History of Site Use, Investigation, and Cleanup

From 1887, the northern portion of the Site has been developed with a 2-story building used by the Water Purveyors Bureau, a single-story building used as a Wagon Shed and another 2-story building used by Department of City Works. By 1918, the single-story was occupied by an Auto Shed, the 2-story building for storage and remained in this configuration until 1938 when all three buildings were replaced with the current 1-story building. From 1947 until at least 2007, the 1-story building was occupied by the City of N.Y. Dept. of Corrections garage.

Since 1887, the southern portion of the Site has occupied by five small residential dwellings. By 1904, only two residential dwellings remained with the remaining area vacant until 1947 when a small warehouse occupied the vacant land. In 1977 the three buildings were replaced with a single auto body shop. As of 1995, the southern portion of the Site has remained vacant.

Soil, groundwater and soil vapor samples collected during the October 2015 and December 2015 revealed the presence of numerous organic and inorganic contaminants onsite. The soil analytical data indicated the presence of contaminants generally associated with urban fill material including residuals from coal gas production onsite in concentrations above the Site Cleanup Objectives (SCOs). Soil boring SB-5 contained the highest concentrations of contaminants in the surface sample collected at this location.

Groundwater, found at approximately 45 feet below grade, contained contaminants including organic solvents above the applicable standards including tetrachloroethene (PCE) and trichloroethene (TCE). The groundwater also contained several metals in concentrations above the standards including iron, manganese, selenium, and sodium. A number of other metals were detected below the standards.

Soil-vapor samples were also collected onsite and indicated a large number of organic compounds present in the soil. Included in these compounds were benzene, toluene, ethylbenzene and xylene (BTEX), associated with fuel oil contamination, PCE and TCE. For detailed information regarding the contaminants found on-site refer to the Interim Remedial Measures (IRM) Work Plan located in the repository, as described in Appendix A.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the Site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination on-site, and must conduct a "qualitative exposure assessment,"

a process that characterizes the actual or potential exposures of people to contaminants on the Site and to contamination that has migrated from the Site.

The Applicant in its Application proposes that the Site will be used for restricted purposes.

To achieve this goal, the Applicant will conduct investigation activities at the Site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the Site.

Investigation

The Applicant has completed an initial Site investigation before it entered into the BCP. For the partial investigation, NYSDEC determined that the data are useable.

The Applicant will conduct an additional investigation of the Site officially called a "remedial investigation" (RI). This investigation will be performed with NYSDEC oversight. The Applicant must develop a remedial investigation work plan, which is subject to public comment.

The Site investigation has several goals:

1) Further define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) Identify the source(s) of the contamination;
3) Assess the impact of the contamination on public health and the environment; and
4) Provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant submits a draft "Remedial Investigation Work Plan" to NYSDEC for review and approval. NYSDEC makes the draft plan available to the public review during a 30-day public comment period.

When the investigation is complete, the Applicant will prepare and submit a final RI report that summarizes the results. The RIR will incorporate all DEC and NYSDOH comments from the Preliminary Remedial Investigation Report (PRIR) required by OER. This report also will recommend whether cleanup action is needed to address Site-related contamination. The investigation report is subject to review and approval by NYSDEC.

The NYSDEC will use the information in the investigation report to determine if the Site poses a significant threat to public health or the environment. If the Site is a "significant threat", it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by the NYSDEC. If the Site does not

pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An IRM is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the Site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the Site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a "Certificate of Completion" (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a "Remedial Work Plan". The Remedial Work Plan describes the Applicant's proposed remedy for addressing contamination related to the Site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce th*e availability of the draft plan for public review during a 45-day public comment period.*

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the Site Decision Document.

The Applicant may then design and perform the cleanup action to address the Site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a Final Engineering Report (FER) that certifies that cleanup requirements have been achieved or will be achieved within a specific time

frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the Site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the Site, it will approve the FER. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for Site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the Site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the Site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the Site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the Site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the Site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A -

Project Contacts and Locations of Reports and Information

Project Contacts

For information about the Site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Melissa L. Sweet
Project Manager
NYSDEC
Division of Environmental Remediation
625 Broadway, Albany, NY 12233-7015

Tel: (518) 402-9614
Email: melissa.sweet@dec.ny.gov

Thomas Panzone
Citizen Participation Specialist
NYSDEC Region 2
Office of Communications Services
47-40 21st Street
Long Island City, NY 11101
Tel: 718-482-4953
Email: Thomas.panzone@dec.ny.gov

New York State Department of Health (NYSDOH):
Eamonn O'Neil
Project Manager
NYSDOH
Empire State Plaza, Corning Tower
Rm. 1787
Albany, NY 12237
Tel: 518-402-7860
Email: BEEI@health.ny.gov

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

Brooklyn Public Library
Williamsburg Branch
240 Division Avenue at Marcy Avenue
Brooklyn, NY 11211
Call for hours: (718) 302-3485

The Brooklyn Community Board No.1
435 Graham Avenue
Brooklyn, NY 11211 Call for hours: (718) 389-0098

Appendix B - Site Contact List

Melissa L. Sweet
Project Manager and Primary Contact
Division of Environmental Remediation
625 Broadway, Albany, NY 12233-7015
(518) 402-9614

Local Government Officials:

Hon. Bill de Blasio
Mayor of New York City
City Hall
New York, NY 10007
311 or (212) New-York if outside NYC

Hon. Scott Stringer
NYC Comptroller
1 Centre Street
New York, NY 10007

Hon. Letitia James
Public Advocate
1 Centre Street
New York, NY 10007

Dan Walsh, Director
NYC Office of Environmental Remediation
100 Gold Street - 2nd Floor
New York, NY 10038

Julie Stein
Office of Environmental Assessment & Planning
NYC Dept. of Environmental Protection
96-05 Horace Harding Expressway
Flushing, NY 11373

Hon Eric Adams
Brooklyn Borough President
209 Joralemon Street
Brooklyn, NY 11201

Hon Charles Schumer
U.S. Senator
780 Third Avenue, Suite 2301
New York, NY 10017
Hon. Kirsten Gillibrand
U.S. Senator

780 Third Avenue, Suite 2601
New York, NY 10017

Hon. Nydia Velazquez
U.S. House of Representatives
266 Broadway, Suite 201
Brooklyn, NY 11211

Hon. Antonio Reynoso
NYC Councilmember
244 Union Ave
Brooklyn, NY 11206

Hon. Martin Malave Dilan
NYS Senator
573 Metropolitan Avenue
Brooklyn, NY 11211

Hon. Joseph R. Lentol
NYS Assembly Member
619 Lorimer Street
Brooklyn, NY 11211

Nancy T. Sunshine
Kings County Clerk
360 Adams Street, Room 189
Brooklyn, NY 11201

Vincent Sapienza, Acting Commissioner
NYC Department of Environmental Protection
59-17 Junction Blvd.
Flushing, NY 11373

Gerald A. Esposito, District Manager
Brooklyn Community Board 1
435 Graham Avenue
Brooklyn, NY 11211

Dealice Fuller, Chair
Brooklyn Community Board 1
435 Graham Avenue
Brooklyn, NY 11211

Ryan Kuonen
Brooklyn Community Board 1
Environmental Committee
435 Graham Avenue
Brooklyn, NY 11211

Bob Jackson
Project Engineer
Equity Environmental Engineering
500 International Drive, Suite 150
Mt. Olive, NY 07828
(973) 527-7451

Peter Procida
Procida Companies
456 E. 173rd St.
Bronx, NY 10457
Office: 718-299-7000x211

Sarah Williams
General Counsel
Procida Companies
456 E. 173rd St.
Bronx, NY 10457
Tel: 718-299-7000 x 234

109 South 5 Properties
East Adjacent Property
109 South 5th Street
Brooklyn, NY 11249

RLBK Property LLC
North Adjacent Property
100 South 4th Street
Brooklyn, NY 11249

Celita Concepcion
North Adjacent Property
South 4th Street
Block 2443, Lot 12
Brooklyn, NY 11249

Terra Gardens, LLC
North Adjacent Property
94 South 4th Street
Brooklyn, NY 11249

92 South 4th Street
North Adjacent Property
92 South 4th Street
Brooklyn, NY 11249

333 Berry Street, LLC
North Adjacent Property
333 Berry Street
Brooklyn, NY 11249

345-45 Berry St. Real
South Adjacent Property
343 Berry Street
Brooklyn, NY 11249

95 South 5th LLC
South Adjacent Property
347 Berry Street
Brooklyn, NY 11249

Berry Bridge Corp
South Adjacent Property
Block 2456, Lot 2
353 Berry Street
Brooklyn, NY 11249

Schools & Daycare Facilities:

Nuestros Ninos Daycare Center
161 South 3rd Street
Brooklyn, NY 11211

JHS John D. Wells School
Attn: Benjamin Honoroff, Principal
183 South 3rd Street
Brooklyn, NY 11211

El Puente Academy
Attn: Wanda Vazquez, Principal
211 South 4th Street
Brooklyn, NY 11211

Community, Civic, Religious and Environmental Institutions:

Los Sures David Santiago Senior Center
Attn: Executive Director
201 South 4th Street
Brooklyn, NY 11211

First Spanish Presbyterian Church
Attn: Pastor
157 South 3rd Street
Brooklyn, NY 11211

Holy Trinity Church of Ukrainian
Autocephalic Orthodox Church in Exile
Attn: Pastor
117-185 South 5th Street
Brooklyn, NY 11211

Sts. Peter and Paul Church
82 South 2nd Street
Brooklyn, NY 11249

Williamsburg Greenpoint Preservation Alliance
302 Bedford Avenue, #113
Brooklyn, NY 11211

El Puente
Attn: Executive Director
211 South 4th Street
Brooklyn, NY 11211

El Puente Academy for Peace & Justice
250 Hooper Street
Brooklyn, NY 11211

Antonia Yuille, Director
Consolidated Edison Public Affairs
30 Flatbush Avenue
Brooklyn, NY 11217

Raquel Queme, President
90th NYPD Police Precinct Council
211 Union Avenue
Brooklyn, NY 11211

Engine 221 Ladder 104
FDNY
161 South 2nd Street
Brooklyn, NY 11211

Local Media Outlets

NY 1 News
75 Ninth Avenue
New York, NY 10011

Hoy Nueva York
1 MetroTech Center, 18th Floor
Brooklyn, NY 11201

El Diario La Prensa
1 MetroTech Center, 18th Floor
Brooklyn, NY 11201

Courier-Life Publications
1 Metro-Tech Center North - 10th Floor
Brooklyn, NY 11201

Brooklyn Daily Eagle
30 Henry Street
Brooklyn, NY 11201

The Brooklyn Papers
1 Metrotech Center, Suite 1001
Brooklyn, NY 11201

New York Daily News
4 New York Plaza
New York, NY 10004

New York Post
1211 Avenue of the Americas
New York, NY 10036

Appendix C - Site Location Map

Remedial Programs
Scoping Sheet for Major Issues of Public Concern

Instructions

This Scoping Sheet assesses major issues of public concern; impacts of the Site and its remedial program on the community; community interest in the Site; information the public needs; and information needed from the public.

The information generated helps to plan and conduct required citizen participation (CP) activities, and to choose and conduct additional CP activities, if appropriate. The scoping sheet can be revisited and updated as appropriate during the Site's remedial process to more effectively implement the Site's CP program.

Note: Use the information as an aid to prepare and update the Major Issues of Public Concern section of the Site CP Plan.

General Instructions

- When to prepare: During preparation of the CP Plan for the Site. It can be revisited and updated anytime during the Site remedial process.
- Fill in Site name and other information as appropriate.
- The Scoping Sheet may be prepared by DEC or a remedial party, but must be reviewed and approved by the DER Site project manager or his/her designee.

Instructions for Numbered Parts

Consider the bulleted issues and questions below and any others that may be unique or appropriate to the Site and the community to help complete the five Parts of this Scoping Sheet. Identify the issue stakeholders in Parts 1 through 3 and adjust the Site's contact list accordingly.

Part 1. List Major Issues of Public Concern and Information the Community Wants.

- Is our health being impacted? (E.g. are there problems with our drinking water or air? Are you going to test our water, yards, sumps, basements? Have health studies been done?)
- There are odors in the neighborhood. Do they come from the Site and are they hazardous?
- Are there restrictions on what we may do (e.g. Can our children play outside? Can we garden? Must we avoid certain areas? Can we recreate (fish, hunt, hike, etc. on/around the Site?)
- How and when were the Site's contamination problems created?
- What contaminants are of concern and why? How will you look for contamination and find out where it is going? What is the schedule for doing that?
- The Site is affecting our property values!
- How can we get more information (e.g. who are the project contacts?)
- How will we be kept informed and involved during the Site remedial process?
- Who has been contacted in the community about Site remedial activities?
- What has been done to this point? What happens next and when?
- The Site is going to be cleaned up for restricted use. What does that mean? We don't want

redevelopment on a “dirty” Site.

Part 2. List Important Information Needed From the Community, if Applicable.

- Can the community supplement knowledge about past/current uses of the Site?
- Does the community have knowledge that the Site may be significantly impacting nearby people, properties, natural resources, etc.?
- Are activities currently taking place at the Site or at nearby properties that may need to be restricted?
- Who may be interested or affected by the Site that has not yet been identified?
- Are there unique community characteristics that could affect how information is exchanged?
- Does the community and/or individuals have any concerns they want monitored?
- Does the community have information about other sources in the area for the contamination?

Part 3. List Major Issues and Information That Need to be Communicated to the Community.

- Specific Site investigation or remediation activities currently underway, or that will begin in the near future.
- The process and general schedule to investigate, remediate and, if applicable, redevelop the Site.
- Current understanding about the Site contamination and effects, if any, on public health and the environment.
- Site impacts on the community and any restrictions on the public's use of the Site and/or nearby properties.
- Planned CP activities, their schedule, and how they relate to the Site’s remedial process.
- Ways for the community to obtain/provide information (document repositories, contacts, etc.).

Part 4. Community Characteristics

a. - e. Obtain information from local officials, property owners and residents, Site reports, Site visits, “windshield surveys,” other staff, etc.

f. Has the affected community experienced other **significant** present or past environmental problems unrelated to this Site? Such experiences could significantly affect public concerns and perspectives about the Site; how the community will relate to project staff; the image and credibility of project staff within the community; and the ways in which project staff communicate with the community.

g. In its remedial programs, DER seeks to integrate, and be consistent with, environmental justice principles set forth in *DEC Commissioner Policy 29 on Environmental Justice* and *DER 23 – Citizen Participation Handbook for Remedial Programs*. Is the Site and/or affected community wholly or partly in an Environmental Justice (EJ) Area? Use the Search feature on DEC’s public website for “environmental justice”. DEC’s EJ pages define an EJ area, and link to county maps to help determine if the Site and/or community are in an EJ area.

h. Consider factors such as:

- Is English the primary language of the affected community? If not, provisions should be considered regarding public outreach activities such as fact sheets, meetings, door-to-door visits and other activities to ensure their effectiveness.
- The age demographics of the community. For example, is there a significant number of senior citizens in the community? It may be difficult for some to attend public meetings and use document repositories. This may suggest adopting more direct interaction with the community with activities such as door-to-door visits, additional fact sheets, visits to community and church centers, nursing homes, etc.

- How do people travel about the community? Would most people drive to a public meeting or document repository? Is there adequate public transportation?

Part 5. Affected/Interested Public.

Individuals and organizations who need or want information and input can change during the Site's remedial process. This need is influenced by real, potential, or perceived impacts of the Site or the remedial process. Some people may want information and input throughout the remedial process. Others may participate only during specific remedial stages, or may only be interested in particular issues.

It is important to revisit this question when reviewing this scoping sheet. Knowing who is interested in the Site – and the issues that are important to them – will help to select and conduct appropriate outreach activities, and to identify their timing and the information to be exchanged.

Check all affected/interested parties that apply to the Site. **Note: Adjust the Site's contact list appropriately.** The following are some ways to identify affected/interested parties:

- Tax maps of adjacent property owners
- Attendees at public meetings
- Telephone discussions
- Letters and e-mails to DER, the remedial party, and other agencies
- Political jurisdictions and boundaries
- Media coverage
- Current/proposed uses of Site and/or nearby properties (recreational, commercial, industrial)
- Discussions with community organizations: grass roots organizations, local environmental groups, environmental justice groups, churches, and neighborhood advisory groups

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern (see instructions)

Site Name: Williamsburg Bridgeview Apartments

Site Number: C224233

Site Address and County: 105 South 5th Street / 337 Berry Street, Kings County

Remedial Party(ies): LPC Development Group, LLC

Note: For Parts 1. – 3. The individuals, groups, organizations, businesses and units of government identified should be added to the Site contact list as appropriate.

Part 1. List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and information needs. See the section on Major Issues of Public Concern, Fact Sheets to be translated into Spanish, Potential Impacts with regards to noise, odor, and truck traffic. **Use this information as an aid to prepare or update the Major Issues of Public Concern Section of the Site Citizen Participation Plan.**
Please see the Site Contact List.

How were these issues and/or information needs identified?
Census Bureau statistics were used to determine the need to translate into another language.

Part 2. List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed.
Please see the Site Contact List.

How were these information needs identified?
Census Bureau statistics.

Part 3. List major issues and information that need to be communicated **to** the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information.
Possible air, noise and truck-related impacts.

How were these issues and/or information needs identified?
Previous project experience.

Part 4. Identify the following characteristics of the affected/interested community. This knowledge will help to identify and understand issues and information important to the community, and ways to effectively develop and implement the Site citizen participation plan (mark all that apply):

a. Land use/zoning at and around Site:
X Residential ☐ **Agricultural** ☐ **Recreational** ☐ **Commercial** ☐ **Industrial**

b. Residential type around Site:
X Urban ☐ **Suburban** ☐ **Rural**

c. Population density around Site:
X High ☐ Medium ☐ Low

d. Water supply of nearby residences:
X Public ☐ Private Wells ☐ Mixed

e. Is part or all of the water supply of the affected/interested community currently impacted by the Site?
☐ **Yes X No**

Provide details if appropriate:
NA

f. Other environmental issues significantly impacted/impacting the affected community?
☐ **Yes X No**

Provide details if appropriate:
NA

g. Is the Site and/or the affected/interested community wholly or partly in an Environmental Justice Area?
X Yes ☐ No

h. Special considerations:
X Language ☐ Age ☐ Transportation ☐ Other

Explain any marked categories in **h:**
The Site is located in and Environmental Justice Area, with a sizable Hispanic-American community nearby. Therefore, all future fact sheets will be translated into Spanish.

Part 5. The Site contact list must include, at a minimum, the individuals, groups, and organizations identified in the instructions for **Part 5.** Are other individuals, groups, organizations, and units of government affected by, or interested in, the Site, or its remedial program? (Mark and identify all that apply, then adjust the Site contact list as appropriate.)

X **Non-Adjacent Residents/Property Owners:** Please see Site Contact List

X **Local Officials:** Please see Site Contact List

X **Media:** Please see Site Contact List

☐ **Business/Commercial Interests:** NA

☐ **Labor Group(s)/Employees:** NA

☐ **Indian Nation:** NA

X **Citizens/Community Group(s):** Please see Site Contact List

X **Environmental Justice Group(s):** Please see Site Contact List

X **Environmental Group(s):** Please see Site Contact List

X **Civic Group(s):** Please see Site Contact List

☐ **Recreational Group(s):** NA

☐ **Other(s):** NA

Prepared/Updated By: Frank Urilov **Date:** 8/29/16

Reviewed/Approved By: Thomas V. Panzone, NYSDEC **Date:** 8/25/16

APPENDIX 3

SUSTAINABILITY STATEMENT

This Sustainability Statement documents sustainable activities and green remediation efforts planned under this remedial action.

Reuse of Clean, Recyclable Materials and Reduced Consumption of Non-Renewable Resources: Reuse of clean, locally-derived recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction.

An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

Reduced Energy Consumption and Promotion of Greater Energy Efficiency: Reduced energy consumption lowers greenhouse gas emissions, improves local air quality, lessens in-city power generation requirements, can lower traffic congestion, and provides substantial cost savings.

Best efforts will be made to quantify energy efficiencies achieved during the remediation and will be reported in the Remedial Action Report (RAR). Where energy savings cannot be easily quantified, a gross indicator of the amount of energy saved or the means by which energy savings was achieved will be reported.

Conversion to Clean Fuels: Use of clean fuel improves NYC's air quality by reducing harmful emissions.

Natural gas will be utilized for fuel in the new building. An estimate of the volume of clean fuels used during remedial activities will be quantified and reported in the RAR.

Recontamination Control: Recontamination after cleanup and redevelopment is completed undermines the value of work performed, may result in a property that is less protective of public health or the environment, and may necessitate additional cleanup work later or impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site.

An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

Stormwater Retention: Stormwater retention improves water quality by lowering the rate of combined stormwater and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters.

An estimate of the enhanced stormwater retention capability of the redevelopment project will be included in the RAR.

Linkage with Green Building: Green buildings provide a multitude of benefits to the city across a broad range of areas, such as reduction of energy consumption, conservation of resources, and reduction in toxic materials use.

The number of Green Buildings that are associated with this brownfield redevelopment property will be reported in the RAR. The total square footage of green building space created as a function of this brownfield redevelopment will be quantified for residential, commercial and industrial/manufacturing uses.

Low-Energy Project Management Program: LPC is participating in a low-energy project management program. Under this program, whenever possible, meetings are held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation.

Trees and Plantings: Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance.

An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

APPENDIX 4

SOIL/MATERIALS MANAGEMENT PLAN

1.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the final remedial report. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of final signoff by DEC.

1.2 Stockpile Methods

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by DEC. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible. Hay bales or equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

1.3 Characterization of Excavated Materials

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Soils proposed for reuse on-Site will be managed as defined in this plan.

1.4 Materials Excavation, Load-Out, and Departure

The PE/QEP overseeing the remedial action will:

- oversee remedial work and the excavation and load-out of excavated material;
- ensure that there is a party responsible for the safe execution of invasive and other work performed under this work plan;
- ensure that Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAWP;
- ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this plan are properly addressed by appropriate parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site;
- ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

Locations where vehicles exit the Site shall be inspected daily for evidence of soil tracking off premises. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

Open and uncontrolled mechanical processing of historical fill and contaminated soil on-Site is not planned and will not be performed without prior DEC approval.

1.5 Off-Site Materials Transport

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with

applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on-Site, when possible in order to minimize off Site disturbance. Off-Site queuing will be minimized.

Outbound truck transport routes are described in the remedial report. This routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

1.6 Materials Disposal Off-Site

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) a letter from the PE/QEP or Enrollee to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in New York City under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the final remedial report.

The Remedial Action Report will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the final remedial report.

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the final remedial report. A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the final remedial report. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), including transport to a Part 360-16 Registration Facility, a formal request will be made for approval by DEC with an associated plan compliant with 6NYCRR Part 360-16. This request and plan will include the location, volume and a description of the material to be recycled, including verification that the material is not impacted by site uses and that the material complies with receipt requirements for recycling under 6NYCRR Part 360. This material will be appropriately handled on-Site to prevent mixing with impacted material.

1.7 Materials Reuse On-Site

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site.

1.8 Demarcation

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the

SMP; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the remedy is complete. Demarcation may be established by one or any combination of these three methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the RAR.

This demarcation will constitute the top of the site management horizon. Materials within this horizon require adherence to special conditions during future invasive activities as defined in the Site Management Plan.

1.9 Import of Backfill Soil from Off-Site Sources

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet DEC-approved backfill and cover soil quality objectives for this Site. The backfill and cover soil quality objectives are listed in Section 4.2. Imported soils will not exceed groundwater protection standards established in Part 375. Imported soils for Track 1 remedial action projects will not exceed Track 1 SCO's.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site. The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC.

- All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this remedial plan. The final remedial report will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.
- All material will be subject to source screening and chemical testing.
- Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:
- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the final remedial report. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

1.10 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

1.11 Stormwater Pollution Prevention

Applicable laws and regulations pertaining to stormwater pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this remedial plan (silt fences and barriers, and hay bale checks) will be installed around the entire perimeter of the remedial construction area and inspected once a week and after every storm event to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by DEC. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

1.12 Contingency Plan for Unknown Contamination Sources

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to DEC's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to DEC. Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

1.13 Odor, Dust, and Nuisance Control

Odor Control

All necessary means will be employed to prevent on- and off-Site odor nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) use of foams to cover exposed odorous soils. If odors develop and cannot otherwise be controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; and (e) use of chemical odorants in spray or misting systems.

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. DEC will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP's certifying this remedial plan.

Dust Control

Dust management during invasive on-Site work will include, at a minimum:

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.

- Use of properly anchored tarps to cover stockpiles.
- Exercise extra care during dry and high-wind periods.
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. DEC will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying this remedial plan.

Other Nuisances

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.

Rodent control will be provided during Site clearing and grubbing and during the remedial program, as necessary, to prevent nuisances.

APPENDIX 5

CONSTRUCTION HEALTH AND SAFETY PLAN

Project Name: 105 South 5th Street
Project Number: 2014074

EQUITY ENVIRONMENTAL ENGINEERING, LLC
500 International Drive, Suite 150
Mount Olive, New Jersey 07828

SITE-SPECIFIC CONSTRUCTION HEALTH AND SAFETY PLAN

Address: 105 South 5th Street Brooklyn, New York 11201

Plan Revisions

Number	Date	Initials
1	5/6/15	RLJ
2	7/6/16	FU
3		
4		

Faron Moser _____ _____
Site Supervisor (SS) Date

Robert Jackson _____ _____
Project Manager (PM) Date
Health and Safety Officer
Plan Preparer

Neha Gautam _____ _____
Alternate Health & Safety Officer Date

Table of Contents

FORMS

Introduction

This Site-Specific Health and Safety Plan (HASP) has been prepared by Equity Environmental Engineering, LLC (Equity) to summarize the work related health and safety hazards at the subject site (105 South 5th Street, Brooklyn, New York) and the requirements and procedures to protect its employees from them. This plan meets or exceeds the requirements of Occupational Safety and Health Administration (OSHA), 29 CFR 1910.120, for a site-specific health and safety plan.

This plan was designed to reduce the potential for occupational illness or injury resulting from working at this site. The purpose of the HASP is to inform Equity's employees of the health and safety risks present at this site, and the proper methods of protecting themselves from those risks. Each worker must be fully aware of the risks associated with the work to be accomplished, and be dedicated to completing that work safely.

Existing and potential hazards at this site have been identified. As new information becomes available, this HASP will be revised. Standard practices and procedures of industrial hygiene, occupational health, safety, and environmental protection are prescribed in this plan, which was prepared and reviewed by experienced professionals.

Equity employees who work on this site must read the HASP and sign the form included in this plan, to indicate that they understand the plan's contents, and agree to comply with its provisions. Anyone who cannot, or will not comply with this HASP will be excluded from on-site activities. Violations of this HASP or any applicable federal, state, or local health and safety regulations should be reported immediately to the Site Supervisor (SS), or to Equity's Health & Safety Officer (HSO).

This HASP will be readily available so workers can reference it when necessary.

Site Information

Location: 105 South 5th Street, Brooklyn, NY 11201

Current Site Information:

The subject property currently consists of a multi-story building located at 105 South 5th Street (Block 2443 /Lots 6, 37 and 41) in Brooklyn. This is an initial investigation of the subject property.

Location/Class: [X] Industrial [ ] Commercial [ ] Urban/Residential
[ ] Suburban [ ] Rural

Site Regulatory Status: [ ] CERCLA/SARA [ ] US EPA [ ] NYCDEP
[ ] NPL [ ] RCRA [ ] NJ ISRA
[X] Other (OER) [ ] Not Regulated

Operations or Tasks to be Performed, and Approximate Duration of Each:

1- **Subsurface geophysics survey**
2- **Installation and sampling of soil borings, soil-gas points and monitoring wells.**
3- **Excavation of contaminated soils.**
4- **Back-fill with clean soil.**
5- **Installation of vapor mitigation system**

Surrounding Population/Structures:

The area surrounding the subject property is mixed residential and commercial/industrial.

Site and Surrounding Topography:

The topography is generally flat.

Known or Suspected Pathways of Contaminant Dispersion:

None

Emergency Shower, Eyewash and First Aid Equipment Located at:

Eyewash and emergency shower will be available.

First aid provided by emergency services (911).

Personnel On-Site trained in First Aid:

1. N. Gautam
2. F. Moser
3. B. Jackson
4. P. Jaran
5. _____
6. _____
7. _____
8. _____

Emergency Medical Care

Hospital

Hospital Name: SUNY Downstate Medical Center Telephone #: 888-270-7869

Address: 450 Clarkson Ave, Brooklyn, NY 11203

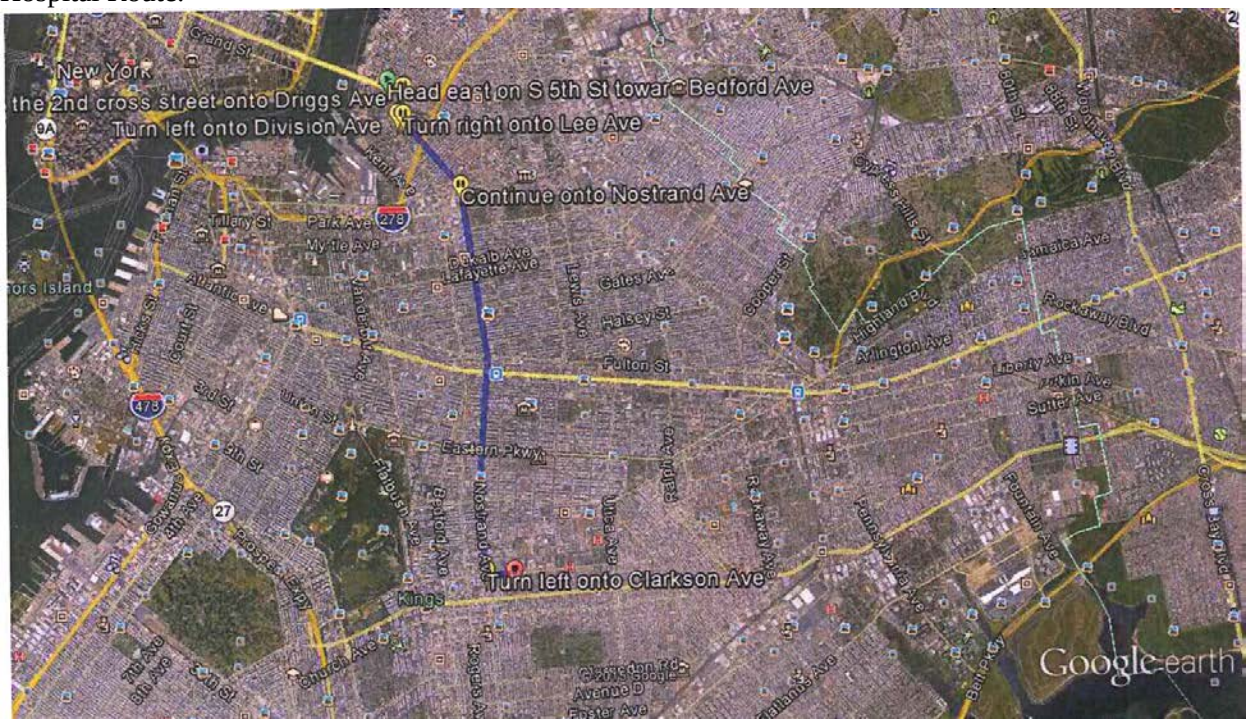
Contact: Operator Telephone #: 888-270-7869

Type of Service (X) Physical Trauma Only

( ) Physical Trauma and Chemical Exposure

( ) Available 24 Hours

Hospital Route:



1. Head east on S 5th St 0.1 mi
2. Turn right onto Driggs Ave 0.2 mi
3. Turn left onto Division Ave 0.2 mi
4. Turn right onto Lee Ave 0.7 mi
5. Continue onto Nostrand Ave 3.1 mi
6. Turn left onto Clarkson Ave – 0.2 mi

Hospital route information has been provided to satisfy OSHA requirements (29 CFR 1910.120). **However, where 911-emergency service and/or transport is available, Equity personnel are strictly prohibited from transporting accident victims in either company or personal vehicles.

Transporting the injured in non-emergency vehicles increases the potential for motor vehicle accidents during transit to the hospital and further injury to the victim. Also, the victims' condition can worsen during transit. As a result, transportation in non-emergency vehicles can delay or even prevent treatment by trained emergency personnel during a critical time. Employees must remain at the site of the accident, administer appropriate first aid, and await the arrival of **trained emergency and/or rescue personnel.**

Emergency Contacts

	Town	**Phone**
Fire Department	NYC	911
Police Department	NYC	911 / (212) 334-0611
Site Contact	Equity Personnel	(973) 641-0825
Site Telephone	Equity Personnel	(973) 641-0825
Nearest Telephone	Equity Personnel	TBD
First Aid/EMS	NYC	911
Federal Agency Representative	NA	NA
State Agency Representative	NA	NA
Local Agency Representative	NA	NA
Pesticide Poisoning	NA	(800) 845-7633
NY Poison Control Center	State-wide	(212) 764-7667
CHEM TREC	Washington, DC	(800) 424-9300
Utility	**Company Name**	**Phone**
Water Supply	NYC DEP	*
Sewer	NYC DEP	*
Power	Con Edison	*
Telephone	*	*
Gas	National Grid	*
NY One Call	NY	811

* NY One Call will supply this information

Equity Environmental Engineering LLC Emergency Contact List
Cell Phone Numbers

Peter Jaran	(973) 479-2381
Bob Jackson	(973) 641-0825
Faron Moser	(201) 341-1323
Neha Gautam	(201) 916-3416

Key Project Personnel

The following describes the project position assignments, associated responsibilities, and reporting relationships.

Position	Job Description	Interactions
Project Manager (PM)	Responsible for technical and administrative performance of the project. Supports Site Supervisor and is available to him at all times. Will visit the site periodically, or as necessary. Reports progress of project on a regular basis. Assigns key personnel, and identifies, requests, secures, and monitors use of resources for project. Approves program expenditures and invoices.	Reports directly to Managing Director. Works closely with Site Supervisor.
Site Supervisor (SS)	Acts as point of contact for client and client's representative(s). Supervises all on-site personnel and subcontractors. Coordinates daily site-specific work efforts, and ensures all activities are in strict compliance with site-specific health and safety plan. Has authority to suspend all work that possesses any health and safety risk. Briefs subordinate technical personnel on task requirements. Identifies and resolves technical problems. Provides periodic review of project progress.	Reports directly to Project Manager.
Health & Safety Officer (HSO)	Develops, implements, and enforces the on-site safety program. Oversees all health and safety aspects of project, conducts periodic audits to ensure compliance. Available at all times to discuss project progress and health and safety related issues.	Reports directly to Managing Director. Works closely with Project Manager, and Site Supervisor.
Onsite Health Physicist	Implementing the radiation safety at the Site with authorization to stop work due to unsafe acts, unsafe conditions, non-compliance and/or non-implementation of the Safety Plan and/or applicable safety and health requirements; performs the proper operation of radiation monitoring equipment; conducts radiation surveys; and notifies anomalies to the site supervisor.	Reports directly to Site Supervisor.

Equity is the entity responsible for managing health and safety for its employees at this site. Key project personnel are as follows:

Project Manager:	Robert Jackson	973-527-7451/974-641-0825
HSO	Name	Telephone / Cellular Number
Site Supervisor:	Faron Moser	973-527-7451/201-341-1323
	Name	Telephone / Cellular Number
Alternate SSO:	Neha Gautam	973-527-7451/201-916-3416
		Telephone / Cellular Number

Medical Surveillance and Training Dates for Authorized Personnel

Employee	Medical Exam	OSHA 8-Hr.	Site Supervisor Training	Respirator Fit Test
Bob Jackson	12/12/14	11/11/2013	9/27/2004	12/13/2012
Peter Jaran	12/16/14	11/11/2013		12/13/2012
Faron Moser	4/1/2014	1/28/2014		
Neha Gautam	3/4/2014	6/25/2013		

Task Identification

Tasks covered under this plan:

Task #	Description
1	Surface geophysics Survey
2	Installation of soil borings, soil-gas points and monitoring wells
3	Collection of soil, soil-gas and groundwater samples.
4	Excavation of contaminated soils
5	Back-fill with clean soil
6	Installation of vapor mitigation system

Off-site tasks planned? No

Describe:

Chemical Hazards

Task No.(s)	Chemical Name (or class)	PEL	TLV	Other Pertinent Limits (specify)	Primary Hazard			SDS Attached (Y/N)
					Ingestion	Dermal	Inhalation	
2, 3	Isobutylene (PID Calibration Gas)	250 ppm	250 ppm		x	x	x	Y
2,3 and 4	Benzo(a) anthracene*	0.2 mg/m^3	0.2 mg/m^3		x	x	x	Y
2,3 and 4	Benzo(a)pyrene*	0.2 mg/m^3	0.2 mg/m^3		x	x	x	Y
2,3 and 4	Benzo(b) fluoranthene*	0.2 mg/m^3	0.2 mg/m^3		x	x	x	Y
2,3 and 4	Chrysene *	0.2 mg/m^3	0.2 mg/m^3		x	x	x	Y
2,3 and 4	Indeno (1,2,3-cd) Pyrene*	0.2 mg/m^3	0.2 mg/m^3		x	x	x	Y
2,3 and 4	Mercury	0.1 mg/m^3	0.025 mg/m^3		x	x	x	Y

* Values based on OSHA Coal tar pitch volatiles (benzene soluble fraction), anthracene, BaP, phenanthrene, acridine, chrysene, pyrene)

PEL – OSHA Permissible Exposure Limit: the maximum allowable 8-hour time weighted average (TWA) exposure concentration.
TLV – ACGIH Threshold Limit Value: the recommended 8-hour TWA exposure concentration.
STEL – ACGIH or OSHA Short-term Exposure Limit: the maximum allowable 15-minute TWA exposure concentration.
Ceiling – OSHA and Cal-OSHA Ceiling Limit: the maximum exposure concentration above, which an employee shall not be exposed during any period without respiratory protection.
IDLH – Immediately Dangerous to Life and Health: the concentration at which one could be exposed for 30 minutes without experiencing escape-impairing or irreversible health effects.

Physical and Biological Hazards

Hazard	Yes	No	Task No.(s)	Hazard	Yes	No	Task No.(s)
Electrical (overhead lines)		X	1,2,3,4.5	Uneven Terrain		X	
Electrical (underground lines)	X		1,2,3,4.5	Unstable Surfaces	X		1,2,3,4.5
Gas Lines	X		1,2,3,4.5	Elevated Surfaces		X	
Water Lines	X		1,2,3,4.5	Lightning	X		1,2,3,4.5
Drilling Equipment	X		1,2,3,4.5	Rain	X		1,2,3,4.5
Excavation Equipment	X		1,2,3,4.5	Snow	X		1,2,3,4.5
Power Tools	X		1,2,3,4.5	Liquefied/Pressurized Gases		X	
Heat Exposure	X		1,2,3,4.5	Lifting Equipment		X	
Cold Exposure	X		1,2,3,4.5	Vermin	X		1,2,3,4.5
Oxygen Deficiency		X		Insects	X		1,2,3,4.5
Confined Spaces		X		Disease-causing organisms	X		1,2,3,4.5
Noise	X		1,2,3,4.5	Others, e.g., marine sampling (specify)		X	
Ionizing Radiation		X					
Non-Ionizing Radiation		X					
Fire	X		1,2,3,4.5				
Explosive Atmospheres		X					
Shoring	X		1,2,3,4.5				
Scaffolding		X					
Holes/Ditches	X		1,2,3,4.5				
Steep Grades		X					
Slippery Surfaces	X		1,2,3,4.5				

Risk Analysis

Task #	Substance	Concentration (if known)	Risk*
1,2,3	Isobutylene (PID Calibration Gas)	250 ppm	1
2,3 and 4	Benzo(a) anthracene	1.39 mg/kg	1
2,3 and 4	Benzo(a)pyrene	1.25 mg/kg	1
2,3 and 4	Benzo(b) fluoranthene	1.62 mg/kg	1
2,3 and 4	Chrysene	1.31 mg/kg	1
2,3 and 4	Indeno (1,2,3-cd) Pyrene	0.957 mg/kg	1
2,3 and 4	Mercury	0.97 mg/kg	1

*Risk
0 – No Risk
1 – Slight Risk
2 – Moderate Risk
3 – Dangerous Conditions/Caution
4 – High Risk
5 – Extremely Dangerous

General Safety Rules

1. If an employee must work alone, he/she must call his/her supervisor twice a day. If the supervisor is unavailable, that supervisor's supervisor must be contacted.

2. Workers must wear all personal protective equipment required for the tasks to be performed.

3. Horseplay or practical jokes are forbidden on the job.

4. Compressed air must not be used to blow dirt from clothing, or played with or blown at another person.

5. Drinking of alcoholic beverages or the use of drugs on the job is prohibited. Their use will cause immediate dismissal from the site.

6. All areas must be continually cleaned to maintain good housekeeping. Trash is to be piled neatly and removed promptly. All tools and work areas are to be kept in clean and safe condition.

7. Competent workers must do welding and cutting.

8. Ladders are to be of proper design and tied off while in use. Do not go up or down a ladder without the free use of both hands. Use a rope to lift or lower materials or tools. Always face a ladder when climbing or descending.

9. Every work site must have a complete first aid kit.

10. **ALL** accidents must be investigated and reported. Use the Accident Investigation Form in the back section of this plan.

11. Injuries sustained while on duty must be reported to supervisor immediately, or as soon as possible after injury is sustained.

12. Explosives must be handled and transported by licensed people only.

13. All tools and electrical equipment must be in proper working order.

14. Clothing appropriate to the duties performed shall be worn by all workers. Large pockets, loose jewelry, cuffed trousers and loose or torn clothing are dangerous and should not be worn around machinery, or when climbing ladders, or working on structures.

Heat Stress

Site employees will be trained to recognize signs of heat stress. The Site Supervisor will maintain a log of all site employees exposed to temperature extremes, showing the work and rest times as well as worker monitoring results. Appropriate rest periods will be provided to help site workers accommodate to temperature extremes.

Signs and Symptoms of Heat Stress

- **Heat rash** may result from continuous exposure to heat or humid air.
- **Heat cramps** are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:
  - muscle spasms
  - pain in the hands, feet and abdomen
- **Heat exhaustion** occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms are:
  - pale, cool, moist skin
  - heavy sweating
  - dizziness
  - nausea
  - fainting
- **Heat stroke** is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occurs. Competent medical help must be obtained. Signs and symptoms are:
  - red, hot, usually dry skin
  - lack of reduced perspiration
  - nausea
  - dizziness and confusion
  - strong, rapid pulse
  - coma

Measures to Avoid Heat Stress

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
- Identify a shaded, cool rest area.
- Rotate personnel, alternate job functions.
- Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink less fluids than needed because of an insufficient thirst. DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK. For an 8-hour workday, 50 ounces of fluids should be drunk.
- Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
- Save most strenuous tasks for non-peak hours, such as the early morning or at night.
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.

Site personnel should monitor their pulse rate as an indicator of heat strain by the following method:

At the beginning of the rest period, count the radial pulse during a 30-second period. If the rate exceeds 110 beats per minute, lengthen the rest period by one-third. If the heart rate still exceeds 110 beats per minute at the end of the rest period, shorten the next work cycle by one-third.

Cold Stress

Equity will provide appropriate rest periods to help site workers accommodate to temperature extremes. Site employees will be trained to recognize signs of cold stress.

Measures to Avoid Cold Stress

- Wear multi-layer clothing (the outer most layer should be of wind-resistant fabric)
- Drink warm fluids
- Work in pairs
- Avoid heavy sweating

Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (in mph)	Equivalent Chill Temperature (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-195
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect).	LITTLE DANGER In <hr. with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trench foot and immersion foot may occur at any point on this chart											

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA

The Site Supervisor will maintain a log of all site employees exposed to temperature extremes, showing the work and rest times as well as environmental monitoring results.

Employee Training Program

All personnel performing work in areas on this site covered by this HASP must have completed the appropriate training requirements specified in 29 CFR 1910.120(e). Each individual must have completed an 8-hour refresher-training course and/or initial 40-hour training course within the last two years prior to performing any intrusive work on this site covered by this HASP. Records that demonstrate that all persons subject to the training requirements have actually met them will be maintained either on site or in the project file. The Project Manager and/or Supervisor are responsible for verifying compliance of the project team with these rules.

Prior to commencement of on-site activities, a site safety meeting will be held to review the specific information and requirements of this HASP. HASP sign-off sheets will be collected at the end of this meeting.

Site Specific Training (when applicable) will include:

- Explanation of the overall site HASP.
- Health and safety personnel and organization.
- Brief site history.
- Special attention to signs and symptoms of overexposure to known and suspected site contaminants.
- Health effects of site contaminants.
- Air monitoring description.
- Physical hazards associated with the project.
- Selection, use and limitations of available safety.
- Personal hygiene and decontamination.
- Respirator face-piece fit testing.
- PPE use and maintenance.
- Site rules and regulations.
- Work zone establishment and markings.
- Site communication.
- Emergency preparedness procedures.
- Equipment decontamination.
- Medical monitoring procedures.
- Contingency plan.

Prior to work, each Equity employee will attend the contractor's health and safety orientation, if applicable. In addition, Equity's employees will review health and safety items specific to the tasks to be performed that were not covered in the contractor's orientation.

Site Health and Safety Meetings

In addition, the Site Supervisor will meet daily with all Equity employees prior to beginning work on site. The agenda of the meeting will include a review of important elements of this plan, any special safety items, and a discussion of the emergency response procedures. Also, everyone will agree on a schedule for periodic meetings, (for example, before beginning work each day), to review the effectiveness of this plan and make changes as necessary. If significant changes at the site occur, special meetings will be scheduled.

Training Records

The Site Supervisor will complete a report of the daily safety meetings, using the form in the back section of this plan, and all attending the meeting will sign the Daily Safety Meeting Log.

The training status of contractor and subcontractor employees will be verified that their training criteria meets the requirements specified in 29 CFR 1910.120(e). A copy of all training certificates will be kept for Equity personnel working at the site.

Personal Protective Equipment (PPE) Requirements

Task No.(s)	Level of Protection (A – D)*	Level of Upgrade	PPE Suit	PPE Gloves	PPE Feet	PPE Head	PPE Eye	PPE Ear	PPE Respirator	Additional PPE for Upgrade
1,2,3	D	NA	Std	N	Steel	HH	Glasses	Plugs	NA	

SUIT

Std = Standard Work Clothes
Tyvek = Uncoated Tyvek Disposal Coverall
PE Tyvek = Polyethylene-coated Tyvek
Saranex = Saranex-laminated Tyvek
PVC Suite = PVC Raingear

GLOVES

Work = Work Gloves (canvas, leather)
Neo = Neoprene Gloves
PVC = PVC Gloves
N = Nitrile Gloves
V = Vinyl Gloves
L = Latex Gloves

FEET

Steel = Steel-toe shoes or boots
Steel+ = Steel-toe shoes or boots & PVC boots
Booties = PVC booties

HEAD

HH = Hardhat

EYE

Glasses = Safety glasses
Goggles = Goggles
Shield = Face shield

EAR

Plugs = Earplugs
Muff = Ear muffs

RESPIRATOR

APR = Air purifying respirator
Full APR = Full face APR
Half APR = Half face APR
SAR = Airline supplied air respirator
SCBA = Self-contained breathing apparatus
Escape = Escape SCBA
OV = Organic Vapor Cartridge
AG = Acid Gas Cartridge
OV/AG = Organic Vapor/Acid Gas Cartridge
AM = Ammonia Cartridge
Dust/Mist = Dust/Mist pre-filter and cover for cartridge
HEPA = High efficiency particulate air filter cartridge

* For unspecified volatile organics (based on 1-minute breathing zone measurement using PID or OVA):

Up to 1 ppm above background	Level D
1 – 5 ppm above background	Level C
5 – 500 ppm above background	Level B
500 ppm above background	Level A

** Earplugs will be available on-site, but are not required

Suggested Levels of Protection

Level "D" Protection

1. Coveralls (optional)
2. Gloves
3. Boots/shoes – steel toe
4. Boots (outer) chemical resistant (disposable- if required)
5. Safety glasses or chemical splash goggles
6. Hard hat (safety shield if required)

Level "C" Protection

1. Full-face, air-purifying, canister-equipped respirator (NIOSH/MSHA approved)
2. Chemical resistant clothing (coveralls; hooded, two-piece, chemical splash suit; chemical resistant hood & apron; disposable, chemical-resistant coveralls)
3. Coveralls
4. Gloves (outer) chemical-resistant
5. Gloves (inner) chemical-resistant
6. Boots (outer) chemical-resistant
7. Boots (inner) steel toe
8. Hard hat (face shield)
9. Escape mask
10. Two-way radio

Level "B" Protection

1. Pressure/Demand SCBA (MSHA-NIOSH approved)
2. Chemical resistant clothing (overalls and long-sleeved jacket; coveralls; hooded, one- or two-piece chemical splash suite; disposable, chemical-resistant coveralls)
3. Coveralls
4. Gloves (outer) chemical-resistant
5. Gloves (inner) chemical-resistant
6. Boots (outer) chemical-resistant
7. Boots (inner) steel toe
8. Hard hat (face shield)
9. Two-way radio

Level "A" Protection (Equity does not perform work in Level A PPE)

1. Pressure/Demand SCBA (MSHA-NIOSH approved)
2. Fully encapsulating, chemical-resistant suit
3. Coveralls
4. Gloves (outer) chemical-resistant
5. Gloves (inner) chemical-resistant
6. Boots, chemical-resistant, steel toe (depending on suit construction, work over or under suit boot)
7. Hard hat (under suit)
8. Two-way radio

Medical Surveillance

Requirements

All Equity employees covered by this HASP, who engage in site activities governed by 29 CFR 1910.120 for 30 or more days per year, must meet the medical surveillance requirements specified in 1910.120(f). Therefore, such personnel must have completed occupational medical baseline or surveillance examination, performed by a licensed physician, within the last 24 months. The medical examination includes the following components:

- Personal Medical Questionnaire
- Occupational Exposure History
- Physical Examination
- Vision Testing
- Spirometry
- Audiometry
- Blood Chemistry Panel (e.g., SMAC-20)
- Complete Blood Count with Differential
- Urinalysis
- Chest X-Ray (every two years at a minimum)
- Electrocardiogram (at physician's discretion)

Examinations are required upon hiring, termination, and exposure to substances at or above the PEL.

Results of the examinations are communicated directly from the physician to the employee. Medical records for Equity's employees are kept by the Company and the employee

Monitoring Requirements

Monitoring is to be conducted by the Site Supervisor, or his/her designee. Copies of monitoring results and calibration logs will be filed with the HASP.

Monitoring is designed to assess exposure to employees during site activities, and to determine if PPE is required and adequate to assure protection. Because investigation and remediation activities at hazardous waste sites are of an inconsistent nature, it is not possible to assign a monitoring protocol that excludes, or is not directly dependent upon, professional judgment in determining when monitoring is required to assess exposure. Thus, the following generic protocol must be followed at a minimum, and should be modified to be more conservative (e.g., require more monitoring) if deemed necessary by the Site Supervisor or HSO. Under no conditions will the required frequency be decreased.

At a minimum, air monitoring will be conducted before and during each task or activities for which air monitoring has been designated. If airborne concentrations of contaminants reach action levels based on observations with the direct reading instruments, then the appropriate PPE upgrade or work stoppage order will be enforced by the Site Supervisor. In case a work stoppage order is given, the area must be cleared of all personnel immediately.

The use of action levels and the basis for the selection of monitoring equipment is explained as follows:

Action levels determine:

(1) the PPE to be used by site workers
(2) their ability to remain and work in the exclusion zone

The selection of the specified monitoring equipment is based on

(1) the nature of the contaminants
(2) the likely concentrations of the contaminants
(3) the probable duration of exposure
(4) the relative sensitivity of the monitoring equipment to the specific contaminants

The following summarizes the calibration requirements for the air monitoring instruments used at the site:

Instrument	Calibration Frequency
PID: Mini RAE-3000 (or equivalent)	Beginning of each work shift

Air Monitoring and Contaminant Action Levels

Task No.(s)	Location	Contaminant	Monitoring Equipment	Monitoring Frequency	Action Level Concentration	
					Mandatory Respirator Use	Mandatory Work Stoppage
1,2,3	Work Areas	Volatile Organic	PID: Mini-Rae	Periodically during all tasks/activities.	NA	10 ppm above background in breathing zone

PID = Photoionization Detector (e.g., Multi-Rae, Mini-Rae, HNU, TIP, OVM)
FID = Flame Ionization Detector (e.g., OVA)
LEL-O_2 = Explosivity and Oxygen Meter

Name(s) of individual(s) responsible for performing the monitoring, and certifying the results:
All Equity personnel

Type, make and model of instruments used: Mini-Rae 3000 (or equivalent) PID Gas Monitor

Method and frequency of calibration:

- 100 ppm isobutylene-calibration gas. Calibrated prior to each day's use according to manufacturer's instruction.
- The calibration of all radiation survey instrumentation will be conducted using calibration standards traceable to the National Bureau of Standards, All instruments used for surveys will be calibrated every six months and after instrument repair when required. All instrument calibrations will be performed by the original manufacturer or a qualified vendor. Instruments will be response checked to a known source of radiation prior to and after field use.

Procedures for Handling Anticipated Wastes

Waste Generation

Anticipated: Yes___X___ No ____

Types: Liquid ___X___Solid ___X___ Sludge _____Gas _____

Quantity: Expected volume of each type: Field determined

This project ____ will __X__ will not generate hazardous wastes. These wastes will be:
_____ stored _____ treated
__ transported ___ manifested in accordance with NYS and federal regulations.

Any soil and/or groundwater produced from sampling activities will remain onsite.

Packaging requirements for waste material:

_____
_____
_____
_____

Spill Prevention and Response

Potentially hazardous spill situations can be mitigated by using containment devices and materials in work areas. If site conditions are suitable, earthen berms will be constructed around specific areas. If site conditions are not suitable for this, or the potential spill is smaller, barriers will be constructed with sorbent materials such as "speedi-dry", sorbent booms and/or straw bales. Dikes and berms will also be used to divert stormwater run-on and run-off away from critical zones.

Because a spill cleanup must be conducted under crisis conditions, it is important that the methods used for dealing with a spill be thought out beforehand. However, the steps followed cannot be inflexible, because no two spills are identical. Factors that will be assessed in the event of any and all spills include:

1. The volume of the hazardous substance released and the rate of release.
2. The nature of the spill material.
3. What danger exists to personnel in the immediate area.
4. Nature of damage and possibilities of repair.
5. If the transfer of material to an alternate containment is advisable.
6. Feasibility of the construction of a containment dike.
7. Nature of spill area.
8. Whether the spilled substance has reached a watercourse or sewer.
9. Danger of explosion or fire.
10. Equipment and supplies necessary to confine the material and carry out the cleanup.

In most cases, the success of a cleanup operation is dependent upon the time it takes to contain the spill. Therefore, Equity's first attempt at spill containment will be at the point of discharge. This can often be accomplished by closing valves, reinforcing or repairing damaged containers, moving or changing the position of fallen or ruptured containers, or emptying the container by pumping to a temporary storage or holding vessel. Pumps, suction hoses and containers will be available to recover spilled materials when directed to do so by the Site Supervisor.

Handling and transport of drummed waste always must be conducted in a controlled and safe manner, which will minimize damage to structurally sound drums, repacks and overpacks. If leakage or spillage of waste occurs, the drum must immediately be placed within an overpack unit. Overpack units must be provided at each staging area, at areas of existing drums, and along all site roadways.

Task/Work Area	Potential Spill or Discharge	Equipment, Materials, and Procedures for Spill Cleanup
Soil excavation	Hydraulic fluid from drill rig	Pads/Speedy Dry

Emergency Procedures

Potential emergencies that may arise are most likely to be associated with physical hazards from heavy equipment operation and/or lifting and loading of debris. Emergency response will, in most cases, be performed in Level D protection.

Modifications to these emergency procedures may be necessary after the actual site set-up, based on prevailing conditions. Periodic reviews of these procedures will be performed by the Site Supervisor to ensure that they are appropriate for all anticipated emergencies.

Responsibilities

The Site Supervisor has the authority and responsibility to commit company resources to appropriately respond to an emergency, and to exclude all personnel not directly responding to the emergency.

Prior to beginning work at the site, Equity will designate an employee, usually the Site Supervisor, to be responsible for initiating any emergency response actions. In the event an injury or illness requires more than first aid treatment, the Site Supervisor (or alternate) will accompany the injured person to the hospital, and will remain with the person until release, admittance is decided, or another Equity staff relieves them of this responsibility.

Evacuation Plan

The basic elements of an emergency evacuation plan include employee training, escape routes, escape procedures, critical operations or equipment, rescue and medical duty assignments, designation of responsible parties, emergency reporting procedures and methods to account for all employees after evacuation.

When appropriate, wind direction will be discussed during the daily safety briefing to all on-site personnel by the Site Supervisor to indicate possible routes of upwind escape. Work-area entrance and exit routes will be planned, and emergency escape routes will be delineated by the Site Supervisor. The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated, will result in the evacuation of the team and a re-evaluation of the hazard and the level of protection required. This re-evaluation will be conducted by appropriate on-site health and safety personnel in coordination with the HSO

In the highly unlikely event that barrels, canisters, or chemical gases or vapors are uncovered during site work, the following procedures shall be followed:

1) In the event that barrels, canisters, or any other vessels are encountered during excavation, all work shall immediately cease and all workers to be removed from the area. The Site Supervisor shall be immediately notified, and he/she shall identify vessel contents, handling procedures and storage and disposal techniques prior to starting work.

2) In the event that high concentrations of gases or vapors are detected, the following actions will be taken:

    - Remove all workers from the area
    - Monitor gas or vapor concentrations to determine the type of respiratory protection that will be required before workers reenter the area.

3) In the highly unlikely event of a major leak of toxic gas, such as might occur if a compressed gas cylinder were ruptured during excavation or drilling, all on-site personnel will be evacuated to a safe distance. The HSO and Emergency services will be contacted immediately and the risk will be assessed prior to restarting work.

Training

Employees will be instructed in the specific aspects of emergency evaluation applicable to the site as part of the site safety meeting prior to the commencement of all on-site activities. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed. During the site safety meeting, all employees will be trained in, and reminded of the location of this plan, the procedures outlined in this plan, and the communication systems and evacuation routes used during an emergency.

On a continuous basis, individual employees should be constantly alert for indicators of potentially hazardous situations, and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. In the event of any emergency that necessitates an evaluation of the site, on-site personnel will be notified by the use of car horns sounded in regularly spaced, repeated blasts, as detailed in the next section of this procedure. The Site Supervisor will control the site until the appropriate local or state agency representatives arrive, if required. He will also contact the HSO.

Alarm Systems Emergency Signals

The simplest and most effective emergency communication system, in any situation, is direct voice communications. Voice communications will be supplemented anytime voices cannot be clearly perceived above ambient noise levels (e.g., noise from heavy equipment, drilling rigs or backhoes0, and anytime a clear line-of-sight cannot be easily maintained among all site personnel because of distance, terrain, or other obstructions. When voice communications must be supplemented, the following emergency signals, using car horns, will be used.

- One Horn Blast: General Warning

One blast is used to signal relatively minor, but important events on site. An example would be a minor chemical spill where there is no immediate damage to life or health, yet personnel working on site should be aware of the situation so unnecessary problems are avoided. If one horn blast is sounded, personnel must stop all activity and equipment on site and await further instruction from the Site Supervisor.

- Two Horn Blasts: Medical Emergency

Two blasts are used to signal a medical emergency where immediate first aid or emergency medical care is required. If two horn blasts are sounded, all first aid and CPR trained personnel should respond, as appropriate. All other activity and equipment should stop, and personnel should await further instructions from the Site Supervisor.

- Three Horn Blasts Followed by One Continuous Blast: Immediate Danger to Life or Health

Three blasts followed by another extended or continuous horn blast signals a situation that could present an immediate danger to the life or health (IDLH) to all employees on site. Examples of possible IDLH situations could include fires, explosions, hazardous chemical spills or releases, hurricanes, tornadoes, blizzards or floods. If three horn blasts followed by a continuous blast are sounded, all activity and equipment must stop, and all personnel must evacuate the site to an appropriately designated site located outside the site gate, or further off site if necessary. (Note: unless otherwise specified, all decontamination procedures must be implemented.) All personnel must be accounted for by the Site Supervisor, and other response actions determined by the Site Supervisor must be followed.

Employees on site will use the "buddy" system (pairs). Buddies should pre-arrange hand signals or other means of emergency communication in case radios cannot be used, or if the radios no longer operate. The following had signals are suggested:

1. Hand gripping throat: out of air, can't breathe.
2. Grip partner's wrist or place both hands around waste: leave area immediately, no debate.
3. Hand on top of head: need assistance.
4. Thumbs up: OK, I'm alright, I understand.
5. Thumbs down: No, negative.

Visual contact will be maintained between employee pairs. Team members will remain in close proximity to each other in order to provide assistance in case of emergencies, and will inform each other of any of the following effects of exposure to site contamination:

- headaches
- dizziness
- blurred vision
- cramps
- irritation of eyes, skin or respiratory tract

If any member of the work crew experiences any adverse symptoms while on site, the entire work crew will immediately stop work and follow the instructions provided by the Site Supervisor.

Medical Treatment/First Aid

Community emergency services (EMS, fire, and police) will be notified immediately if their resources are needed on site. If necessary, the injured or sick party shall be taken to the nearest hospital.

Emergency Reporting

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage will be reported to Equity. An incident investigation will be initiated as soon as emergency conditions are under control. The purpose of this investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided.

The investigations will begin while details are fresh in the mind of all involved. The person administering first aid may be able to start the fact gathering process if the injured are able to speak. Pertinent facts must be determined. Questions beginning with who, what, when, where, and how are usually most effective to discover ways to improve job performance in terms of efficiency, quality of work, as well as safety and health concerns.

On-Site Evacuation Plan –A series of repeated blasts is the signal for all Equity personnel and subcontractors to evacuate the site and assemble at:

To be determined at the beginning of each field event

The criteria for activating the alarm will be the first sign of any serious problem that requires assistance or evacuation. Should either a fire or explosion occur, all personnel will proceed immediately to the evacuation assembly point and await further instructions. At that time a personnel check will be conducted to determine if anyone is missing, and the local fire and police departments will be called for assistance. Once on site, the acting officer of the fire department and the Site Supervisor will determine if further evacuations are necessary. No Equity personnel will re-enter the site without clearance from the fire/police department and Site Supervisor. Subcontractor

Safety It has been and shall continue to be the policy of Equity that employees of all subcontractors are required to adhere to all applicable company, local, state, and federal safety rules and regulations.

When an infraction of a local, state, federal, or company safety regulation is observed, the Site Supervisor will request verbally that the subcontractor's supervisory personnel correct the infraction immediately. If correction is not made, then the project manager will request in writing that proper corrective action be taken. Subcontractors who continue to ignore proper safety procedures will have payments withheld until compliance is achieved or be terminated.

Subcontractors are required to hold safety meetings for their employees when they are working on Equity projects, and submit documentation of such meetings to the Project Manager. At a minimum they shall have specific safety procedures for proper use of all heavy equipment such as excavators, drilling rigs, etc., on site during the project. Subcontractor employees are required to attend Equity's safety meetings.

Forms

Job Safety & Health Protection

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

Employers

All employers must furnish to employees' employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational salary and health standards, and its Compliance Safety and Health Officers conduct job site inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection. If they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period with which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory penalties against employers of up to $1,000 for each serious violation and for optional penalties of up to $1,000 for each non-serious violation. Penalties of up to $1,000 per day may be proposed for failure to correct violations within the proposed time period. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to $10,000 for each such violation.

There are also provisions for central penalties. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of up to $250,000 (or $500,000 if the employer is a corporation), or by imprisonment for up to six months or both. A second conviction of an employer doubles the possible term of imprisonment.

Voluntary Activity

While providing penalties for violation, the Act also encourages efforts by labor and management before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort if requested. Also, your local OSHA office can provide considerable help and advice on saving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers, without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State of Labor or Health Department or a State University.

Under provisions of Title 29, Code of Federal Regulations, part 1903.2(s)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

HASP Sign-Off Form

INSTRUCTIONS: Site personnel are required to read, understand, and agree to the provision of the plan. Personnel are required to sign this form indicating agreement. The original of this form is maintained by the Project Manager, and becomes part of the permanent site project files upon completion of site work.

Site Name: South 5th Street

Location: 105 South 5th Street, Brooklyn, New York

Project Name and Number: 2014074

I have read, understand, and agree to comply with the provisions of this HASP for work activities on this site.

Name	Signature	Company/Agency	Date

Equipment Calibration Log

Operator Name:_____ Instrument Notice:_____

Signature:_____ Serial Number:_____

Date	Time	Concentration	Comments

Sampling Log

Operator Name:_____ Instrument Notice:_____

Signature:_____ Serial Number:_____

Was the equipment calibrated? _____ Yes _____ No

Date	Time	Concentration	Comments

Heat Stress Monitoring Log

Employee Name							
Start Time							
Measurement 1 Pulse Work Minutes Rest Minutes							
Measurement 2 Pulse Work Minutes Rest Minutes							
Measurement 3 Pulse Work Minutes Rest Minutes							
Measurement 4 Pulse Work Minutes Rest Minutes							
Measurement 5 Pulse Work Minutes Rest Minutes							
Measurement 6 Pulse Work Minutes Rest Minutes							
Measurement 7 Pulse Work Minutes Rest Minutes							
Measurement 8 Pulse Work Minutes Rest Minutes							

Signature of Site Supervisor (or designee) Date

Daily Sign In/Sign Out Form

(to be completed on site)

Site Name: South 5th Street

Location: South 5th St, Brooklyn, New York

Employee Name	Company Name	Purpose	Time In	Time Out	Date

Signature of Site Supervisor (or designee) Date

Daily Safety Meeting Log

(to be completed on site)

Site Name South 5th St.

Location South 5th St, Brooklyn, New York

Weather _____

Topics _____

_____

_____

_____

_____

_____

_____

Employee Names: Signatures

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Signature of Site Supervisor (or designee) Date

ACCIDENT INVESTIGATION REPORT

Place Accident Occurred:		Name of Person Involved:	
Site Location		Age / Sex	Job Title
		Yrs in This Job	Yrs with Company
Date & Time of Incident AM ___/___/_____:___ PM		Date & Time of Investigation AM ___/___/_____:___ PM	
Date Incident Reported ___/___/	Reported to Whom	Investigated By:	
Regulatory Agencies or Insurance Carriers Contacted:		Witness(es):	
Description from injured or witnesses (use reverse side of form for more space): Signature Date			

Select one or more in each column. Don't hesitate to write in your own words (continue on reverse side, if necessary).

When completing the following task:
- ☐Operating (what machine)_____
- ☐Using (what tool)_____
- ☐Handling (what material)_____
- ☐Maintenance or repair (of what)_____
- ☐Office or sales task_____
- ☐Other -- Provide details_____

The following occurred:
- ☐Amputation (total or partial)_____
- ☐Burn (thermal)_____
- ☐Burn (chemical)_____
- ☐Electric shock_____
- ☐Concussion/unconscious_____
- ☐Crushing injury (contusion, crush, bruise) -- intact skin_____
- ☐Cut, laceration, puncture, abrasion_____
- ☐Fracture or dislocation_____
- ☐Sprain/strain_____
- ☐Cumulative trauma_____
- ☐Occupational illness or disease_____
- ☐Internal injuries_____
- ☐None -- Near accident_____
- ☐Other -- Provide details_____
- ☐Respiratory_____

To the (explain details):
- ☐Head, face, neck_____
- ☐Eye_____
- ☐Trunk, abdomen_____
- ☐Back (upper, lower)_____
- ☐Arm, shoulder_____
- ☐Fingers_____
- ☐Leg, hip, knee_____
- ☐Ankle, foot_____
- ☐Toes_____
- ☐Internal Injuries_____
- ☐Body System:_____
- ☐Circulatory_____
- ☐Digestive_____
- ☐Musculoskeletal_____
- ☐Nervous_____
- ☐Other_____
- ☐Other (specify)_____

Person was, or got:
- ☐Struck against (not including falls)_____
- ☐Struck by_____
- ☐Fell from (from a higher level)_____
- ☐Slipped, tripped, fell on (in the same level)_____
- ☐Foreign body in eye_____
- ☐Contacted electrical energy from_____
- ☐Exposure to (substance)_____
  - from inhalation_____
  - ingestion_____
  - skin absorption_____
- ☐Vehicle accident_____
- ☐Caught in, under or between_____
- ☐Repetitive_____
- ☐Other_____

While (taking what position) Where (or What):
- ☐Carrying_____
- ☐Climbing_____
- ☐Bending_____
- ☐Driving_____
- ☐Jumping_____
- ☐Kneeling_____
- ☐Lifting - below waist, give weight)_____
- ☐Lifting - above waist, give weight)_____
- ☐Pulling_____
- ☐Pushing_____
- ☐Reaching or stretching_____
- ☐Riding_____
- ☐Running_____
- ☐Sitting_____
- ☐Standing_____
- ☐Throwing_____
- ☐Twisting or turning_____
- ☐Walking_____
- ☐Other_____

Medical Treatment (check as many as apply)
- ☐The injured employee was able to return to work the same day.
- ☐The injured employee was sent home
- ☐The injured employee was sent to a doctor/ clinic; list the doctor/clinic name, address, and phone:_____

- ☐The employee was hospitalized.

List name and address of hospital:

Attending physician:_____

What conditions contributed
- ☐Awkward job procedure
- ☐Inadequate guard/safety device
- ☐Inadequate warning/labeling system
- ☐Fire/explosion hazard
- ☐Not secured against moving
- ☐Poor housekeeping
- ☐Protruding object
- ☐Close clearance/congestion
- ☐Hazardous arrangement/storage
- ☐Defective tools/equipment
- ☐Inadequate ventilation
- ☐Atmospheric condition: gases,

What unsafe procedures contributed
- ☐Operating without training/authority
- ☐Failure to follow proper procedure
- ☐Failure to secure
- ☐Operating at unsafe speed
- ☐Failure to warn/signal
- ☐Congestion
- ☐Used defective equipment
- ☐Used equipment improperly/unsafely
- ☐Improper loading or placement
- ☐Horseplay/distraction
- ☐Improper protective equipment
- ☐Improper lifting or carrying

The underlying causes of the incident are:
- ☐Unaware of job hazards
- ☐Inattention to hazard
- ☐Unaware of how to avoid incident
- ☐Not enough time to act
- ☐Person motivated to use unsafe procedure
- ☐Emotional/mental/physical stress
- ☐Equipment failed to perform as expected
- ☐Intoxicant/drugs
- ☐Failure to report/correct unsafe condition
- ☐Illness/medical condition
- ☐Work procedure not ergonomically correct
- ☐Substandard design

Classification (check as many as apply)
- ☐Fatality
- ☐Medical treatment other than First Aid
- ☐Occupation illness or disease
- ☐First Aid
- ☐Environmental Release
- ☐Property Damage
- ☐Near-accident

dusts, fumes, vapors
☐Repetitive motion
☐Illumination/noise hazard
☐Other

☐Taking unsafe or awkward position
☐Servicing moving equipment
☐Other

☐Other

ACCIDENT DESCRIPTION (continued):

What steps have already been taken to prevent similar incidents?_____

What else can be done (engineering controls, training, enforcement, process changes) to eliminate the hazard?_____

_____
Site Supervisor Signature Date

Health and Safety Review: Is proposed action appropriate? Yes ☐ No ☐ Comments_____

_____
HSO Signature Date

VEHICLE ACCIDENT REPORT

EMPLOYEE NAME:_____ DRV LIC NO.:_____

COMPANY ADDRESS:_____ INSURANCE COMPANY_____

POLICY NO.:_____

DESCRIPTION OF ACCIDENT

DATE:_____ TIME:_____ SPEED LIMIT_____:

LOCATION:_____

DIRECTION OF TRAVEL:_____

HOW DID IT HAPPEN?_____

_____

USE SPACE BELOW TO INDICATE VEHICLE PATHS - INDICATE NORTH BY ARROW

POLICE REPORT

NAME OF OFFICER: _____ BADGE #:_____

DEPARTMENT:_____ LOCATION:_____

SUMMONS ISSUED? Y [ ] N [ ] TO WHOM?_____

YOUR VEHICLE

YEAR/MAKE:_____ REGIST #:_____

DRIVEN BY:_____ AGE:_____ TEL #:_____

ADDRESS:_____ CITY:_____ STATE:_____

NATURE OF DAMAGE:_____

OTHER DRIVER
(continue below for additional drivers and witnesses)

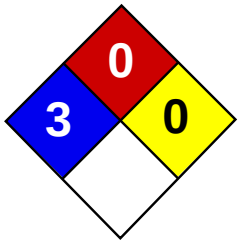
NAME:_____ DRV LIC NO.:_____

ADDRESS:_____ VEHICLE REGISTRATION:_____

_____ INSURANCE COMPANY_____

POLICY NO.:_____

Safety Data Sheets



Material Safety Data Sheet
Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragyrum

Chemical Name: Mercury

Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:
A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 0.025 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonynickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsiliane, calcium,

Special Remarks on Corrosivity:
The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalga) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):
R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:22 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

SUPELCO INC -- 48499, INDENO (1,2,3-CD) PYRENE 10MG -- 6810-00N032522

========== Product Identification ==========

Product ID:48499, INDENO (1,2,3-CD) PYRENE 10MG
MSDS Date:06/06/1985
FSC:6810
NIIN:00N032522
MSDS Number: BNSSK
=== Responsible Party ===
Company Name:SUPELCO INC
Address:SUPELCO PARK
City:BELLEFONTE
State:PA
ZIP:16823-0048
Country:US
Info Phone Num:814-359-3441
Emergency Phone Num:814-359-3441
CAGE:54968
=== Contractor Identification ===
Company Name:SIGMA-ALDRICH INC.
Address:3050 SPRUCE STREET
Box:14508
City:ST. LOUIS
State:MO
ZIP:63103
Country:US
Phone:314-771-5765/414-273-3850X5996
CAGE:54968

========== Composition/Information on Ingredients ==========

Ingred Name:INDENO 1,2,3-CD PYRENE
CAS:193-39-5
RTECS #:NK9300000
EPA Rpt Qty:100 LBS
DOT Rpt Qty:100 LBS

========== Hazards Identification ==========

LD50 LC50 Mixture:NONE SPECIFIED BY MANUFACTURER.
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
Health Hazards Acute and Chronic:REPORTED ANIMAL CARCINOGEN.
Explanation of Carcinogenicity:INDENO(1,2,3-CD) PYRENE: GROUP 2B(IARC),
ANTICIPATED TO BE CARCINOGEN (NTP).
Effects of Overexposure:NONE SPECIFIED BY MANUFACTURER.
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

========== First Aid Measures ==========

First Aid:EYES: FLUSH WITH WATER FOR AT LEAST 15 MIN. SKIN: FLUSH WITH
LARGE VOLUMES OF WATER. REMOVE CONTAMINATED CLOTHING. INHAL: MOVE
TO FRESH AIR. IF BREATHING STOPS, GIVE ARTF RESP. INGEST: IMMED
CONTACT A PHYSICIAN.

========== Fire Fighting Measures ==========

Flash Point:400F,204C
Extinguishing Media:CO2, DRY CHEMICAL.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA AND FULL
PROTECTIVE EQUIPMENT .

========== Accidental Release Measures ==========

Spill Release Procedures:SWEEP UP MATERIAL. AVOID GENERATING DUST.

Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN SEALED CONTR IN COOL, DRY LOCATION. KEEP AWAY FROM OXIDIZERS. STORE IN DRY, WELL VENTILATED AREA.
Other Precautions:REPORTED CANCER HAZARD. AVOID EYE OR SKIN CONTACT.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .
Ventilation:USE ONLY IN EXHAUST HOOD.
Protective Gloves:NEOPRENE GLOVES.
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:NONE SPECIFIED BY MANUFACTURER.
Supplemental Safety and Health
NONE SPECIFIED BY MANUFACTURER.

========== Physical/Chemical Properties ==========

HCC:T6
Melt/Freeze Pt:M.P/F.P Text:324F,162C
Vapor Pres:0.10
Appearance and Odor:YELLOW CRYSTALS

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS. METALLIC SODIUM & POTASSIUM.

========== Disposal Considerations ==========

Waste Disposal Methods:COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR LOCAL REGULATIONS.

Material Safety Data Sheet
Chrysene, 98%

ACC# 95251

Section 1 - Chemical Product and Company Identification

MSDS Name: Chrysene, 98%
Catalog Numbers: AC224140000, AC224140010, AC224140050, AC224145000, NC9381297, XXAC22414-300G
Synonyms: 1,2-Benzophenanthrene; Benzo(a)phenanthrene; 1,2,5,6-Dibenzonaphthalene.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
218-01-9	Chrysene	98	205-923-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: very light beige solid.
Caution! May cause eye and skin irritation. May cause respiratory tract irritation. May cause cancer in humans.
Target Organs: Liver, skin.

Potential Health Effects
Eye: May cause eye irritation.
Skin: May cause skin irritation.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: May cause respiratory tract irritation.
Chronic: May cause cancer according to animal studies.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or

water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: ; Flammability: 1; Instability:

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Wash thoroughly after handling. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Avoid breathing dust.
Storage: Store in a tightly closed container. Store in a cool, dry area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Chrysene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (benzene soluble fraction) (listed under Coal tar pitches).

OSHA Vacated PELs: Chrysene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: very light beige
Odor: Not available.
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 448 deg C @ 760 mm Hg
Freezing/Melting Point:250-255 deg C
Decomposition Temperature: Not available.
Solubility: insoluble
Specific Gravity/Density: Not available.
Molecular Formula:C18H12
Molecular Weight:228.29

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Dust generation.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 218-01-9: GC0700000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 218-01-9:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Known carcinogen (listed as Coal tar pitches).

- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: Chrysene was mutagenic to S. Typhimurium in the presence of an exogenous metabolic system.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Water flea LC50 = 1.9 mg/L; 2 Hr.; Unspecified Fish toxicity : LC50 (96hr) Neauthes arenacedentata >1ppm.(Rossi,S.S. et al Marine Pollut. Bull. 1978) Invertebrate toxicity : lethal treshold concentration (24hr) Daphnia Magna 0,7æg/l.(* Newsted,J.L. et al Environ. Toxicol. Chem. 1987) Bioaccumulation : 24hr Daphnia Magna log bioconcentration factor 3.7845 (*)
Environmental: Degradation studies : biodegradated by white rot fungus (Proc.Annu.Meet.Am.Wood-Preserv.Assoc.1989) May be utilised by axenic cultures of microorganisms e.g. Pseudomonas pancimobilis EPA505, which may have novel degradative systems(Mueller,J.G. et al ppl.Environ.Microbiol.1990; Mueller, J.G. et al Environ.Sci.Technol.1991).
Physical: Not found.
Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 218-01-9: waste number U050.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S.	No information available.
Hazard Class:	9	
UN Number:	UN3077	
Packing Group:	III	

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 218-01-9 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 218-01-9: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313

This material contains Chrysene (CAS# 218-01-9, 98%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water Act.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 218-01-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Chrysene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 218-01-9: 0.35 æg/day NSRL (oral)

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T

Risk Phrases:

R 45 May cause cancer.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.
S 60 This material and its container must be disposed of as hazardou s waste.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 218-01-9: No information available.

Canada - DSL/NDSL

CAS# 218-01-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 218-01-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/30/1999
Revision #5 Date: 3/15/2007

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

CHEM SERVICE INC -- F74 BENZO/B/FLUORANTHENE -- 6550-00F037517

========== Product Identification ==========

Product ID:F74 BENZO/B/FLUORANTHENE
MSDS Date:09/11/1990
FSC:6550
NIIN:00F037517
MSDS Number: BWJGM
=== Responsible Party ===
Company Name:CHEM SERVICE INC
Address:660 TOWER LN
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381-3108
Country:US
Info Phone Num:215-692-3026/800-452-9994
Emergency Phone Num:215-692-3026/800-452-9994
CAGE:84898
=== Contractor Identification ===
Company Name:CHEM SERVICE INC
Box:3108
City:WEST CHESTER
State:PA
ZIP:19381
Country:US
Phone:215-692-3026
CAGE:84898
Company Name:CHEM SERVICE, INC
Address:660 TOWER LN
Box:599
City:WEST CHESTER
State:PA
ZIP:19301-9650
Country:US
Phone: 610-692-3026
CAGE:8Y898

========== Composition/Information on Ingredients ==========

Ingred Name:BENZO (B) FLUORANTHENE (SUSPECTED CARCINOGEN BY NTP, IARC GROUP 2B) *94-4*
CAS:205-99-2
RTECS #:DF6350000
Other REC Limits:A2 CARCINOGEN
EPA Rpt Qty:1 LB
DOT Rpt Qty:1 LB

========== Hazards Identification ==========

LD50 LC50 Mixture:ORAL LD50 (RAT/MOUSE): 72 MG/KG
Routes of Entry: Inhalation:NO Skin:NO Ingestion:NO
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
Explanation of Carcinogenicity:SEE INGREDIENTS

========== First Aid Measures ==========

First Aid:EYES: FLUSH W/WATER FOR 15-20 MINS. SKIN: FLUSH W/WATER FOR

15-20 MINS. IF NOT BURNED, WASH W/SOAP & WATER TO CLEANSE. INHALATION: REMOVE TO FRESH AIR. GIVE CPR/OXYGEN IF NEEDED. KEEP WARM & QUIET. IN GESTION: DON'T GIVE LIQUIDS/INDUCE VOMITING IF UNCONSCIOUS/CONVULSING. IF VOMITING OCCURS, WATCH CLOSELY TO AVOID AIRWAY OBSTRUCTION. OBTAIN MEDICAL ATTENTION IN ALL CASES.

========== Fire Fighting Measures ==========

Extinguishing Media:CO2, DRY CHEMICAL POWDER/SPRAY.

========== Accidental Release Measures ==========

Spill Release Procedures:EVACUATE AREA. WEAR APPRORPRIATE OSHA REGULATED EQUIPMENT. VENTILATE AREA. ABSORB ON VERMICULITE/SIMILAR MATERIAL. SWEEP UP & PLACE IN APPROPRIATE CONTAINER/HOLD FOR DISPOSAL. WASH CONTAMINATED SURFAC ES TO REMOVE ANY RESIDUES.

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN A COOL DRY PLACE ONLY W/COMPATIBLE CHEMICALS. KEEP TIGHTLY CLOSED. FOR LABORATORY USE ONLY.
Other Precautions:AVOID CONTACT W/SKIN, EYES & CLOTHING. DON'T BREATH VAPORS. CONTACT LENSES SHOULDN'T BE WORN IN THE LABORATORY. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS. AVOID DIRECT PHYSICAL CONTACT.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:WEAR APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.
Ventilation:CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.
Eye Protection:EYE SHIELDS
Work Hygienic Practices:REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Supplemental Safety and Health

========== Physical/Chemical Properties ==========

Melt/Freeze Pt:M.P/F.P Text:334.4F
Appearance and Odor:CRYSTALLINE SOLID

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES

========== Disposal Considerations ==========

Waste Disposal Methods:BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER IAW/FEDERAL, STATE & LOCAL REGULATIONS.

Material Safety Data Sheet

Benzo[a]pyrene, 98%

ACC# 37175

Section 1 - Chemical Product and Company Identification

MSDS Name: Benzo[a]pyrene, 98%
Catalog Numbers: AC105600000, AC105600010, AC105601000, AC377200000, AC377200010, AC377201000 AC377201000
Synonyms: 3,4-Benzopyrene; 3,4-Benzpyrene; Benzo[def]chrysene.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
50-32-8	Benzo[a]pyrene	>96	200-028-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: yellow to brown powder.
Danger! May cause harm to the unborn child. May impair fertility. May cause eye, skin, and respiratory tract irritation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Cancer hazard. May cause allergic skin reaction. May cause heritable genetic damage.
Target Organs: Reproductive system, skin.

Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause skin irritation. May be harmful if absorbed through the skin. May cause an allergic reaction in certain individuals.
Ingestion: May cause irritation of the digestive tract. The toxicological properties of this substance have not been fully investigated. May be harmful if swallowed.
Inhalation: May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated. May be harmful if inhaled.
Chronic: May cause cancer in humans. May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Benzo[a]pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar	0.2 mg/m3 TWA (as benzene soluble fraction) (listed under Coal tar pitches).

		pitches).	

OSHA Vacated PELs: Benzo[a]pyrene: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Powder
Appearance: yellow to brown
Odor: faint aromatic odor
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 495 deg C @ 760 mm Hg
Freezing/Melting Point:175 - 179 deg C
Decomposition Temperature: Not available.
Solubility: 1.60x10-3 mg/l @25°C
Specific Gravity/Density: Not available.
Molecular Formula:C20H12
Molecular Weight:252.31

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Dust generation.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 50-32-8: DJ3675000
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 50-32-8:

- **ACGIH:** A2 - Suspected Human Carcinogen

- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: Adverse reproductive effects have occurred in experimental animals.
Mutagenicity: Mutagenic effects have occurred in humans.Mutagenic effects have occurred in experimental animals.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 50-32-8: waste number U022.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	NOT REGULATED FOR DOMESTIC TRANSPORT	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOL (Benzo{a} pyrene)
Hazard Class:		9
UN Number:		UN3077
Packing Group:		III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 50-32-8 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 50-32-8: immediate, delayed.

Section 313

This material contains Benzo[a]pyrene (CAS# 50-32-8, >96%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

The following statement(s) is(are) made in order to comply with the California Safe Drinking Water Act:

WARNING: This product contains Benzo[a]pyrene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 50-32-8: 0.06 æg/day NSRL

European / International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T N

Risk Phrases:

R 43 May cause sensitization by skin contact.
R 45 May cause cancer.
R 46 May cause heritable genetic damage.
R 60 May impair fertility.
R 61 May cause harm to the unborn child.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 53 Avoid exposure - obtain special instructions before use.
S 60 This material and its container must be disposed of as hazardou s waste.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.

WGK (Water Danger/Protection)

CAS# 50-32-8: No information available.

Canada - DSL/NDSL

CAS# 50-32-8 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #7 Date: 6/30/2006

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

SUPELCO,INC. -- BENZO(A)ANTHRACENE 0.1G,48563 -- 6810-00N010656

========== Product Identification ==========

Product ID:BENZO(A)ANTHRACENE 0.1G,48563
MSDS Date:05/16/1985
FSC:6810
NIIN:00N010656
MSDS Number: BHYRL
=== Responsible Party ===
Company Name:SUPELCO,INC.
Address:SUPELCO PARK
City:BELLEFONTE
State:PA
ZIP:16823-0048
Info Phone Num: 814-359-3441
Emergency Phone Num: 814-359-3441
CAGE:HO582
=== Contractor Identification ===
Company Name:SIGMA-ALDRICH INC.
Address:3050 SPRUCE STREET
Box:14508
City:ST. LOUIS
State:MO
ZIP:63103
Country:US
Phone:314-771-5765/414-273-3850X5996
CAGE:54968
Company Name:SUPELCO,INC.
Address:SUPELCO PARK
Box:City:BELLEFONTE
State:PA
ZIP:16823-0048
Phone: 814-359-3441
CAGE:HO582

========== Composition/Information on Ingredients ==========

Ingred Name:BENZ A ANTHRACENE (SARA III)
CAS:56-55-3
RTECS #:CV9275000
Other REC Limits:N/K
ACGIH TLV:A2 ; 9394
EPA Rpt Qty:10 LBS
DOT Rpt Qty:10 LBS

========== Hazards Identification ==========

Routes of Entry: Inhalation:NO Skin:NO Ingestion:NO
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
Health Hazards Acute and Chronic:SEE SIGNS AND SYMPTOMS OF OVEREXPOSURE.
Explanation of Carcinogenicity:SUSPECTED HUM CARCIN/KNOWN ANIM CARCIN (NTP 1985).INADEQ EVID FOR CARC IN HUM,SUFF EVID FOR CARC IN ANIMALS (IARC 1987).
Effects of Overexposure:EYES/SKIN/INGESTION/INHALATION:N/K .
Medical Cond Aggravated by Exposure:N/K

========== First Aid Measures ==========

First Aid:EYES:FLUSH WITH WATER FOR AT LEAST 15 MINUTES.SKIN:FLUSH WITH LARGE VOLUMES OF WATER.REMOVE CONTAMINATED CLOTHING.INGESTION:CONTACT PHYSICIAN.INHALATION:IMMEDIAATELY MOVE TO FRESH AIR.GIVE OXYGEN IF B REATHING IS LABORED.IF BREATHING STOPS,GIVE ARTIFICIAL RESPIRATION.CONTACT PHYSICIAN.

========== Fire Fighting Measures ==========

Flash Point:N/K
Lower Limits:N/K
Upper Limits:N/K
Extinguishing Media:CO*2,FOAM,DRY CHEMICAL.
Fire Fighting Procedures:USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT .

========== Accidental Release Measures ==========

Spill Release Procedures:SWEEP UP MATERIAL.VENTILATE AREA.AVOID GENERATING DUST.
Neutralizing Agent:N/K

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN SEALED CONTAINER IN COOL,DRY LOCATION.KEEP AWAY FROM OXIDIZERS.AVOID GENERATING DUST.
Other Precautions:REPORTED CANCER HAZARD.AVOID EYE OR SKIN CONTACT.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN .
Ventilation:LOCAL AND GENERAL VENTILATION NECESSARY TO KEEP AIR CONCENTRATION BELOW LEVEL OF CONCERN .
Protective Gloves:RUBBER
Eye Protection:CHEMICAL WORKERS GOGGLES .
Work Hygienic Practices:N/K
Supplemental Safety and Health
ROUTES OF ENTRY:INHALATION/SKIN/INGESTION .

========== Physical/Chemical Properties ==========

Boiling Pt:B.P. Text:438C,820F
Melt/Freeze Pt:M.P/F.P Text:157C,315F
Decomp Temp:Decomp Text:N/K
Appearance and Odor:PALE YELLOW CRYSTAL.

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
OXIDIZING AGENTS.

========== Disposal Considerations ==========

Waste Disposal Methods:DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL,STATE AND LOCAL REGULATIONS .

Disclaimer (provided with this information by the compiling agencies):
This information is formulated for use by elements of the Department of Defense. The United States of America in no manner whatsoever,

expressly or implied, warrants this information to be accurate and disclaims all liability for its use. Any person utilizing this document should seek competent professional advice to verify and assume responsibility for the suitability of this information to their particular situation.

AIR LIQUIDE™

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: NONFLAMMABLE GAS MIXTURE

Containing One or More of the Following Components in a Nitrogen Balance Gas:
Oxygen 0-23.5%; Isobutylene, 0.0005-0.9%

SYNONYMS: Not Applicable **CHEMICAL FAMILY NAME:** Not Applicable **FORMULA:** Not Applicable

Document Number: 50054

Note: The Material Safety Data Sheet is for this gas mixture supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). This MSDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 2 (Composition and Information on Ingredients). Refer to the product label for information on the actual composition of the product.

PRODUCT USE:	Calibration of Monitoring and Research Equipment
U.S. SUPPLIER/MANUFACTURER'S NAME:	CALGAZ
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
BUSINESS PHONE:	1-410-228-6400 (8 a.m. to 5 p.m. U.S. EST)
General MSDS Information**:**	1-713-868-0440
Fax on Demand:	1-800-231-1366
EMERGENCY PHONE:	
Chemtrec: United States/Canada/Puerto Rico:	1-800-424-9300 [24-hours]
Chemtrec International:	1-703-527-3887 [24-hours]

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH	OTHER
			TWA ppm	STEL ppm	TWA ppm	STEL ppm	IDLH ppm	ppm
Isobutylene	115-11-7	0.0005-0.9%	There are no specific exposure limits for Isobutylene.					
Oxygen	7782-44-7	0-23.5%	There are no specific exposure limits for Oxygen.					
Nitrogen	7727-37-9	Balance	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This gas mixture has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This is a colorless, odorless gas mixture. Releases of this gas mixture may produce oxygen-deficient atmospheres (especially in confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated. Isobutylene, a component of this gas mixture, may cause drowsiness and other central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for this gas mixture is by inhalation.

INHALATION: Due to the small size of an individual cylinder of this gas mixture, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. The chief health hazard associated with this gas mixture is when this gas mixture contains less than 19.5% Oxygen and is released in a small, poorly-ventilated area (i.e. an enclosed or confined space). Under this circumstance, an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The effects associated with various levels of oxygen are as follows:

CONCENTRATION OF OXYGEN	OBSERVED EFFECT
12-16% Oxygen:	Breathing and pulse rate increase, muscular coordination slightly disturbed.
10-14% Oxygen:	Emotional upset, abnormal fatigue, disturbed respiration.
6-10% Oxygen:	Nausea, vomiting, collapse, or loss of consciousness.
Below 6%:	Convulsive movements, possible respiratory collapse, and death.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Over-exposure to this gas mixture may cause the following health effects:

ACUTE: Due to the small size of the individual cylinder of this gas mixture, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. The most significant hazard associated with this gas mixture when it contains less than 19.5% oxygen is the potential for exposure to oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, nausea, unconsciousness, and death. The skin of a victim of over-exposure may have a blue color. Additionally, Isobutylene, a component of this gas mixture, may cause drowsiness or central nervous system effects in high concentrations; however, due to its low concentration in this gas mixture, this is unlikely to occur.

CHRONIC: Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

TARGET ORGANS: ACUTE: Respiratory system, eyes. CHRONIC: Heart, cardiovascular system, central nervous system.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD	(BLUE)	1
FLAMMABILITY HAZARD	(RED)	0
PHYSICAL HAZARD	(YELLOW)	0

PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
See Section 8			

For Routine Industrial Use and Handling Applications

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS MIXTURE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn.

No unusual health effects are anticipated after exposure to this gas mixture, due to the small cylinder size. If any adverse symptom develops after over-exposure to this gas mixture, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary. Victim(s) who experience any adverse effect after over-exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by over-exposure to this gas mixture.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary; treat symptoms and eliminate exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.
Upper (UEL): Not applicable.

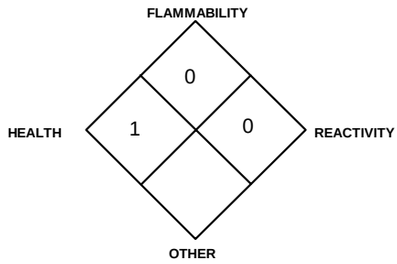
FIRE EXTINGUISHING MATERIALS: Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.

NFPA RATING



6. ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Due to the small size and content of the cylinder, an accidental release of this gas mixture presents significantly less risk of an oxygen deficient environment and other safety hazards than a similar release from a larger cylinder. However, as with any chemical release, extreme caution must be used during emergency response procedures. In the event of a release in which the atmosphere is unknown, and in which other chemicals are potentially involved, evacuate immediate area. Such releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel.

Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for oxygen. Oxygen levels must be above 19.5% before non-emergency personnel are allowed to re-enter area.

If leaking incidentally from the cylinder, contact your supplier.

7. HANDLING and USE

WORK PRACTICES AND HYGIENE PRACTICES: Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify the cylinders containing this gas mixture. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.

STORAGE AND HANDLING PRACTICES: Cylinders should be firmly secured to prevent falling or being knocked-over. Cylinders must be protected from the environment, and preferably kept at room temperature (approximately 21°C [70°F]). Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. These cylinders are not refillable. **WARNING! Do not refill DOT 39 cylinders. To do so may cause personal injury or property damage.**

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: WARNING! Compressed gases can present significant safety hazards. During cylinder use, use equipment designed for these specific cylinders. Ensure all lines and equipment are rated for proper service pressure.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: No special ventilation systems or engineering controls are needed under normal circumstances of use. As with all chemicals, use this gas mixture in well-ventilated areas. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of Nitrous Oxide and Oxygen.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection when oxygen levels are below 19.5%, or during emergency response to a release of this gas mixture. During an emergency situation, before entering the area, check the concentration of Methane and Oxygen. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Wear leather gloves when handling cylinders. Chemically resistant gloves should be worn when using this gas mixture. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for Nitrogen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.072 lbs/ ft^3 (1.153 kg/m^3)
BOILING POINT: -195.8°C (-320.4°F)
FREEZING/MELTING POINT @ 10 psig: -210°C (-345.8°F)
SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 0.906
pH: Not applicable.
SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.023
MOLECULAR WEIGHT: 28.01
EVAPORATION RATE (nBuAc = 1): Not applicable.
EXPANSION RATIO: Not applicable.
ODOR THRESHOLD: Not applicable.
SPECIFIC VOLUME (ft^3/lb): 13.8
VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for Oxygen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.083 lb/cu ft (1.326 kg/m^3)
FREEZING/MELTING POINT @ 10 psig: -218.8°C (-361.8°F)
BOILING POINT: -183.0°C (-297.4°F)
SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 1.105
pH: Not applicable.
SOLUBILITY IN WATER vol/vol at 32°F (0°C) and 1 atm: 0.04.91
MOLECULAR WEIGHT: 32.00
EVAPORATION RATE (nBuAc = 1): Not applicable.
EXPANSION RATIO: Not applicable.
ODOR THRESHOLD: Not applicable.
VOLUME (ft^3/lb): 12.1
VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for the gas mixture.

APPEARANCE AND COLOR: This is a colorless, odorless gas mixture.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of this gas mixture. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

10. STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state.
DECOMPOSITION PRODUCTS: The thermal decomposition products of Isobutylene include carbon oxides. The other components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of a fire.
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Titanium will burn in the Nitrogen component of this gas mixture. Lithium reacts slowly with Nitrogen at ambient temperatures. The Isobutylene component of this gas mixture is also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen difluoride, and nitrogen trifluoride).
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology data are available for the components of this gas mixture:

ISOBUTYLENE:
LC_{50} (inhalation, rat) = 620,000 mg/kg/4 hours
LC_{50} (inhalation, mouse) = 415,000 mg/kg
NITROGEN:
There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

SUSPECTED CANCER AGENT: The components of this gas mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.
IRRITANCY OF PRODUCT: Contact with rapidly expanding gases can be irritating to exposed skin and eyes.
SENSITIZATION TO THE PRODUCT: The components of this gas mixture are not known to cause human skin or respiratory sensitization.
REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this gas mixture and its components on the human reproductive system.

Mutagenicity: No mutagenicity effects have been described for the components in this gas mixture.
Embryotoxcity: No embryotoxic effects have been described for the components in this gas mixture.
Teratogenicity: No teratogenicity effects have been described for the components in this gas mixture.
Reproductive Toxicity: No reproductive toxicity effects have been described for the components in gas mixture.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.
BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for the components of this gas mixture.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The components of this gas mixture occur naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this gas mixture.
OXYGEN: Water Solubility = 1 volume Oxygen/32 volumes water at 20°C. Log K_{ow} = -0.65
NITROGEN: Water Solubility = 2.4 volumes Nitrogen/100 volumes water at 0°C. 1.6 volumes Nitrogen/100 volumes water at 20°C.
EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on the effects of this gas mixture on plant and animal life.
EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on the effects of this gas mixture on aquatic life.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Cylinders with undesired residual product may be safely vented outdoors with the proper regulator. For further information, refer to Section 16 (Other Information).

14. TRANSPORTATION INFORMATION

THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.
PROPER SHIPPING NAME: Compressed gases, n.o.s. (*Oxygen, Nitrogen)*or the gas component with the next highest concentration next to Nitrogen.
HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)
UN IDENTIFICATION NUMBER: UN 1956
PACKING GROUP: Not applicable.
DOT LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126
MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).
SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.
Note: DOT 39 Cylinders ship in a strong outer carton (outer package). Pertinent shipping information goes on the outside of the outer package. DOT 39 Cylinders do not have transportation information on the cylinder itself.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This gas is considered as Dangerous Goods, per regulations of Transport Canada.
PROPER SHIPPING NAME: Compressed gases, n.o.s. (*Oxygen, Nitrogen)*or the gas component with the next highest concentration next to Nitrogen.
HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)
UN IDENTIFICATION NUMBER: UN 1956
PACKING GROUP: Not Applicable
HAZARD LABEL: Class 2.2 (Non-Flammable Gas)
SPECIAL PROVISIONS: None
EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX: 0.12
ERAP INDEX: None
PASSENGER CARRYING SHIP INDEX: None
PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX: 75
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126
NOTE: Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992).

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:
U.S. SARA REPORTING REQUIREMENTS: The components of this gas mixture are not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.
U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this gas mixture. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.
U.S. TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.
U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.
OTHER U.S. FEDERAL REGULATIONS:

- No component of this gas mixture is subject to the requirements of CFR 29 1910.1000 (under the 1989 PELs).
- Isobutylene is subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for this gas is 10,000 pounds.
- The regulations of the Process Safety Management of Highly Hazardous Chemicals are not applicable (29 CFR 1910.119).
- This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR Part 82).

15. REGULATORY INFORMATION (continued)

- Nitrogen and Oxygen are not listed as Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Isobutylene is listed under this regulation in Table 3 as Regulated Substances (Flammable Substances), in quantities of 10,000 lbs (4,554 kg) or greater.

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: No.
California - Permissible Exposure Limits for Chemical Contaminants: Nitrogen.
Florida - Substance List: Oxygen, Isobutylene.
Illinois - Toxic Substance List: No.
Kansas - Section 302/313 List: No.
Massachusetts - Substance List: Oxygen, Isobutylene.
Michigan - Critical Materials Register: No.
Minnesota - List of Hazardous Substances: No.
Missouri - Employer Information/Toxic Substance List: No.
New Jersey - Right to Know Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Pennsylvania - Hazardous Substance List: Oxygen, Nitrogen, Isobutylene.
Rhode Island - Hazardous Substance List: Oxygen, Nitrogen.
Texas - Hazardous Substance List: No.
West Virginia - Hazardous Substance List: No.
Wisconsin - Toxic and Hazardous Substances: : No.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this gas mixture is on the California Proposition 65 lists.

ADDITIONAL CANADIAN REGULATIONS:
CANADIAN DSL/NDSL INVENTORY STATUS: The components of this gas mixture are listed on the DSL Inventory.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this gas mixture are not on the CEPA Priorities Substances Lists.
CANADIAN WHMIS REGULATIONS: This gas mixture is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

16. OTHER INFORMATION

INFORMATION ABOUT DOT-39 NRC (Non-Refillable Cylinder) PRODUCTS

DOT 39 cylinders ship as hazardous materials when full. Once the cylinders are relieved of pressure (empty) they are not considered hazardous material or waste. Residual gas in this type of cylinder is not an issue because toxic gas mixtures are prohibited. Calibration gas mixtures typically packaged in these cylinders are Nonflammable n.o.s., UN 1956. A small percentage of calibration gases packaged in DOT 39 cylinders are flammable or oxidizing gas mixtures.

For disposal of used DOT-39 cylinders, it is acceptable to place them in a landfill if local laws permit. Their disposal is no different than that employed with other DOT containers such as spray paint cans, household aerosols, or disposable cylinders of propane (for camping, torch etc.). When feasible, we recommended recycling for scrap metal content. CALGAZ will do this for any customer that wishes to return cylinders to us prepaid. All that is required is a phone call to make arrangements so we may anticipate arrival. Scrapping cylinders involves some preparation before the metal dealer may accept them. We perform this operation as a service to valued customers who want to participate.

MIXTURES: When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

Further information about the handling of compressed gases can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Telephone: (703) 412-0900.

P-1 *"Safe Handling of Compressed Gases in Containers"*
AV-1 *"Safe Handling and Storage of Compressed Gases"*
"Handbook of Compressed Gases"

AIR LIQUIDE™

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this gas mixture. To the best of CALGAZ knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

APPENDIX 6
VENDOR INFORMATION

GEOVENT™

ACTIVE/PASSIVE GAS VENTING SYSTEM

GEOVENT™ allows for ease of installation directly on the subgrade, eliminating the need for costly and labor-intensive trenching.

GEOVENT™ allows for ease of installation directly on the subgrade, eliminating the need for costly and labor-intensive trenching.

DESCRIPTION

GEOVENT™ consists of a three-dimensional vent core that is wrapped in a non-woven, needle-punched filter fabric.

GEOVENT End Outlets are available for use in conjunction with GEOVENT active/passive gas venting systems.

APPLICATION

GEOVENT™ Is designed for use in the following application:

- An active or passive venting when used with CETCO vapor intrusion mitigation systems.

BENEFITS

- Installed directly on subgrade eliminating trenching and potential interference or damage to existing underground utilities
- Placed in closer proximity to the vapor intrusion barrier allowing for more effective venting of any accumulated gas
- Greater opening area per lineal foot of pipe and integral filter fabric allows for higher ventilation efficiency

TESTING DATA

PHYSICAL PROPERTIES		
CORE PROPERTY	TEST METHOD	RESULT
Compressive Strength	ASTM D 1621	8,500 - 11,000 psf (407 - 527 kN/m²)
Thickness	ASTM D 1777	1.0 in. (2.54 cm)
Flow Rate (Hydraulic gradient = .1)	ASTM D 4716	30 gpm/ft width (372 lpm/m)

FABRIC PROPERTY	TEST METHOD	RESULT
A.O.S.	ASTM D 4751	70 US Sieve (0.212 mm)
Grab Tensile Strength	ASTM D 4632	100 lbs. (0.45 kN)
CBR Puncture Strength	ASTM D 6241	250 lbs. (1.11 kN)
Flow Rate	ASTM D 4491	140 gpm/ft² (5,704 lpm/m²)

PACKAGING

GEOVENT™ Is available in the following packaging option:

- 1 ft. x 165 ft. (0.3 m x 50 m) Rolls

North America: 847.851.1800 | 800.527.9948 | www.CETCO.com

UPDATED: FEBRUARY 2014

TDS_GEOVENT_AM_EN_201403_v1

CETCO®

OUR STANDARDS. YOUR PEACE OF MIND.

A Minerals Technologies Company

FLORPRUFE® 120

Integrally bonded vapor protection for slabs on grade

Description

Florprufe® 120 is a high perfor-mance vapor barrier with Grace's Advanced Bond Technology™ that forms a unique seal to the underside of concrete floor slabs.

Comprising a highly durable polyolefin sheet and a specially developed, non-tacky adhesive coating, Florprufe 120 seals to liquid concrete to provide integrally bonded vapor protection.

Florprufe exceeds ASTM E1745 Class A rating.

Advantages

- Forms a powerful integral seal to the underside of concrete slabs
- Protects valuable floor finishes such as wood, tiles, carpet and resilient flooring from damage by vapor transmission
- Direct contact with the slab complies with the latest industry recommendations
- Remains sealed to the slab even in cases of ground settlement
- Ultra low vapor permeability
- Durable, chemical resistant polyolefin sheet
- Lightweight, easy to apply, kick out rolls
- Simple lap forming with mechanical fixings or tape

Use

Florprufe 120 is engineered for use below slabs on grade with moisture-impermeable or moisture-sensitive floor finishes that require the highest level of vapor protection.

[1] ACI 302.1R-96

Product Advantages

- Forms a powerful integral seal
- Protects valuable floor finishes
- Ultra low vapor permeability
- Durable, chemical resistant
- Lightweight and easy to apply

Florprufe complies with the latest recommendations of ACI Committees 302 and 360, i.e. for slabs with vapor sensitive coverings, the location of the vapor barrier should always be in direct contact with the slab1.

The membrane is loose laid onto the prepared sub-base, forming overlaps that can be either mechanically secured or taped. The unique bond of Florprufe to concrete provides continuity of vapor protection at laps. Alternatively, if a taped system is preferred, self-adhered Preprufe® Tape can be used to overband the laps.

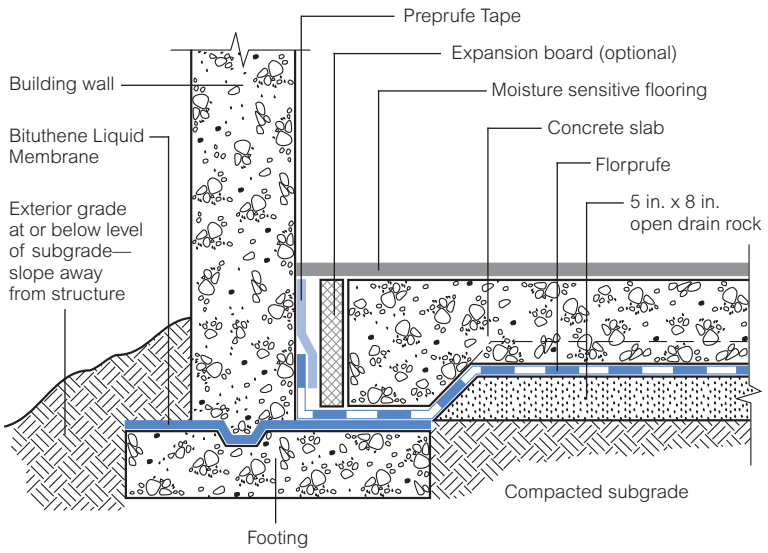
Slab reinforcement and concrete can be placed immediately. Once the concrete is poured, an integral bond develops between the concrete and membrane.

Installation

Health & Safety

Refer to relevant Material Safety Data Sheet. Complete rolls should be handled by 2 persons.

Florprufe 120 can be applied at temperatures of 25ºF (-4ºC) or above. Membrane installation is unaffected by wet weather. Installation and detailing of Florprufe 120 are generally in accordance with ASTM E1643-98.



Typical Assembly

Drawings are for illustration purposes only.
Please refer to www.graceconstruction.com for specific application details.

PREPRUFE® Detail Tape

Two Sided Self-Adhesive Tape

Description

Preprufe® Detail Tape is a specially formulated, two-sided, highly aggressive tape. It is a 2 in (50 mm) wide x 50 ft (15 m) long self-adhesive tape with a release liner.

Preprufe Detail Tape is provided in Low Temperature and Hot Climate Grades as follows:

- Preprufe Detail Tape LT Grade—for temperatures between 25°F (-4°C) and 86°F (+30°C)
- Preprufe Detail Tape HC Grade—for use in Hot Climates (minimum 50°F (+10°C))

Use

Preprufe Detail Tape is ideally suited for the following uses:

- As a detailing accessory to the Preprufe and Preprufe SCS Systems
- Adhering Hydroduct® drainage composites and insulation boards to waterproofing membranes

Application

Surface Preparation

All surfaces must be clean, dry and free from dirt, grease oil, dust or other contaminants.

Preprufe and Preprufe SCS Systems— Preprufe Detail Tape must be rolled firmly into place prior to removing the release liner. Ensure the release liner is then removed prior to adhering the next piece of membrane to the Preprufe Detail Tape, which then must be rolled into place as well over the Preprufe Detail Tape. Refer to applicable system detail drawings at www.graceconstruction.com

Hydroduct drainage composites— Where Hydroduct drainage composites are placed horizontally from rolls onto a wall, a continuous strip of Preprufe Detail Tape near the top and another strip near the bottom is recommended. If the drainage composite is cut and applied vertically in 6 to 8 ft (1.8 to 2.4 m) lengths, a strip is recommended near the top, another near the middle and a third near the bottom.

On decks, a strip of tape is recommended at approximately 10 ft (3 m) intervals, or more frequently in the event of high wind. Unroll the tape and adhere to the waterproofing membrane. Leave the release sheet on the tape until just before applying the drainage composite. The tape and release liner may be cut with a utility knife. Peel the release liner and apply the drainage composite. Press the composite firmly to assure good contact. For deck applications, the tape may be applied to the back of the drainage composite rather than to the waterproofing membrane, if it is more convenient.

Polystyrene protection board and insulation— On walls, apply a strip of tape near the top and bottom edge of the board or insulation. If the board is applied vertically in lengths of 8 ft(2.4m) or more, apply a third strip of tape in the middle of the board or insulation. Press panel firmly over the tape to assure a good bond. Preprufe Detail Tape may also be used to adhere polystyrene board or insulation in deck applications in the event of high winds.

Supply

Preprufe Detail Tape	
Roll size	2 in. x 50ft. (50 mm x 15m)
Packaging	16 rolls/carton

www.graceconstruction.com

For technical assistance call toll free at 866-333-3SBM (3726)

PF-197 Printed in U.S.A. 11/13 GCS/PDF

BITUTHENE® LIQUID MEMBRANE

Two component, elastomeric, liquid applied detailing compound for use with Grace waterproofing membranes

Description

Bituthene® Liquid Membrane is a two component, elastomeric, cold applied, trowel grade material designed for a variety of uses with the Grace waterproofing systems. The VOC (Volatile Organic Compound) content is 10 g/L.

Architectural and Industrial Maintenance Regulations limit the VOC content in products classified as Architectural Coatings. Refer to Technical Letters at www.graceconstruction.com for most current list of allowable limits.

Advantages

- **Liquid applied**—conforms to irregular profiles
- **Waterproof**—resistant to water vapor and water pressure
- **Tough, rubber-like**—flexible and damage resistant
- **Chemically cured**—unaffected by in-service temperature variations
- **Cold applied**—no flame hazard
- **System compatible**—formulated for use with Grace waterproofing membrane systems

Use

Bituthene Liquid Membrane is ideally suited for the following uses:

- Fillet material at inside corners
- Reinforcement material at inside corners
- Flashing material around drains, protrusions, curbs and parapets
- Sealing material at terminations
- Repair material for defects on concrete surfaces
- Flashing material at corners

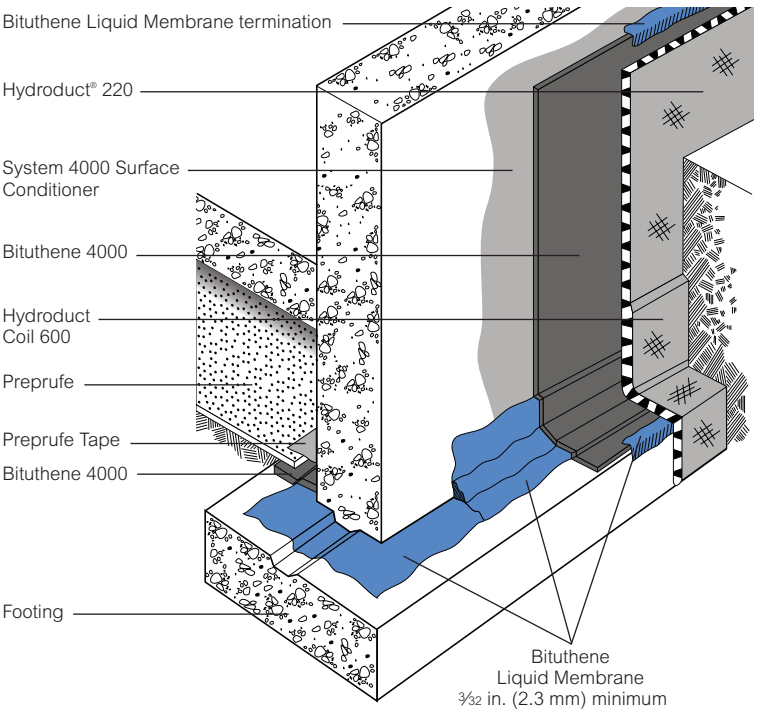
The two parts of Bituthene Liquid Membrane are mixed on site and troweled on to provide a simple and quick waterproofing detailing aid in conjunction with Bituthene, Preprufe® and Procor® systems.

Compatibility

Bituthene Liquid Membrane is completely compatible with Bituthene, Preprufe and Procor, and with existing asphalt or coal tar-based waterproofing materials. It is also compatible with cured silicone and polyurethane sealants. It is not compatible with creosote, pentachlorophenol, linseed oil or polysulfide-based sealants.

Product Advantages

- Liquid applied
- Waterproof
- Tough, rubber-like
- Chemically cured
- Cold applied
- System compatible



Drawings are for illustration purposes only.
Please refer to www.graceconstruction.com for specific application details.

Supply

Bituthene Liquid Membrane (Parts A & B)		
Unit size	1.5 gal (5.7 L)	4 gal (15.1 L)
Weight per unit	16 lbs (8 kg)	44 lbs (20 kg)
Units per pallet	100	24

Physical Properties

Property	Typical Value	Test Method
Color		
Part A	Black	
Part B	Clear	
Mixture of Parts A and B	Black	
Solids content	100%	ASTM D1644
Elongation	250% minimum	ASTM D412
Peel strength	5 lbs/in. (880 N/m) minimum	ASTM D903
Flexibility, 180° bend over 1 in. (25 mm) mandrel at -25°F (-32°C)	Unaffected	ASTM D1970

Application Procedures

Safety, Storage and Handling Information

Bituthene products must be handled properly. Vapors from solvent-based primers and mastic are harmful and flammable. For these products, the best available information on safe handling, storage, personal protection, health and environmental considerations has been gathered. Material Safety Data Sheets (MSDS) are available at www.graceconstruction.com and users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and the MSDS before use.

Surface Preparation

All surfaces must be dry and free from dirt, grease, oil, dust or other contaminants. Bituthene Liquid Membrane may be applied at temperatures of 25°F (-4°C) or above. Below 40°F (5°C), store in a warm place before application.

Mixing

Add the entire contents of the Part B container to Part A and mix for 3 to 5 minutes until uniform. Part A is black and Part B is clear. Take care to scrape material from the side and bottom of the containers to assure thorough mixing. A low speed (150 rpm) mechanical mixer with flat paddle blades is required. Do not apply any material if streaks can be seen due to insufficient mixing.

Once mixed, Bituthene Liquid Membrane must be applied by trowel within 1.5 hours. More time is available at lower temperatures. At high temperatures, thickening and curing will be faster. Material that has thickened must be discarded. The material will cure to a very flexible rubber-like material.

Bituthene Liquid Membrane must be applied at a minimum thickness of 3⁄32 in. (2.3 mm) unless otherwise noted on details. In fillet applications, the face of the fillet should be a minimum of ¾ in. (20 mm). In corner flashing application details, it should extend 6 in. (150 mm) in each direction from the corner. Bituthene Liquid Membrane will adhere to primed or unprimed concrete.

Bituthene Liquid Membrane should be allowed to cure at least 24 hours before flood testing.

Coverage

As a fillet material, 1 gal (3.8 L) will cover approximately 100 linear feet (30 m). As a flashing material, 1 gal (3.8 L) will cover approximately 17 ft^2 (1.6 m^2). As a fillet and reinforcement, 1 gal (3.8 L) will cover approximately 14 linear feet (4.3 m).

Cleaning

Clean tools and equipment with mineral spirits before Bituthene Liquid Membrane has cured. Mineral spirits is a combustible liquid and should be used only in accordance with the manufacturer's safety recommendations. Do not use solvents to clean hands or skin.

www.graceconstruction.com

For technical assistance call toll free at 866-333-3SBM (3726)

BIT-230D Printed in USA 3/07 FA/LI/1M

GRACE

Supply

Florprufe 120	
Supplied in rolls	4 ft x 115 ft (1.2 m x 35 m)
Roll area	460 ft² (42 m²)
Roll weight	70 lbs (32 kg) approx.
Ancillary Products	
Preprufe Tape is packaged in cartons containing 4 rolls that are 4 in. x 49 ft (100 mm x 15 m).	
Bituthene Liquid Membrane is supplied in 1.5 gal (5.7 L) pails.	

Physical Properties: Exceeds ASTM E1745 Class A rating

Property	Typical Value	Test Method
Color	White	
Thickness (nominal)	0.021 in. (0.5 mm)	ASTM D3767—method A
Water vapor permeance	0.03 perms	ASTM E96—method B1
Tensile strength	65 lbs/in.	ASTM E1541
Elongation	300%	ASTM D412
Puncture resistance	3300 gms	ASTM D17091
Peel adhesion to concrete	>4 lbs/in.	ASTM D903

1. Test methods that comprise ASTM E1745 standard for vapor retarders

Prepare substrate in accordance with ACI 302.1R Section 4.1. Install Florprufe 120 over the leveled and compacted base. Place the membrane with the smooth side down and the plastic release liner side up facing towards the concrete slab. Remove and discard plastic release liner. End laps should be staggered to avoid a build up of layers. Succeeding sheets should be accurately positioned to overlap the previous sheet 2 in. (50 mm) along the marked lap line.

Laps

1. Mechanical fastening method—
To prevent the membrane from moving and gaps opening, the laps should be fastened together at 39 in. (1.0 m) maximum centers. Fix through the center of the lap area using 0.5 in. (12 mm) long washer-head, self-tapping, galvanized screws (or similar) and allowing the head of the screw to bed into the adhesive compound to self-seal. It is not necessary to fix the membrane to the substrate, only to itself. Ensure the membrane lays flat and no openings occur. (See Figure 1.) Additional fastening may be required at corners, details, etc. Continuity is achieved once the slab is poured and the bond to concrete develops.

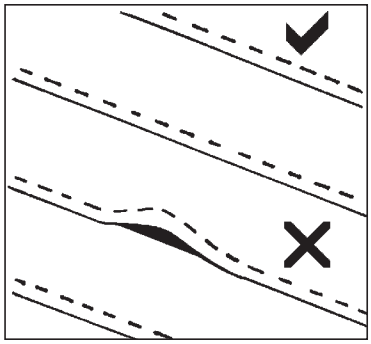


Figure 1

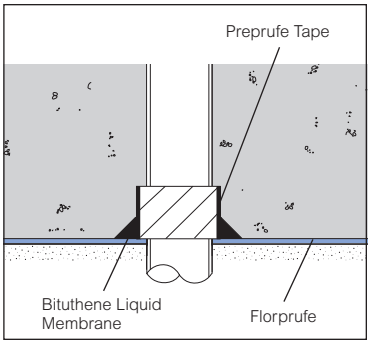


Figure 2

OR

2. Taped lap method—
For additional security use Grace Preprufe Tape to secure and seal the overlaps. Overband the lap with the 4 in. (100 mm) wide Preprufe Tape, using the lap line for alignment. Remove plastic release liner to ensure bond to concrete.

Penetrations

Mix and apply Bituthene Liquid Membrane detailing compound to seal around penetrations such as drainage pipes, etc. (See Figure 2 and refer to the Bituthene Liquid Membrane data sheet, BIT-230.)

Concrete Placement

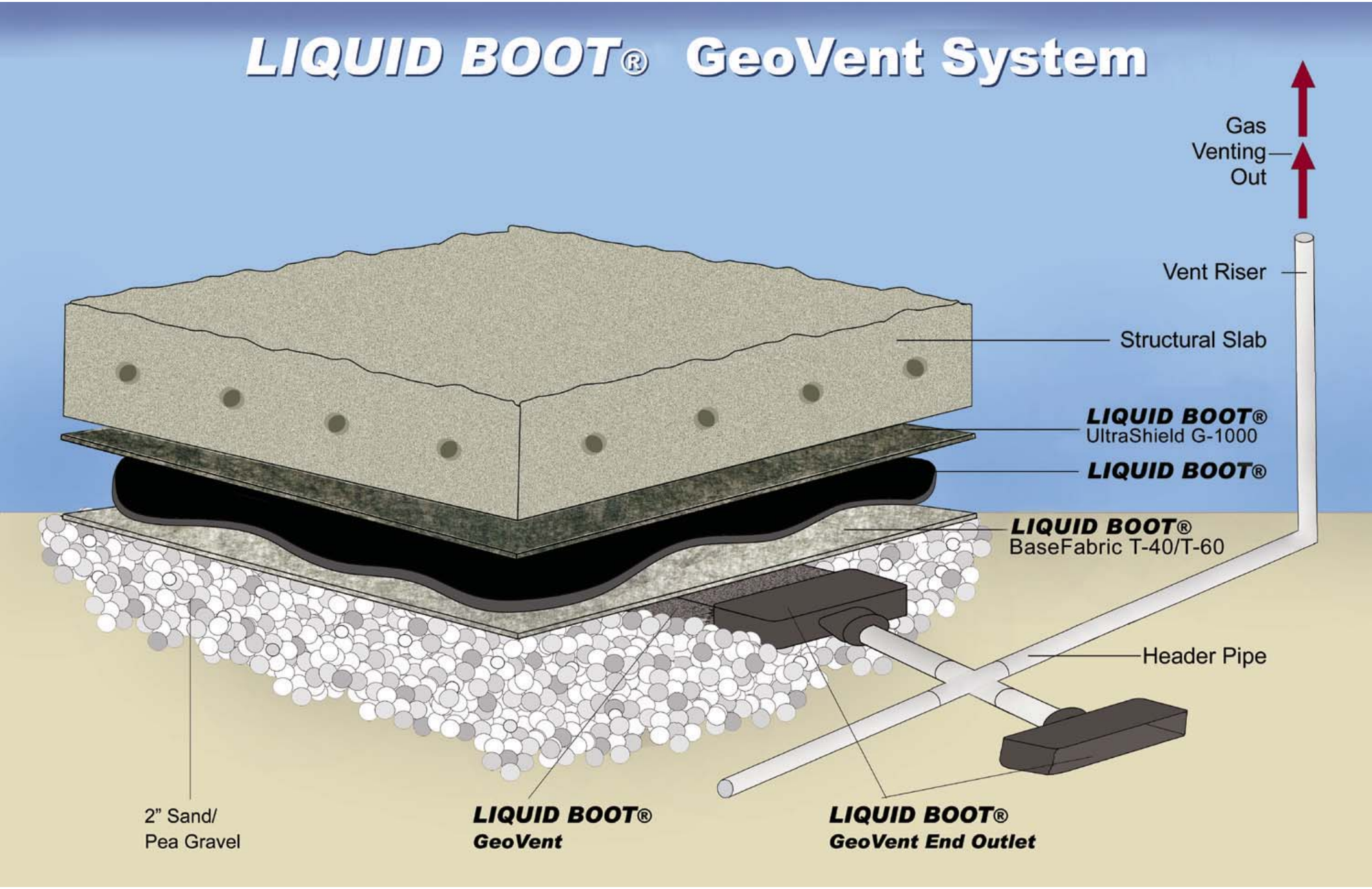
Place concrete within 30 days. Inspect membrane and repair any damage with patches of Preprufe Tape. Ensure all liner is removed from membrane and tape before concreting.

www.graceconstruction.com

For technical assistance call toll free at 866-333-3SBM (3726)

PF-001G Printed in U.S.A. 3/07 FA/LI/1M

GRACE


LIQUID BOOT® GeoVent System
Gas
Venting
Out
Vent Riser
Structural Slab
LIQUID BOOT®
UltraShield G-1000
LIQUID BOOT®
LIQUID BOOT®
BaseFabric T-40/T-60
Header Pipe
2" Sand/
Pea Gravel
LIQUID BOOT®
GeoVent
LIQUID BOOT®
GeoVent End Outlet

GeoVent® End Outlets

GAS VENTING SYSTEM

PRODUCT DESCRIPTION

GeoVent® End Outlets are designed for use with:

- GeoVent® active/passive gas venting systems

GeoVent® End Outlets are manufactured to meet or exceed the minimum average roll values listed below.

INSTALLATION

Product should be installed in accordance with specific installation guide specifications.

BENEFITS

- N/A

PACKAGING

- Sold individually

PHYSICAL PROPERTIES

CORE PROPERTIES	TEST METHOD	VALUE
Compressive Strength	ASTM D 1621	9,500 psf
Thickness	ASTM D 1777	1.0 in.
Flow Rate (Hydraulic gradient = .1)	ASTM D 4716	30 gpm/ft/width

FABRIC PROPERTIES	TEST METHOD	VALUE
A.O.S.	ASTM D 4751	70 US Sieve
Grab Tensile Strength	ASTM D 4632	100 lbs.
Puncture Strength	ASTM D 4833	65 lbs.
Flow Rate	ASTM D 4491	140 gpm/ft^2
Permeability	ASTM D 4491	0.21 cm/sec
Fabric - Mass / Unit Area	ASTM D 5261	4.0 oz/yd^2
UV Resistance	ASTM D 4355	70%

AVAILABILITY

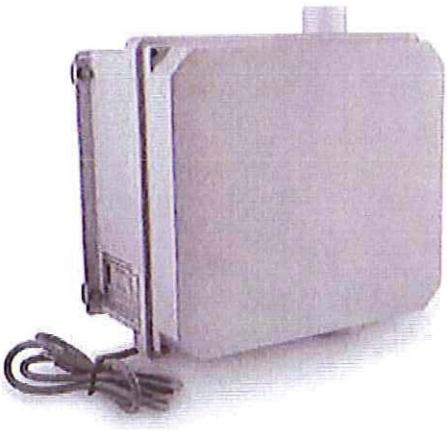
Shipping available from two convenient plant locations:

- CETCO, 1001 S Linwood Ave, Santa Ana, CA
- CETCO, 218 NE Industrial Park Rd, Cartersville, GA

Contact your local technical sales manager at:
714-384-0111 or 800-527-9948

LIMITATIONS

- N/A



HS2000 Radon Fan w/ Power Cord

Item # 23004-1

Description - HS fans offer a proven solution for tough radon mitigation jobs, providing up to 25 times the suction of inline tube fans to deal with sand, tight soil or clay sub-slab material.

Quantity Price Discounts apply at 5.
Pricing will update when added to Shopping Cart.

RadonAway is a B2B business only. You must be an approved RadonAway customer to purchase products through this website. If you are an existing RadonAway customer and need a website login, click here. If you are a professional and would like to become a RadonAway customer, click here.

Technical Specifications:

Features:

- Internal condensate bypass
- Mounts vertically Indoors or outdoors
- Inlet: 3.0" PVC/Outlet: 2.0" PVC
- Weight: 18 lbs.
- Size: 15"W x 13"H x 8"D
- One-year limited warranty (3-year option available)

Radon Fan Model Selection Guidelines:

(Choice of model is dependent on building characteristics and should be made by a radon professional.)

- **HS2000** - High suction and high flow for large areas such as schools and commercial buildings
- **HS3000** - Single family homes with very tight sub-slab material

- **HS5000** - For extremely tight sub-slab material or where the number of holes is restricted; also useful for high altitudes

Additional Fan Information:

- Downloadable Fan Installation Instructions (PDF format)
- Calculate your estimated annual electrical cost.

Typical CFM vs. Static Pressure WC

Model	P/N	Watts	Max Pressure "WC	0"	10"	15"	20"	25"	35"
HS2000	23004-1	150-270	18	110	72	40	-	-	-
HS3000	23004-2	105-195	27	40	33	29	24	18	-
HS5000	23004-3	180-320	50	53	47	42	38	34	24

Radon Supplies
Serving Radon Professionals and Homeowners Since 1989

Need Help? Ordering Information
sales@radonsupplies.com
(888) 800-5955

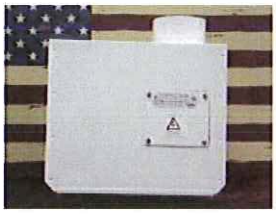
Home
My Account
Shopping Cart

Product Search

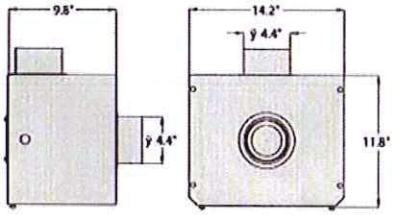
Shop For...

- New Products
- Backer Rod and Caulk
- Diagnostic Aids
- Downspout and Accessories
- Drains
- Fans and Accessories
- Installation Accessories
- Manometers
- Monitors
- Pipe Guards and Caps
- Polar Products
- Sump Covers and Accessories
- System Labels
- Test Kits
- Custom Products

Home > Festa AMG Force



Festa AMG Force



High Suction/Moderate Flow
Very Large Footprint
Moderately Compacted Subslab

Volts	Watts	Max. Amps	CFM at STATIC PRESSURE in. w.g.										
120V 60Hz	142	302	0"	0.5"	1.0"	1.5"	2.0"	2.5"	3.0"	3.5"	4.0"	4.5"	5"
Weight: 8 lbs 3 oz. Fan Speed: 3000 rpm			240	223	207	191	174	155	133	110	83	55	28

Performance shown is for installation type D - Ducted inlet, Ducted outlet.
Speed (rpm) shown is nominal. Performance is based on actual speed of test.
Performance ratings do not include the effects of appurtenances in the airstream.
The performance figures shown have been corrected to standard air density.

Product#		Price	Qty	
FORCE	Festa AMG Force	$480.00	1	Add to Cart

TRIPLEGUARD

How can we improve our Product Images?

Compare

Pressure Gauge, 0 to 15 psi

DWYER INSTRUMENTS

Price
$219.75 / each

Deliver one time only

Auto-Reorder Every 1 Month

1 Add to Cart

+ Add to List

Confirm ZIP Code to determine availability.

ZIP Code 07869 Save

Add Repair & Replacement Coverage for $55.95 each.

Be the first to write a review | Ask & Answer

Item # **3T325** Mfr. Model # **2215** UNSPSC # **41112403**

Catalog Page # **817** Shipping Weight **2.25 lbs.**

Country of Origin **USA** | *Country of Origin is subject to change.*

Note: Product availability is real-time updated and adjusted continuously. The product will be reserved for you when you complete your order. More

Technical Specs

Item	**Differential Pressure Gauge**
Differential Pressure Range	**0 to 15 psi**
Rated Total Pressure	**-20" Hg to 35 psi**
Connection Size	**1/8" NPT**
Dial Size	**4"**
Body Material	**Die Cast Aluminum**
Scale Type	**Pressure**

Pressure Range Minor Div.	**0.50 psi**
Accuracy	**+/-2%**
Dial Material	**Die Cast Aluminum**
Ambient Operating Range	**20 Degrees to 140 Degrees F**
Includes	**Instructions, Two 1/8" NPT Plugs, Two 1/8" NPT to 3/16" I.D. Rubber Tubing Adapters and Three Mounting Adapters with Screws**
Manufacturers Warranty Length	**1 yr.**

How can we improve our Product Images?

Compare

This item has been discontinued and is unavailable for purchase. Check the Alternate Products selection below for options. For more information call 1-800-GRAINGER (472-4643).

Horn Strobe, Red, Polycarbonate, 24VDC

FEDERAL SIGNAL

Price: NA

Item no longer available

Add Repair & Replacement Coverage for each.

Be the first to write a review | Ask & Answer

Item # **3TDD7**	Mfr. Model # **AV1-024R**	UNSPSC # **39111706**
Catalog Page # **N/A**	Catalog Group # **F0387**	Shipping Weight **1.95 lbs.**

Country of Origin **USA** | *Country of Origin is subject to change.*

Note: Product availability is real-time updated and adjusted continuously. The product will be reserved for you when you complete your order. More

Technical Specs

Item	**Horn Strobe**	Lens Design	**Dome**
Lens Color	**Red**	Light Output	**175,000 CP**
Voltage	**24VDC**	Flashes per Minute	**75**
Current Drawn	**0.39 A**	Lamp Type	**Incandescent**
Sound Level	**85dB @ 10 ft.**	Lamp Life	**1000 hr.**
Height	**6-1/2"**	Mounting	**Pipe/Surface**
Diameter	**5-3/4"**	Rating	**NEMA 3R**
Lens Material	**Polycarbonate**	Operating Temp.	**-31 to 150 Degrees F**
Housing Material	**Polycarbonate**	Standards	**UL and cUL, CSA**

CHARLOTTE
PIPE AND FOUNDRY COMPANY®

No-Hub

List Price Schedule NH-112
Effective January 2, 2012
(Updated March 12, 2012)
Supersedes Price Schedule NH-111

>> No-Hub (Hubless) Cast Iron Soil Pipe and Fittings

MADE IN USA

ASTM A 888 & CISPI 301

Part No. NH 1
No-Hub Coupling

Size	*UPC# 611942-	Pieces Full Crate	Pieces Half Crate	Weight	List Price Each
1½	00097			.2	*
2x1½	00099			.4	*
2	00098			.3	*
3x2	00101			.4	*
3	00100			.3	*
4x3	00103			.8	*
4	00102			.7	*
5	00104			.9	*
6	00105			1.0	*
8	00106			1.4	*
10	00107			1.7	*

Part No. SDC 4
Heavy Duty 4000 Coupling

Size	*UPC# 611942-	Pieces Full Crate	Pieces Half Crate	Weight	List Price Each
1½	11512			.5	**
2	11513			.6	**
3	11514			.7	**
4	11515			.9	**
5	11516			1.5	**
6	11517			1.7	**
8	11518			2.1	**
10	11519			2.5	**
12†	09632			3.4	**
15†	09633			4.1	**

* Please see list price in No-Hub Couplings price sheet.
** Please see list price in Heavy Duty Couplings price sheet.
† 12" and 15" furnished in Heavy Duty No-Hub Coupling.

Charlotte Pipe® products are manufactured to the applicable ASTM standard. Charlotte Pipe and Foundry cannot accept responsibility for the performance, dimensional accuracy, or compatibility of pipe, fittings, gaskets, or couplings not manufactured or sold by Charlotte Pipe and Foundry.

Part No. NH 2
No-Hub Pipe

Size	*UPC# 611942-	Pieces Full Crate	Pieces Half Crate	Weight	List Price Each
1½"x10'	00128			28.5	$98.40
2"x10'	00129			37.1	98.80
3"x10'	00130			54.0	136.30
4"x10'	00131			71.2	177.00
5"x10'	00132			97.6	255.20
6"x10'	00133			117.8	304.30
8"x10'	00134			170.9	474.00
10"x10'	00135			254.6	805.40
12"x10'	09606			318.0	1170.00
15"x10'	09607			492.6	1709.80

Part No. NH 4
Quarter Bend

Size		*UPC# 611942-	Pieces Full Crate	Pieces Half Crate	Weight	List Price Each
1½		00136	1400	700	1.7	$13.40
2		00137	900	450	2.2	14.50
3		00141	425	200	3.7	20.30
4		00146	220	110	6.5	30.10
5		00148	130	65	9.3	67.60
6		00149	80	40	13.4	72.70
8		00150	40	20	23.1	204.40
4x3	Reducing Increasing	00147			5.5	61.20

See page 15 for fitting crate and half crate quantities.
See page 16 for pipe bundle quantities.

Charlotte Pipe and Foundry Company strongly recommends that its cast iron pipe and fittings be joined with shielded hubless couplings manufactured in accordance with CISPI 310 or ASTM C 1540. Failures in installations using couplings not recommended by Charlotte Pipe® are not the responsibility of this Company.

You can't beat the system.®

PO BOX 35430 CHARLOTTE, NORTH CAROLINA 28235
SALES PHONE (704) 348 6450 (800) 572 4199
TECHNICAL PHONE (800) 438 6091 FAX (800) 553 1605
LITERATURE BY FAX (800) 745 9382 WWW.CHARLOTTEPIPE.COM

Part No. EZS 14
Extended Short Sweep

Size	*UPC# 611942-	Pieces Full Crate	Pieces Half Crate	Weight	List Price Each
2x18	04448			8.0	$85.40
2x24	04444			11.0	94.10
2x34	04449			13.9	158.80

Part No. NH 18
Long Sweep

Size	*UPC# 611942-	Pieces Full Crate	Pieces Half Crate	Weight	List Price Each
1½	00198			4.4	$31.80
2	00199	400	180	5.8	31.80
3	00201	185	85	9.4	38.60
4	00203	100	50	12.3	61.40
5	00204	70	30	18.6	110.90
6	00205	45	22	23.3	135.30
4x3 Reducing Increasing	00202			12.4	119.10

Part No. NH 20
Wye

Size	*UPC# 611942-	Pieces Full Crate	Pieces Half Crate	Weight	List Price Each
1½	00207			2.5	$19.00
2	00208	700	300	3.3	18.60
3x1½	00215	425	212	4.4	24.10
3x2	00216	400	200	3.4	20.00
3	00209	280	140	5.1	27.10
4x2	00217	275	130	5.1	28.90
4x3	00218	200	100	7.3	37.60
4	00210	140	70	9.1	43.20
5x2	00220			8.8	63.70
5x3	00221	115	57	10.5	89.40
5x4	00219			13.1	92.00
5	00211			15.1	102.70
6x2	00225			9.8	70.90
6x3	00224	80	40	12.5	89.40
6x4	00223	70	35	14.6	92.00
6x5	00222	55	28	17.6	111.60
6	00212	40	20	19.7	115.20
8x3	00227			17.5	144.40
8x4	00228	45	22	22.0	158.10
8x5	00229			23.9	191.60
8x6	00230			28.3	194.60
8	00213			36.3	271.50
10x4	00231			32.9	417.80
10x6	00232			42.1	437.40
10x8	00233			56.1	524.90
10	00214			74.9	602.60
12	09619			97.0	1186.70
15	09620			189.5	2654.80

Part No. NH 21
Double Wye

Size	*UPC# 611942-	Pieces Full Crate	Pieces Half Crate	Weight	List Price Each
2	00234	600	300	4.5	$29.50
3x2	00241	410	205	5.5	45.90
3	00235	200	100	7.9	54.30
4x2	00242	220	110	6.5	61.20
4x3	00243	150	75	8.8	69.20
4	00236	100	50	12.1	110.60
5x4	00244	90	45	15.7	146.80
6x4	00245	55	28	16.4	157.80
6	00237			27.4	195.20
8	00238			45.3	556.90
8x4	00246			23.0	269.60
8x6	00247			31.3	379.00

Part No. NH 21A
Upright Wye

Size	*UPC# 611942-	Pieces Full Crate	Pieces Half Crate	Weight	List Price Each
2	00248	350	175	4.8	$32.70
3x2	00251	280	140	5.7	31.90
3	00249	175	88	9.5	44.60
4x2	00252			7.7	44.80
4x3	00253			10.1	59.70
4	00250			12.9	118.10
5x2	04428			11.0	194.00
5	04740			19.9	214.20

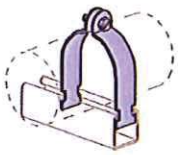
⚠ WARNING

Testing with or use of compressed air or gas in Cast Iron pipe or fittings can result in explosive failures and cause severe injury or death.

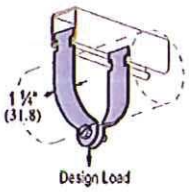
- NEVER test with or transport/store compressed air or gas in Cast Iron pipe or fittings.
- NEVER test Cast Iron pipe or fittings with compressed air or gas.
- ONLY use Cast Iron pipe and fittings for drain, waste and vent or sanitary sewer applications.

P2024 THRU P2070-84

PIPE CLAMPS FOR O.D. TUBING



P2024 - P2029	16 ga.
P2030 - P2035	14 ga.
P2037 - P2052	12 ga.
P2053 - P2066	11 ga.
P2067 - P2070-84	10 ga.



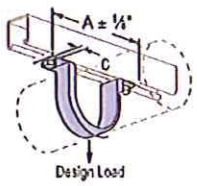
Slotted hex head screw and nut included with EG or HG Finish.

Part Number	O.D. Size In (mm)	W/100 pcs Lbs (kg)	Design Load Lbs (kN)
P2024	¼ (6.4)	8 (3.6)	400 (1.78)
P2025	⅜ (9.5)	8 (3.6)	
P2026	½ (12.7)	9 (4.1)	
P2027	⅝ (15.9)	10 (4.5)	
P2028	¾ (19.1)	11 (5.0)	
P2029	⅞ (22.2)	12 (5.4)	
P2030	1 (25.4)	14 (6.4)	600 (2.67)
P2031	1⅛ (28.6)	15 (6.8)	
P2032	1¼ (31.8)	16 (7.3)	
P2033	1⅜ (34.9)	17 (7.7)	
P2034	1½ (38.1)	18 (8.2)	
P2035	1⅝ (41.3)	19 (8.6)	
P1430	1¾ (44.5)	29 (13.2)	800 (3.56)
P2037	1⅞ (47.6)	28 (12.7)	
P2038	2 (50.8)	31 (14.1)	
P2039	2⅛ (54.0)	32 (14.5)	
P2040	2¼ (57.2)	33 (15)	
P1117	2⅜ (60.3)	34 (15.4)	
P2042	2½ (63.5)	35 (15.9)	
P2043	2⅝ (66.7)	37 (16.8)	
P2044	2¾ (69.9)	38 (17.2)	
P1118	2⅞ (73.0)	40 (18.1)	
P2046	3 (76.2)	41 (18.6)	
P2047	3⅛ (79.4)	43 (19.5)	
P2048	3¼ (82.6)	45 (20.4)	
P2049	3⅜ (85.7)	46 (20.9)	
P1119	3½ (88.9)	47 (21.3)	
P2051	3⅝ (92.1)	56 (25.4)	1000 (4.45)
P2052	3¾ (95.3)	58 (26.3)	
P2053	3⅞ (98.4)	60 (27.2)	
P1120	4 (101.6)	62 (28.1)	
P2055	4⅛ (104.8)	62 (28.1)	
P2056	4¼ (108.0)	64 (29.0)	
P2057	4⅜ (111.1)	66 (29.9)	
P1121	4½ (114.3)	67 (30.4)	
P2059	4⅝ (117.5)	70 (31.8)	
P2060	4¾ (120.7)	72 (32.7)	

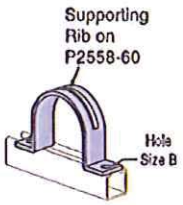
Part Number	O.D. Size In (mm)	W/100 pcs Lbs (kg)	Design Load Lbs (kN)
P2061	4⅞ (123.8)	73 (33.1)	1000 (4.45)
P2062	5 (127.0)	74 (33.6)	
P2063	5⅛ (130.2)	76 (34.5)	
P2064	5¼ (133.4)	77 (34.9)	
P2065	5⅜ (136.5)	78 (35.4)	
P2066	5½ (140.0)	79 (35.8)	
P2067	5⅝ (142.9)	88 (39.9)	
P2068	5¾ (146.1)	90 (40.8)	
P2069	5⅞ (149.2)	92 (41.7)	
P2070	6 (152.4)	94 (42.6)	
P2070-61	6⅛ (155.6)	96 (43.5)	
P2070-62	6¼ (158.8)	98 (44.5)	
P2070-63	6⅜ (161.9)	99 (44.9)	
P2070-64	6½ (165.1)	100 (45.4)	
P1124	6⅝ (168.3)	102 (46.3)	
P2070-66	6¾ (171.5)	104 (47.2)	
P2070-67	6⅞ (174.6)	106 (48.1)	
P2070-70	7 (177.8)	108 (49.0)	
P2070-71	7⅛ (181.0)	110 (49.9)	
P2070-72	7¼ (184.2)	112 (50.8)	
P2070-73	7⅜ (187.3)	114 (51.7)	
P2070-74	7½ (190.5)	116 (52.6)	
P2070-75	7⅝ (193.7)	117 (53.1)	
P2070-76	7¾ (196.9)	119 (54.0)	
P2070-77	7⅞ (200.0)	121 (54.9)	
P2070-80	8 (203.2)	123 (55.8)	
P2070-81	8⅛ (206.4)	125 (56.7)	
P2070-82	8¼ (209.6)	126 (57.2)	
P2070-83	8⅜ (212.7)	128 (58.1)	
P2070-84	8½ (215.9)	129 (58.5)	
P1126	8⅝ (219.1)	130 (59.0)	

P2558-5 THRU P2558-60

SINGLE PIECE PIPE STRAP



Hardware sold separately.



Part No.	Nom. Pipe Size In	A In (mm)	"B" In (mm)	C In (mm)	Thickness In (mm)	W/100 pcs Lbs (kg)	Design Load Lbs (kN)
P2558-05	½	2⅞ 73.0	1/32 7.1	7/16 11.1	⅛ 3.2	23 10.4	500 2.22
P2558-07	¾	3⅛ 79.4				26 11.8	
P2558-10	1	3⅜ 85.7				31 14.1	
P2558-12	1¼	3¾ 95.3				35 15.9	
P2558-15	1½	3⅞ 98.4				39 17.7	
P2558-20	2	5⅛ 146.1	7/16 11.1	11/16 17.5	¼ 6.4	94 42.6	1,000 4.45
P2558-25	2½	6⅛ 158.8				114 51.7	
P2558-30	3	6⅛ 174.6				133 60.3	
P2558-35	3½	7⅛ 187.3				152 68.9	
P2558-40	4	7⅞ 200.0				176 79.8	
P2558-50	5	9 228.6				198 89.8	
P2558-60	6	10 254.0				225 102.1	