INTERIM REMEDIAL MEASURES WORK PLAN

for

363 BOND STREET
Brooklyn, New York

Tax Map Block 452, Lot 1
NYCOER Project No. 13EH-A196K
NYSDEC Spill No. 05-01697
NYSDEC Brownfield Cleanup Site No. C224173
USEPA No. 422395.DE.02

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1.0 INTRODUCTION

1.1 General

This Interim Remedial Measures (IRM) Work Plan was prepared by Langan Engineering, Environmental, Surveying, and Landscape Architecture, D.P.C. (Langan) on behalf of LSG 363 Bond Street, LLC (the Volunteer) for the property at 363 Bond Street in the Carroll Gardens neighborhood of Brooklyn, New York (the "Site"). The Volunteer has entered into the Brownfield Cleanup Program (Site No. C224173) with the New York State Department of Environmental Conservation (NYSDEC) as a "Volunteer", to investigate and, where necessary, remediate contaminated soil and groundwater encountered during development of the ±0.68-acre Site. The Site is identified as Block 452, Lot 1 on the New York City tax maps. Proposed development plans for the Site include demolition of the existing structure and construction of a 5- to 12-story residential apartment building, with ground-floor residential and commercial spaces, and a partial below-grade parking level. The entire frontage along the Gowanus Canal within the extent of the Site will be redeveloped as a waterfront esplanade to serve as an open space. A site location map is provided as Figure 1.

The scope of this IRM Work Plan includes the following:

- Recovery and remediation of light non-aqueous phase liquid (LNAPL) and associated impacted soil and groundwater within the central portion of the site;
- Recovery and remediation of gasoline and gasoline-impacted soil and groundwater in the area of two potential underground storage tanks (USTs);
- Closure and removal of potential USTs and two aboveground storage tanks (ASTs) within the basement level of the site in accordance with all federal, state, and local regulations.

This IRM Work Plan has been prepared in accordance with requirements of the New York State Brownfield Cleanup Program (BCP) and New York State Department of Environmental Conservation's (NYSDEC) May 2010 DER-10 - Technical Guidance for Site Investigation and Remediation. The IRM will be completed in advance of completing a final remedy for the Site. This is in accordance with the definition of an IRM (May 2010 DER-10):

> ***"Interim remedial measure" or "IRM"*** *means activities to address both emergency and non-emergency site conditions, which can be undertaken without extensive investigation and evaluation, to prevent, mitigate or remedy environmental damage or the consequences of environmental damage attributable to a site, including, but not limited to, the following activities: construction of diversion ditches; collection systems;*

drum removal; leachate collection systems; construction of fences or other barriers; installation of water filters; provision of alternative water systems; the removal of source areas; or plume control.

This IRM WP has been prepared for the site to allow for the immediate implementation of the above identified remedial activities in order to mitigate any spread of existing contamination, and to immediately remove and/or reduce any onsite source material. With exception of the UST removal, these tasks are being proposed for immediate implementation prior to demolition of the building to allow for the controlled recovery of a LNAPL within the existing building which will reduce the contaminant mass prior to site redevelopment. The gasoline UST removal will be completed following demolition of the existing building unless it is determined that they contain product and are identified as a continuing source. The removal of a portion of the impacted material will assist in the development of the property by removing existing LNAPL which would be a health and safety concern for the construction workers as well as the surrounding community. The tasks identified in this IRM WP will be completed without any further investigation. A final Remedial Action Plan (RAP) will be proposed at a later date to address any remaining contamination and site management requirements.

1.2 Site Description

The Site (Block 452, Lot 1) is located at 363 Bond Street in the Carroll Gardens neighborhood of Brooklyn, New York (Figure 1) and consists of an approximately ±0.68-acre lot containing a one- and two-story light industrial building. A basement level boiler room is located in the northwestern area of the building that contains the two 1,000-gallon fuel oil ASTs. A site plan is provided as Figure 2.

1.3 Site Geology and Hydrogeology

Geologic Conditions

Based on observations made during previous environmental and preliminary geotechnical investigations, the soil profile at the Site generally consists of miscellaneous fill underlain by a clay layer. The fill was observed to be approximately 6- to 17-feet thick, and consists of brown coarse to fine sand with varying amounts of sit, gravel, brick, cinders, concrete, and wood. The clay layer was observed to be at least 4-feet thick and consists of gray organic clay with trace amounts of wood fibers, shells and sand.

Hydrogeologic Conditions

Based on observations and monitoring well data obtained during previous investigations, groundwater is encountered at approximately 1.25- to 7.5-feet below ground surface (bgs) and groundwater flow is to the east towards the Gowanus Canal, located directly adjacent to the eastern property boundary. Groundwater conditions at the site are tidally affected; however, based on groundwater gauging results completed during the September 2013 Remedial Investigation (RI) activities, groundwater elevations vary less than one-foot between low and high tides.

1.4 Site History

The Site is located in an area of historical industrial usage and has been used for manufacturing and industrial purposes for more than 100 years. According to the February 2012 Phase I Environmental Site Assessment conducted by P.W. Grosser Consulting, Inc., an asphalt and cement works occupied the central portion of the site until 1904, a paint manufacturer occupied the western portion of the site until 1928, a garage and automotive repair shop occupied the western portion of the site until 1938 and operated gasoline USTs that were present along the Bond Street side of the building, a radio parts and automotive spray paint booth occupied multiple portions of the site until 1950 (gasoline tanks were shown as no longer present based on Sanborn Maps reviewed for this time), a wholesale grocery warehouse occupied the site from 1969 through 2007, and most recently the site was occupied by a baby clothing warehouse until 2012. The approximate locations of former underground storage tanks and current above ground storage tanks are shown on Figure 2.

During previous investigations, light non-aqueous phase liquid (LNAPL) was encountered in soil and groundwater samples collected within the central portion of the site (AOC-3). These impacts are presumed to be associated with the former use of the site as a garage and automotive repair shop. A detailed summary of the previous investigation results was provided in the NYSDEC-approved July 2013 Remedial Investigation Work Plan (RIWP) and summaries of LNAPL observations in soil and groundwater are provided on Figure 3. The proposed scope for addressing LNAPL in AOC-3 as part of this IRM is discussed in Section 3.1.2.

Geophysical anomalies indicative of USTs or abandoned in-place USTs were identified at AOC-5 along the western boundary of the Site during the 2013 Remedial Investigation (RI). The location of these USTs is consistent with the locations shown on the 1938 Sanborn map. Based on the results of the geophysical survey, proper closure/removal of these USTs will be conducted as part of this IRM in accordance with NYSDEC DER-10 and 6 NYCRR Part 612 requirements during site demolition activities. Due to the presence of LNAPL detected in

monitoring wells and soil borings in the vicinity of these USTs, a scope for removal of LNAPL in AOC-5 is provided in this IRM as discussed in Section 3.1.3.

During the RI conducted in September 2013, two ASTs were identified in the basement within the northwest corner of the Site. One of these ASTs has been shown on Sanborn Maps from 1938 to the present. The ASTs were observed to be approximately 1,000-gallon tanks that currently contain No. 4 fuel oil. In order to properly close the ASTs, all removal activities will be completed in accordance with NYSDEC DER-10 and 6 NYCRR Part 612 requirements as part of this IRM. The proposed scope for removal of the AST and associated piping systems is provided in Section 3.1.41.5

1.5 Proposed Development

The purpose of the project is to develop an underutilized, contaminated parcel into affordable and market rate residential use, while implementing remedial measures that are protective of human health and the environment. The proposed project will include the demolition of the existing structure and the construction of a 5 to 12-story residential apartment building, with ground-floor residential and commercial spaces, and a partial below-grade parking level. The building will occupy almost the entire footprint of the Site. In addition to the building plans, a waterfront esplanade will be developed along the Gowanus Canal shoreline. Based on the current site elevations and the proposed redevelopment, with exception of limited foundation excavations, the only proposed site cut area is associated with the partial below grade parking garage structure. The remaining grades at the site will be raised between one- to five-feet to allow for the slab on grade construction of the residential and amenity spaces.

2.0 SUMMARY OF INVESTIGATIONS

2.1 Areas of Concern

Based on the review of previous environmental investigation reports and the 2012 Limited Phase II Site Investigation and 2013 RI conducted by Langan, the following areas of concern (AOCs) were identified at the Site:

- AOC-3: LNAPL Impacted Hotspot;
- AOC-5: Gasoline Hotspot and USTs; and,
- Two 1,000 gallon ASTs.

2.2 Previous Investigations

As detailed in the 10 July 2013 RIWP, environmental investigations were conducted at the Site between 2004 and 2012. Sampling locations are shown on Figure 2 and historical analytical results are summarized on Tables 1 through 3. A detailed discussion of the previous investigation is provided in the RIWP. Based on the results of the previous investigations, the following AOCs were identified and required further assessment:

AOC-3

The 2005 ELM Phase II Investigation for the 363 Bond Street property identified LNAPL impacts (staining, odors, and elevated PID readings) in all ten boring locations completed in the area identified as AOC-3. Free phase liquid was reported at locations SB-1 and MW-5, located within the central portion of the existing onsite building within AOC-3. During the 2012 Phase II Site Investigation Langan completed additional sampling in AOC-3 to provide further delineation of LNAPL impacted soils. Soil sampling was completed to the north and west of the extents of impacted soils previously identified in the 2009 RAP. The presence of LNAPL was noted during the Limited Phase II Site Investigation sampling at MW-5.

In accordance with the 2013 RIWP, Langan completed additional soil and groundwater delineation in 2013 to further delineate the LNAPL impacted area. Specifically, sampling was conducted within AOC-3 and to the east and west of the proposed extents of the AOC. During the RI, Langan observed the presence of LNAPL in AOC-3 in soil boring location LSB-22 (from 3.5- to 16-feet b.g.s.), monitoring well locations MW-5 and test pit locations TP-1, TP-2 and TP-3 (0.10-foot to a sheen). In addition a strong odor was observed at LMW-6, the monitoring well installed in soil boring LSB-22.

Soil and groundwater samples were collected from the three test pits and a fingerprint analysis was performed. Results identified hydraulic fluid as the LNAPL encountered on groundwater in TP-1 and diesel and unknown hydrocarbons in the soil sample collected from TP-3. Due to limited recovery, fingerprint analysis form the soil collected from test pit TP-2 and groundwater collected from test pit TP-3 was not completed.

AOC 5

The potential presence of two gasoline USTs was identified on the 1938 historic Sanborn map along the western boundary of property within the footprint of the existing building. The two gasoline USTs were not shown on any subsequent Sanborn maps from 1950 to the present.

As part of the Langan Limited Phase II Investigation, one soil boring (LSB-1) was installed directly downgradient of the former USTs. LNAPL was observed in the soil boring from 8- to 12-feet bgs.

Anomalies indicative of the presence of the USTs were documented during the 2013 Remedial investigation. Langan also completed additional soil and groundwater sampling in 2013 RI to further delineate the gasoline impacted area as detailed in the RIWP. Specifically, sampling was conducted within AOC-5 and to the east and south of the proposed extents of the AOC (LSB-8 and LSB-25/LMW-7). During the RI, Langan observed the presence of gasoline-impacted groundwater at LMW-7, where approximately three feet of gasoline LNAPL was encountered at the water table from 6.58- to 9.57-feet bgs. In addition, a sheen was observed at soil boring LSB-8 from 8- to 12-feet bgs.

Two 1,000-Gallon ASTs

As access to the former boiler room was not provided prior to the initiation of the 2013 RI activities, the potential presence of ASTs associated with the building could not be confirmed. During the RI two 1,000-gallon No. 4 fuel oil ASTs were observed within the basement of the onsite building.

3.0 SUMMARY OF INTERIM REMEDIAL MEASURES

The proposed IRM consists of the following tasks:

- Recovery of product and remediation of LNAPL-impacted soil and groundwater within AOC-3
- Recovery of product and remediation of gasoline-impacted soil and groundwater within AOC-5;
- Removal and disposal of the potential gasoline USTs and two fuel oil ASTs in accordance with all applicable federal, state and local regulations.

The IRM described herein will be performed in accordance with applicable federal, state, and city regulations. A Health and Safety Plan (HASP) is provided as Appendix A.

3.1 Objectives and Rationale

The objectives of the IRM are to remove contaminant sources and source material and thereby mitigate contaminant migration, and to eliminate human health exposure pathways during and following the implementation of the proposed development plan. This IRM Work Plan has been prepared for the site to allow for the immediate implementation of the above identified remedial activities in order to mitigate any spread of existing contamination, immediately remove and/or reduce any onsite source material at the soonest possible time. The proposed IRM will prevent additional environmental impacts to Site media (soil, groundwater, and soil vapor) through the removal of LNAPL USTs and and the fuel-oil ASTs. The proposed IRM will also simultaneously prepare the Site for redevelopment and a determination of the final remedial requirements.

3.1.1 Site Preparation

The Site will be prepared by the Remediation Contractor for implementation of the proposed IRM. Activities to be performed by the Contractor will include, but are not limited to, the establishment of work zones, addition of support facilities, construction of decontamination facilities, and implementation of Site security measures (i.e. erection of security fencing around work zones and staging areas). The Contractor will ensure that soil erosion control and sediment control measures are in operation prior to the commencement of, and during all work operations contained in the proposed IRM.

The Contractor will ensure that all necessary permits are obtained prior to the commencement of any task included in the proposed IRM.

Prior to intrusive activities, Dig Safely New York (811) will be contacted by the Contractor a minimum of three business days in advance of the work. Dig Safely New York will be informed of the nature of the work and the intent to perform excavation activities at the Site.

3.1.2 LNAPL Recovery and Remediation of LNAPL-Impacted Soil and Groundwater in AOC-3

Multi-Phase Extraction (MPE) IRM will be implemented to recover product from AOC-3. The objective of MPE is to achieve substantial LNAPL removal from AOC-3 prior to the redevelopment of the site. MPE uses a high vacuum air extraction system to remove a "multiphase" stream from the subsurface (i.e., the stream consists of LNAPL,

contaminated ground water, and vapor). The fringes of LNAPL and residual groundwater impacts would not be remediated by the proposed IRM.

Ten extraction wells will be installed in the impacted AOC-3 area at the locations shown on Figure 4. The wells will be installed in the overburden fill material, at a depth of approximately 12.5 feet below ground surface (feet bgs) to create a pressure/vaccum gradient for enhanced fluid and/or vapor recovery. The wells will be constructed of four-inch diameter Schedule 40 polyvinyl chloride (PVC) casing with a Schedule 40 PVC 0.020-inch slot screen installed between 5 to 12.5-feet bgs interval. All drilling and well installation activities will be performed by the licensed drilling contractor.

The MPE system will include a skid mounted process equipment rental unit that will be procured and delivered on site. The process equipment unit will include liquid ring pump skid with a capacity of 150 scfm at 25" Hg vacuum, an air/moisture separator with an appropriate flow capacity, a LNAPL/water separator, holding tanks for LNAPL/water storage, and carbon absorption vessels. All process equipment will be explosion-proof to Class I Division I standards. The process equipment will be connected to the extraction wells through above ground manifolding. The proposed MPE system layout is shown on Figure 4. All mechanical and electrical work will be performed by a licensed contractor.

Following installation, the system will be activated. An equipment shakedown and dry run testing will be performed prior to system startup. After the startup activities have been completed flow optimization (i.e., focusing and balancing air flow) will be performed to match the design operational parameters. During flow optimization phase, the system will be configured to operate in a manner to minimize the amount of groundwater recovery while maximizing the LNAPL recovery. This optimization will be performed by controlling the wellhead vacuums and air/liquid flow rates at individual MPE wells using wellhead control valves. During operation of the system air discharge will be routed through a carbon absorption vessel(s) prior to atmospheric discharge via an exterior stack inside the facility. The water/LNAPL effluent will be piped to a holding tank for eventual disposal off-site as regulated petroleum impacted waste.

Once the system has been activated, the system operations, maintenance, and monitoring (OM&M) activities will be initiated. OM&M activities will consist of operation, inspections, monitoring, optimization, and troubleshooting of the system and will continue until the demolition of the existing facility. OM&M activities will be

conducted weekly for the first month and monthly thereafter. The OM&M activities will include:

- Routine measurements of operating parameters (i.e., total flow and vacuum) at the process equipment.
- Measurements of gallons of LNAPL recovered.
- Measurements of water levels at nearby monitoring wells.
- Measurements of vapor flow rate and VOC concentrations.
- Vapor VOC concentration monitoring before and after carbon absorption vessels using handheld photoionization detector (PID).
- Vapor sampling for VOC analysis via USEPA Method TO-15 (weekly for the first month and monthly thereafter) to estimate the VOC mass removal rate.

3.1.3 Recovery of Product and Remediation of Gasoline-Impacted Soil and Groundwater in AOC-5

Product recovery and gasoline-impacted soil and groundwater remediation in AOC-5 will be completed using Soil Vapor Extraction (SVE) and product recovery wells. The objective of proposed IRM is to achieve substantial gasoline removal from AOC-5. Gasoline-containing vapors will be extracted by inducing a negative pressure gradient in the subsurface via the application of a vacuum.

Seven SVE wells will be installed in the LNAPL area, at the locations shown on Figure 4. SVE wells will be completed to a depth of 6 feet bgs. The wells will be constructed of two-inch diameter Schedule 40 PVC casing with a Schedule 40 PVC 0.020-inch slot screen installed between 3 and 6-feet bgs interval. In addition to SVE wells, four product recovery wells will be installed to facilitate LNAPL recovery. Product recovery wells will be installed at a depth of approximately 15 feet bgs and will be constructed of four-inch diameter Schedule 40 PVC casing with a screen installed between 5 and 15-feet bgs interval. The product recovery wells will be utilized to expedite LNAPL removal via a direct extraction technique using vacuum truck(s), as needed. All drilling and well installation activities will be performed by the licensed drilling contractor.

The SVE system will include a blower skid with a capacity of 250 scfm at 15" Hg vacuum, an air/moisture separator and a rental Catalytic Oxidizer for off-gas treatment. The process equipment will be mounted on a skid and will be connected to the wells through above ground manifolding. A detail showing the connections between the well network and the process equipment area is shown in Figure 4**.** All process equipment

will be explosion-proof to Class I Division I standards. All mechanical and electrical work will be performed by a licensed contractor.

The system will be activated following system installation. An equipment shakedown and dry run testing will be performed prior to system startup. After the startup activities have been completed flow optimization (i.e. focusing and balancing air flow) will be performed to match design operational parameters. During operation the SVE system vapor discharge will be routed through a Catalytic Oxidizer for treatment. The moisture/condensate water will be stored in holding tank for disposal off-site as regulated petroleum impacted waste. The water/LNAPL effluent will be piped to a holding tank for eventual disposal off-site as regulated petroleum impacted waste.

Once the system has been activated, the system OM&M activities will be initiated. OM&M activities will consist of operation, inspections, monitoring, optimization, and troubleshooting of the system and will continue until the demolition of the existing facility. OM&M activities will be conducted weekly for the first month and monthly thereafter. The OM&M activities will include:

- Routine measurements of operating parameters (i.e., total flow and pressure/ vacuum) at the process equipment.
- Measurements of water levels at nearby monitoring wells.
- Measurements of vapor concentrations before and after Catalytic Oxidizer using handheld photoionization detector (PID).
- Vapor sampling for VOC analysis via USEPA Method TO-15 (weekly for the first month and monthly thereafter) to estimate the VOC mass removal rate.

Contingent upon the actual LNAPL recovery rates by the SVE system and through the use of product recovery wells, addition of an air sparge component to the SVE system will be evaluated, to be able further enhance LNAPL recovery, as needed. The system will be designed such that the product recovery wells may be converted to air sparging wells, as needed. The contingent air sparge system will only be activated once the LNAPL recovery by the SVE system has reached asymptotic (mass transfer limiting) conditions) and the monitoring data indicates the continued presence of residual LNAPL fringes in the capillary or saturated zones.

3.1.4 Removal and Disposal of Two, 1,000 Gallon Fuel Oil ASTs

Removal of two 1,000-gallon No. 4 Fuel Oil ASTs is included in the proposed IRM. Removal of the ASTs will be performed in accordance with NYSDEC procedures and regulations. The contents of the tanks will be removed and disposed of at a regulated recycling facility and the tanks will be cleaned prior to off-site transport to a metal recycling facility. As these tanks are located on a concrete slab, it is not anticipated that any sampling will be conducted; however, the concrete in the vicinity will be inspected for competency and any evidence of staining or leaking. Due to access constraints, if any impacts are suspected they will be addressed following building demolition activities. These tanks will be registered with NYSDEC Petroleum Bulk Storage (PBS) unit. NYSDEC will be notified at least 10 days in advance of UST removal activities.

3.1.5 Removal and Disposal of Potential Gasoline USTs

Removal of potential gasoline USTs is included in the proposed IRM; however, this portion of the IRM will be completed following the demolition of the existing building or prior to demolition if it is determined that the tanks are acting as a continuing source of free product. Based on previous environmental investigations and assessments conducted for the Site, the presence of additional USTs was suspected, and their presence was verified during the geophysical investigation that was completed as part of the recent Remedial Investigation activities. Removal of the potential USTs will be performed in accordance with NYSDEC procedures and protocols. All tanks removed from the Site will be cleaned prior to off-site transport. Any remaining associated impacted soil and groundwater will be addressed via the over-excavation and off-site disposal of these impacted materials. Any unregistered tanks that are discovered will be registered with NYSDEC Petroleum Bulk Storage (PBS) unit. NYSDEC will be notified at least 10 days in advance of UST removal activities.

3.2 Remedial Activity Oversight

The Remediation Engineer, Langan, will oversee interim remedial action planning and implementation. The Remediation Engineer is responsible for documenting that the contractor performs the work as specified in the IRM Work Plan and provides the proper documentation required by NYSDEC. These contractor documents will be submitted to the NYSDEC in the CCR; which is described in Section 4.0.

The Remediation Engineer will provide full-time oversight of the IRM activities. The activities that occur during the IRM will be properly documented in monthly BCP progress reports and in the CCR as described in Section 4.0.

3.3 Soil Screening Methods

Visual, olfactory and instrumental soil screening and assessment will be performed by a qualified environmental professional during remediation excavations and or drilling operations into known or potentially impacted material. Instrumental screening will be performed with a photoionization detector (PID) equipped with a 10.6 electron Volt (eV) bulb and will be calibrated daily.

3.4 Waste Characterization

Waste characterization samples will be collected from the drill cutting materials generated during implementation of the IRM per disposal facility requirements. This activity will be coordinated and overseen by the Remediation Engineer. Samples will be collected to be representative of the material requiring disposal at a frequency consistent with disposal facility requirements. Samples may be collected from stockpiled excavated materials.

Waste characterization samples will be submitted to a New York State Department of Health (NYSDOH) ELAP-approved laboratory for analysis in accordance with the Quality Assurance Project Plan (QAPP) provided in Appendix B. Analytical data will be compared to Part 375 Restricted Residential SCOs, as listed in 6 NYCRR Chapter IV Subpart 375-6, Table 375-6.8(a). Any grossly (presence of free product or other visual signs of significant impacts) contaminated material or material that exceeds the Restricted Use SCOs will be transported off-site and disposed at a permitted facility during the Site redevelopment excavation activities. All remaining materials will be re-used as backfill material during site redevelopment activities.

Waste characterization samples will be analyzed for parameters that are typically required by disposal facilities, including, target compound list (TCL) VOCs, TCL SVOCs, Resource Conservation and Recovery Act (RCRA) metals, PCBs, pesticides, herbicides, toxicity characteristic leaching procedure (TCLP) VOCs, TCLP SVOCs, TCLP metals, ignitability, corrosivity, reactivity, and paint filter. Additional sampling and analyses may be required, in accordance with the selected disposal facility requirements.

3.5 Material Load Out and Transport

Non-hazardous, petroleum-impacted material will be handled, transported and disposed by a licensed hauler in accordance with applicable Part 360 and 364 regulations and other applicable local, state, federal regulations. The waste removal contractor will provide the appropriate permits, certifications, and written commitments from disposal facilities to accept the material throughout the life of the contract. Petroleum-impacted material will be transported by a waste removal contactor who possesses a valid New York State Part 364 Waste Transporter Permit.

Waste manifests will be used to track the material that is transported off-site. Haulers will be appropriately licensed and trucks will be properly placarded.

The Remediation Engineer will oversee the load-out of excess drill cuttings. Once the loading of a container, dump truck, or trailer has been completed, the material will be transported to the approved off-site disposal facility. Loaded vehicles leaving the Site will be appropriately lined, securely covered, and manifested in accordance with appropriate federal, state, local, and NYSDOT requirements (or other applicable transportation requirements). If loads contain wet material capable of producing free liquid, truck liners will be used.

3.6 Material Off-Site Disposal

The Remediation Engineer will review submittals for proposed disposal facilities before any materials leave the Site to verify that the facility has the proper permits and to review their requirements. Waste characterization will be performed for off-site disposal in accordance with receiving facility requirements and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and quality assurance/quality control (QA/QC) methods will be reported in the CCR upon completion of the IRM and in the Final Engineering Report (FER) upon completion of the final remedy. All waste characterization data available for soil/material to be disposed at a given facility will be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

3.7 Material Reuse On-site

Non-hazardous construction and demolition material, historic fill and underlying native soil that is free of petroleum impacts may be reused or re-graded on-site at the discretion of the Remediation Engineer. Material intended for reuse on-site will be stockpiled separately.

3.8 Waste Liquid Management

Waste liquids will be generated as part of the LNAPL recovery portion of this IRM. The liquids generated in AOC-5 as part of the product recovery portion of this IRM will be properly characterized and will be removed from the Site. All waste liquids will be properly characterized, and handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Waste characterization will be performed for off-site disposal in accordance with receiving facility requirements and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and quality assurance/quality control (QA/QC) methods will be reported in the CCR upon completion of the IRM and in the Final Engineering Report (FER) upon completion of the final remedy. All waste

characterization data available for waste liquids to be disposed at a given facility will be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

Liquids generated as part of the Multi-Phase Extraction in AOC-3 and as part of the Soil Vapor Extraction system in AOC-5 will be run through an oil/water separator prior to the water being placed in a settling tank that will then be pumped through a carbon unit of sufficient size to remove any remaining volatile organic compounds to the applicable NYSDEC surface water quality criteria. In order to insure that the treatment of this effluent material is sufficient, the treated effluent will be characterized prior to discharge in accordance with NYSDEC requirements and will be compared to the surface water criteria prior to direct discharge to the canal. Sampling and analytical methods, sampling frequency, analytical results and quality assurance/quality control (QA/QC) methods will be reported in the CCR upon completion of the IRM and in the Final Engineering Report (FER) upon completion of the final remedy. If the effluent samples do not meet the NYSDEC surface water quality criteria, the water will be compared to the New York City Department of Environmental Protection (NYCDEP) Sewer Discharge Criteria for potential disposal to the combined sewer system.

3.9 Importation and Backfill of Clean Fill Material

Backfilling is not anticipated for the implementation of the IRM Work Plan. However, if required, imported fill will meet Part 375 Restricted Residential SCOs. Prior to its placement, imported material will be screened for evidence of contamination (visual, olfactory and instrument). Material from industrial sites, spill sites, other environmental remediation sites or other potentially impacted sites will also not be imported to the Site. The imported fill will not include solid waste including brick, concrete, glass, ash, wood, or other debris. All materials proposed for import onto the Site will be approved by the Remediation Engineer and will be in compliance with provisions in this IRM Work Plan prior to receipt at the Site.

3.10 Dust, Odor, Vapor and Nuisance Control Plan

This dust, odor, organic vapor and nuisance control plan was developed in accordance with the NYSDOH Generic Community Air Monitoring Plan (CAMP) and OSHA standards for construction (29 CFR 1926). The remediation activities described in this IRM WP will be monitored for dust and odors by the Remediation Engineer's field inspector. Continuous monitoring on the perimeter of the work zones for odor, VOCs, and dust will be required for all ground intrusive activities, such as well installation, soil excavation and handling activities. Additionally, as the proposed IRM will also recover volatile organic compound vapors, monitoring of the indoor air within the facility at the exclusion zone will also be completed in accordance with the CAMP. The work zone is defined as the general area in which machinery

is operating in support of remediation activities. A portable PID will be used to monitor the work zone during well installation and AST removal and for periodic monitoring for VOCs during system operation and maintenance. The Site perimeter will be visually monitored for fugitive dust emissions. Action levels for site worker respiratory use are set forth in the HASP, included in Appendix A. Action levels for the protection of the community and visitors are discussed in Section 3.11.1.

3.10.1 Dust, Odor and Vapor Control

Work practices to minimize odors and vapors (VOCs) include limiting the time that the excavations remain open, wetting exposed fill or soil, minimizing stockpiling of impacted-source soil, and minimizing the handling of impacted material. Offending odor and organic vapor controls may include the application of foam suppressants or tarps over the odor or petroleum source areas. Foam suppressants may include biodegradable foams that are applied over the source material for short-term control of the odor.

VOCs will be monitored with a handheld PID with an action level of 25 parts per million (ppm) in the absence of benzene, in accordance with the HASP. The action level for benzene is 1 ppm. If the action level is exceeded and adequate ventilation cannot be provided, work will cease and the potential affected portion of the work area will be evacuated until adequate mechanical ventilation can be implemented to control the hazard. Level C respiratory protection may be donned in accordance with the HASP if untrained personnel are not present and the action level is exceeded.

This plan will be implemented to control emissions of VOCs and nuisance odors. Specific VOC and odor control methods to be used on a routine basis will include limiting the time that the excavations remain open, minimizing stockpiling of impacted-source soil, and minimizing the handling of impacted material. If nuisance odors or vapors exceeding action levels set forth in the IRM Work Plan are identified off-site, work will be halted and the source of odors will be identified and corrected. Work will not resume until all VOCs or nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor and vapor events and of all other complaints about the project. Implementation of all odor and vapor controls, including the halting of work, will be the responsibility of the Remediation Contractor under the oversight of the Remediation Engineer, who is responsible for certifying the CCR.

3.11 Health and Safety Plan

The Remediation Engineer prepared a Site-specific HASP for the IRM, which is included as Appendix A. The HASP provides a mechanism for establishing on-site safe working conditions, safety organization, procedures, and personal protective equipment requirements. The HASP meets the requirements of 29 CFR 1910 and 29 CFR 1926 (which includes 29 CFR 1910.120 and 29 CFR 1926.65). The HASP includes, but is not limited to, the following components listed below:

- Organization and Identification of key personnel;
- Training requirements;
- Medical surveillance requirements;
- List of Site hazards;
- Excavation safety;
- Work zone descriptions and monitoring procedures;
- Personal safety equipment and protective clothing requirements;
- Decontamination requirements;
- Standard operating procedures;
- Contingency Plan; and,
- Material Safety Data Sheets.

3.12 Quality Assurance Project Plan

The Remediation Engineer prepared a QAPP, which includes proposed sampling procedures and analytical methods for waste characterization samples. The QAPP is provided as Appendix B.

3.13 Notification

The NYSDEC will be notified prior to commencement of work related to the IRM. A pre-construction meeting will be coordinated between the Remediation Engineer, the Remediation Contractor, and the NYSDEC. This meeting must take place prior to the implementation of this IRM Work Plan.

4.0 REPORTING

Upon completion of the IRM, a CCR will be prepared and submitted. The Remediation Engineer responsible for certifying all reports will be an individual licensed to practice engineering in the State of New York. Ron Boyer, P.E. of Langan will have this responsibility. Should Mr. Boyer become unable to fulfill this responsibility, another suitably qualified New York State professional engineer will take his place. All project reports will be submitted to the NYSDEC

electronically as PDFs. Laboratory analytical data will be submitted in an electronic data deliverable (EDD) format that complies with the NYSDEC's electronic data warehouse standards.

4.1 Daily Reports

Daily reports will be prepared for the project file and for review by Project Managers. Daily reports will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions; and
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the IRM Work Plan or other sensitive or time critical information. However, such conditions will also be included in the daily reports. Emergency conditions and changes to the IRM Work Plan will be addressed directly to NYSDEC Project Manager via personal communication. If Site conditions warrant, the Remediation Engineer may request to change from daily to weekly reports that include the above information.

4.2 Construction Completion Report

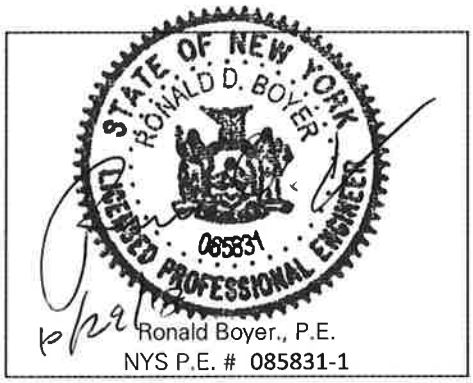
A CCR will be submitted to the NYSDEC Project Managers within 90 days of completing the interim remedial action. The CCR will document the implementation of the remedial action undertaken as an IRM. The CCR will be incorporated into and referenced in the FER for the Site when issued. The CCR will provide:

1. The Remediation Engineer will certify that:
    a. Data generated was useable and met the remedial requirements;
    b. The remedial work conformed to the IRM Work Plan;
    c. Dust, odor, and vapor control measures were implemented during invasive work and conformed with the IRM Work Plan;
    d. Remediation waste was transported and disposed in accordance with the IRM Work Plan;
    e. Source approval and sampling of imported acceptable fill (not anticipated) was completed in a manner consistent with the methodology of the IRM Work Plan;

2. Description of any problems encountered and their resolutions;
3. Description of changes in the IRM from the elements provided in the IRM Work Plan and associated design documents and the reasons for them;
4. Description of the deviations from the approved IRM Work Plan;
5. "As-built" drawings including remediation areas, vapor mitigation system, and permanent structures;
6. Listing of waste streams, quantity of materials disposed, and where they were disposed;
7. List of the remediation standards applied to the remedial actions;
8. Description of source and quality of fill;
9. A summary of all residual impacted material left on the Site;
10. A tabular summary of all sampling results and all material characterization results and other sampling and chemical analysis performed as part of the IRM;
11. Written and photographic documentation of all remedial work performed under this remedy;
12. Copies of all the submitted progress reports;
13. Certifications, manifests, and bills of lading for excavated materials transported off-site;
14. An accounting of the destination of all material removed from the Site, including excavated impacted soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids; and
15. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

5.0 CERTIFICATION

I, Ron Boyer, P.E. certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Interim Remedial Measures Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).



TABLES

TABLE 1
SUMMARY OF HISTORICAL SOIL ANALYTICAL RESULTS
PROPOSED BOND STREET DEVELOPMENT

363 Bond Street
Brooklyn, New York

Consultant:							Environmental Liability Management of New York, LLC																											
Sample ID:		SUBPART 375-6 (Revised Brownfields) #					MW-1/3-4		MW-1/9-10		MW-2/1-3		MW-2/9-10		MW-3/4-6		MW-3/13-15		MW-4/6-8		MW-4/12-14		MW-5/7.5-9.5		MW-5/13-15		SB-1/1-4		SB-1/10-12		SB-2/6-8		SB-2/10-12	
Laboratory Sample Number:		Protection of Public Health					209324-001		209324-002		209324-003		209324-004		209324-005		209324-006		209324-007		209324-008		209324-009		209324-010		209324-011		209324-012		209324-013		209324-014	
Sampling Date:	CAS No.	Unrestricted Use	Residential	Restricted - Residential	Restricted - Commerical	Restricted - Industrial	4/15/2005		4/15/2005		4/15/2005		4/15/2005		4/15/2005		4/15/2005		4/20/2005		4/20/2005		4/20/2005		4/20/2005		4/20/2005		4/20/2005		4/20/2005		4/20/2005	
Sampling Depth (ft):							3-4'		9-10'		1-3'		9-10'		4-6'		13-15'		6-8'		12-14'		7.5-9.5'		13-15'		1-4'		10-12'		6-8'		10-12'	
VOC Sampling Depth (ft):																																	
Units:		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q
VOCs																																	
1,1-Dichloroethane	75-34-3	0.27	19	26	240	480	0.0015	U	0.0016	U	0.0017	U	0.0018	U	***0.71***	*U*	0.0015	U	0.0018	U	0.0019	U	***0.29***	*U*	0.0015	U	***0.3***	*U*	0.0016	U	0.0015	U	0.0016	U
1,1-Dichloroethene	75-35-4	0.33	100	100	500	1,000	0.0024	U	0.0024	U	0.0025	U	0.0028	U	***0.83***	*U*	0.0024	U	0.0028	U	0.0029	U	***0.34***	*U*	0.0022	U	***0.35***	*U*	0.0024	U	0.0023	U	0.0025	U
1,2-Dichloroethane	107-06-2	0.02	2.3	3.1	30	60	0.0021	U	0.0022	U	0.0023	U	0.0025	U	***0.71***	*U*	0.0021	U	0.0025	U	0.0026	U	***0.29***	*U*	0.002	U	***0.3***	*U*	0.0022	U	0.0021	U	0.0023	U
1,2-Dichloroethene (cis)	156-59-2	0.25	59	100	500	1,000	0.0014	U	0.0014	U	0.0015	U	0.0017	U	***0.71***	*U*	0.0014	U	0.0017	U	0.0018	U	***0.29***	*U*	0.042		***0.3***	*U*	0.0015	U	0.0014	U	0.0015	U
1,2-Dichloroethene (trans)	156-60-5	0.19	100	100	500	1,000	0.0017	U	0.0017	U	0.0018	U	0.002	U	***0.59***	*U*	0.0017	U	0.002	U	0.002	U	***0.24***	*U*	0.0016	U	***0.25***	*U*	0.0017	U	0.0016	U	0.0018	U
Acetone	67-64-1	0.05	100	100	500	1,000	0.02	B	0.024	B	**0.051**	B	0.047	B	***1.7***	*U*	0.014		0.0024	U	0.0025	U	***0.68***	*U*	0.016		***0.71***	*U*	0.04		0.002	UB	0.0021	U
Benzene	71-43-2	0.06	2.9	4.8	44	89	0.0017	U	0.0017	U	0.0018	U	0.002	U	***0.47***	*U*	0.0017	U	0.011		0.002	U	**0.98**	J	0.0016	U	***0.2***	*U*	0.0017	U	0.0016	U	0.023	
Carbon Disulfide	75-15-0	---	---	---	---	---	0.002	U	0.0058	J	0.0078		0.006	J	1.1	U	0.002	U	0.0024	U	0.0025	U	0.43	U	0.0032	J	0.46	U	0.0021	U	0.002	U	0.0021	U
Carbon tetrachloride	56-23-5	0.76	1.4	2.4	22	44	0.0025	U	0.0025	U	0.0027	U	0.0029	U	***1.2***	*U*	0.0025	U	0.003	U	0.0031	U	0.48	U	0.0024	U	0.51	U	0.0025	U	0.0024	U	0.0027	U
Chloroform	67-66-3	0.37	10	49	350	700	0.0013	U	0.0013	U	0.0014	U	0.0015	U	***0.83***	*U*	0.0013	U	0.0016	U	0.0016	U	0.34	U	0.0012	U	0.35	U	0.0013	U	0.0013	U	0.0014	U
Ethylbenzene	100-41-4	1	30	41	390	780	0.0021	U	0.0022	U	0.0066		0.0025	U	***1.2***	*U*	0.0021	U	0.0025	U	0.0026	U	**1.3**	J	0.0067		**1.9**	J	0.0022	U	0.0021	U	0.0038	J
Methyl ethyl ketone (MEK / 2-butanone)	78-93-3	0.12	100	100	500	1,000	0.0027	U	0.0028	U	0.0029	U	0.0032	U	**8**	B	0.0027	U	0.0033	U	0.0034	U	***0.58***	*U*	0.0026	U	***0.61***	*U*	0.0037	J	0.0027	U	0.0029	U
Methylene chloride	75-09-2	0.05	51	100	500	1,000	0.006	JB	0.0058	JB	0.0069	JB	0.0074	JB	***0.47***	*UB*	0.0066	JB	0.005	UB	0.0059	JB	**0.29**	JB	0.0089	JB	**0.27**	JB	0.0073	JB	0.0049	JB	0.0044	UB
Styrene	100-42-5	---	---	---	---	---	0.0012	U	0.0012	U	0.0016	J	0.0014	U	0.59	U	0.0012	U	0.0014	U	0.0015	U	0.24	U	0.0011	U	0.25	U	0.0012	U	0.0012	U	0.0013	U
Toluene	108-88-3	0.7	100	100	500	1,000	0.002	U	0.002	U	**2.9**	J	0.0024	U	0.36	U	0.002	U	0.0024	U	0.0025	U	0.67	J	0.0027	J	**0.89**	J	0.0021	U	0.002	U	0.0085	
Trichloroethene	79-01-6	0.47	10	21	200	400	0.002	U	0.002	U	0.0022	U	0.0024	U	***0.83***	*U*	0.002	U	0.0024	U	0.0025	U	0.34	U	0.0067		0.35	U	0.0021	U	0.002	U	0.0021	U
Vinyl Chloride	75-01-4	0.02	0.21	0.9	13	27	0.0024	U	0.0024	U	0.0025	U	0.0028	U	***0.95***	*U*	0.0024	U	0.0028	U	0.0029	U	***0.39***	*U*	0.014		***0.41***	*U*	0.0024	U	0.0023	U	0.0025	U
Xylene (total)	1330-20-7	0.26	100	100	500	1,000	0.0054	U	0.0054	U	0.051		0.0063	U	***1.2***	*U*	0.0053	U	0.0085		0.0066	U	**2.4**	J	0.033		**3.7**		0.0054	U	0.0052	U	0.017	
SVOCs																																	
1,2-Dichlorobenzene	95-50-1	1.1	100	100	500	1,000	0.065	U	0.065	U	***1.4***	*U*	0.15	U	***1.3***	*U*	0.26	U	0.15	U	0.08	U	13	U	0.62	U	***2.8***	U	0.067	U	0.13	U	0.14	U
2-Methylnaphthalene	91-57-6	---	---	---	---	---	0.061	U	0.061	U	8.9		2.1		59		16		0.18	J	0.14	J	240		3.2	J	20		0.064	U	0.35	J	0.39	J
4-Chloro-3-methylphenol	35421-08-0	---	---	---	---	---	0.13	U	0.13	U	2.8	U	0.31	U	2.6	U	0.52	U	0.31	U	0.16	U	26	U	1.3	U	ND		ND		ND		ND	
Acenaphthene	83-32-9	20	100	100	500	1,000	0.064	U	0.063	U	5.6	J	1.1		1.3	U	0.25	U	0.15	U	0.079	U	**200**		6.6		19		0.066	U	0.12	U	0.71	J
Acenaphthylene	208-96-8	100	100	100	500	1,000	0.048	U	0.047	U	1.5	J	0.48	J	0.95	U	0.19	U	0.11	U	0.059	U	18	J	1.3	J	8.1	J	0.049	U	0.092	U	0.33	J
Anthracene	120-12-7	100	100	100	500	1,000	0.064	U	0.063	U	11		1.9		1.3	U	0.25	U	0.26	J	0.1	J	**270**		13		48		0.066	U	0.12	U	0.75	J
Benzo (a) anthracene	56-55-3	1	1	1	5.6	11	0.052	U	0.052	U	**26**		**3.7**		***1***	U	0.21	U	0.48	J	0.19	J	**340**		**16**		**62**		0.056	J	0.25	J	**1.9**	
Benzo (a) pyrene	50-32-8	1	1	1	1	1.1	0.048	U	0.047	U	**26**		**3.7**		0.95	U	0.19	U	0.51	J	0.16	J	**330**		**14**		**61**		0.049	U	0.28	J	**2.2**	
Benzo (b) fluoranthene	205-99-2	1	1	1	5.60	11	0.11	U	0.11	U	**19**		**2.8**		***2.1***	U	0.43	U	0.45	J	0.18	J	**210**		**11**		**38**		0.11	U	0.21	U	**1.6**	
Benzo (g,h,i) perylene	191-24-2	100	100	100	500	1,000	0.043	U	0.043	U	18		1.9		0.85	U	0.17	U	0.39	J	0.13	J	**200**		8.2		31		0.044	U	0.36	J	1.3	
Benzo (k) fluoranthene	207-08-9	0.8	1	3.9	56	110	0.043	U	0.043	U	**19**		**2.4**		***0.85***	U	0.17	U	0.21	J	0.16	J	**270**		**10**		**42**		0.045	J	0.13	J	**1.3**	
bis(2-ethylhexyl)phthalate	117-81-7	---	---	---	---	---	0.051	U	0.051	U	1.1	U	0.12	U	1	U	0.76	J	0.42	J	0.21	J	10	U	0.49	U	2.2	U	0.14	J	0.12	J	0.11	U
Carbazole	86-74-8	---	---	---	---	---	0.057	U	0.057	U	2.4	J	0.53	J	1.1	U	0.23	U	0.13	U	0.07	U	88		4.1		16		**0.059**	J	0.11	U	0.46	J
Chrysene	218-01-9	1	1	3.9	56	110	0.049	U	0.048	U	**30**		**4.3**		0.97	U	0.2	J	0.58	J	0.27	J	**410**		**18**		**61**		0.064	J	0.3	J	**2.2**	
Dibenzo (a,h) anthracene	53-70-3	0.33	0.33	0.33	0.56	1.1	0.043	U	0.043	U	**6.8**	J	**0.71**	J	***0.85***	U	0.17	U	0.15	J	0.053	U	**84**		**3.9**		**12**	J	0.044	U	0.083	U	**0.57**	J
Dibenzofuran	132-64-9	---	---	---	---	---	0.061	U	0.061	U	3.3	J	0.61	J	1.2	U	0.25	U	0.15	U	0.076	U	130		5.3		18		0.064	U	0.12	U	0.6	J
Di-n-butyl phthalate	84-74-2	---	---	---	---	---	0.051	U	0.051	U	1.1	U	0.12	U	1	U	0.2	U	0.13	J	0.063	U	10	U	0.49	U	2.2	U	0.053	U	0.098	U	0.11	U
Fluoranthene	206-44-0	100	100	100	500	1,000	0.049	U	0.048	U	71		9.1		1.5	J	0.38	J	1.1		0.46	J	**950**		52		**180**		0.12	J	0.41	J	3.5	
Fluorene	86-73-7	30	100	100	500	1,000	0.05	U	0.05	U	5.6	J	1.3		4.4	J	1.1	J	0.13	J	0.079	J	**200**		6.8		27		0.052	U	0.096	U	0.85	
Indeno (1,2,3-cd) pyrene	193-39-5	0.5	0.5	0.5	5.6	11	0.039	U	0.039	U	**15**		**1.8**		***0.78***	U	0.16	U	0.3	J	0.11	J	**170**		**7.6**		**27**		0.041	U	0.14	J	**1.1**	
Naphthalene	91-20-3	12	100	100	500	1,000	0.066	U	0.066	U	**23**		2.7		1.3	U	0.26	U	0.26	J	0.17	J	**300**		5.9		**21**		0.12	J	0.32	J	1	
o-Cresol(s) (2-Methylphenol)	95-48-7	0.33	100	100	500	1,000	0.1	U	0.1	U	***2.2***	*U*	0.24	U	***2.1***	*U*	***0.41***	*U*	0.24	U	0.13	U	***20***	*U*	***0.99***	*U*	***4.4***	*U*	0.11	U	0.2	U	0.22	U
p-Cresol(s) (4-Methylphenol)	106-44-5	0.33	34	100	500	1,000	0.21	U	0.21	U	***4.4***	*U*	***0.49***	*U*	***4.1***	*U*	***0.83***	*U*	***0.49***	*U*	0.26	U	***41***	*U*	***2***	*U*	***8.8***	*U*	0.22	U	***0.4***	*U*	**0.56**	J
Pentachlorophenol	87-86-5	0.8	2.4	6.7	6.7	55	0.33	U	0.33	U	***7.1***	*U*	0.78	U	***6.6***	*U*	***1.3***	*U*	0.79	U	0.41	U	***66***	*U*	***3.2***	*U*	***14***	*U*	0.35	U	0.64	U	0.73	U
Phenanthrene	85-01-8	100	100	100	500	1,000	0.045	U	0.045	U	45		8.4		6	J	1.7		0.9	J	0.43	J	**1,100**		49		**190**		0.14	J	0.18	J	3.1	
Phenol	108-95-2	0.33	100	100	500	1,000	0.11	U	0.11	U	***2.4***	*U*	0.26	U	***2.2***	*U*	***0.45***	*U*	0.27	U	0.14	U	***22***	*U*	***1.1***	*U*	***4.8***	*U*	0.12	U	0.22	U	0.24	U
Pyrene	129-00-0	100	100	100	500	1,000	0.053	U	0.053	U	72		7.7		1.2	J	0.4	J	0.77	J	0.39	J	**890**		45		**110**		0.13	J	0.38	J	3.1	
PCBs/Pesticides																																	
4,4'-DDE	72-55-9	0.0033	1.8	8.9	62	120	0.0005	U	0.00052	U	0.0027	U	0.00061	U	0.0018	J	0.00051	U	0.00061	U	**0.37**		**1.5**		**0.11**		0.0027	U	0.00052	U	0.0027	J	0.00054	U
4,4'-DDT	50-29-3	0.0033	1.7	7.9	47	94	0.00036	U	0.00037	U	0.0019	U	0.00043	U	0.00036	U	0.00036	U	0.00043	U	**0.11**		***0.018***	U	0.0017	U	0.0019	U	0.00037	U	0.00035	U	0.00039	U
4,4'-DDD	72-54-8	0.0033	2.6	13	92	180	0.00044	U	0.00045	U	0.0024	U	0.00053	U	0.00045	U	0.00045	U	0.00053	U	***0.0055***	*U*	***0.023***	*U*	0.0021	U	0.0024	U	0.00045	U	0.00043	U	0.00048	U
Aldrin	309-00-2	0.005	0.019	0.097	0.68	1.4	0.00041	U	0.00042	U	0.0022	U	0.0005	U	0.00042	U	0.00042	U	0.0005	U	***0.0052***	*U*	***0.021***	*U*	0.002	U	0.0022	U	0.00042	U	0.00041	U	0.00044	U
Alpha-BHC	319-84-6	0.02	0.097	0.48	3.4	6.8	0.00032	U	0.00033	U	0.0017	U	0.00038	U	0.0016	J	0.00032	U	0.00039	U	0.004	U	0.016	U	0.0015	U	0.0017	U	0.00033	U	0.00031	U	0.00034	U
Beta-BHC	319-85-7	0.036	0.072	0.36	3	14	0.00031	U	0.00032	U	0.0017	U	0.0012	J	0.00032	U	0.00032	U	0.00038	U	0.0039	U	**0.12**		0.013		0.01	J	0.00032	U	0.00031	U	0.00034	U
Chlordane (alpha)	5103-71-9	0.094	0.91	4.2	24	47	0.00013	U	0.00013	U	0.065		0.00015	U	0.00013	U	0.00013	U	0.00015	U	0.0016	U	0.0065	U	0.00061	U	0.00069	U	0.00013	U	0.00013	U	0.00014	U
Delta-BHC	319-86-8	0.04	100	100	500	1,000	0.00012	U	0.00012	U	0.00064	U	0.00014	U	0.00016	J	0.00012	U	0.00014	U	0.0015	U	0.0061	U	0.0043	J	0.0082	J	0.00012	U	0.00012	U	0.00013	U
Dieldrin	60-57-1	0.005	0.039	0.2	1.4	2.8	0.00037	U	0.00038	U	**0.053**		0.00045	U	0.00038	U	0.00038	U	0.00045	U	0.0047	U	***0.019***	*U*	0.0018	U	0.002	U	0.00038	U	0.00037	U	0.0004	U
Endosulfan I	959-98-8	2.4	4.8	24	200	920	0.00017	U	0.00018	U	0.16		0.0002	U	0.00017	U	0.00017	U	0.00021	U	0.0021	U	0.0087	U	0.00082	U	0.00092	U	0.00018	U	0.00017	U	0.00018	U
Endosulfan II	33213-65-9	2.4	4.8	24	200	920	0.0002	U	0.0002	U	0.0011	U	0.00024	U	0.0002	U	0.0002	U	0.00024	U	0.0025	U	0.01	U	0.00094	U	0.011	J	0.0002	U	0.00019	U	0.00021	U
Endosulfan Sulfate	1031-07-8	2.4	4.8	24	200	920	0.0002	U	0.00021	U	0.0011	U	0.001		0.0002	U	0.0002	U	0.0058	U	0.0025	U	0.01	U	0.00096	U	0.23		0.0002	U	0.0001	U	0.0024	J
Endrin aldehyde	7421-93-4						0.00037	U	0.00038	U	0.028		0.00045	U	0.00038	U	0.00038	U	0.00045	U	0.0047	U	0.019	U	0.0018	U	0.002	U	0.00038	U	0.00037	U	0.0004	U
Endrin ketone	53494-70-5	---	---	---	---	---	0.00017	U	0.00017	U	0.046		0.0002	U	0.00017	U	0.00017	U	0.0002	U	0.0021	U	0.0085	U	0.0008	U	0.0009	U	0.00017	U	0.00016	U	0.00018	U
Heptachlor	76-44-8	0.042	0.42	2.1	15	29	0.00017	U	0.00018	U	0.00094	U	0.00021	U	0.00018	U	0.00018	U	0.00021	U	0.0022	U	0.035	J	0.00083	U	0.00094	U	0.00018	U	0.00017	U	0.00019	U
Heptachlor epoxide	1024-57-3	---	---	---	---	---	0.00013	U	0.00014	U	0.015		0.0031		0.0013	J	0.00013	U	0.0014	J	0.0017	U	0.45		0.032		0.068		0.00014	U	0.00013	U	0.0013	J
Lindane	58-89-9	0.1	0.28	1.3	9.2	23	0.00018	U	0.00018	U	0.034		0.00021	U	0.0019	J	0.00018	U	0.00021	U	0.0022	U	0.009	U	0.00084	U	0.00095	U	0.00018	U	0.00017	U	0.00019	U
Methoxychlor	72-43-5	---	---	---	---	---	0.0025	U	0.0025	U	0.013	U	0.032		0.0025	U	0.0025	U	0.015	J	0.031	U	1.1		0.086	J	0.26		0.0025	U	0.0024	U	0.0026	U
Polychlorinated biphenyls (PCBs)	1336-36-3																																
Aroclor 1254	11097-69-1	0.1	1	1	1	25	0.0014	U	0.0014	U	0.0015	U	0.0017	U	0.0014	U	0.0014	U	0.0017	U	0.0018	U	0.0014	U	0.0013	U	0.0015	U	0.0014	U	0.0014	U	0.0015	U
Aroclor 1260	11096-82-5	0.1	1	1	1	25	0.0046	U	0.0048	U	0.005	U	0.0056	U	0.0047	U	0.0047	U	0.0056	U	0.008	J	0.0047	U	0.0044	U	0.005	U	0.0048	U	0.0046	U	0.005	U
Metals																																	
Aluminum	7429-90-5	---	---	---	---	---	10,200		9,900		3,250		4,330		4,500		4,590		4,830		5,170		3,480		1,960		2,780		4,590		749		4,300	
Arsenic	7440-38-2	13	16	16	16	16	3.1	B	4.5	J	**51.5**		**13.9**		2	J	2.2	J	**17**		5.1	J	**80.3**		2.8	J	8.6	J	5.6	J	1.4	U	7.7	J
Barium	7440-39-3	350	350	400	400	10,000	49.6		55.6		**524**		131		39		40.8		**502**		128		**1,060**		28		164		166		30.5		170	
Beryllium	7440-41-7	7.2	14	72	590	2,700	0.7	U	0.71	U	0.65	U	0.74	U	0.5	U	0.69	U	0.8	U	0.71	U	0.72	U	0.6	U	0.64	U	0.61	U	0.57	U	0.67	U
Cadmium	7440-43-9	2.5	2.5	4.3	9.3	60	1.4	U	1.4	U	1.3	U	1.5	U	1	U	1.4	U	1.6	U	1.6	J	1.5	J	1.2	U	**4.7**		1.2	U	**3.4**	B	1.3	U
Calcium	7440-70-2	---	---	---	---	---	989		1,360		12,300		20,000		2,020		1,930		6,960		46,700		27,900		15,300		6,780		6,270		671		16,900	
Chromium	7440-47-3	1	22	110	400	800	**22.2**		**21.2**		**11.9**		**11.4**		**9.4**		**9.8**		**9.4**		**7.1**		**14**		**4.4**		**12.2**		**9**		**2.8**	J	**6.8**	
Cobalt	7440-48-4	---	---	---	---	---	8.6		7.5		5.2		4.3		5.3		4.9		4.8		2.9		2.9		1.7	J	3.8		4.2		1.2	J	4.7	
Copper	7440-50-8	50	270	270	270	10,000	26		20.2		**354**		**69.2**		11.8		12.7		**67.7**		23.3		**2,680**		16.5		**76.9**		16		46.7		33.3	
Iron	7439-89-6	---	---	---	---	---	19,700		20,200		15,200		9,700		9,150		9,630		6,870		7,470		10,500		3,650		7,210		11,300		2,120		9,950	
Lead	7439-92-1	63	400	400	1,000	3,900	12.6		23.6		**851**		**674**		41.7		49.2		**1,290**		**201**		**1,420**		37.5		**489**		**106**		**91.9**		**1,450**	
Magnesium	7439-95-4	---	---	---	---	---	3,010		2,770		3,020		3,290		2,260		2,360		1,170		2,030		2,630		2,450		1,430		1,680		91.7		1,170	
Manganese	7439-96-5	1600	2,000	2,000	10,000	10,000	315		264		192		145		353		263		168		144		307		62.6		133		278		14.2		99	
Mercury (elemental)	7439-97-6	0.18	0.81	0.81	2.8	5.7	0.041	J	0.042	J	**9.9**		**0.68**		0.074		0.11		**1.6**		**0.84**		**19.5**		0.12		**1.5**		0.11		0.18		**0.38**	
Nickel	7440-02-0	30	140	310	310	10,000	23.3		20.5		25.7		25.2		24.3		22		12.5		9.6		14.1		4.7	J	14		13.9		5.3	J	9.7	
Potassium	7440-09-7	---	---	---	---	---	730		714		614		608		513		562		630		681		457		149	J	488		544		45.5	U	425	
Selenium	7782-49-2	3.9	36	180	1,500	6,800	2.2	U	2.3	U	2.1	U	2.4	U	1.6	U	2.2	U	2.5	U	2.3	U	2.3	U	1.9	U	2	U	2	U	**5.5**	J	2.2	U
Silver	7440-22-4	2	36	180	1,500	6,800	0.45	U	0.46	U	0.42	U	0.47	U	0.32	U	0.44	U	0.51	U	0.45	U	0.65	J	0.38	U	0.41	U	0.39	U	0.36	U	0.43	U
Sodium	7440-23-5	---	---	---	---	---	144		127	J	430		624		72.3	J	92.5	J	984		677		1,130		417		593		784		34.5	J	392	
Vanadium	7440-62-2	---	---	---	---	---	29.8		28.8		18.3		12.8		13.5		15		23.6		11.8		13.2		5.2		11.8		17.9		5.4		16.9	
Zinc	7440-66-6	109	2200	10000	10000	10000	37.5		38.4		**552**		**138**		26.2		28.2		**483**		60.9		**1,270**		**1,050**		**243**		35.8		25.1		57	

NOTES:
NYSDEC Soil Cleanup Objective Tables can be found in Tables 375-6.8(a) and 375-6.8(b) dated 14 December 2006.
Italicized results indicate values in which the minimum detection limit (MDL) exceed the criteria.
Sample data were provided in the Phase II Investigation Report, 363 Bond Street by ELM dated May 2005.
-- : No standard indentified
J: Estimated value
U: Indicates that the result is lower than the MDL.

TABLE 1
SUMMARY OF HISTORICAL SOIL ANALYTICAL RESULTS
PROPOSED BOND STREET DEVELOPMENT

363 Bond Street
Brooklyn, New York

Consultant:		Environmental Liability Management of New York, LLC																																	
Sample ID:		SUBPART 375-6 (Revised Brownfields) #					SB-3/6-8		SB-3/10-12		SB-4/9-10.5		SB-4/14-16		SB-5/5-7		SB-5/7-8		LSB-1		LSB-2		LSB-2		LSB-3		LSB-3		LSB-4		DUP-1 (LSB-4)	
Laboratory Sample Number:			Protection of Public Health				209324-015		209324-016		209324-017		209324-018		209324-019		209324-020		JB14351-1,2		JB14351-3,4		JB14351-5,6		JB14454-1,2		JB14454-3,4		JB14454-5,6		JB14454-7,8	
Sampling Date:	CAS No.	Unrestricted Use	Residential	Restricted - Residential	Restricted - Commerical	Restricted - Industrial	4/21/2005		4/21/2005		4/21/2005		4/21/2005		4/21/2005		4/21/2005		8/21/2012		8/21/2012		8/21/2012		8/22/2012		8/22/2012		8/22/2012		8/22/2012	
Sampling Depth (ft):							6-8'		10-12'		9-10.5'		14-16'		5-7'		7-8'		7.5-9.5		6.5-8.5		11.5-13.5		6-8		12-14		7-9		7-9	
VOC Sampling Depth (ft):																			8-8.5		6.5-7		11.5-12		6-6.5		12-12.5		8.5-9		8.5-9	
Units:		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q	mg/kg	Q
VOCs																																			
1,1-Dichloroethene	75-34-3	0.27	19	26	240	480	***0.38***	U	0.0015	U	***0.34***	U	0.0016	U	0.0016	U	0.0015	U	< 0.0084	U	< 0.00015	U	< 0.00015	U	< 0.0075	U	< 0.0088	U	< 0.0076	U	< 0.0091	U
1,1-Dichloroethene	75-35-4	0.33	100	100	500	1,000	***0.44***	U	0.0024	U	***0.4***	U	0.0024	U	0.0024	U	0.0023	U	< 0.016	U	< 0.00028	U	< 0.00028	U	< 0.014	U	< 0.016	U	< 0.014	U	< 0.017	U
1,2-Dichloroethane	107-06-2	0.02	2.3	3.1	30	60	***0.38***	U	0.0021	U	***0.34***	U	0.0022	U	0.0022	U	0.0021	U	< 0.0083	U	< 0.00015	U	< 0.00015	U	< 0.0074	U	< 0.0087	U	< 0.0075	U	< 0.0090	U
1,2-Dichloroethene (cis)	156-59-2	0.25	59	100	500	1,000	***0.38***	U	0.0014	U	***0.34***	U	0.0015	U	0.0015	U	0.0014	U	0.0681	J	< 0.00020	U	< 0.00020	U	0.0376	J	< 0.012	U	0.135	J	0.188	J
1,2-Dichloroethene (trans)	156-60-5	0.19	100	100	500	1,000	***0.32***	U	0.0017	U	***0.28***	U	0.0017	U	0.0017	U	0.0016	U	< 0.015	U	< 0.00026	U	< 0.00026	U	< 0.013	U	< 0.015	U	0.0501	J	0.0622	J
Acetone	67-64-1	0.05	100	100	500	1,000	***0.88***	U	0.042	B	***0.8***	U	0.018	B	0.018	B	0.016	B	**0.217**	J	0.0254		0.0357		***< 0.093***	U	***< 0.11***	U	***< 0.094***	U	***< 0.11***	U
Benzene	71-43-2	0.06	2.9	4.8	44	89	**3.1**	J	0.0017	U	***0.23***	U	0.0017	U	0.0017	U	0.0016	U	0.0202	J	< 0.00013	U	< 0.00013	U	< 0.0065	U	< 0.0076	U	0.0120	J	0.0360	J
Carbon Disulfide	75-15-0	---	---	---	---	---	0.57	U	0.002	U	0.51	U	0.0021	U	0.0021	U	0.002	U	0.0357	J	< 0.00013	U	0.0013	J	< 0.0064	U	< 0.0075	U	0.0174	J	< 0.0078	U
Carbon tetrachloride	56-23-5	0.76	1.4	2.4	22	44	0.63	U	0.0025	U	0.57	U	0.0026	U	0.0026	U	0.0025	U	< 0.0081	U	< 0.00014	U	< 0.00015	U	< 0.0073	U	< 0.0085	U	< 0.0074	U	< 0.0089	U
Chloroform	67-66-3	0.37	10	49	350	700	***0.44***	U	0.0013	U	***0.4***	U	0.0013	U	0.0013	U	0.0013	U	< 0.0051	U	< 0.000089	U	< 0.000091	U	< 0.0045	U	< 0.0053	U	< 0.0046	U	< 0.0055	U
Ethylbenzene	100-41-4	1	30	41	390	780	0.96	J	0.0021	U	**1.3**	J	0.0022	U	0.0022	U	0.0021	U	**2.26**		< 0.00028	U	< 0.00029	U	< 0.014	U	< 0.017	U	0.151		0.31	
Methyl ethyl ketone (MEK / 2-butanone)	78-93-3	0.12	100	100	500	1,000	***0.76***	U	0.012		***0.68***	U	0.0028	U	0.0028	U	0.0027	U	***< 0.15***	U	< 0.0026	U	< 0.0026	U	***< 0.13***	U	***< 0.15***	U	***< 0.13***	U	***< 0.16***	U
Methylene chloride	75-09-2	0.05	51	100	500	1,000	**0.32**	JB	0.0055	JB	**0.38**	JB	0.006	JB	0.0061	JB	0.0042	JB	***< 0.078***	U	< 0.0014	U	< 0.0014	U	***< 0.070***	U	***< 0.082***	U	***< 0.071***	U	***< 0.085***	U
Styrene	100-42-5	---	---	---	---	---	0.32	U	0.0012	U	0.28	U	0.0012	U	0.0012	U	0.0012	U	< 0.0056	U	< 0.000099	U	< 0.00010	U	< 0.0050	U	< 0.0059	U	< 0.0051	U	< 0.0061	U
Toluene	108-88-3	0.7	100	100	500	1,000	**2.7**	J	0.002	U	0.17	U	0.0021	U	0.0021	U	0.002	U	0.0184	J	< 0.00011	U	< 0.00012	U	< 0.0057	U	< 0.0067	U	0.0381	J	0.0837	
Trichloroethene	79-01-6	0.47	10	21	200	400	0.44	U	0.002	U	0.4	U	0.0021	U	0.0021	U	0.002	U	0.0605	J	< 0.00019	U	< 0.00019	U	0.0750	J	0.0211	J	< 0.0097	U	< 0.012	U
Vinyl Chloride	75-01-4	0.02	0.21	0.9	13	27	***0.51***	U	0.0024	U	***0.46***	U	0.0024	U	0.0024	U	0.0023	U	< 0.0088	U	< 0.00016	U	< 0.00016	U	< 0.0079	U	< 0.0092	U	< 0.0080	U	< 0.0096	U
Xylene (total)	1330-20-7	0.26	100	100	500	1,000	**3.9**		0.0053	U	**5.7**		0.0055	U	0.0055	U	0.0053	U	NA		NA		NA		NA		NA		NA		NA	
SVOCs																																			
1,2-Dichlorobenzene	95-50-1	1.1	100	100	500	1,000	***1.4***	U	0.063	U	0.98	U	0.066	U	0.068	U	0.5	U	NA		NA		NA		NA		NA		NA		NA	
2-Methylnaphthalene	91-57-6	---	---	---	---	---	4.6	J	0.059	U	50		0.2	J	0.064	U	1.1	J	76.2		0.0436	J	0.0427	J	0.343		0.828		1.19		0.176	
4-Chloro-3-methylphenol	35421-08-0	---	---	---	---	---	ND		0.13	U	2	U	0.13	U	0.14	U	1	U	< 0.35	U	< 0.033	U	< 0.034	U	< 0.036	U	< 0.037	U	< 0.037	U	< 0.039	U
Acenaphthene	83-32-9	20	100	100	500	1,000	5.4	J	0.062	U	3	J	0.065	U	0.15	J	2	J	**72.2**		0.184		0.235		0.759		1.81		0.975		0.291	
Acenaphthylene	208-96-8	100	100	100	500	1,000	3.9	J	0.046	U	0.72	U	0.048	U	0.05	U	1.1	J	4.26		0.146		0.121		0.0429		0.355		0.0328	J	0.0286	J
Anthracene	120-12-7	100	100	100	500	1,000	8		0.062	U	5.5	J	0.067	J	0.16	J	4.9		**151**		0.604		0.740		1.18		3.23		1.49		0.552	
Benzo (a) anthracene	56-55-3	1	1	1	5.6	11	***22***		0.05	U	**8.2**		0.13	J	0.34	J	**11**		**168**		**2.67**		**2.62**		**1.58**		**6.45**		**1.66**		0.989	
Benzo (a) pyrene	50-32-8	1	1	1	1	1.1	**25**		0.046	U	**7.8**		0.13	J	0.34	J	**16**		**152**		**3.08**		**2.91**		**1.41**		**6.17**		**1.32**		0.902	
Benzo (b) fluoranthene	205-99-2	1	1	1	5.60	11	**15**		0.1	U	**4.8**	J	0.12	J	0.28	J	**11**		**150**		**3.00**		**2.84**		**1.49**		**4.96**		**1.24**		0.754	
Benzo (g,h,i) perylene	191-24-2	100	100	100	500	1,000	16		0.041	U	3.5	J	0.092	J	0.26	J	8.4		96.0		2.10		1.91		0.802		3.68		0.731		0.539	
Benzo (k) fluoranthene	207-08-9	0.8	1	3.9	56	110	**18**		0.041	U	**5.1**	J	0.085	J	0.28	J	**10**		**76.7**		**1.36**		**1.37**		0.722		**4.51**		**0.864**		0.619	
bis(2-ethylhexyl)phthalate	117-81-7	---	---	---	---	---	1.1	U	0.049	U	0.77	U	0.052	U	0.054	U	0.39	U	< 0.31	U	0.0356	J	0.0458	J	< 0.032	U	< 0.033	U	< 0.033	U	< 0.034	U
Carbozole	86-74-8	---	---	---	---	---	1.5	J	0.055	U	2.1	J	0.058	U	0.062	J	0.95	J	57.8		0.110		0.167		0.569		1.10		0.476		0.228	
Chrysene	218-01-9	1	1	3.9	56	110	**27**		0.047	U	**7.9**		0.14	J	0.41	J	**13**		**166**		**2.67**		**2.58**		**1.55**		**6.09**		**1.58**		**1.03**	
Dibenzo (a,h) anthracene	53-70-3	0.33	0.33	0.33	0.56	1.1	**4.8**	J	0.041	U	**1.4**	J	0.044	U	0.079	J	**3.2**		**36.9**		**0.774**		**0.686**		0.300		**1.31**		0.309		0.201	
Dibenzofuran	132-64-9	---	---	---	---	---	5.1	J	0.059	U	2.9	J	0.063	U	0.064	U	1.1	J	**62.1**		0.0904		0.104		0.448		1.17		0.335		0.156	
Di-n-butyl phthalate	84-74-2	---	---	---	---	---	1.1	U	0.049	U	0.77	U	0.052	U	0.054	U	0.39	U	< 0.078	U	< 0.0074	U	< 0.0075	U	< 0.0079	U	< 0.0082	U	< 0.0082	U	< 0.0086	U
Fluoranthene	206-44-0	100	100	100	500	1,000	37		0.047	U	22		0.31	J	0.77		25		**473**		5.64		5.24		5.03		16.2		4.97		2.48	
Fluorene	86-73-7	30	100	100	500	1,000	7.7	J	0.048	U	4.3	J	0.054	J	0.13	J	2.1	J	**84.2**		0.231		0.260		0.924		2.05		1.11		0.361	
Indeno (1,2,3-cd) pyrene	193-39-5	0.5	0.5	0.5	5.6	11	**12**		0.038	U	**3.1**	J	0.066	J	0.2	J	**7.6**		**89.9**		**1.91**		**1.75**		**0.762**		**3.55**		**0.718**		**0.503**	
Naphthalene	91-20-3	12	100	100	500	1,000	3.9	J	0.064	U	**20**		0.11	J	0.12	J	2.3	J	**102**		0.0563		0.0771		0.291		1.04		1.01		0.242	
o-Cresol(s) (2-Methylphenol)	95-48-7	0.33	100	100	500	1,000	***2.2***	U	0.1	U	***1.6***	U	0.11	U	0.11	U	***0.79***	U	**1.50**		< 0.038	U	< 0.039	U	< 0.041	U	< 0.042	U	< 0.042	U	< 0.044	U
p-Cresol(s) (4-Methylphenol)	106-44-5	0.33	34	100	500	1,000	***4.4***	U	0.2	U	***3.1***	U	0.21	U	0.22	U	***1.6***	U	NA		NA		NA		NA		NA		NA		NA	
Pentachlorophenol	87-86-5	0.8	2.4	6.7	6.7	55	***7***	U	0.32	U	***5***	U	0.34	U	0.35	U	***2.6***	U	< 0.60	U	< 0.057	U	< 0.058	U	< 0.061	U	< 0.063	U	< 0.063	U	< 0.066	U
Phenanthrene	85-01-8	100	100	100	500	1,000	28		0.044	U	23		0.32	J	0.66		16		**539**		1.91		2.36		5.37		13.3		6.15		2.29	
Phenol	108-95-2	0.33	100	100	500	1,000	***2.4***	U	0.11	U	***1.7***	U	0.11	U	0.12	U	***0.86***	U	**1.91**		< 0.035	U	< 0.036	U	< 0.037	U	< 0.039	U	< 0.039	U	< 0.041	U
Pyrene	129-00-0	100	100	100	500	1,000	39		0.051	U	16		0.33	J	0.82		21		**340**		4.30		4.33		3.28		12.1		3.25		2.00	
PCBs/Pesticides																																			
4,4'-DDE	72-55-9	0.0033	1.8	8.9	62	120	**0.075**		0.0005	U	**0.065**		**0.0063**		0.00052	U	0.0025	U	NA		NA		NA		NA		NA		NA		NA		NA	
4,4'-DDT	50-29-3	0.0033	1.7	7.9	47	94	0.0019	U	0.00036	U	0.0017	U	0.00037	U	0.00037	U	0.0018	U	NA		NA		NA		NA		NA		NA		NA	
4,4'-DDD	72-54-8	0.0033	2.6	13	92	180	0.0024	U	0.00044	U	0.0021	U	0.00046	U	0.00046	U	0.0022	U	NA		NA		NA		NA		NA		NA		NA	
Aldrin	309-00-2	0.005	0.019	0.097	0.68	1.4	0.0022	U	0.00041	U	**0.017**		0.00043	U	0.00043	U	0.0021	U	NA		NA		NA		NA		NA		NA		NA	
Alpha-BHC	319-84-6	0.02	0.097	0.48	3.4	6.8	0.0017	U	0.00032	U	0.0016	U	0.00033	U	0.00033	U	0.0016	U	NA		NA		NA		NA		NA		NA		NA	
Beta-BHC	319-85-7	0.036	0.072	0.36	3	14	0.0017	U	0.00031	U	0.0015	U	0.00033	U	0.00032	U	0.0016	U	NA		NA		NA		NA		NA		NA		NA	
Chlordane (alpha)	5103-71-9	0.094	0.91	4.2	24	47	0.00069	U	0.00013	U	0.00062	U	0.00013	U	0.00013	U	0.00064	U	NA		NA		NA		NA		NA		NA		NA	
Delta-BHC	319-86-8	0.04	100	100	500	1,000	0.00064	U	0.00012	U	0.00058	U	0.00012	U	0.00012	U	0.0006	U	NA		NA		NA		NA		NA		NA		NA	
Dieldrin	60-57-1	0.005	0.039	0.2	1.4	2.8	0.002	U	0.00037	U	0.0018	U	0.00039	U	0.00039	U	0.0019	U	NA		NA		NA		NA		NA		NA		NA	
Endosulfan I	959-98-8	2.4	4.8	24	200	920	0.00092	U	0.00017	U	0.038		0.00018	U	0.00018	U	0.00086	U	NA		NA		NA		NA		NA		NA		NA	
Endosulfan II	33213-65-9	2.4	4.8	24	200	920	0.0011	U	0.0002	U	0.00096	U	0.00021	U	0.00021	U	0.00099	U	NA		NA		NA		NA		NA		NA		NA	
Endosulfan Sulfate	1031-07-8	2.4	4.8	24	200	920	0.0011	U	0.0002	U	0.00098	U	0.0028	J	0.00021	U	0.001	U	NA		NA		NA		NA		NA		NA		NA	
Endrin aldehyde	7421-93-4						0.002	U	0.00037	U	0.0018	U	0.00039	U	0.00039	U	0.0019	U	NA		NA		NA		NA		NA		NA		NA	
Endrin ketone	53494-70-5	---	---	---	---	---	0.0009	U	0.00017	U	0.00081	U	0.00017	U	0.00017	U	0.00084	U	NA		NA		NA		NA		NA		NA		NA	
Heptachlor	76-44-8	0.042	0.42	2.1	15	29	0.00094	U	0.00017	U	0.00085	U	0.00018	U	0.00018	U	0.00087	U	NA		NA		NA		NA		NA		NA		NA	
Heptachlor epoxide	1024-57-3	---	---	---	---	---	0.022		0.00013	U	0.00064	U	0.0018	J	0.00014	U	0.019		NA		NA		NA		NA		NA		NA		NA	
Lindane	58-89-9	0.1	0.28	1.3	9.2	23	0.014		0.00018	U	0.0055	J	0.00018	U	0.00018	U	0.00088	U	NA		NA		NA		NA		NA		NA		NA	
Methoxychlor	72-43-5	---	---	---	---	---	0.091	J	0.0024	U	0.012	U	0.015	J	0.0026	U	0.096	J	NA		NA		NA		NA		NA		NA		NA	
Polychlorinated biphenyls (PCBs)	1336-36-3																																		
Aroclor 1254	11097-69-1	0.1	1	1	1	25	0.0015	U	0.0014	U	**0.88**		0.026		0.0015	U	0.0062	J	NA		NA		NA		NA		NA		NA		NA	
Aroclor 1260	11096-82-5	0.1	1	1	1	25	0.005	U	0.0046	U	0.022	U	0.011	J	0.0048	U	0.013	J	NA		NA		NA		NA		NA		NA		NA	
Metals																																			
Aluminum	7429-90-5	---	---	---	---	---	3,210		8,040		4,060		4,440		9,140		2,800		NA		NA		NA		NA		NA		NA		NA	
Arsenic	7440-38-2	13	16	16	16	16	7	J	7.5	J	2.5	J	2.3	J	5.6	J	**39.2**		NA		NA		NA		NA		NA		NA		NA	
Barium	7440-39-3	350	350	400	400	10,000	106		69.9		47.4		40		58.1		273		NA		NA		NA		NA		NA		NA		NA	
Beryllium	7440-41-7	7.2	14	72	590	2,700	0.68	U	0.65	U	0.54	U	0.68	U	0.6	U	0.58	U	NA		NA		NA		NA		NA		NA		NA	
Cadmium	7440-43-9	2.5	2.5	4.3	9.3	60	1.4	U	1.3	U	**32.4**		1.4	J	1.2	U	1.2	U	NA		NA		NA		NA		NA		NA		NA	
Calcium	7440-70-2	---	---	---	---	---	6,380		4,650		4,820		2,200		1,200		15,200		NA		NA		NA		NA		NA		NA		NA	
Chromium	7440-47-3	1	22	110	400	800	**8.3**		**17.1**		**10.7**		**9.5**		**12.8**		**7.8**		NA		NA		NA		NA		NA		NA		NA	
Cobalt	7440-48-4	---	---	---	---	---	4.8		7.3		4.4		6.2		4.3		3.6		NA		NA		NA		NA		NA		NA		NA	
Copper	7440-50-8	50	270	270	270	10,000	**78.5**		27.9		27.9		14.2		15.4		**176**		NA		NA		NA		NA		NA		NA		NA	
Iron	7439-89-6	---	---	---	---	---	7,080		15,100		9,370		9,930		12,000		9,750		NA		NA		NA		NA		NA		NA		NA	
Lead	7439-92-1	63	400	400	1,000	3,900	**371**		41.1		**88.5**		9.2	J	41		**582**		**435**		NA		NA		NA		NA		NA		NA	
Magnesium	7439-95-4	---	---	---	---	---	1,670		3,730		2,790		2,950		1,950		1,720		NA		NA		NA		NA		NA		NA		NA	
Manganese	7439-96-5	1600	2,000	2,000	10,000	10,000	136		168		136		165		126		176		NA		NA		NA		NA		NA		NA		NA	
Mercury (elemental)	7439-97-6	0.18	0.81	0.81	2.8	5.7	**0.97**		0.048		**0.46**		0.026	J	0.1		**2.4**		NA		NA		NA		NA		NA		NA		NA	
Nickel	7440-02-0	30	140	310	310	10,000	13.1		**46.2**		20.5		23.3		12.5		11.2		NA		NA		NA		NA		NA		NA		NA	
Potassium	7440-09-7	---	---	---	---	---	362		1,290		891		751		372		380		NA		NA		NA		NA		NA		NA		NA	
Selenium	7782-49-2	3.9	36	180	1,500	6,800	2.2	U	2.1	U	1.7	U	2.2	U	1.9	U	1.9	U	NA		NA		NA		NA		NA		NA		NA	
Silver	7440-22-4	2	36	180	1,500	6,800	0.44	U	0.41	U	0.35	U	0.44	U	0.38	U	0.47	J	NA		NA		NA		NA		NA		NA		NA	
Sodium	7440-23-5	---	---	---	---	---	185		196		566		213		193		269		NA		NA		NA		NA		NA		NA		NA	
Vanadium	7440-62-2	---	---	---	---	---	12.5		19.6		20.7		17		19.4		13		NA		NA		NA		NA		NA		NA		NA	
Zinc	7440-66-6	109	2200	10000	10000	10000	**147**		**136**		**350**		44.9		39.9		**520**		NA		NA		NA		NA		NA		NA		NA	

NOTES:
NYSDEC Soil Cleanup Objective Tables can be found in Tables 375-6.8(a) and 375-6.8(b) dated 14 December 2006.
Italicized results indicate values in which the minimum detection limit (MDL) exceed the criteria.
Sample data were provided in the Phase II Investigation Report, 363 Bond Street by ELM dated May 2005.
--- : No standard indentified
J: Estimated value
U: Indicates that the result is lower than the MDL.

TABLE 2
SUMMARY OF HISTORICAL GROUNDWATER ANALYTICAL RESULTS
PROPOSED BOND STREET DEVELOPMENT
363 Bond Street
Brooklyn, New York

Consultant:			Environmental Liability Management of New York, LLC										Langan Engineering									
Sample ID:	CAS No.	Ground Water Quality Standards Part 703***	MW-1		MW-2		MW-4		MW-5		MW-2		MW-4		MW-4 (MS/MSD)	
Laboratory Sample Number:			209387-001		209387-002		209387-003		209387-004		JB-15285-3		JB-15285-1		JB-15285-2	
Sampling Date:			4/28/2005		4/28/2005		4/28/2005		4/28/2005		8/30/2012		8/30/2012		8/30/2012	
Sampling Depth (ft):											7		10		10	
Units:		(ug/L)	ug/l	Q	ug/l	Q	ug/l	Q	ug/l	Q	ug/l	Q	ug/l	Q	ug/l	Q
VOCs																
1,1,2-Trichloroethane	79-00-5	1	0.6	U	0.6	U	0.6	U	***3***	*U*	NA		NA		NA	
1,2-Dichloroethane	107-06-2	0.6	***0.6***	U	***0.6***	U	***0.6***	U	***3***	*U*	*< 0.26*	*U*	*< 0.26*	*U*	*< 0.26*	*U*
1,2-Dichloroethene (cis)	156-59-2	5	0.6	U	0.6	U	1.5	J	**450**		*< 0.19*	*U*	*< 0.19*	*U*	*< 0.19*	*U*
Acetone	67-64-1	5	**14**		2.4	J	1.4	U	**11**	J	< 3.3	U	< 3.3	U	< 3.3	U
Benzene	71-43-2	1	0.4	U	0.4	U	**1**	J	**59**		< 0.24	U	0.39	J	0.42	J
Bromomethane	74-83-9	5	1.2	U	1.2	U	1.2	U	***6***	*U*	< 0.22	U	< 0.22	U	< 0.22	U
Carbon tetrachloride	56-23-5	5	1	U	1	U	1	U	***5***	*U*	< 0.22	U	< 0.22	U	< 0.22	U
Ethylbenzene	100-41-4	5	1	U	1	U	1	U	**19**	J	< 0.23	U	< 0.23	U	< 0.23	U
Methyl ethyl ketone (MEK / 2-butanone)	78-93-3	5	1.2	U	1.2	U	1.2	U	**21**	J	< 2.4	U	< 2.4	U	< 2.4	U
Methylene chloride	75-09-2	5	0.4	UB	0.4	UB	0.4	UB	2.9	JB	< 0.70	U	< 0.70	U	< 0.70	U
Toluene	108-88-3	5	0.3	U	0.3	U	0.3	U	**38**		< 0.23	U	< 0.23	U	0.24	J
Trichloroethene	79-01-6	5	0.7	U	0.7	U	2.2	J	3.5	U	< 0.22	U	< 0.22	U	< 0.22	U
Vinyl Chloride	75-01-4	2	0.8	U	0.8	U	1.7	J	**320**		NA		NA		NA	
Xylene (mixed)	1330-20-7	5	1	U	1	U	1	U	**94**		NA		NA		NA	
SVOCs																
1,2,4-Trichlorobenzene	120-82-1	5	0.6	U	0.6	U	0.7	U	***7***	*U*	NA		NA		NA	
2-Chlorophenol	95-57-8	5*	1	U	1	U	1	U	***12***	*U*	< 1	U	< 1.0	U	< 0.99	U
2-Methylnaphthalene	91-57-6	5*	0.6	U	**6**	C	0.7	U	**150**		*< 0.4*	*U*	*< 0.40*	*U*	*< 0.39*	*U*
2-Nitroaniline	88-74-4	5*	1	U	1	U	1	U	***10***	*U*	*< 1.2*	*U*	*< 1.2*	*U*	*< 1.1*	*U*
2-Nitrophenol	88-75-5	5*	1	U	1	U	1	U	***13***	*U*	*< 1.6*	*U*	*< 1.6*	*U*	*< 1.5*	*U*
2,4-Dichlorophenol	120-83-2	5*	1	U	1	U	1	U	***11***	*U*	< 1.2	U	< 1.2	U	< 1.2	U
2,4-Dimethylphenol	105-67-9	5*	0.9	U	0.9	U	0.9	U	**260**		< 1.6	U	< 1.6	U	< 1.6	U
2,4-Dinitrophenol	51-28-5	5*	2	U	2	U	2	U	***20***	*U*	***< 17***	*U*	***< 17***	*U*	***< 17***	*U*
2,4-Dinitrotoluene	121-14-2	5	1	U	1	U	1	U	***11***	*U*	< 0.44	U	< 0.44	U	< 0.43	U
2,4,5-Trichlorophenol	95-95-4	5*	1	U	1	U	1	U	***10***	*U*	< 1.6	U	< 1.6	U	< 1.6	U
2,6-Dinitrotoluene	606-20-2	5	0.6	U	0.6	U	0.7	U	***7***	*U*	< 0.48	U	< 0.48	U	< 0.47	U
3-Nitroaniline	99-09-2	5*	0.7	U	0.7	U	0.8	U	***8***	*U*	*< 1.3*	*U*	*< 1.3*	*U*	*< 1.3*	*U*
3,3'-Dichlorobenzidine	91-94-1	5	0.7	U	0.7	U	0.8	U	***8***	*U*	< 0.38	U	< 0.37	U	< 0.37	U
4-Chloroaniline	106-47-8	5	0.6	U	0.6	U	0.7	U	***7***	*U*	< 0.55	U	< 0.55	U	< 0.54	U
4-Chloro-3-methylphenol	35421-08-0	5*	1	U	1	U	2	U	***16***	*U*	< 1.9	U	< 1.9	U	< 1.9	U
4-Nitroaniline	100-01-6	5*	0.9	U	0.9	U	0.9	U	***9***	*U*	*< 1.7*	*U*	*< 1.7*	*U*	*< 1.7*	*U*
4-Nitrophenol	100-02-7	5*	0.9	U	0.9	U	0.9	U	***9***	*U*	***< 5.4***	*U*	***< 5.4***	*U*	***< 5.3***	*U*
Acenaphthene	83-32-9	20	0.7	U	7	J	0.8	U	**90**	J	3.4	U	< 0.27	U	< 0.27	U
Acenaphthylene	208-96-8	5*	0.7	U	0.7	U	0.8	U	***8***	*U*	< 0.24	U	< 0.24	U	< 0.23	U
Anthracene	120-12-7	5*	0.9	U	2	J	0.9	U	**20**	J	1.2	U	< 0.30	U	< 0.29	U
Benzo(a)anthracene	56-55-3	5*	0.4	U	0.4	U	0.5	U	**10**	J	< 0.24	U	< 0.23	U	< 0.23	U
Benzo(a)pyrene	50-32-8	---	0.5	U	0.5	U	0.6	U	8	J	< 0.24	U	< 0.23	U	< 0.23	U
Benzo(b)fluoranthene	205-99-2	5*	1	U	1	U	1	U	***11***	*U*	< 0.48	U	< 0.47	U	< 0.47	U
Benzo(g,h,i)perylene	191-24-2	5*	0.6	U	0.6	U	0.7	U	***7***	*U*	< 0.34	U	< 0.33	U	< 0.33	U
Benzo(k)fluoranthene	207-08-9	5*	2	U	2	U	2	U	***18***	*U*	< 0.53	U	< 0.53	U	< 0.52	U
bis(2-Chloroethyl)ether	111-44-4	5	0.5	U	0.5	U	0.6	U	***6***	*U*	< 0.32	U	< 0.32	U	< 0.31	U
bis(2-Ethylhexyl)phthalate	117-81-7	5*	3	U	3	U	3	U	***28***	*U*	< 0.61	U	< 0.61	U	< 0.6	U
Butyl benzyl phthalate	85-68-7	5*	0.6	U	0.6	U	0.7	U	***7***	*U*	< 0.3	U	< 0.30	U	< 0.29	U
Carbazole			0.3	U	5	J	0.3	U	89	J	< 0.38	U	< 0.37	U	< 0.37	U
Chrysene	218-01-9	5*	0.5	U	0.5	U	0.6	U	**11**	J	< 0.3	U	< 0.30	U	< 0.29	U
Dibenzo(a,h)anthracene	53-70-3	5*	0.9	U	0.9	U	0.9	U	***9***	*U*	< 0.39	U	< 0.39	U	< 0.39	U
Dibenzofuran	132-64-9	7×10^{-7}	***0.9***	*U*	**3**	J	***0.9***	*U*	**53**	J	< 0.28	U	< 0.27	U	< 0.27	U
Diethyl phthalate	84-66-2	5*	0.9	U	0.9	U	0.9	U	***9***	*U*	< 0.34	U	< 0.34	U	< 0.33	U
Dimethyl phthalate	131-11-3	5*	0.6	U	0.6	U	0.7	U	***7***	*U*	< 0.29	U	< 0.29	U	< 0.29	U
Di-n-octyl phthalate	117-84-0	5*	0.7	U	0.7	U	0.8	U	***8***	*U*	< 0.32	U	< 0.32	U	< 0.31	U
Fluoranthene	206-44-0	5*	0.6	U	2	J	0.7	J	**42**	J	2	U	< 0.33	U	< 0.32	U
Fluorene	86-73-7	5*	0.7	U	**6**	J	0.8	U	**59**	J	2.7	U	< 0.29	U	< 0.28	U
Hexachlorobenzene	118-74-1	0.04	***0.7***	*U*	***0.7***	*U*	***0.8***	*U*	***8***	*U*	***< 0.35***	*U*	***< 0.35***	*U*	***< 0.34***	*U*
Hexachlorobutadiene	87-68-3	0.5	***1***	*U*	***1***	*U*	***1***	*U*	***12***	*U*	***< 0.53***	*U*	***< 0.53***	*U*	***< 0.52***	*U*
Hexachlorocyclopentadiene	77-47-4	5	***6***	*U*	***6***	*U*	***7***	*U*	***64***	*U*	***< 7.4***	*U*	***< 7.4***	*U*	***< 7.3***	*U*
Hexachloroethane	67-72-1	5	1	U	1	U	1	U	***10***	*U*	*< 0.57*	*U*	*< 0.57*	*U*	*< 0.56*	*U*
Indeno(1,2,3-cd)pyrene	193-39-5	5*	0.7	U	0.7	U	0.8	U	***8***	*U*	*< 0.39*	*U*	*< 0.39*	*U*	*< 0.38*	*U*
Isophorone	78-59-1	5*	0.6	U	0.6	U	0.7	U	***7***	*U*	*< 0.28*	*U*	*< 0.28*	*U*	*< 0.28*	*U*
Naphthalene	91-20-3	5*	0.7	U	**23**		0.8	J	**620**		*< 0.27*	*U*	*< 0.27*	*U*	*< 0.26*	*U*
Nitrobenzene	98-95-3	0.4	***0.5***	*U*	***0.5***	*U*	***0.6***	*U*	***6***	*U*	***< 0.44***	*U*	***< 0.43***	*U*	***< 0.43***	*U*
o-Cresol(s) (2-Methylphenol)	95-48-7	5*	1	U	1	U	1	U	**47**	J	*< 1.1*	*U*	*< 1.0*	*U*	*< 1.1*	*U*
p-Cresol(s) (4-Methylphenol)	106-44-5	5*	2	U	2	U	2	U	**29**	J	NA		NA		NA	
Pentachlorophenol	87-86-5	5*	2	U	2	U	2	U	***18***	*U*	< 1.4	U	< 1.4	U	< 1.4	U
Phenanthrene	85-01-8	5*	0.5	U	**10**	J	0.6	J	**110**	J	3.5	U	< 0.30	U	< 0.3	U
Phenol	108-95-2	5*	0.5	U	0.5	U	0.6	U	**7**	J	< 1.3	U	< 1.3	U	< 1.3	U
Pyrene	129-00-0	5*	0.4	U	2	J	0.6	J	**37**	J	1.5	U	< 0.28	U	< 0.28	U

TABLE 2
SUMMARY OF HISTORICAL GROUNDWATER ANALYTICAL RESULTS
PROPOSED BOND STREET DEVELOPMENT
363 Bond Street
Brooklyn, New York

Consultant:			Environmental Liability Management of New York, LLC										Langan Engineering									
Sample ID:	CAS No.	Ground Water Quality Standards Part 703***	MW-1		MW-2		MW-4		MW-5		MW-2		MW-4		MW-4 (MS/MSD)	
Laboratory Sample Number:			209387-001		209387-002		209387-003		209387-004		JB-15285-3		JB-15285-1		JB-15285-2	
Sampling Date:			4/28/2005		4/28/2005		4/28/2005		4/28/2005		8/30/2012		8/30/2012		8/30/2012	
Sampling Depth (ft):											7		10		10	
Units:		(ug/L)	ug/l	Q	ug/l	Q	ug/l	Q	ug/l	Q	ug/l	Q	ug/l	Q	ug/l	Q
Pesticides																
4,4'-DDE	72-55-9	0.2	0.01	U	0.0098	U	0.0096	U	**0.22**		NA		NA		NA	
Aldrin	309-00-2	---	0.0067	U	0.0064	U	0.0063	U	0.049	J	NA		NA		NA	
Beta-BHC	319-85-7	0.04	0.015	U	0.014	U	0.014	U	**0.13**		NA		NA		NA	
Dieldrin	60-57-1	0.001	***0.0066***	U	***0.0063***	U	***0.0062***	U	***0.0067***	U	NA		NA		NA	
Endosulfan Sulfate	1031-07-8	5*	0.016	U	0.016	U	0.015	U	0.076	J	NA		NA		NA	
Heptachlor epoxide	1024-57-3	0.03	0.0066	U	0.0063	U	0.0062	U	**0.58**		NA		NA		NA	
Toxaphene	8001-35-2	0.06	***0.25***	U	***0.24***	U	***0.23***	U	***0.25***	U	NA		NA		NA	
Polychlorinated biphenyls (PCBs)	1336-36-3	0.09	***0.12***	U	***0.12***	U	***0.12***	U	***0.12***	U	NA		NA		NA	
Aroclor 1221	11104-28-2	0.09	***0.12***	U	***0.12***	U	***0.12***	U	***0.12***	U	NA		NA		NA	
Aroclor 1232	11141-16-5	0.09	***0.094***	U	***0.09***	U	0.088	U	***0.095***	U	NA		NA		NA	
Aroclor 1254	11097-69-1	0.09	***0.11***	U	***0.1***	U	***0.1***	U	***0.11***	U	NA		NA		NA	
Aroclor 1260	11096-82-5	0.09	***0.095***	U	***0.091***	U	0.089	U	***0.096***	U	NA		NA		NA	
Total Metals																
Aluminum	7429-90-5	---	97.7	J	92	U	92	U	924		NA		NA		NA	
Antimony	7440-36-0	3	***5.4***	U	***5.4***	U	***5.4***	U	***5.4***	U	NA		NA		NA	
Arsenic	7440-38-2	25	3.9	U	10	J	3.9	U	**35.7**	J	NA		NA		NA	
Barium	7440-39-3	1,000	145		224		21.9		157		NA		NA		NA	
Cadmium	7440-43-9	5	1.1	U	1.1	U	**16.4**		1.7	J	NA		NA		NA	
Calcium	7440-70-2	---	87,900		108,000		70,300		28,300		NA		NA		NA	
Chromium			1.3	U	1.3	U	1.3	U	21.2		NA		NA		NA	
Cobalt	7440-48-4	5*	1.8	U	2.1	J	1.8	U	**7.1**	J	NA		NA		NA	
Copper	7440-50-8	200	4.3	U	4.3	U	8.3	J	17.2		NA		NA		NA	
Iron	7439-89-6	300	**5,990**		**3,730**		270		**3,600**		NA		NA		NA	
Iron and Manganese	493-89-6/7439-96	500	**6,946**		**4,274**		330		**3,771**		NA		NA		NA	
Lead	7439-92-1	25	3	U	3.6	J	3	U	**227**		NA		NA		NA	
Magnesium	7439-95-4	---	10,600		32,800		5,800		23,500		NA		NA		NA	
Manganese	7439-96-5	300	**956**		**544**		60		171		NA		NA		NA	
Mercury (elemental)	7439-97-6	0.7	0.07	U	0.07	U	0.07	U	0.49		NA		NA		NA	
Nickel	7440-02-0	100	1.9	U	4.1	J	3.7	J	43.2		NA		NA		NA	
Potassium	7440-09-7	---	14,000		50,300		6,550		79,100		NA		NA		NA	
Sodium	7440-23-5	20,000	**105,000**		**155,000**		**28,400**		**187,000**		NA		NA		NA	
Thallium	7440-28-0	5*	***10***	U	***10***	U	***10***	U	***10***	U	NA		NA		NA	
Vanadium	7440-62-2	5*	1.5	U	1.5	U	**5.7**	J	**19.8**		NA		NA		NA	
Zinc	7440-66-6	66**	11	U	11	U	27	J	**165**		NA		NA		NA	
Dissolved Metals																
Antimony	7440-36-0	3	***5.4***	U	***5.4***	U	***5.4***	U	***5.4***	U	NA		NA		NA	
Arsenic	7440-38-2	25	3.9	U	7.5	J	3.9	U	**30.5**	J	NA		NA		NA	
Barium	7440-39-3	1,000	110		158		20.9		123		NA		NA		NA	
Cadmium	7440-43-9	5	1.1	U	1.1	U	**15.3**		1.1	U	NA		NA		NA	
Calcium	7440-70-2	---	91,400		107,000		73,100		27,600		NA		NA		NA	
Chromium			1.3	U	1.3	U	1.3	U	16.5		NA		NA		NA	
Cobalt	7440-48-4	5*	1.8	U	2.4	J	1.8	U	**6.5**	J	NA		NA		NA	
Copper	7440-50-8	200	4.3	U	4.3	U	5.1	J	6.2	J	NA		NA		NA	
Iron	7439-89-6	300	**1,290**		54	U	70.9	J	**1,830**		NA		NA		NA	
Iron and Manganese	493-89-6/7439-96	500	**2,267**		**512**		132.1		**1,982**		NA		NA		NA	
Lead	7439-92-1	25	3	U	3	U	3	U	**135**		NA		NA		NA	
Magnesium	7439-95-4	---	11,200		32,200		5970		23,200		NA		NA		NA	
Manganese	7439-96-5	300	**977**		**512**		61.2		152		NA		NA		NA	
Nickel	7440-02-0	100	1.9	U	4.6	J	3.9	J	41.9		NA		NA		NA	
Potassium	7440-09-7	---	15100		50,400		6690		80,300		NA		NA		NA	
Sodium	7440-23-5	20,000	**111,000**		**156,000**		**29,000**		**184,000**		NA		NA		NA	
Thallium	7440-28-0	5*	***10***	U	***10***	U	***10***	U	***10***	U	NA		NA		NA	
Vanadium	7440-62-2	5*	1.5	U	1.5	U	**5.2**	J	**17.1**		NA		NA		NA	
Zinc	7440-66-6	66**	11	U	11	U	34.9	J	62.9		NA		NA		NA	

NOTES:
* : No criteria established, value is generic criteria
NYSDEC Groundwater Criteria are a combination of values from Part 703 if the NYS Code and TAGM 4046. Most values are generic screening values, however where contaminant specific criteria have been established they are used in this table.
Sample data were provided in the Phase II Investigation Report, 363 Bond Street by ELM dated May 2005.
Italicized results indicate values in which the minimum detection limit (MDL) exceed the criteria.
J: Estimated value
U: Indicates that the result is lower than the MDL.

Table 3
363 Bond Street
Historic Vapor Analytical Results
Proposed Bond Street Development
Brooklyn, New York

Location ID				LSV-1		LSV-2	
Sample ID				033		034	
Lab ID		**NYSDOH [1]**	**USEPA 2001 [2]**	JB15244-2		JB15244-3	
Sample Date			90th Percentile	8/30/2012		8/30/2012	
Compound	CAS No.	µg/m^3	µg/m^3	Result (ug/m^3)	Q	Result (ug/m^3)	Q
VOCs							
1,1-DICHLOROETHANE	75-34-3	---	---	< 0.45	U	< 0.45	U
1,1-DICHLOROETHENE	75-35-4	---	---	< 0.71	U	< 0.71	U
BENZENE	71-43-2	13	9.4	3.2		1.9	J
ETHYLBENZENE	100-41-4	6.4	5.7	< 0.52	U	3.4	J
TETRACHLOROETHYLENE(PCE)	127-18-4	2.5 to 100 *	15.9 to 100 *	**4160**		**1010**	
TOLUENE	108-88-3	57	43	4.5		8.7	
TRICHLOROETHYLENE (TCE)	79-01-6	0.5 to 5 *	4.2	**379**		**2180**	
O-XYLENE (1,2-DIMETHYLBENZENE)	95-47-6	7.1	7.9	1.7	J	4.8	
M AND P XYLENES	179601-23-1	11	22.2	4.3		7.4	

NOTES:

1: NYSDOH 2003: Study of Volatile Organic Chemicals in Air of Fuel Oil Heated Homes (Upper Fence criteria)

2: USEPA 2001: Building Assessment and Survey Evaluation (BASE) Database using Summa Cannister Method

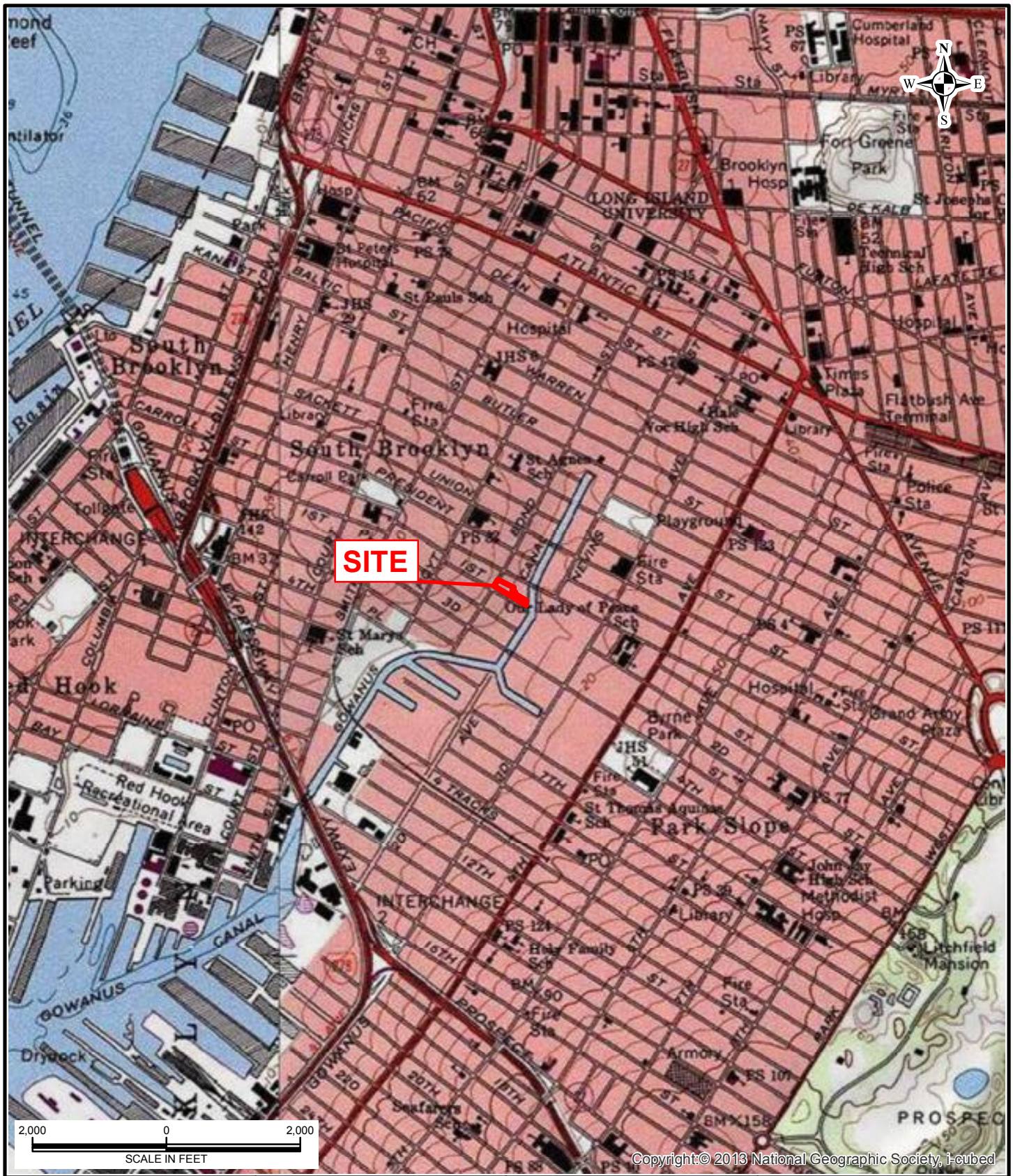
* Upper range based on NYSDOH Air Guideline Values as published in the NYSDOH Soil Vapor Intrusion Guidance dated October 200 October 2006.

---: Not included in study

U: Indicates that the result is lower than the MDL.

J: Estimated Value

FIGURES



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Project

363 BOND STREET

BLOCK 452, LOT 1

BROOKLYN

KINGS COUNTY NEW YORK

Drawing Title

SITE LOCATION MAP

Project No. 100287501	Figure 1
Date 10/19/2012	
Scale 1"=2000'	
Drawn By amf	
Last Revised 10/11/2013	

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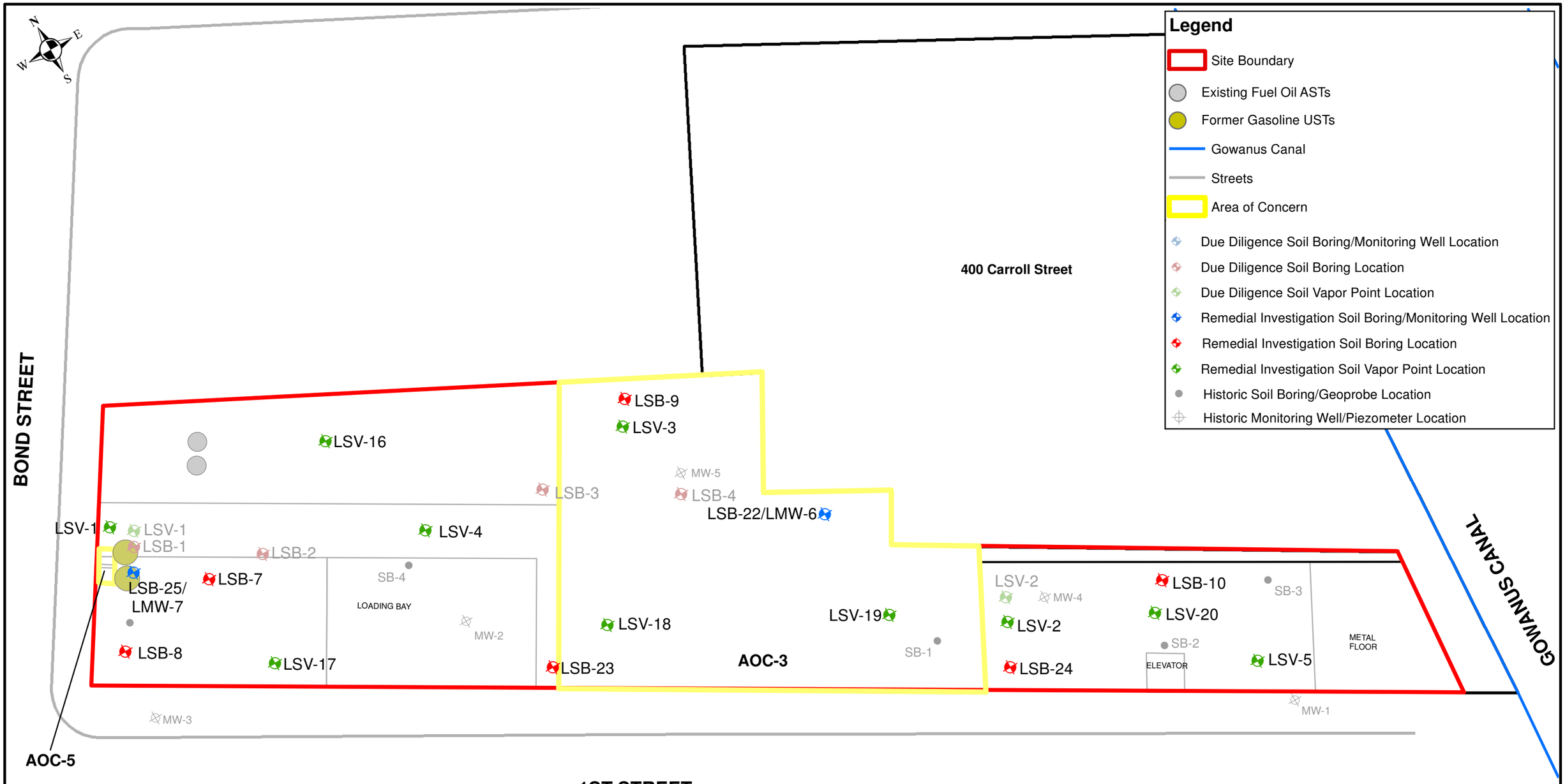
Path: \\langan.com\data\EP\data5\100287501\ArcGIS\ArcMap_Documents\2013-10 - IRMWP (363)\Figure 1 - Site Location Plan.mxd



30 0 30
SCALE IN FEET

Notes:
1. Map features are based on aerial photographs, tax maps, and the following ELM report: Phase II Investigation Report, 363 Bond Street (May 2005).
2. All ELM sample locations are approximate and based on the following ELM report: Phase II Investigation Report, 363 Bond Street (May 2005).
3. AOC-3: Proposed Excavation Area - 363 Bond Street; AOC-5: Former UST Area

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NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project	363 BOND STREET BLOCK 452, LOT 1 BROOKLYN KINGS COUNTY NEW YORK
Drawing Title	SITE PLAN
Project No.	100287501
Date	11/6/2012
Scale	1"=30'
Drawn By	amf
Last Revised	10/15/2013
Figure	2

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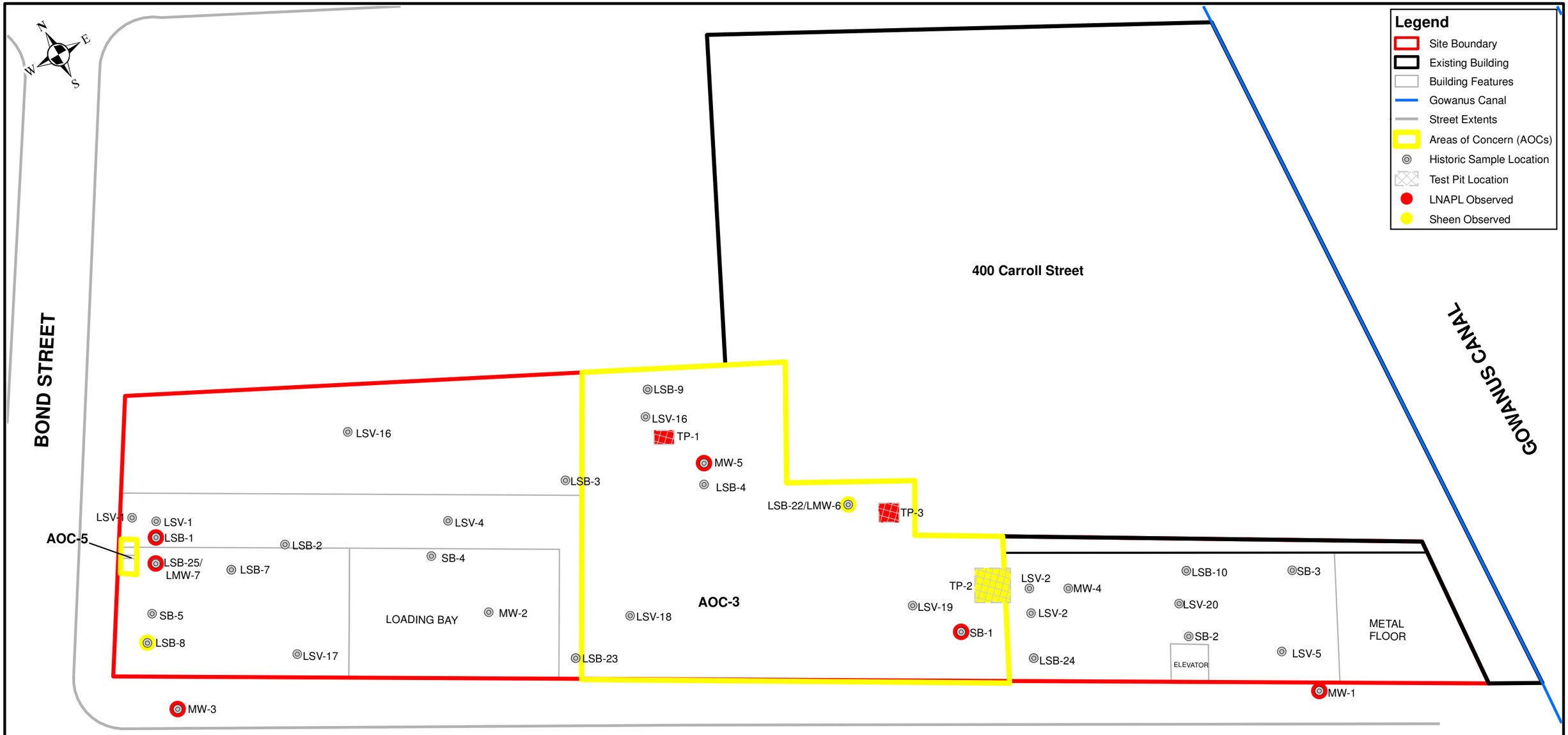
Path: \\Langan.com\data\EP\data5\100287501\ArcGIS\ArcMap_Documents\2013-10 - IRMWP (363)\Figure 2 - Site Plan.mxd



Notes:
1. Map features are based on aerial photographs, tax maps, and the following ELM report: Phase II Investigation Report, 363 Bond Street (May 2005.
2. AOC-3: Proposed Excavation Area - 363 Bond Street; AOC-5: Former UST Area

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NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project
PROPOSED BOND STREET DEVELOPMENT
BLOCK No. 452, LOT Nos. 1 & 15
BROOKLYN
KINGS COUNTY NEW JERSEY

Drawing Title
SUMMARY OF NAPL OBSERVATIONS

Project No.	100287501
Date	11/6/2012
Scale	1"=30'
Drawn By	amf
Last Revised	10/15/2013
Figure	3

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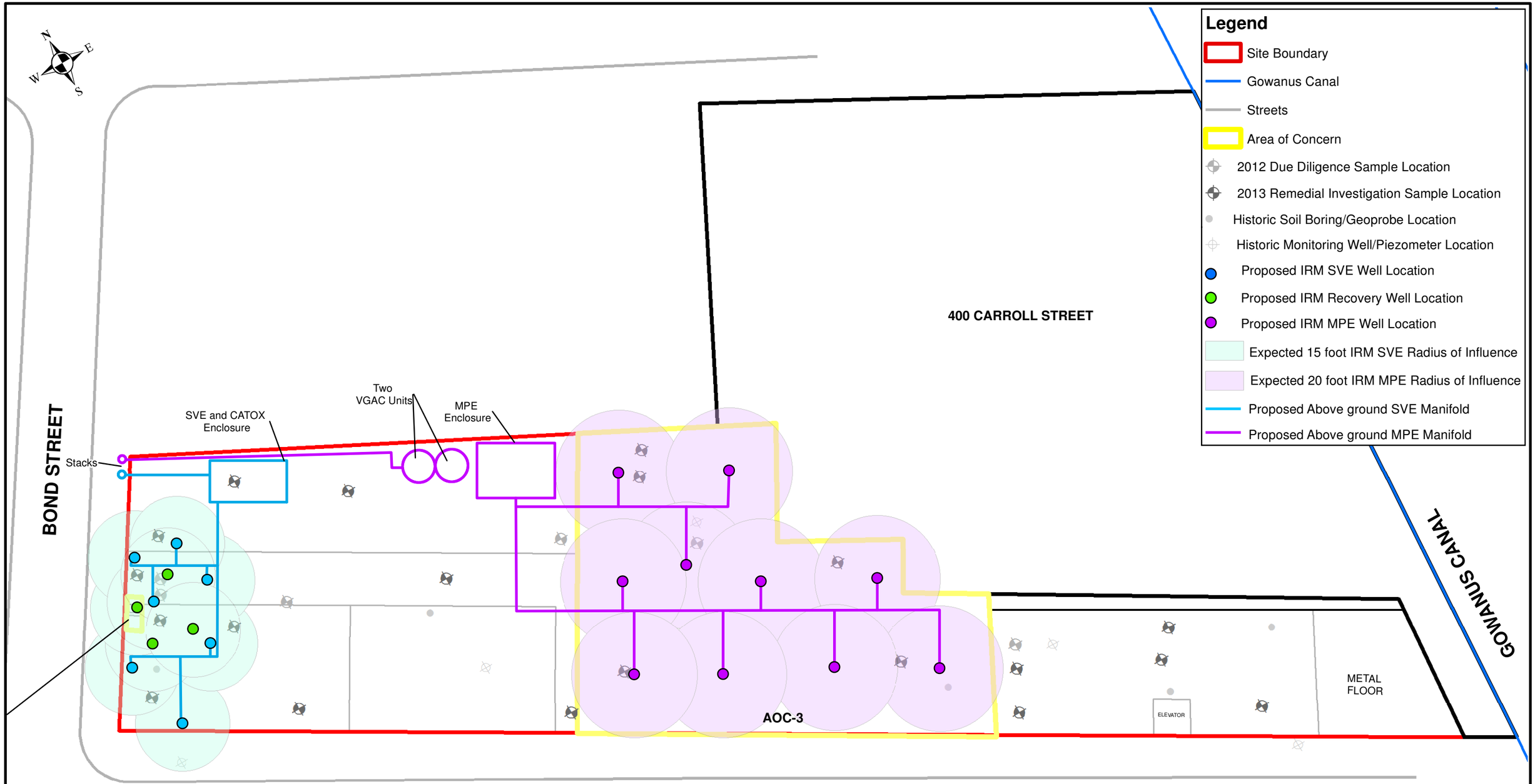

Notes:
1. Map features are based on aerial photographs, tax maps, and the following ELM report: Phase II Investigation Report, 363 Bond Street (May 2005).
2. All ELM sample locations are approximate and based on the following ELM report: Phase II Investigation Report, 363 Bond Street (May 2005).
3. AOC-3: Proposed Excavation Area - 363 Bond Street; AOC-5: Former UST Area
4. SVE: Soil Vapor Extraction
5. VGAC: Vapor Granulated Activated Carbon
6. CATOX: Catalytic Oxidizer

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NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project
PROPOSED BOND STREET DEVELOPMENT
BLOCK No. 452, LOT No. 1
BROOKLYN
KINGS COUNTY NEW YORK

Drawing Title
PROPOSED IRM LAYOUT MAP 363 Bond Street

Project No.	100287501
Date	10/14/2013
Scale	1"=30'
Drawn By	bs
Last Revised	10/15/2013
Figure	4

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Path: \\Langan.com\data\EP\data5\100287501\ArcGIS\ArcMap_Documents\2013-10 - IRMWP (363)\Figure 4 - Proposed IRM Layout Map.mxd

APPENDIX A

CONSTRUCTION HEALTH & SAFETY PLAN

LANGAN

CONSTRUCTION HEALTH AND SAFETY PLAN
FOR
INTERIM REMEDIAL MEASURES WORK PLAN

363 Bond Street
Brooklyn, New York

Prepared For:

LSG 363 Bond Street, LLC
c/o The Lightstone Group
460 Park Avenue, 13th Floor
New York, New York 10022

Prepared By:

Langan Engineering, Environmental, Surveying
and Landscape Architecture, D.P.C.
619 River Drive Center 1
Elmwood Park, New Jersey 07407
NJ Certificate of Authorization No: 24GA27996400

October 2013

100287501

CONSTRUCTION HEALTH AND SAFETY PLAN

Client:	**The Lightstone Group**
Project:	**INTERIM REMEDIAL MEASURES WORK PLAN**
Location:	**363 Bond Street, Brooklyn, New York**
Chemical Hazards:	**VOCs, SVOCs, Metals, PCBs**
Prepared By:	**Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.**
Version:	**1**
Date:	**October 2013**

Client Contact:	**Dennis Freed**
Langan Project Manager (PM):	**Chris McMahon**
Langan Health & Safety Coordinator (HSC):	**Tony Moffa, CHMM**
Langan Site Supervisor	**Field Personnel**
Langan Site Safety Officer (SSO):	**Field Personnel**

LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING AND LANDSCAPE ARCHITECTURE, D.P.C. (LANGAN) AND LANGAN SUBCONTRACTORS DO NOT GUARANTEE THE HEALTH OR SAFETY OF ANY PERSON ENTERING THIS SITE. DUE TO THE NATURE OF THIS SITE AND THE ACTIVITY OCCURRING THEREON, IT IS NOT POSSIBLE TO DISCOVER, EVALUATE, AND PROVIDE PROTECTION FOR ALL POSSIBLE HAZARDS WHICH MAY BE ENCOUNTERED. STRICT ADHERENCE TO THE HEALTH AND SAFETY GUIDELINES SET FORTH HEREIN WILL REDUCE, BUT NOT ELIMINATE, THE POTENTIAL FOR INJURY AT THIS SITE. THE HEALTH AND SAFETY GUIDELINES IN THIS PLAN WERE PREPARED SPECIFICALLY FOR THIS SITE AND SHOULD NOT BE USED ON ANY OTHER SITE WITHOUT PRIOR RESEARCH AND EVALUATION BY A TRAINED HEALTH AND SAFETY SPECIALIST.

APPROVALS

By signature, the personnel identified below hereby acknowledge that they have reviewed this Construction Health and Safely Plan (CHASP) and agree to comply with the requirements contained therein as well as the applicable provisions of 29 CFR Parts 1910 and 1926. The undersigned also acknowledge and accept that this EHS Plan is the project EHS Plan for the site work described in the Interim Remedial Measures Work Plan (IRMWP). Furthermore, in reviewing and accepting this EHS Plan, as currently written, the undersigned agree that to the best of their knowledge, this EHS Plan adequately identifies the activities and hazards associated with work at this site and describes the appropriate and necessary precautions and protections for site workers required by the applicable OSHA statutes and regulations.

LANGAN Project Manager - PM (Chris McMahon) — Date: 10/14/2013

LANGAN Health and Safety Coordinator (Tony Moffa, CHMM) — Date

LANGAN Site Supervisor — Date

LANGAN Site Safety Officer – SSO — Date

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1.0 INTRODUCTION

1.1 Purpose and Policy

This Construction Health and Safety Plan (CHASP) has been developed to comply with the regulations under Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120(b)(4), Hazardous Waste Operations and Emergency Response. The plan addresses activities associated with the Interim Remedial Measures (IRM) work to be conducted at 363 Bond Street, Brooklyn, New York (see Figure 1). This CHASP establishes personnel protection standards and mandatory safety practices and procedures. Additionally, it assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while operations are being conducted at known or suspected hazardous waste sites.

The provisions of this HASP are mandatory for all on-site personnel. Although for use only by Langan personnel, HASPs prepared by subcontractors must conform to the requirements of this HASP at a minimum. All personnel who engage in project activities must be familiar with this HASP, comply with its requirements, and sign the Field Personnel Review Form (Section 12.0)

1.2 Site Descriptions

Please refer to the IRM Workplan (IRMWP) for the full job description and scope of work. The following provides a general job description summary.

The scope of work for the Interim Remedial Measures Work Plan includes the following field tasks:

- Implementation of a Community Air Monitoring Plan (CAMP) for particulates and VOCs;
- Perimeter and work zone air monitoring for VOCs and particulates;
- Recovery of product and remedial of LNAPL-impacted soil and groundwater within AOC-3;
- Recovery of product and remediation of gasoline-impacted soil and groundwater within AOC-5;
- Removal and off-site disposal of soil for sump installation;

- Collection and analysis of soil samples for waste characterization of soil removed as part of sump installation;
- Removal and disposal of any underground storage tanks (USTs) discovered during remediation of soil and groundwater, in accordance with all applicable federal, state and local regulations;
- Removal and disposal of two fuel oil ASTs in accordance with all applicable federal, state and local regulations; and,
- Installation a soil vapor extraction and air sparge system.

Following the Contractor obtaining the necessary permits, they will mobilize to the Site. Langan will oversee the completion of work specified in the IRMWP.

2.0 PROJECT TEAM ORGANIZATION AND RESPONSIBILITIES

This section specifies the Langan Project Organization.

2.1 Project Manager

Assumes total control over site activities. Reports to upper-level management. Has authority to direct response operations.

Responsibilities:

- Prepares and organizes the background review of the situation, the IRMWP, the site CHASP, and the field team.
- Obtains permission for site access and coordinates activities with appropriate officials.
- Ensures that the Work Plan is executed and on schedule.
- Briefs the field team on their specific assignments.
- Coordinates with the Site Safety Officer (SSO) to ensure that health and safety requirements are met.
- Prepares the final report and support files on the response activities.
- Serves as the liaison with public officials.

2.2 Site Supervisor/Site Safety Officer (SSO)

Advises the Project Manager on all aspects of health and safety on site. Stops work if any operation threatens worker or public health or safety. Is directly responsible for the field team and the safety of site operations.

Responsibilities:

- Manages field operations.
- Executes the Work Plan and schedule.
- Enforces safety procedures.
- Coordinates with the SSO in determining protection level.
- Enforces site control.
- Documents field activities and sample collection.
- Serves as a liaison with public officials.
- Ensures that all necessary Health and Safety equipment is available on site and is functional.
- Periodically inspects protective clothing and equipment.
- Conducts all on-site air monitoring activities and modifies PPE requirements based on action levels shown in Table 4.
- Ensures that protective clothing and equipment are properly stored and maintained.
- Controls entry and exit at the Access Control points.
- Coordinates health and safety program activities with the HSC.
- Confirms each team member's suitability for work based on a physician's recommendation.
- Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue.
- Implements all elements of this EHS Plan.
- Conducts periodic inspections to determine if this EHS Plan is being followed.
- Enforces the "buddy" system.

- Knows emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Notifies, when necessary, local public emergency officials.
- Coordinates emergency medical care.
- Sets up decontamination lines and the decontamination solutions appropriate for the type of chemical contamination on the site.
- Controls the decontamination of all equipment, personnel, and samples from the contaminated areas.
- Assures proper disposal of contaminated clothing and materials.
- Ensures that all required equipment is available.
- Advises medical personnel of potential exposures and consequences.
- Notifies emergency response personnel by telephone or radio in the event of an emergency.
- Assist in the preparation of all Root Cause Investigation Reports/ Preventative Action Plans for any incidents and or Close Calls.

2.3 Health and Safety Coordinator (HSC)

Responsibilities:

- Assists SSO with development of the HASP, updating HASP as dictated by changing conditions, jobsite inspection results, etc.
- Assists SSO in conducting Jobsite Safety Inspections and assists with the correction of shortcomings found.
- Coordinates the activities of the Contract Medical Advisor staff in their EHS Plan responsibilities.
- Ensures training requirements are satisfied in a timely manner.
- Ensures medical evaluations of Langan personnel are current.
- Maintains all records on personnel (medical evaluation results, training and certifications, accident investigation results, etc.).
- Prepare any Root Cause Investigation Reports/Preventative Action Plans for any incidents and or Close Calls.

2.4 Work Team

Vacuum truck operators, drillers, samplers, surveyors, etc. The work party must consist of at least two people.

Responsibilities:

- Safely completes the on-site tasks required to fulfill the Work Plan.
- Complies with this HASP.
- Notifies SSO of suspected unsafe conditions.
- Report any unsafe or potentially hazardous conditions to the SSO.
- Maintain knowledge of the information, instructions and emergency response actions contained in this HASP.
- Comply with roles, regulations and procedures as set forth in this HASP and any revisions.
- Prevent admittance to work sites by unauthorized personnel.
- Inspect all tools and equipment, including PPE, daily prior to use.

3.0 HAZARDS ANALYSIS

This section presents all assessment of the chemical, biological, and physical hazards that may be encountered during the tasks specified under this HASP (Section 3). A detailed list of types of potential contaminants of concerns Langan anticipates to encounter at different locations during the intrusive investigation is listed in Table 1 of this HASP.

3.1 Chemical Exposure Hazards

Potential contaminants that may be encountered while conducting site construction activities include VOCs, SVOCs, metals, and PCBs and historic fill. Some relevant properties of these contaminants are shown in Table 1.

On-site personnel will make efforts to avoid activities that could generate potentially contaminated dust, and work upwind of potentially contaminated soils and ground water during excavation activities. In addition to the site's suspected contaminants, materials used in the site construction activities itself may potentially be hazardous to human health if they are not used properly. Material

Safety Data Sheets for materials that will be brought or used on site and the known or suspected site contaminants are included in Attachment A.

3.2 Biological Hazards

During the course of the project, there is a potential for workers to come into contact with biological hazards such as animals, insects, and blood-borne pathogens.

3.2.1 Blood-Borne Pathogens

During the course of the project, there is a potential for workers to come into contact with biological hazards such as animals and insects. As the potential for exposure to blood borne pathogens during the construction activities is anticipated to be low, a Blood-borne Pathogen Exposure Plan (BBPEP) is not required. A BBPEP will be prepared if site operation requires its implementation. Regardless, a first aid kit will be available on site at all times during work

3.2.2 Animals

During site operations, animals such as dogs, cats, pigeons, mice, and rats may be encountered. Workers shall use discretion and avoid all contact with animals. Bites and scratches from dogs and cats can be painful and if the animal is rabid, the potential for contracting rabies exists. Contact with rat and mice droppings may lead to contracting hantavirus. Inhalation of dried pigeon droppings may lead to psittacosis. Cryptococcosis and histoplasmosis are also diseases associated with exposure to dried bird droppings but these are less likely to occur in this occupational setting.

3.2.3 Insects

Insects, including bees, wasps, hornets, mosquitoes, spiders, and ticks may be present at the site. Some individuals may have a severe allergic reaction to an insect bite or sting that can result in a life threatening condition. In addition, mosquito bites may lead to St. Louis encephalitis or West Nile encephalitis.

3.2.4 Wound Care

A source of occupational exposure may occur when an employee gives First Aid and or CPR to an individual who had infectious blood. The occupational exposure occurs when there is the possibility for an employee's eyes, mucous membranes, non-intact skin (i.e., cut and abraded skin) to come into contact with potentially infectious materials from another employee. If an accident were to occur where First Aid would need to be administered, the person administering the First Aid will presume that any wounds and materials used are contaminated with BBP and should wear the appropriate PPE to prevent contact with these materials. Additionally, should the use of First Aid materials and or clothing that was potentially contaminated with BBP be encountered these materials should be property containerized and transported to the nearest hospital for proper disposal.

3.3 Physical Hazards

3.3.1 Temperature Extremes

Hot Temperatures

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE, in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke. If onsite workers exhibit the signs of heat exhaustion or heat stroke, they should seek immediate medical attention.

Cold Temperatures

Workers may be exposed to the hazard of working in a cold environment. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia, as well as slippery surfaces, brittle equipment, poor judgment, and unauthorized procedural changes. In order to prevent frostbite, hypothermia, trench foot and immersion foot, the workers are responsible for dressing warmly in layers with thick socks, gloves, and appropriate head and face gear. Upon the onset of discomfort due to the cold, onsite workers should take regular five to ten minute breaks to warm up inside nearby buildings and to drink warm fluids. Please note that the NYCDEP statute prohibits idling an engine for more than three minutes (one-minute if adjacent to a school). This statue

includes the use of a vehicle for the purpose of warming up employees. As such, all contractors and employees shall identify a place to warm up in advance. If discomfort continues and the onsite workers start to exhibit the signs of frostbite, hypothermia, trench foot or immersion foot, they should seek immediate medical attention.

3.3.2 Noise and Air Resources

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps and generators. Hearing protection is required for noise levels of greater than 85 dBA.

The New York City Department of Environmental Protection (NYCDEP) has initiated construction noise rules effective 1 July 2007. Contractors employing construction equipment such as vacuum excavators, drill rigs, and jackhammers, are required by the rules to have notarized Construction Noise Mitigation Plans. Noise mitigation measures may include mufflers, etc. Boring activities will occur during daytime hours only to minimize noise disturbance to the community. In addition, no vehicles will idle for more than three minutes (one-minute adjacent to a school) when not in use for powering a tool.

3.3.3 Hand and Power Tools

In order to complete the various tasks for the project, personnel will utilize hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Proper personal protective equipment shall be worn while utilizing hand and power tools. Ground Fault Circuit Interrupters (GFCIs) are required for all portable electric tools.

3.3.4 Slips, Trips, and Falls

Working in and around the site will pose slip, trip and fall hazards due to equipment, piping, slippery surfaces that may be oil covered, or from surfaces that are wet from rain or ice. Potential adverse health effects include falling to the ground and becoming injured or twisting an ankle. Good housekeeping at the site must be maintained at all times.

3.3.5 Fire and Explosion

Prior to starting all excavation and boring work, a review of appropriate New York City maps will be conducted to identify potential hazards. The possibility of encountering fire and explosion hazards exists from underground utilities and gases; therefore, all excavation/boring equipment must be grounded.

3.3.6 Material Handling

Manual lifting of heavy objects may be required. Failure to follow proper lifting techniques can result in back injuries and strains. Back injuries are a serious concern as they are the most common workplace injury, often resulting in lost or restricted work time, and long treatment and recovery periods.

Whenever possible, heavy objects must be lifted and moved by mechanical devices rather than by manual effort. The mechanical devices will be appropriate for the lifting or moving task and will be operated only by trained and authorized personnel. Objects that require special handling or rigging will only be moved under the guidance of a person who has been specifically trained to move such objects, such as a Master Rigger or equivalent. Lifting devices, including equipment, slings, ropes, chains, and straps, will be inspected, certified, and labeled to confirm their weight capacities. Defective equipment will be taken out of service immediately and repaired or destroyed.

The wheels of any trucks being loaded or unloaded, and/or parked on an incline, will be chocked to prevent movement. If applicable, outriggers will be extended on a flat, firm surface during operation. The lift and swing path of a crane/equipment will be watched and maintained clear of obstructions. Personnel will not pass under a raised load, nor will a suspended load be left unattended. Personnel will not be carried on lifting equipment, unless it is specifically designed to carry passengers.

All reciprocating, rotating, or other moving parts will be guarded at all times. Accessible fire extinguishers will be made available in all mechanical lifting devices. All material must be stored in tiers, racked,

blocked, or otherwise secure to prevent sliding, falling, or collapse. All loads/material will be verified to be secure before transportation.

3.3.7 Drill Rig Operations

In order to complete soil borings, a direct-push drill rig with hollow stem auger capability will be used. Working with and near this equipment poses many potential hazards, including being struck by or against, or pinched/caught by moving parts. These hazards can result in serious physical harm. Other hazards include electrocution and explosion due to encountering overhead or underground utilities.

Drill rigs for hollow stem auger drilling and other machinery with exposed moving parts must be equipped with an operational emergency stop device. Drillers and other field personnel must be aware of the location of this device. This device must be tested prior to job initiation and periodically thereafter. The driller and helper shall not simultaneously handle augers unless there is a standby person to activate the emergency switch. Only equipment that has been approved by the manufacturer may be used in conjunction with site equipment and specifically to attach sections of drilling tools together. Pins that protrude excessively from augers shall not be allowed.

The driller must never leave the controls while the tools are rotating unless all personnel are kept clear of rotating equipment. A remote sampling device must be used to sample drill cuttings if the tools are rotating or if the tools are readily capable of rotating. Samplers must not reach into or near the rotating equipment. Drillers, helpers, and other field personnel must secure all loose clothing when in the vicinity of drilling operations. No person shall climb the drill mast while tools are rotating or without the use of ANSI-approved fall protection (approved belts, lanyards and a fall protection slide rail) or portable ladder that meets the requirement of the OSHA standard.

3.3.8 Electrical Safety

Although not anticipated, personnel may utilize hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or

struck by the tool, fire, and electrocution. Ground Fault Circuit Interrupters (GFCIs) are required for all portable electric tools. Construction vehicles and equipment will have grounds mounted to them.

3.3.9 Utilities

Prior to the start of any intrusive work, the location of above-ground and underground utilities and other structures will be completed by the contractor/subcontractor responsible for completing construction activities.

3.3.10 Vehicular Traffic

Portions of site activities (load in and load out) will be conducted in the street so vehicular and pedestrian traffic will be present. Appropriate precautions to protect to works and civilians should be used including the use of cones and traffic vests as appropriate.

3.4 Task Hazard Analysis

Hazards that are potentially present have been determined for each specific task to be undertaken at the Site. Table 2 and Table 3 provide a summary of chemical exposure and physical hazards that could potentially be encountered by personnel during the following major task efforts.

3.4.1 Recovery of Product and Remediation of LNAPL- and Gasoline-Impacted Soil and Groundwater Within AOC-3 and AOC-5 and SVE System Installation

Identified potential issues related to work at this Site include: low levels of regulated compounds in soil and/or groundwater (i.e., petroleum-related volatile organic compounds, semi volatile organic compounds, specifically polycyclic aromatic hydrocarbons, metals, and pesticides), and drilling/cutting with gas-powered equipment indoors potentially generating CO and CO_2 in the exhaust fumes.

Chemical exposure may occur as workers encounter soil and groundwater across the site, or are exposed to products used at the site including gasoline, diesel and motor oil. Activities will be conducted in Level D but may be upgraded to Modified Level D. Although not

anticipated, there will be a Level C contingency should pockets of contaminants be brought to the surface and breathing zone air become contaminated.

If evidence of historic or unknown contamination, such as oily materials, high PID readings, etc., is encountered during intrusive work, the Site Safety Officer will determine the appropriate level of personnel protection.

3.4.2 Soil Removal for Sump Installation

The following hazards are associated with the removal of soil: heavy equipment (impact hazard to on-foot workers), uneven land surface (slip and trip hazard), and contaminated medium (chemical exposure hazard).

4.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

4.1 Levels of Protection

PPE must protect workers from the specific hazards they are likely to encounter on site. Selection of the appropriate PPE must take into consideration: (1) identification of the hazards or suspected hazards; (2) potential exposure routes; and, (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards. Based on anticipated site conditions and the proposed work activities to be performed at the site, Level D Protection will be used. The upgrading/downgrading of these levels of protection will be based on continuous air monitoring results as described in Section 5.0. The decision to modify standard PPE will be made by the SSO after conferring with the Project Manager. The levels of protection are described below.

- **Level D Protection**

  a. Safety glasses w/ sideshields or chemical splash goggles
  b. Safety boots/shoes (toe-protected)
  c. Hard hat
  d. Long sleeve work shirt and work pants
  e. Nitrile gloves
  f. Hearing protection (as needed)
  g. Reflective traffic vest

- **Level D Protection (Modified)**

  a. Safety glasses w/ sideshields or chemical splash goggles
  b. Safety boots/shoes (toe-protected)
  c. Disposable chemical-resistant boot covers
  d. Coveralls (polycoated Tyvek or equivalent to be worn when contact with wet contaminated soil, groundwater, or non-aqueous phase liquids is anticipated)
  e. Hard hat
  f. Long sleeve work shirt and work pants
  g. Nitrile gloves
  h. Hearing protection (as needed)
  i. Reflective traffic vest

- **Level C Protection**

  a. Full face-piece, air-purifying, cartridge*-equipped, NIOSH-approved respirator [*combo cartridge P100/OV/CL/HC/SD/CD/HS (escape)]
  b. Inner (latex) and outer (nitrile) chemical-resistant glove
  c. Chemical-resistant safety boots/shoes (toe-protected)
  d. Disposable chemical-resistant boot covers
  e. Hard hat
  f. Long sleeve work shirt and work pants
  g. Coveralls (Tyvek or equivalent, poly-coated Tyvek will be worn when contact, or anticipated contact with wet contaminated soils, ground water, and/or non-aqueous phase liquids (NAPL) is anticipated)
  h. Hearing protection (as needed)
  i. Reflective traffic vest

  The action levels used in determining the necessary levels of respiratory protection and upgrading to Level C, Level B, or Level A are summarized in Table 2. The written Respiratory Protection Program is maintained by the HSC in Langan's Doylestown, Pennsylvania office. The monitoring procedures and equipment are outlined in Section 5.0. Prior to the start of any intrusive work, the location of above-ground and underground utilities and other structures will be completed by the contractor/ subcontractor responsible for completing construction activities.

4.2 Respirator Fit-Test

All Langan employees and subcontractors performing site work who could be exposed to hazardous substances at the work site are required to be in possession of a full face-piece, air-purifying respirator and have been successfully quantitative fit-tested within the past year. Quantitative fit-test records are maintained by the HSC.

4.3 Respirator Cartridge Change-Out Schedule

Respiratory protection is required to be worn when certain action levels (Table 2) are reached. A respirator cartridge change-out schedule has been developed in order to comply with 29 CFR 1910.134. The respirator cartridge change-out schedule for this project is as follows:

- Cartridges shall be removed and disposed of at the end of each shift, when cartridges become wet or wearer experiences breakthrough, whichever occurs first.
- If the humidity exceeds 85%, then cartridges shall be removed and disposed of after 4 hours of use.

Respirators shall not be stored at the end of the shift with contaminated cartridges left on. Cartridges shall not be worn on the second day, no matter how short the time period was the previous day they were used.

5.0 MONITORING PROGRAM

The following sections contain information describing the types, frequency and location of real-time, integrated, and other monitoring.

Air monitoring results are partially used to provide data to determine when exclusion zones (EZs) need to be established and when certain levels of PPE are required. For all instruments, there are specific action level criteria which are used in making field health and safety determinations. Other data, such as the visible presence of contamination or the steady state nature of air contaminant concentrations, are also used in making field health and safety decisions. Therefore, the SSO or Site Supervisor may establish an EZ or require a person to wear a respirator even though atmospheric air contaminant concentrations are below established HASP action levels.

5.1 Community Air Monitoring Plan

Community air monitoring will be conducted in compliance with the Community Air Monitoring Plan (CAMP) outlined below.

Monitoring for total organic vapors (TOVs) and particulate will be conducted during all ground intrusive activities. Upwind concentrations will be measured at the start of each workday to establish background concentrations. TOVs and particulates will be monitored within the work zone and at the downwind perimeter of the Site with a PID equipped with a 10.6 eV lamp and a DusTrak or DataRAM, respectively. Monitoring equipment will be capable of calculating 15-minute running average concentrations.

The following actions will be taken based on TOV levels measured:

- If total organic vapor levels exceed 5 ppm above background for the 15-minute average at the perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the Site persist at levels in excess of 5 ppm above 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 at the perimeter of the Site is below 5 ppm above background for the 15-minute average.
- If the total organic vapor level is above 25 ppm at the perimeter of the Site, activities will be shutdown.

The following actions will be taken based on particulate concentrations measured:

- If the downwind particulate level is 100 micrograms per cubic meter (ug/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 particulate levels do not exceed 150 ug/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 particulate levels are greater than 150 ug/m3 above the background 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 particulate concentration to within 150 ug/m3 of the upwind level and in preventing visible dust migration.
- In order to minimize the generation of dust, water will be sprayed on soils to be excavated, as needed. Water will also be sprayed on any areas of the Site where dust could be generated. A suitable dust control material, such as calcium chloride, will be used, as necessary, in high-traffic areas in order to minimize dust caused by vehicular traffic.

Action levels are also provided in Table 4.

5.1.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the Site, intrusive activities will be halted or vapor suppression controls will be employed, and monitoring continued. When work shut-down occurs, downwind air monitoring as directed by the Field Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

If the organic vapor level decreases below 5 ppm above background, intrusive activity can resume, provided:

- The organic vapor level at the downwind perimeter of the Site is below 1 ppm over background, and
- More frequent intervals of monitoring, as directed by the Site Health and Safety Officer, are conducted.

5.1.2 Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified at the downwind perimeter of the Site, all work activities must be halted or odor controls must be implemented.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background at the downwind perimeter of the Site, then the air quality must be monitored

within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If either of the following criteria is exceeded in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented.

- Sustained organic vapor levels approaching 5 ppm above background for a period of more than 30 minutes, or
- Organic vapor levels greater than 5 ppm above background for any time period.

5.1.3 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. The local police authorities will immediately be contacted by the Site Health and Safety Officer and advised of the situation;
2. Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Site Health and Safety Officer; and

All Emergency contacts will go into effect as appropriate.

5.2 Monitoring Equipment Calibration and Maintenance

Instrument calibration shall be documented and included in a dedicated safety and health logbook or on separate calibration pages of the field book. All instruments shall be calibrated before each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

All instruments shall be operated in accordance with the manufacturers' specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on site by the SSO/Site Supervisor for reference.

6.0 WORK ZONES AND DECONTAMINATION

6.1 Site Control

Work zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas.

Any person working in an area where the potential for exposure to site contaminants exists will only be allowed access after providing the SSO with proper training and medical documentation.

Exclusion Zone (EZ) - All activities which may involve exposure to site contaminants, hazardous materials and/or conditions should be considered an EZ. Decontamination of field equipment will also be conducted in the Contaminant Reduction Zone (CRZ) which will be located on the perimeter of the EZ. The EZ and the CRZ will be clearly delineated by cones, tapes or other means. The SSO/Site Supervisor may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be determined by the SSO/Site Supervisor allowing adequate space for the activity to be completed, field members and emergency equipment.

6.2 Contamination Control

6.2.1 Personnel Decontamination Station

Personal hygiene, coupled with diligent decontamination, will significantly reduce the potential for exposure.

6.2.2 Minimization of Contact with Contaminants

During completion of all site activities, personnel should attempt to minimize the chance of contact with contaminated materials. This involves a conscientious effort to keep "clean" during site activities. All personnel should minimize kneeling, splash generation, and other physical contact with contamination as PPE is intended to minimize accidental contact. This may ultimately minimize the degree of decontamination required and the generation of waste materials from site operations.

Field procedures will be developed to control over spray and runoff and to ensure that unprotected personnel working nearby are not affected.

6.2.3 Personnel Decontamination Sequence

Decontamination will be performed by removing all PPE used in EZ and placing it in drums/trash cans at the CRZ. Baby wipes shall be available for wiping hands and face.

6.2.4 Emergency Decontamination

If circumstances dictate that contaminated clothing cannot be readily removed, then remove gross contamination and wrap injured personnel with clean garments/blankets to avoid contaminating other personnel or transporting equipment.

If the injured person can be moved, he/she will be decontaminated by site personnel as described above before emergency responders handle the victim. If the person cannot be moved because of the extent of the injury (a back or neck injury), provisions shall be made to ensure that emergency response personnel will be able to respond to the victim without being exposed to potentially hazardous atmospheric conditions. If the potential for inhalation hazards exist, such as with open excavation, this area will be covered with polyethylene sheeting to eliminate any potential inhalation hazards. All emergency personnel are to be immediately informed of the injured person's condition, potential contaminants, and provided with all pertinent data.

6.2.5 Hand-Held Equipment Decontamination

Hand-held equipment includes all monitoring instruments as stated earlier, samples, hand tools, and notebooks. The hand-held equipment is dropped at the first decontamination station to be decontaminated by one of the decontamination team members. These items must be decontaminated or discarded as waste prior to removal from the CRZ.

To aid in decontamination, monitoring instruments can be sealed in plastic bags or wrapped in polyethylene. This will also protect the instruments against contaminants. The instruments will be wiped clean using wipes or paper towels if contamination is visually evident. Sampling equipment,

hand tools, etc. will be cleaned with non-phosphorous soap to remove any potentially contaminated soil, and rinsed with deionized water. All decontamination fluids will be containerized and stored on-site pending waste characterization sampling and appropriate off-site disposal.

6.3 Communications

The following communications equipment will be utilized as appropriate.

- Telephones - A cellular telephone will be located with the SSO/Site Supervisor for communication with the HSC and emergency support services/facilities.
- Hand Signals - Hand signals shall be used by field teams, along with the buddy system. The entire field team shall know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

Signal	Meaning
Hand gripping throat	Out of air, can't breathe
Grip on partner's wrist or placement of both hands around partner's waist	Leave area immediately, no debate
Hands on top of head	Need assistance
Thumbs up	Okay, I'm all right, I understand
Thumbs down	No, negative

7.0 MEDICAL SURVEILLANCE

All contractor and subcontractor personnel performing site field work where potential exposure to contaminants exists are required to have passed a complete medical surveillance physical examination in accordance with 29 CFR 1910.120(f).

8.0 MEDICAL SURVEILLANCE PROGRAM REQUIREMENTS

A physician's medical clearance for work will be confirmed by the SSO/Site Supervisor before an employee can work in the EZ. The examination will be completed annually at a minimum. Additional medical testing may be required by the HSC if, a.) an over-

exposure or accident occurs, b.) an employee exhibits symptoms of exposure, or c.) other site conditions warrant further medical surveillance.

9.0 EMERGENCY RESPONSE PLAN

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures that are addressed in the following subsections include communications, local emergency support units, preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures.

9.1 Responsibilities

9.1.1 Health and Safety Coordinator (HSC)

The HSC oversees and approves the Emergency Response/Contingency Plan and performs audits to determine that the plan is in effect and that all pre-emergency requirements are met. The HSC will be notified of all incidents, injuries, near misses, OSHA recordable incidents, fires, spills, releases or equipment damage. The HSC acts as a liaison to applicable regulatory agencies.

9.1.2 Site Safety Officer (SSO)

The SSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The SSO is responsible for ensuring the HSC are notified of all incidents, all injuries, near misses, fires, spills, releases or equipment damage. The SSO is required to immediately notify the HSC of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSC can notify OSHA within the required time frame.

9.1.3 Emergency Coordinator

The Emergency Coordinator is normally the SSO.

The Emergency Coordinator shall make contact with Local Emergency Response personnel prior to beginning work on site. In these contacts, the Emergency Coordinator will inform interested parties about the nature and duration of work expected on the site and the type of contaminants and possible health or safety effects of emergencies involving these contaminants. The Emergency Coordinator shall locate emergency phone numbers and identify hospital routes prior *to beginning* work on the sites. The Emergency Coordinator shall make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator shall implement the Emergency Response/ Contingency Plan whenever conditions resulting from the Site construction warrant such action.

9.1.4 Site Personnel

Project site personnel are responsible for knowing the Emergency Response/Contingency Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency. Project site personnel, including all subcontractors will be trained in the Emergency Response/ Contingency Plan.

9.2 Communications

Once an emergency situation has been stabilized or as soon as practically possible, the SSO will contact the Langan project manager of any emergency situation.

9.3 Local Emergency Support Units

In order to be able to deal with any emergency that might occur during investigative activities at the site, Attachment D will be available in the field vehicles and provided to all personnel conducting work within the EZ.

Figure 2 shows the hospital route map. Outside emergency number 911 and local ambulance should be relied on for response to medical emergencies and transport to emergency rooms. Due to traffic congestion that is prevalent in the New York metropolitan area, alternate hospital routes will need to be

considered. The Emergency Coordinator will determine the appropriate route based on time of day and traffic patterns. Changes in the referenced primary facilities shall be documented with the HASP Field Change Authorization Request Form (Attachment B).

The Emergency Phone Numbers listed are preliminary. Upon mobilization, the SSO shall verify all numbers and document the changes in the Site Health and Safety Logbook. Any changes shall also be documented with the HASP Field Change Authorization Request Form.

Hospital route maps will be provided to all field personnel.

9.4 Pre-Emergency Planning

Langan will communicate directly with administrative personnel from the emergency room at the hospital in order to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and in each site vehicle.

Before fieldwork on the site commences, each person who will be working there or observing the operations will complete a medical data sheet. These data sheets will be filled out during the initial site safety training meeting and will be kept on the site.

In the event of an incident where a team member becomes exposed or suffers from an acute symptom of exposure to site materials and has to be taken to a hospital, a copy of his/her medical data sheet will be presented to the attending physician.

9.5 Emergency Medical Treatment

The procedures and rules in this HASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the SSO on site immediately. First-aid equipment will be available on site at the following locations:

First Aid Kit:	Vehicles
Emergency Eye Wash:	Vehicles

During the site safety briefing, project personnel will be informed of the location of the first aid station(s) that has been set up. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or bums, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

Personnel with current first aid and CPR certification will be identified.

Only in non-emergency situations will an injured person be transported to the hospital by means other than an ambulance.

Nearest hospital: **Long Island College Hospital**
339 Hicks Street
Brooklyn, NY 11201
(718) 780-1000
(directions from site to hospital found on Figure 2)

9.6 Emergency Site Evacuation Routes and Procedures

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs as a result of the site construction activities, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, the Langan Project Manager will be verbally notified immediately. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the nearest intersection to be accounted for and to receive further instructions.

9.7 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site and notification of the Langan Project Manager of the construction activities. Portable fire extinguishers will be provided at the work zone. The extinguishers located in the various locations should also be identified prior to the start of work. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

9.7.1 Fire Prevention

Fires will be prevented by adhering to the following precautions:

- Good housekeeping and storage of materials.
- Storage of flammable liquids and gases away from oxidizers.
- Shutting off engines to refuel.
- Grounding and bonding metal containers during transfer of flammable liquids.
- Use of UL approved flammable storage cans.
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities.

The person responsible for the control of fuel source hazards and the maintenance of fire prevention and/or control equipment is the SSO.

9.8 Significant Vapor Release

Based on the proposed tasks, the potential for a significant vapor is low. However, if a release occurs, the following steps will be taken:

- Move all personnel to an upwind location. All non-essential personnel shall evacuate.
- Upgrade to Level C Respiratory Protection.
- Downwind perimeter locations shall be monitored for volatile organics..
- If the release poses a potential threat to human health or the environment in the community, the Emergency Coordinator shall notify the Langan Project Manager.
- Local emergency response coordinators will be notified.

9.9 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet (MSDS) will be followed, when necessary.

SKIN AND EYE: Use copious amounts of soap and water from eye-wash kits and portable hand wash stations.

CONTACT: Wash/rinse affected areas thoroughly, then provide appropriate medical attention. Eyes shall be rinsed for, minimally, 15 minutes upon chemical contamination. Skin shall also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs. Affected items of clothing shall also be removed from contact with skin.

Providing wash water and soap will be the responsibility of each individual contractor or subcontractor on-site.

9.10 Decontamination During Medical Emergencies

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or omitted. The SSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

9.11 Incident Reporting

Once first aid and/or emergency response needs have been met, the following parties are to be contacted:

- Langan Health and Safety Manager, Tony Moffa (215-491-6500)

- Langan Project Manager, Chris McMahon or Steve Ciambruschini (201-794-6900)
- The employer of any injured worker who is not a Langan employee

For emergencies involving personal injury and/or exposure including near-misses, the SSO or designee will complete and submit an Incident Report form (Attachment H) within 48 hours. If the employee involved is not a Langan employee, his employer shall receive a copy of the report.

9.12 Adverse Weather Conditions

In the event of adverse weather conditions, the SSO/Site Supervisor will determine if work will continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds).
- Limited visibility (fog).
- Potential for electrical storms.
- Earthquakes.
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The SSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

9.13 Spill Control and Response

All small spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining proper waste characterization and the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or

commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. All spill containment materials will be properly disposed. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill.

All contractor vehicles shall have spill kits on them with enough material to contain and absorb the worst-case spill from that vehicle. All vehicles and equipment shall be inspected prior to be admitted on site. Any vehicle or piece of equipment that develops a leak will be taken out of service and removed from the job site.

All subcontractor employees as well as Langan employees will be 40-hour HAZWOPER trained.

The following seven steps shall be taken by the Emergency Coordinator:

1. Determine the nature, identity and amounts of major spills.
2. Make sure all unnecessary persons are removed from the spill area.
3. Notify the Site Supervisor or SSO immediately.
4. Use proper PPE in consultation with the SSO/Site Supervisor.
5. If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosion-proof equipment to contain or clean up the spill (diesel-only vehicles, air-operated pumps, etc.)
6. If possible, try to stop the leak with appropriate material.
7. Remove all surrounding materials that can react or compound with the spill.

In addition to the spill control and response procedures described in this HASP, Langan personnel will coordinate with the designated project manager relative to spill response and control actions. Notification to the Project Manager must be immediate and, to the extent possible, include the following information:

- Time and location of the spill.
- Type and nature of the material spilled.

- Amount spilled.
- Whether the spill has affected or has a potential to affect a waterway or sewer.
- A brief description of affected areas/equipment.
- Whether the spill has been contained.
- Expected time of cleanup completion. If spill cleanup cannot be handled by Langan's on-site personnel alone, such fact must be conveyed to the Project Manager immediately.

Langan shall not make any notification of spills to outside agencies. The client will notify regulatory agencies as per their reporting procedures.

9.14 Emergency Equipment

The following minimum emergency equipment shall be kept and maintained on site:

- Industrial first aid kit.
- Fire extinguishers (one per site).
- Absorbent material.

9.15 Restoration and Salvage

After an emergency, prompt restoration of utilities, fire protection equipment, medical supplies and other equipment will reduce the possibility of further losses. Some of the items that may need to be addressed are:

- Refilling fire extinguishers.
- Refilling medical supplies.
- Recharging eyewashes and/or showers.
- Replenishing spill control supplies.

10.0 TRAINING

10.1 General Health and Safety Training

With Langan corporate policy, and pursuant to 29 CFR 1910.120, hazardous waste site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations unless otherwise noted in the above reference. At a minimum, the training shall have consisted of instruction in the topics outlined in the standard. Personnel who have not satisfied the requirements for initial training shall not be allowed to work in any site activities in which they may be exposed to hazards (chemical or physical).

10.2 Annual Eight-Hour Refresher Training

Annual eight-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for site work. The training will cover a review of 1910.120 requirements and related company programs and procedures. The SSO will be required to have the eight-hour HAZWOPER supervisor training.

10.3 Site-Specific Training

Prior to commencement of site activities, all field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the site operations. It will include a documented verbal review of the entire HASP and all the provisions within the HASP document. Should any new employees arrive on-site, they will also be given a documented full HASP review – or one that address the appropriate tasks that remain at the time of the new employee's arrival.

10.4 Onsite Safety Briefings

Project personnel and visitors will participate in documented daily on-site health and safety briefings ("Tailgate Talks") led by the SSO/Site Supervisor to assist site personnel in safely conducting their work activities. The briefings will include information on operations to be conducted that shift, changes in work practices or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a

forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. The meetings will also be an opportunity for the work crews to be updated on monitoring results. Prior to starting any new activity, a training session will be held for crew members involved in the activity. The Safety Briefing form (Attachment I) can be used to facilitate this effort.

10.5 First Aid and CPR

The SSO will identify those individuals with first aid and CPR training in order to ensure that emergency medical treatment is available during field activities. The training will be consistent with the requirements of the American Red Cross or the National Safety Council.

10.6 Hazard Communication

All material brought on-site will be in the appropriate containers and will be properly labeled. The MSDS for unleaded gasoline, diesel fuel, and hydraulic fluid are attached. Langan's written Hazard Communication program, in compliance with 29 CFR 1910.1200, is maintained in Langan's office in Elmwood Park, New Jersey.

11.0 RECORDKEEPING

The following is a summary of required health and safety logs, reports and recordkeeping.

11.1 Field Change Authorization Request

A field change authorization request is to be completed for requesting a change to this HASP (Attachment B). Any changes to the work to be performed that is not included in the HASP will require an Addendum that is approved by the Langan Project Manager and Langan HSC to be prepared. Approved changes will be reviewed with all field personnel at a safety briefing.

11.2 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training, documentation of three-day OJT, and respirator fit-test records) and

medical clearance for Site work and respirator use will be maintained in the office and available upon request. Records for all subcontractor employees must also be available upon request. All employee medical records will be maintained by the HSC.

11.3 Onsite Log

A log of personnel on site each day will be kept by the SSO or designee.

11.4 Daily Safety Meetings ("Tailgate Talks")

Completed Safety Briefing forms will be maintained by the SSO.

11.5 Exposure Records

All personal monitoring results, laboratory reports, calculations and air sampling data sheets are part of an employee exposure record. These records will be maintained by the SSO/Site Supervisor during site work. At the end of the project they will be maintained according to 29 CFR 1910.1020.

11.6 Incident Reports

The incident reporting during site work will follow the procedures specified here in.

11.7 OSHA Form 300

An OSHA Form 300 will be kept at the Langan Office in Doylestown, Pennsylvania. All recordable injuries or illnesses will be recorded on this form. Subcontractor employers must also meet the requirements of maintaining an OSHA 300 form. The Incident Report form used to capture the details of work-related injuries/illnesses meets the requirements of the OSHA Form 301 (supplemental record) and must be maintained with the OSHA Form 300 for all recordable injuries or illnesses.

11.8 Hazard Communication Program/MSDS

Material Safety Data Sheets (MSDS) have been obtained for applicable substances and are included in this EHS Plan (Attachment A). Langan's written

Hazard Communication program, in compliance with 29 CFR 1910.1200, is maintained by the HSC in Elmwood Park, New Jersey.

11.9 Work Permits

All work permits, including, but not limited to, street-opening, hot work, lockout/tagout, and line-breaking permits will be maintained in the project files.

12.0 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have been verbally given a full HASP review by Langan personnel, and understand the provisions of this EHS Plan. It is maintained on site by the SSO as a project record.

Each field team member shall sign this section after Site-specific training is completed and before being permitted to work onsite.

I have been given a verbal full HASP review by Langan personnel and understand the information presented. I will comply with the provisions contained herein.

Name (Print and Sign)	***Company***	***Date***

TABLES

TABLE 1
SUSPECTED CONTAMINANTS OF CONCERN
363 BOND STREET
BROOKLYN, NEW YORK

Contaminant Of Concern	Affected Media
VOLATILES	
Benzene	Soil Vapor / Soil / Groundwater
Ethylbenzene	Soil Vapor / Soil / Groundwater
n-propylbenzene	Soil Vapor / Soil / Groundwater
MTBE	Soil Vapor / Soil / Groundwater
Toluene	Soil Vapor / Soil / Groundwater
Xylenes	Soil Vapor / Soil / Groundwater
SEMI-VOLATILES	
Common Historic Fill Contaminants:	
Benzo(a)anthracene	Soil / Groundwater
Benzo(b)flouranthene	Soil / Groundwater
Benzo(k)flouranthene	Soil / Groundwater
Benzo(a)pyrene	Soil / Groundwater
Chrysene	Soil / Groundwater
Indeno(1,2,3-cd)pyrene	Soil / Groundwater
PESTICIDES / PCBs	
Miscellaneous TBD	Soil Vapor / Soil / Groundwater
METALS	
Miscellaneous TBD	Soil / Groundwater

TABLE 2
SELECTED POTENTIAL CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
363 BOND STREET
BROOKLYN, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
Benzene	1 ppm	50 ppm	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritate eyes, skin, nose; respiratory system; giddiness; head, nausea, staggered gait; fatigue, anorexia, lassitude; dermatitis; bone marrow depression; [carcinogenic]
Toluene	200 ppm	500 ppm	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritate eyes, nose; fatigue, weakness, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation; nervousness, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage; mucous membrane; narcosis, coma
Ethylbenzene	100 ppm	800 ppm (10% LEL)	Inhalation, Ingestion, skin and/or eye contact	Irritate eyes, skin, mucous membrane ;headache, dermatitis; narcosis, coma
Methyl Tert-Butyl Ether (MTBE)	None Established	1.6%	Inhalation, Ingestion, skin and/or eye contact	Irritate eyes, skin, respiratory tract, kidney damage, headache, depress nervouse central system, nausea, vomiting, dizziness, loss of consciousness, liver damage, lymphomas, leukemias, may cause cancer
Xylenes	100 ppm	900 ppm	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritate eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corn vacuolization; anorexia, nausea, vomit, abdominal pain; dermatitis

TABLE 2
SELECTED POTENTIAL CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
363 BOND STREET
BROOKLYN, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
Total Volatile Organics	15 ppm	150 ppm	Inhalation, Skin Absorption, Ingestion	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]
Benzo(a)anthracene	0.2 mg/m3	80 mg/m3	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Benzo(b)fluoranthene	0.2 mg/m3	80 mg/m3	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Benzo(k)fluoranthene	0.2 mg/m3	80 mg/m3	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Benzo(a)pyrene	0.2 mg/m3	80 mg/m3	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Chrysene	0.2 mg/m3	80 mg/m3	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Indeno (1,2,3-cd) pyrene	0.2 mg/m3	80 mg/m3	Inhalation, Skin Absorption, Ingestion	Irritate eyes, skin, upper respiratory system, cough
Pesticides	1 mg/m3	500 mg/m3	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]

TABLE 2
SELECTED POTENTIAL CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
363 BOND STREET
BROOKLYN, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
Lead	0.05 mg/mg3	100 mg/mg3	Inhalation, Ingestion, Skin and/or Eye Contact	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension
Arsenic	0.010 mg/m3	5 mg/m3	Inhalation, Ingestion, Skin Absorption, Skin and/or Eye Contact	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]
Hexavalent Chromium	5 mg/m3	250 mg/m3	Inhalation, Ingestion, Skin and/or Eye Contact	Irritation eyes, skin; lung fibrosis (histologic)
Total Chromium	5 mg/m3	250 mg/m3	Inhalation, Ingestion, Skin and/or Eye Contact	Irritation eyes, skin; lung fibrosis (histologic)
Mercury	0.1 mg/m3	10 mg/m3	Inhalation, Ingestion, Skin Absorption, Skin and/or Eye Contact	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria
Copper	1 mg/m3	100 mg/m3	Inhalation, Ingestion, skin and/or eye contact	Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing; [potential occupational carcinogen]

TABLE 2
SELECTED POTENTIAL CHEMICAL EXPOSURE LIMITS AND HEALTH EFFECTS
363 BOND STREET
BROOKLYN, NEW YORK

Chemical	Permissible Exposure Limit	IDLH Limit	Exposure Routes	Exposure Symptoms
Nickel	1 mg/m3	10 mg/m3	Inhalation, Skin Absorption, Ingestion, skin and/or eye contact	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria

--- No exposure limits listed in the NIOSH Pocket Guide to Chemical Hazards dated November 2010.

TABLE 3
HAZARD ANALYSIS
363 BOND STREET
BROOKLYN, NEW YORK

Potential Hazard	Sump Installation & Recovery of Product	SVE System Installation	Soil Sampling
Inhalation of volatiles	moderate	moderate	moderate
Skin and eye contact	low to moderate	low to moderate	low to moderate
Ingestion	low	low	low
Inhalation of dust	low to moderate	low to moderate	low to moderate
Heat stress	depends on temperature	depends on temperature	depends on temperature
Cold stress	depends on temperature	depends on temperature	depends on temperature
Confined Space Entry	not applicable	not applicable	not applicable
Heavy equipment	low to moderate	low	low
Noise	low	low	low
Tripping	moderate	moderate	low
PPE	low	low	low
Utilities	low to moderate	low	low
Other Physical hazards	moderate	moderate	moderate
Biological hazards	low	low	low
Flammable hazards	low	low	low

\\Langan.com\data\EP\data5\100287501\Engineering Data\Environmental\Reports\2013-10 - 363 Bond IRM WP\Appendix A - CHASP\Tables\HASP TABLE 3 - Hazard Analysis.doc

TABLE 4
INSTRUMENTATION ACTION LEVELS
363 BOND STREET
BROOKLYN, NEW YORK

Instrument	Action Level	Level of Protection / Action Required
PID*/FID*	< 10 ppm within AOC zone	Level D
	> 10 ppm (initial)	Stop work. Resume work once readings are below 15 ppm.
	> 10 ppm and ≤ 30 ppm (steady state condition) within breathing zone	Level C/Initiate Perimeter Monitoring
	> 30 ppm (steady state condition) within AOC zone	Stop Work / Suppress Emissions / Evacuate and re-evaluate.
	≥10 ppm sustained for 1 minute at AOC site boundary.	Stop Work / Backfill source of emissions and re-evaluate.

BKD = Background concentration
*PID/FID readings are taken at personnel breathing zone height using a 10.6V lamp PID or equivalent.

TABLE 5
PERSONAL PROTECTIVE EQUIPMENT
363 BOND STREET
BROOKLYN, NEW YORK

Respiratory Protection*:*

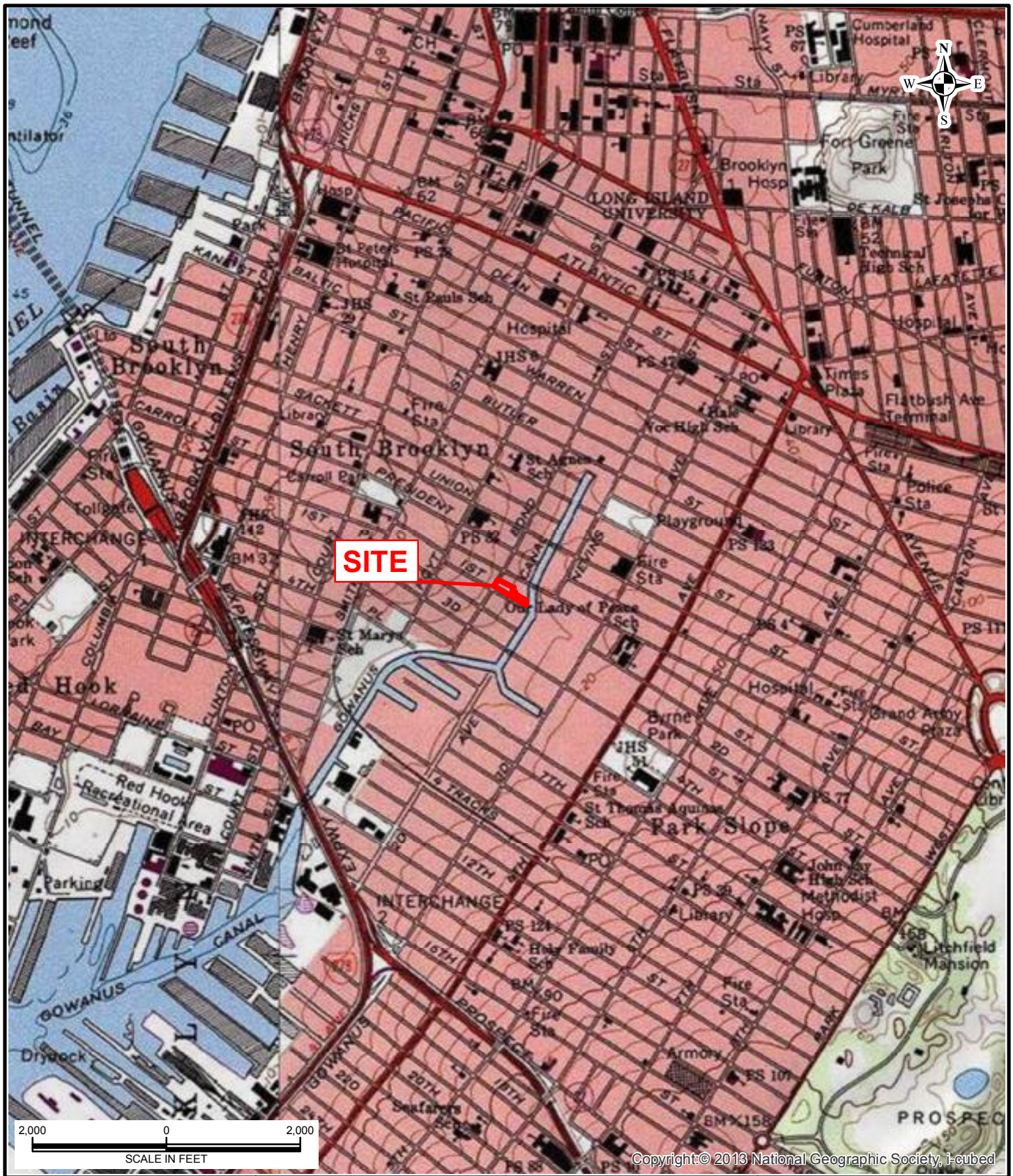
Level D:	No respirator required.
Level C:	Half-face, Air Purifying Respirator (APR) with combination HEPA (dusts, fumes, aerosols) and organic vapor cartridges. The respirator will be NIOSH-approved.
Level C - supplemental by task	Fullface, Air Purifying Respirator (APR) with combination HEPA (dusts, fumes, aerosols), acid gas, organic vapor cartridges. The respirator will be NIOSH-approved.

Personal Protective Clothing*:*

Level D:	Hard-hat, traffic vest (if working on or adjacent to the roadway), long sleeve work shirt & work pants of natural fibers, safety glasses or goggles, steel-toed boots, hearing protection (if needed), nitril inner gloves and leather outer gloves.
Level D - supplemental PPE by task	Tyvek disposal suit
Level C:	Chemically resistant outer boots and Chemical resistant Tyvek disposal suite.

\\LANGAN.COM\DATA\EP\DATA5\100287501\ENGINEERING DATA\ENVIRONMENTAL\REPORTS\2013-10 - 363 BOND IRM WP\APPENDIX A - CHASP\TABLES\HASP TABLE 5 - PPE.DOC

FIGURES



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NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project

363 BOND STREET

BLOCK 452, LOT 1

BROOKLYN

KINGS COUNTY NEW YORK

Drawing Title

SITE LOCATION MAP

Project No. 100287501	Figure 1
Date 10/19/2012	
Scale 1"=2000'	
Drawn By amf	
Last Revised 10/11/2013	

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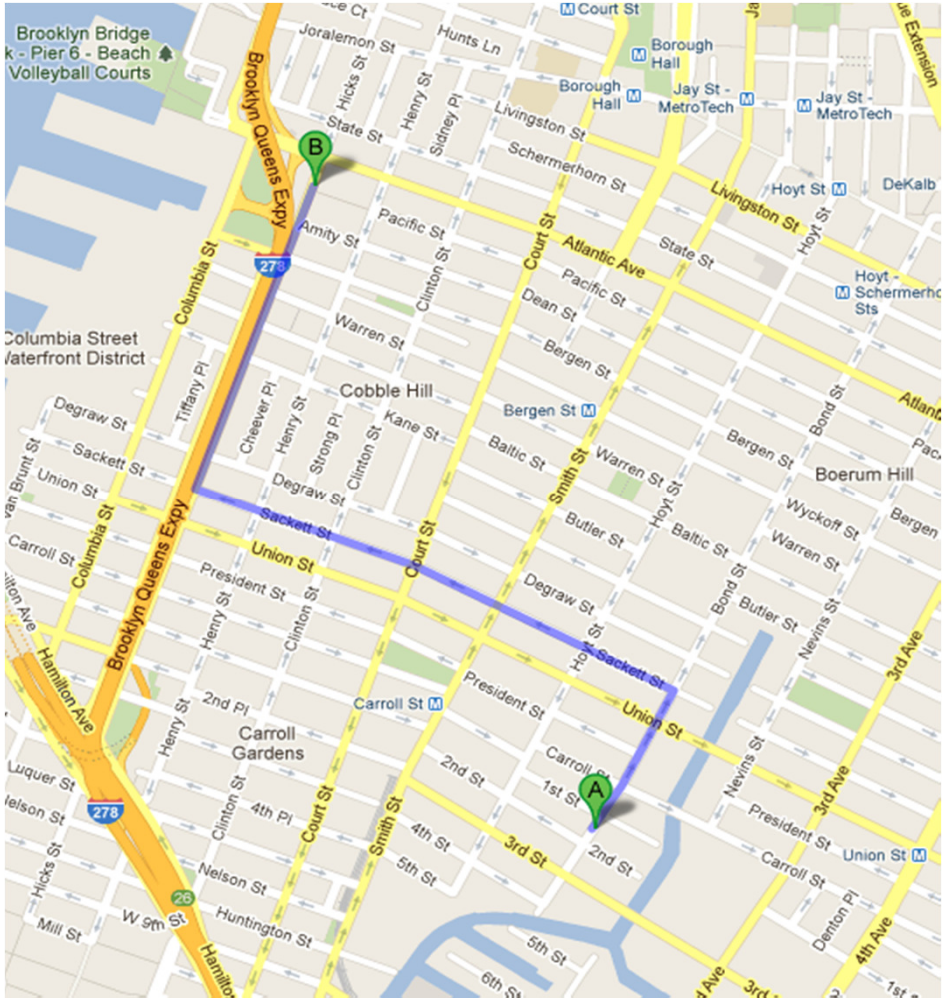
Path: \\langan.com\data\EP\data5\100287501\ArcGIS\ArcMap_Documents\2013-10 - IRMWP (363)\Figure 1 - Site Location Plan.mxd



Emergency Route to Long Island College Hospital (Phone # (718) 780-1000 :

1 Start traveling northeast on Bond Street toward 1st Street
2 Turn Left onto Sackett Street
3 Turn right onto Hicks Street
5 Arrive at Long Island College Hospital, 339 Hicks Street, Brooklyn NY 11201

MAP REFERENCE: Google Maps

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Project

363-365 BOND STREET & 400 CARROLL STREET
EMERGENGY HOSPITAL ROUTE MAP

Manhattan **New York**

PROJECT NO.	DATE	SCALE	FIGURE NO.
100287501	**8/10/2012**	**NTS**	**2**

\\Langan.com\data\EP\data5\100287501\Engineering Data\Environmental\Reports\2013-10 - 363 Bond IRM WP\Appendix A - CHASP\Figures\Figure 2 - Hospital Route/Figure 2 - Hospital Route

ATTACHMENT A

Material Safety Data Sheets (MSDSs)

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MATERIAL SAFETY DATA SHEET

Diesel Fuel (All Types)

MSDS No. 9909

EMERGENCY OVERVIEW
CAUTION!
OSHA/NFPA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT
EFFECTS CENTRAL NERVOUS SYSTEM
HARMFUL OR FATAL IF SWALLOWED

Moderate fire hazard. Avoid breathing vapors or mists. May cause dizziness and drowsiness. May cause moderate eye irritation and skin irritation (rash). Long-term, repeated exposure may cause skin cancer.
If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).

NFPA 704 (Section 16)

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800) 424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732) 750-6000
MSDS INTERNET WEBSITE: www.hess.com (See Environment, Health, Safety & Social Responsibility)

SYNONYMS: Ultra Low Sulfur Diesel (ULSD); Low Sulfur Diesel; Motor Vehicle Diesel Fuel; Diesel Fuel #2; Dyed Diesel Fuel; Non-Road, Locomotive and Marine Diesel Fuel; Tax-exempt Diesel Fuel

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and CHEMICAL INFORMATION ON INGREDIENTS

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Diesel Fuel (68476-34-6)	100
Naphthalene (91-20-3)	Typically < 0.01

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher. Diesel fuel may be dyed (red) for tax purposes. May contain a multifunctional additive.

3. HAZARDS IDENTIFICATION

EYES
Contact with liquid or vapor may cause mild irritation.

SKIN
May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposures has not been determined - see Section 11 Toxicological Information.

IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A). NIOSH regards whole diesel fuel exhaust particulates as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash).

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION
DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	> 125 ^{o}F (> 52 ^{o}C) minimum PMCC
AUTOIGNITION POINT:	494 ^{o}F (257 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	2 (COMBUSTIBLE)
LOWER EXPLOSIVE LIMIT (%):	0.6
UPPER EXPLOSIVE LIMIT (%):	7.5

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

FIRE FIGHTING INSTRUCTIONS

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Diesel fuel, and in particular low and ultra low sulfur diesel fuel, has the capability of accumulating a static electrical charge of sufficient energy to cause a fire/explosion in the presence of lower flashpoint products such as gasoline. The accumulation of such a static charge occurs as the diesel flows through pipelines, filters, nozzles and various work tasks such as tank/container filling, splash loading, tank cleaning; product sampling; tank gauging; cleaning, mixing, vacuum truck operations, switch loading, and product agitation. There is a greater potential for static charge accumulation in cold temperature, low humidity conditions.

Documents such as 29 CFR OSHA 1910.106 "Flammable and Combustible Liquids, NFPA 77 Recommended Practice on Static Electricity, API 2003 "Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents and ASTM D4865 "Standard Guide for Generation and Dissipation of Static

Electricity in Petroleum Fuel Systems" address special precautions and design requirements involving loading rates, grounding, bonding, filter installation, conductivity additives and especially the hazards associated with "switch loading." ["Switch Loading" is when a higher flash point product (such as diesel) is loaded into tanks previously containing a low flash point product (such as gasoline) and the electrical charge generated during loading of the diesel results in a static ignition of the vapor from the previous cargo (gasoline).]

Note: When conductivity additives are used or are necessary the product should achieve 25 picosiemens/meter or greater at the handling temperature.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Components (CAS No.)	Source	Exposure Limits TWA/STEL	Note
Diesel Fuel: (68476-34-6)	OSHA	5 mg/m, as mineral oil mist	
	ACGIH	100 mg/m^3 (as totally hydrocarbon vapor) TWA	A3, skin
Naphthalene (91-20-3)	OSHA	10 ppm TWA	
	ACGIH	10 ppm TWA / 15 ppm STEL	A4, Skin

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION
A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE
Clear, straw-yellow liquid. Dyed fuel oil will be red or reddish-colored.

ODOR
Mild, petroleum distillate odor

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	320 to 690 oF (160 to 366 ^{o}C)
VAPOR PRESSURE:	0.009 psia @ 70 ^{o}F (21 ^{o}C)
VAPOR DENSITY (air = 1):	> 1.0
SPECIFIC GRAVITY (H_2O = 1):	0.83 to 0.88 @ 60 ^{o}F (16 ^{o}C)
PERCENT VOLATILES:	100 %
EVAPORATION RATE:	Slow; varies with conditions
SOLUBILITY (H_2O):	Negligible

10. STABILITY and REACTIVITY

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Keep away from strong oxidizers; Viton ®; Fluorel ®

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute dermal LD50 (rabbits): > 5 ml/kg
Acute oral LD50 (rats): 9 ml/kg
Primary dermal irritation: extremely irritating (rabbits)
Draize eye irritation: non-irritating (rabbits)
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenic: OSHA: NO IARC: NO NTP: NO ACGIH: A3

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

MUTAGENICITY (genetic effects)
This material has been positive in a mutagenicity study.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME:	Diesel Fuel	Placard (International Only):
HAZARD CLASS and PACKING GROUP:	3, PG III	
DOT IDENTIFICATION NUMBER:	NA 1993 (Domestic) UN 1202 (International)	
DOT SHIPPING LABEL:	None	

Use Combustible Placard if shipping in bulk domestically

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the *de minimis* levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

CALIFORNIA PROPOSITON 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Diesel Engine Exhaust (no CAS Number listed)	10/01/1990

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 3 (Combustible Liquid) and Class D, Division 2, Subdivision B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING HEALTH: 0
FIRE: 2
REACTIVITY: 0

Refer to NFPA 704 "Identification of the Fire Hazards of Materials" for further information

HMIS® HAZARD RATING HEALTH: 1 * * Chronic
FIRE: 2
PHYSICAL: 0

SUPERSEDES MSDS DATED: 02/28/2001

ABBREVIATIONS:

AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute (212) 642-4900
API	American Petroleum Institute (202) 682-8000
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
DOT	U.S. Department of Transportation [General info: (800) 467-4922]
EPA	U.S. Environmental Protection Agency
HMIS	Hazardous Materials Information System
IARC	International Agency For Research On Cancer
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Canadian Workplace Hazardous Materials Information System

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades

MSDS No. 9950

EMERGENCY OVERVIEW
DANGER!
EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD

NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800)424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732)750-6000
MSDS (Environment, Health, Safety) Internet Website www.hess.com

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS *

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).

Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION

EYES
Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	-45 ^{o}F (-43^{o}C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 ^{o}F (>280 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 “Low Expansion Foam - 1994 Edition.”

FIRE FIGHTING INSTRUCTIONS
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL******
******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Component (CAS No.)	Source	TWA (ppm)	STEL (ppm)	Exposure Limits Note
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	1000	--	Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	Skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	20	--	A4
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

A translucent, straw-colored or light yellow liquid

ODOR
A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

	Odor Detection	Odor Recognition
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	85 to 437 ^{o}F (39 to 200 ^{o}C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 ^{o}F (38 ^{o}C) (275-475 mm Hg @ 68 ^{o}F (20 ^{o}C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H_2O = 1):	0.70 – 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %
SOLUBILITY (H_2O):	Non-oxygenated gasoline - negligible (< 0.1% @ 77 ^{o}F). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 ^{o}F); ethanol is readily soluble in water

10. STABILITY and REACTIVITY)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS
Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute Dermal LD50 (rabbits): > 5 ml/kg
Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating
Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME:	Gasoline
DOT HAZARD CLASS and PACKING GROUP:	3, PG II
DOT IDENTIFICATION NUMBER:	UN 1203
DOT SHIPPING LABEL:	FLAMMABLE LIQUID

PLACARD:

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION WT. PERCENT
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3

n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION - Parts per million (ppm) by weight
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Benzene	2/27/1987
Ethyl benzene	6/11/2004
Toluene	1/1/1991

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	PHYSICAL:	0	Minimal
			* CHRONIC

SUPERSEDES MSDS DATED: 07/01/06

ABBREVIATIONS:

AP = Approximately	< = Less than	> = Greater than
N/A = Not Applicable	N/D = Not Determined	ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
AIHA	American Industrial Hygiene Association	DOT	U.S. Department of Transportation [General Info: (800)467-4922]
ANSI	American National Standards Institute (212)642-4900	EPA	U.S. Environmental Protection Agency
API	American Petroleum Institute (202)682-8000	HMIS	Hazardous Materials Information System

IARC	International Agency For Research On Cancer	REL	Recommended Exposure Limit (NIOSH)
MSHA	Mine Safety and Health Administration	SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
NFPA	National Fire Protection Association (617)770-3000	SCBA	Self-Contained Breathing Apparatus
NIOSH	National Institute of Occupational Safety and Health	SPCC	Spill Prevention, Control, and Countermeasures
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)	STEL	Short-Term Exposure Limit (generally 15 minutes)
NTP	National Toxicology Program	TLV	Threshold Limit Value (ACGIH)
OPA	Oil Pollution Act of 1990	TSCA	Toxic Substances Control Act
OSHA	U.S. Occupational Safety & Health Administration	TWA	Time Weighted Average (8 hr.)
PEL	Permissible Exposure Limit (OSHA)	WEEL	Workplace Environmental Exposure Level (AIHA)
RCRA	Resource Conservation and Recovery Act	WHMIS	Workplace Hazardous Materials Information System (Canada)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

Material Safety Data Sheet

SECTION I - Material Identity

Item Name	
Part Number/Trade Name	LUBRIPLATE HYDRAULIC OIL, SPECIAL LOW (SUPP
National Stock Number	9150L400652F
CAGE Code	73219
Part Number Indicator	A
MSDS Number	184027
HAZ Code	B

SECTION II - Manufacturer's Information

Manufacturer Name	FISKE BROTHERS REFINING CO
Street	129 LOCKWOOD ST
City	NEWARK
State	NJ
Country	US
Zip Code	07105
Emergency Phone	201-589-9150
Information Phone	201-589-9150

MSDS Preparer's Information

MSDS Preparer Name	ROBERT J. SIBILIA
Date MSDS Prepared/Revised	01JUL90
Date of Technical Review	10SEP92
Active Indicator	N

Alternate Vendors

Vendor #5 CAGE	BPXSL

SECTION III - Physical/Chemical Characteristics

Hazard Storage Compatibility Code	N1
Appearance/Odor	TRANSPARENT AMBER OIL WITH MINERAL OIL ODOR
Boiling Point	>550F,>288C
Melting Point	LIQUID
Vapor Pressure	<0.01
Vapor Density	>5
Specific Gravity	0.87
Decomposition Temperature	N/K
Evaporation Rate	<0.01 (BUTYL ACETATE=1)
Solubility in Water	NEGLIGIBLE
Percent Volatiles by Volume	N/K
Chemical pH	N/K
Corrosion Rate	N/K
Container Pressure Code	4
Temperature Code	8
Product State Code	U

SECTION IV - Fire and Explosion Hazard Data

Flash Point	315
Flash Point Method	COC
Lower Explosion Limit	0.9%
Upper Explosion Limit	7%
Extinguishing Media	FOAM, DRY CHEMICAL, CARBON DIOXIDE OR WATER SPRAY(FOG)
Special Fire Fighting Procedures	WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVEEQUIPMENT (FP N). COOL EXPOSED CONTAINERS WITH WATER
Unusual Fire/Explosion Hazards	DO NOT STORE OR MIX WITH STRONG OXIDANTS. EMPTY CONTAINERS RETAIN RESIDUE. DO NOT CUT, DRILL, GRIND OR WELD AS THEY MAYEXPLODE

SECTION V - Reactivity Data

Stability	YES
Stability Conditions to Avoid	NOT APPLICABLE
Materials to Avoid	AVOID CONTACT WITH STRONG OXIDANTS LIKE LIQUID CHLORINE, CONCENTRATED OXYGEN
Hazardous Decomposition Products	MAY FORM SO*2. IF INCOMPLETE COMBUSTION, CARBON MONOXIDE
Hazardous Polymerization	NO
Polymerization Conditions to Avoid	NOT RELEVANT
LD50 - LD50 Mixture	NONE SPECIFIED BY MANUFACTURER

SECTION VI - Health Hazard Data

Route of Entry: Skin	NO
Route of Entry: Ingestion	YES
Route of Entry: Inhalation	YES
Health Hazards - Acute and Chronic	PRLNGD/RPTD SKIN CONT MAY CAUSE IRRIT.PRDCT CONTACTING EYES MAY CAUSE IRRIT. HUMAN HLTH RISKS VARY FROM PERS TO PERS. AS A PREC, EXPOS TO LIQS, VAPS, MISTS & FUMES SHLD BE MINIMIZED. PROD HAS LOW ORDER OF ACUTE ORAL TOX, BUT MINUTE AMTS ASPIRATED INTO LUNGS DURING INGEST MAY CAUSE MILD TO SEVERE PULMONARY INJURY
Carcinogenity: NTP	NO
Carcinogenity: IARC	NO
Carcinogenity: OSHA	NO
Explanation of Carcinogenity	NOT RELEVANT
Symptoms of Overexposure	SEE HEALTH HAZARDS
Medical Cond. Aggrevated by Exposure	NONE SPECIFIED BY MANUFACTURER
Emergency/First Aid Procedures	EYE:FLUSH W/CLEAR WATER FOR @ LST 15 MIN/UNTIL IRRIT SUBSIDES.IF IRRIT PERSISTS, CONSULT MD. SKIN:REMOVE ANY CONTAMD CLTHG &WASH THORO W/SOAP & WARM WATER. INHAL:VAP PRESS IS VERY LOW & INHAL @ ROOMTEMP IS NOT A PROBLEM.IF OVERCOME BY VAP FROM HOT PROD, IMMED MOVE FROM EXPOS & CALL MD. IF OVEREXPOS TO OIL MIST, REMOVE FROM FURTHER EXPOS UNTIL EXCESSIVE OIL MIST CONDITION SUBSIDES. (SUPP DATA)

SECTION VII - Precautions for Safe Handling and Use

Steps if Material Released/Spilled	RECOVER LIQUID, WASH REMAINDER WITH SUITABLE PETROLEUM SOLVENT OR ADD ABSORBENT. KEEP PETROLEUM PRODUCTS OUT OF SEWERS AND WATER COURSES. ADVISE AUTHORITIES IF PRODUCT HAS ENTERED OR MAY ENTER SEWERS AND WATERCOURSES
Neutralizing Agent	NONE SPECIFIED BY MANUFACTURER
Waste Disposal Method	ASSURE CONFORMITY WITH APPLICABLE DISPOSAL REGULATIONS. DISPOSE OF ABSORBED MATERIAL AT AN APPROVED WASTE DISPOSAL FACILITY OR SITE. DISPOSE I/A/W FEDERAL, STATE AND LOCAL REGULATIONS (FP N)
Handling and Storage Precautions	KEEP CONTAINERS CLOSED WHEN NOT IN USE. DO NOT HANDLE OR STORE NEAR HEAT, SPARKS, FLAME OR STRONG OXIDANTS
Other Precautions	AVOID BREATHING OIL MIST. REMOVE OIL-SOAKED CLOTHING AND LAUNDER BEFORE RESUE

SECTION VIII - Control Measures

Respiratory Protection	NORMALLY NOT NEEDED. NIOSH/MSHA APPROVED

	RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N)
Ventilation	LOCAL EXHAUST: USED TO CAPTURE FUMES AND VAPORS
Protective Gloves	USE OIL-RESISTANT GLOVES, IF NEEDED
Eye Protection	CHEMICAL WORKERS GOGGLES (FP N)
Other Protective Equipment	USE OIL-RESISTANT APRON, IF NEEDED
Work Hygenic Practices	CLEANSE SKIN THOROUGHLY AFTER CONTACT
Supplemental Health/Safety Data	MFR'S TRADE NAME/PART NO: POUR, MINUS 70, MV-HO. FIRST AID PROC: INGEST: IF INGESTED, CALL MD IMMEDIATELY. DO NOT INDUCE VOMITING

SECTION IX - Label Data

Protect Eye	NO
Protect Skin	NO
Protect Respiratory	NO
Chronic Indicator	UNKNOWN
Contact Code	UNKNOWN
Fire Code	UNKNOWN
Health Code	UNKNOWN
React Code	UNKNOWN

SECTION X - Transportation Data

Container Quantity	1
Unit of Measure	GL

SECTION XI - Site Specific/Reporting Information

Volatile Organic Compounds (P/G)	0
Volatile Organic Compounds (G/L)	0

SECTION XII - Ingredients/Identity Information

Ingredient #	01
Ingredient Name	OIL, HYDRAULIC (MIST); (OIL MIST)
CAS Number	1003
NIOSH Number	1005034OH
Proprietary	NO
Percent	0
OSHA PEL	5 MG/M3
ACGIH TLV	5 MG/M3;10 STEL
Recommended Limit	N/K

ATTACHMENT B

Field Change Authorization Request Form

LANGAN

LANGAN EHS PLAN FIELD CHANGE AUTHORIZATION REQUEST FORM

PROJECT: _____

PROJECT LOCATION: _____

DESCRIPTION OF CHANGE: _____

_____

_____

_____

REASON FOR CHANGE: _____

RECOMMENDED DISPOSITION: _____

_____

_____

APPROVALS

PROJECT MANAGER: _____ _____
Signature Date

PROJECT SITE SAFETY OFFICER: _____ _____
Signature Date

CLIENT REPRESENTATIVE: _____ _____
Signature Date

DISTRIBUTION:

Langan SSO	_____
Langan Site Supervisor	_____
Langan Project Manager	_____
Client Project Manager	_____

FIELD CHANGE RECORDS

Record of Field Changes:

Initial for attaching any Field changes to this EHS Plan. Enter the Field Change Number and Date Issued. File the completed field changes to this EHS Plan at the end as attachments. Make PEN and INK changes in the text to alert the reader to the changes that are required in the Field Change.

FIELD CHANGE NUMBER	DATE ENTERED	SYNOPSIS OF CHANGE	INITIAL

ATTACHMENT C

Accident / Incident Report Form

LANGAN

LANGAN ACCIDENT/INCIDENT REPORT FORM

Project Name: _____

Injured or Ill Employee

1. Name _____ Social Security #_____
   (First) (Middle) (Last)
2. Home Address _____
   (No. and Street) (City or Town) (State, Zip)
3. Age _____
4. Sex: Male ( ) Female ( )
5. Occupation _____
   (Specific job title, not the specific activity employee was performing at time of injury)
6. Department _____
   (Enter name of department in which injured person is employed, even though they may have been temporarily working in another department at the time of injury)

Employer

7. Name _____
8. Mailing Address _____
   (No. and Street) (City or Town) (State, Zip)
9. Location (if different from mailing address):_____

THE ACCIDENT OR EXPOSURE TO OCCUPATIONAL ILLNESS

10. Place of accident or exposure _____
    (No. and Street) (City or Town) (State, Zip)
11. Was place of accident or exposure on employer's premises? _____ (Yes / No)
12. What was the employee doing when injured?_____
    (Be specific - was employee using tools or equipment or handling material?)
13. How did the accident occur? _____
    (Describe fully the events that resulted in the injury or occupational illness. Tell what happened and how. Name objects and substances involved. Give details on all factors that led to accident. Use separate sheet if needed)

LANGAN ACCIDENT/INCIDENT REPORT FORM

14. Time of accident: _____

15. Date of injury or initial diagnosis of occupational illness _____
(Date)

16. WITNESS TO ACCIDENT

(Name)	(Affiliation)	(Phone No.)
(Name)	(Affiliation)	(Phone No.)
(Name)	(Affiliation)	(Phone No.)

Occupational Injury/Illness

17. Describe the injury or illness in detail; indicate part of body affected.
_____
_____

18. Name the object or substance that directly injured the employee. (For example, object that struck employee; the vapor or poison inhaled or swallowed; the chemical or radiation that irritated the skin; or in cases of strains, hernias, etc., the object the employee was lifting, pulling, etc.)
_____
_____

19. Did the accident result in employee fatality? _____ (Yes or No)

20. Number of lost workdays ____/restricted workdays _____ resulting from injury or illness?

Other

21. Did you see a physician for treatment? _____ (Yes or No) _____ (Date)

22. Name and address of physician _____
_____
(No. and Street) (City or Town) (State and Zip)

23. If hospitalized, name and address of hospital _____
_____
(No. and Street) (City or Town) (State and Zip)
Date of report _____ Prepared by _____
Official position _____

ATTACHMENT D

Emergency Notification List

LANGAN

ATTACHMENT D

EMERGENCY NOTIFICATION NUMBERS

The following list provides names and telephone numbers for emergency contact personnel.

ORGANIZATION	CONTACT		TELEPHONE
New York City Police			911
New York City Fire			911
Long Island College Hospital			718 780-1000
Langan Project Managers	Chris McMahon		201-794-6900 / 201-218-2339
	Steven Ciambruschini		201-398-4549 / 201-410-9238
National Response Center			800-424-8802
Center for Disease Control			404-488-4100
CHEMTREC			800-424-9300
TSCA HOTLINE			202-554-1404
RCRA HOTLINE			800-424-9346
CDC		(DAY) (NIGHT)	404-452-4100 404-329-2888
BUREAU OF ALCOHOL, TOBACCO & FIREARMS			800-424-9555 202-566-7777
NATIONAL RESPONSE CENTER			800-424-8802
PESTICIDE INFORMATION SERVICE			800-424-9346
BUREAU OF EXPLOSIVES, A.A. RAILWAYS			202-835-9500
FEDERAL EXPRESS - HAZARDOUS MATERIAL INFO			901-922-1666

ATTACHMENT E

Safety Briefing Form

LANGAN

SAFETY BRIEFING

Date:_____ Time:_____ Leader:_____Location:_____

Work Task:_____

SAFETY TOPICS (*provide some detail of discussion points)*

Chemical Exposure Hazards and Control_____

Physical Hazards and Control_____

Air Monitoring_____

PPE_____

Communications_____

Safe Work Practices_____

Emergency Response_____

Hospital/Medical Center Location_____

Phone Nos._____

Other_____

FOR FOLLOW-UP (the issues, responsibilities, due dates, etc.)

_____

_____

_____

ATTENDEES

PRINT NAME	COMPANY	SIGNATURE

Briefing Conducted By:_____

APPENDIX B

CONSTRUCTION QUALITY ASSURANCE PROJECT PLAN

LANGAN

CONSTRUCTION QUALITY ASSURANCE PROJECT PLAN

FOR

INTERIM REMEDIAL MEASURES WORK PLAN

363 Bond Street
Brooklyn, New York

Prepared For:

LSG 363 Bond Street, LLC
c/o The Lightstone Group
460 Park Avenue, 13th Floor
New York, New York 10022

Prepared By:

Langan Engineering, Environmental, Surveying, and Landscape Architecture, D.P.C.
619 River Drive Center 1
Elmwood Park, New Jersey 07407
NJ Certificate of Authorization No: 24GA27996400

14 October 2013

LANGAN

100287501

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1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This Construction Quality Assurance Project Plan (CQAPP) was prepared by Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. (Langan) on behalf of The Lightstone Group (the "Volunteer"), for 363 Bond Street, Brooklyn, New York (the "Site"). The Volunteer applied for acceptance into the New York State Brownfield Cleanup Program (BCP) in February 2013. This CQAPP supports the Interim Remedial Measure (IRM) Work Plan, which provides additional Site information and data collected previously by Langan and others.

This Construction Quality Assurance Project Plan (CQAPP) specifies the analytical methods to be used to ensure that data from the interim remedial action at the Site are precise, accurate, representative, comparable, and complete.

1.2 PROJECT OBJECTIVES

The objective of the IRM Work Plan is to provide the means and methods to remediate areas of concern identified during historical assessments and the RI, to be protective of human health and the environment, mitigate the potential further migration of contaminants in soil, groundwater, and/or soil gas and to facilitate redevelopment of this property.

1.3 SCOPE OF WORK

The scope of work is described in detail in the IRM Work Plan. The IRM will be conducted by the remediation contractor and overseen by Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. (Langan) on behalf of The Lightstone Group. The proposed project will include the demolition of the existing structure and the construction of a 5- to 12-story residential apartment building, with ground-floor residential and commercial spaces, and a partial below-grade parking level. The building will occupy almost the entire footprint of the Site. In addition to the building plans, a waterfront esplanade will be developed along the Gowanus Canal shoreline.

The proposed IRM includes the following:

- Recovery of product and remedial of LNAPL-impacted soil and groundwater within AOC-3;
- Recovery of product and remediation of gasoline-impacted soil and groundwater within AOC-5;

- Removal and off-site disposal of soil for sump installation;
- Collection and analysis of soil samples for waste characterization of soil removed as part of sump installation;
- Removal and disposal of any underground storage tanks (USTs) discovered during remediation of soil and groundwater, in accordance with all applicable federal, state and local regulations;
- Removal and disposal of two fuel oil ASTs in accordance with all applicable federal, state and local regulations; and,
- Installation a soil vapor extraction and air sparge system.

1.4 DATA QUALITY OBJECTIVES AND PROCESSES

The quality assurance and quality control objectives for all measurement data include:

- **Precision** – an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Field sampling precision will be determined by analyzing coded duplicate samples and analytical precision will be determined by analyzing internal QC duplicates and matrix spike duplicates.
- **Accuracy** – a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern. Sampling accuracy will be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy will be assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks.
- **Representativeness** – expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness will be determined by assessing a number of sampling procedures, including chain of custody, decontamination, and analysis of field blanks and trip blanks.
- **Completeness** – the percentage of measurements made which are judged to be valid. Completeness will be assessed through data validation. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested.
- **Comparability** – expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured using several procedures, including standard methods for

sampling and analysis, instrument calibrations, using standard reporting units and reporting formats, and data validation.

Each of the above objectives are discussed in detail in Section 3.

2.0 PROJECT ORGANIZATION

The IRM will be overseen by Langan on behalf of The Lightstone Group. Langan will oversee the removal and off-site disposal of contaminated soil as part of sump installation. Langan will collect waste characterization as required by the IRM Work Plan.

The analytical services will be performed by York Analytical Laboratories, Inc. of Stratford, Conn., NYSDOH ELAP certification number 10854. Data validation services will be performed by Emily Strake; resume attached.

Key contacts for this project are as follows:

The Lightstone Group:	Frank List Telephone: (212) 616-9969
Langan Project Manager:	Mr. Chris McMahon Telephone: (201) 794-6900 Fax: (201) 794-0366
Langan Quality Assurance Officer (QAO):	Steve Ciambruschini Telephone: (201) 794-6900 Fax: (201) 794-0366
Program Quality Assurance Monitor:	Amanda Forsburg Telephone: (201) 794-6900
Data Validator:	Ms. Emily Strake Telephone: (215) 491-6526
Laboratory Representatives:	York Analytical Laboratories, Inc. Phil Murphy Telephone: (203) 598-1371

3.0 QUALITY ASSURANCE/QUALITY CONTROL OBJECTIVES FOR MEASUREMENT OF DATA

3.1 INTRODUCTION

The quality assurance and quality control objectives for all measurement data include precision, accuracy, representativeness, completeness, and comparability. These objectives are defined in following subsections. They are formulated to meet the requirements of the USEPA SW-846. The analytical methods and their Contract Required Quantification Limits (CRQLs) are given in Section 7.

3.2 PRECISION

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value (USEPA, 1987). Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), relative range, and relative percent difference (RPD) are common.

For this project, field sampling precision will be determined by analyzing coded duplicate samples (labeled so that the laboratory does not recognize them as duplicates) for the same parameters, and then, during data validation (Section 8), calculating the RPD for duplicate sample results.

Analytical precision will be determined by the laboratory by calculating the RPD for the results of the analysis of internal QC duplicates and matrix spike duplicates. The formula for calculating RPD is as follows:

$$RPD = \frac{|V1 - V2|}{(V1 + V2)/2} \times 100$$

where:

RPD	=	Relative Percent Difference.
V1, V2	=	The two values to be compared.
$\|V1 - V2\|$	=	The absolute value of the difference between the two values.
$(V1 + V2)/2$	=	The average of the two values.

The data quality objectives for analytical precision, calculated as the RPD between duplicate analyses, are presented in Tables 3.1 and 3.2.

TABLE 3.1
QUALITY CONTROL LIMITS FOR WATER SAMPLES

			Laboratory Accuracy and Precision				
Analytical Parameters	**Analytical Method (a)**	**Matrix Spike (MS) Compounds**	**MS/MSD (b) % Recovery**	**MS/MSD RPD l**	**LCS (d) % Recovery**	**Surrogate Compounds**	**Surrogate % Recovery**
VOCs (e)	8260	1,1-Dichloroethane	61-145	-	NA	Toluene-d8	88-110
		Trichloroethene	71-120	-	NA	Bromofluorobenzene	86-115
		Benzene	76-127	-	NA	1,2-Dichloroethane-d4	76-114
		Toluene	76-125	-	NA		
		Chlorobenzene	75-130	-	NA		
SVOCs (f)	8270	Phenol	12-110	-	NA	Nitrobenzene-d5	35-114
		2-Chlorophenol	27-123	-	NA	2-Fluorobiphenyl	43-116
		1,4-Dichlorobenzene	36-97	-	NA	Terphenyl-d14	33-141
		N-Nitroso-di-n-propylamine	41-116	-	NA	Phenol-d5	10-110
		1,2,4-Trichlorobenzene	39-98	-	NA	2-Fluorophenol	21-110
		4-Chloro-3-methylphenol	23-97	-	NA	2,4,6-Tribromophenol	10-123
		Acenaphthene	46-118	-	NA	2-Chlorophenol-d4	33-110 (g)
		4-Nitrophenol	10-80	-	NA	1,2-Dichlorobenzene-d4	16-110 (g)
		2,4-Dinitrotoluene	24-96	-	NA		
		Pentachlorophenol	9-103	-	NA		
		Pyrene	26-127	-	NA		
Inorganics (i)	6010,7470/7471 ,7841,9010, OIA-1677	Inorganic Analyte	75-125 (j)	- (k)	80-120	NA	NA

(a) Analytical Methods: USEPA SW-846, 3rd edition, Revision 1, November 1990; any subsequent revisions shall supersede this information
(b) Matrix Spike/Matrix Spike Duplicate
(c) Relative Percent Difference
(d) Laboratory Control Sample
(e) Target Compound List Volatile Organic Compounds plus library search
(f) Target Compound List Semivolatile Organic Compounds plus library search
(g) Limits are advisory only
(h) Polychlorinated Biphenyls
(i) Target Analyte List Inorganics (metals)
(j) Matrix spike only
(k) Laboratory duplicate RPD
NA - Not Applicable

TABLE 3.2
QUALITY CONTROL LIMITS FOR SOIL SAMPLES

Laboratory Accuracy and Precision

Analytical Parameter	Analytical Method (a)	Matrix Spike (MS) Compounds	MS/MSD (b) % Recovery	MS/MSD RPD (c)	LCS (d) % Recovery	Surrogate Compounds	Surrogate % Recovery
VOCs (e)	8260	1,1-Dichloroethane	59-172	22	NA	Toluene-d8	84-138
		Trichloroethene	62-137	24	NA	Bromofluorobenzene	59-113
		Benzene	66-142	21	NA	1,2-Dichloroethane-d4	70-121
		Toluene	59-139	21	NA		
		Chlorobenzene	60-133	21	NA		
SVOCs (f)	8270	Phenol	26-90	35	NA	Nitrobenzene-d5	23-120
		2-Chlorophenol	25-102	50	NA	2-Fluorobiphenyl	30-115
		1,4-Dichlorobenzene	28-104	27	NA	Terphenyl-d14	18-137
		N-Nitroso-di-n-propylamine	41-126	38	NA	Phenol-d5	24-113
		1,2,4-Trichlorobenzene	38-107	23	NA	2-Fluorophenol	25-121
		4-Chloro-3-methylphenol	26-103	33	NA	2,4,6-Tribromophenol	19-122
		Acenaphthene	31-137	19	NA	2-Chlorophenol-d4	20-130 (g)
		4-Nitrophenol	11-114	50	NA	1,2-Dichlorobenzene-d4	20-130 (g)
		2,4-Dinitrotoluene	28-89	47	NA		
		Pentachlorophenol	17-109	47	NA		
		Pyrene	35-142	36	NA		
Inorganics (i)	6010, 7470/7471, 7841, 9010	Inorganic Analyte	75-125 (j)	20 (k)	80-120	NA	NA
PCBs	8082	PCB (Aroclor 1260)	50-128	50	NA	Tetrachlorometaxylene Decachlorobiphenyl	24-154 25-159

(a) Analytical Methods: USEPA SW-846, 3rd edition, Revision 1, November 1990, any subsequent revisions shall supersede this information
(b) Matrix Spike/Matrix Spike Duplicate
(c) Relative Percent Difference
(d) Laboratory Control Sample
(e) Target Compound List Volatile Organic Compounds
(f) Target Compound List Semivolatile Organic Compounds
(g) Limits are advisory only
(h) Polychlorinated Biphenyls
(i) Target Analyte List Inorganics (metals and cyanide)
(j) Matrix spike only
(k) Laboratory duplicate RPD
NA - Not Applicable

3.3 ACCURACY

Accuracy is a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern (Taylor, 1987), or the difference between a measured value and the true or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material, and is expressed as the percent of the known quantity, which is recovered or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes, which are close to the detection limits are less accurate because they are more affected by such factors as instrument "noise". Higher concentrations will not be as affected by instrument noise or other variables and thus will be more accurate.

Sampling accuracy may be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy is typically assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks. Additionally, initial and continuing calibrations must be performed and accomplished within the established method control limits to define the instrument accuracy before analytical accuracy can be determined for any sample set.

Accuracy is normally measured as the percent recovery (%R) of a known amount of analyte, called a spike, added to a sample (matrix spike) or to a blank (blank spike). The %R is calculated as follows:

$$\%R = \frac{SSR - SR}{SA} \times 100$$

where:

%R = Percent recovery.

SSR = Spike sample result: concentration of analyte obtained by analyzing the sample with the spike added.

SR = Sample result: the background value, i.e., the concentration of the analyte obtained by analyzing the sample.

SA = Spiked analyte: concentration of the analyte spike added to the sample.

The acceptance limits for accuracy for each parameter are presented in Tables 3.1 and 3.2.

3.4 REPRESENTATIVENESS

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter, which is most concerned with the proper design of the sampling program (USEPA, 1987). Samples must be representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible, that the data derived represents the in-place quality of the material sampled. Every effort will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, and analysis. Decontamination of sampling devices and digging equipment will be performed between samples as outlined in the Field Sampling Plan. Analysis of field blanks, trip blanks, and method blanks will also be performed to monitor for potential sample contamination from field and laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. Sampling heterogeneity will be evaluated during data validation through the analysis of coded field duplicate samples. The analytical laboratory will also follow acceptable procedures to assure the samples are adequately homogenized prior to taking aliquots for analysis, so the reported results are representative of the sample received.

Chain-of-custody procedures will be followed to document that contamination of samples has not occurred during container preparation, shipment, and sampling. Details of blank, duplicate and Chain-of-custody procedures are presented in Sections 4 and 5.

3.5 COMPLETENESS

Completeness is defined as the percentage of measurements made which are judged to be valid (USEPA, 1987). The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested. Completeness is defined as follows for all sample measurements:

$$\%C = \frac{V}{T} \times 100$$

where:

%C = Percent completeness.

V = Number of measurements judged valid.

T = Total number of measurements.

3.6 COMPARABILITY

Comparability expresses the degree of confidence with which one data set can be compared to another (USEPA, 1987). The comparability of all data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;
- Requiring traceability of all analytical standards and/or source materials to the U.S. Environmental Protection Agency (USEPA) or National Institute of Standards and Technology (NIST);
- Requiring that all calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable);
- Using standard reporting units and reporting formats including the reporting of QC data;
- Performing a complete data validation on a representative fraction of the analytical results, including the use of data qualifiers in all cases where appropriate; and
- Requiring that all validation qualifiers be used any time an analytical result is used for any purpose.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

4.0 SAMPLING PROGRAM

4.1 INTRODUCTION

The IRM will consist of the following sampling:

- Waste Characterization Sampling
    - Collection of soil waste characterization samples from soils generated by sump installation.

This section presents sample container preparation procedures, sample preservation procedures, sample holding times, and field QC sample requirements. Sample locations, and the number of environmental and QC samples will be determined per disposal facility requirements. The sampling will be conducted as per IRM Work Plan.

4.2 SAMPLE CONTAINER PREPARATION AND SAMPLE PRESERVATION

Sample containers will be properly washed and decontaminated prior to their use by either the analytical laboratory or the container vendor to the specifications required by the USEPA. Copies of the sample container QC analyses will be provided by the laboratory for each container lot used to obtain samples. The containers will be labeled and the appropriate preservatives will be added. The types of containers are shown in Tables 4.1, 4.2.

Samples shall be preserved according to the preservation techniques given in Tables 4.1 and 4.2. Preservatives will be added to the sample bottles by the laboratory prior to their shipment in sufficient quantities to ensure that proper sample pH is met. Following sample collection, the sample bottles should be placed on ice in the shipping cooler, cooled to 4°C with ice or "blue ice", and delivered to the laboratory within 48 hours of collection. Chain-of-custody procedures are described in Section 7.

4.3 SAMPLE HOLDING TIMES

The sample holding times for organic and inorganic parameters are given in Tables 4.1 and 4.2 and must be in accordance with the NYSDEC ASP requirements. The NYSDEC ASP holding times must be strictly adhered to by the laboratory. Any holding time exceedances must be reported to Langan.

4.4 FIELD QC SAMPLES

To assess field sampling and decontamination performance, two types of "blanks" will be collected and submitted to the laboratory for analyses. In addition, the precision of field sampling procedures will be assessed by collecting coded field duplicates and matrix spike/matrix spike duplicates (MS/MSDs). The blanks will include:

a. Trip Blanks - A trip blank will be prepared before the sample containers are sent by the laboratory. The trip blank will consist of a 40-ml VOA vial containing distilled, deionized water, which accompanies the other water sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of water samples for Part 375 volatiles analysis. The Trip Blank will be analyzed for volatile organic compounds to assess any contamination from sampling and transport, and internal laboratory procedures.

b. Field Blanks - Field blanks will be taken at a minimum frequency of one per 20 field samples per sample matrix. Field blanks are used to determine the effectiveness of the decontamination procedures for sampling equipment. The field blank will consist of a sample of deionized, distilled water provided by the laboratory that has passed through a decontaminated bailer, tubing or other sampling apparatus. It is usually collected as a last step in the decontamination procedure, prior to taking an environmental sample. The field blank may be analyzed for all or some of the parameters of interest.

The duplicates will include:

a. Coded Field Duplicate - To determine the representativeness of the sampling methods, coded field duplicates will be collected at a minimum frequency of one per 20 field samples. The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are a duplicate sample. This will eliminate any possible bias that could arise.

b. Matrix Spike/Matrix Spike Duplicate (MS/MSD) - MS/MSD samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be taken at a frequency of one pair per 20 field samples. These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes. The percent recoveries and RPDs are given in Tables 3.1 and 3.2.

TABLE 4.1
WATER SAMPLE CONTAINERIZATION, PRESERVATION, AND HOLDING TIMES

Analysis	Bottle Type	Preservation (a)	Holding Time (b)
Volatile Organic Compounds (VOCs)	2-40 mL glass vial w/ Teflon septum	Cool to 4^{O}C, HCL pH<2	7 days
Semi-volatile Organics Compounds (SVOCs)	1000 mL glass w/ Teflon lined cap	Cool to 4^{O}C	7 days*
Metals	1000 mL plastic bottle	Nitric Acid to pH < 2 Cool to 4^{O}C	6 months, except mercury (28 days)

(a) All samples to be preserved in ice during collection and transport.

(b) Days from validated time of sample receipt (VTSR).

* Continuous liquid-liquid extraction is the required extraction for water samples for SVOCs. Continuous liquid-liquid extraction and concentration of water samples for SVOCs analysis completed within 7 days of VTSR. Extracts of water samples must be analyzed within 40 days of extraction.

TABLE 4.2
SOIL SAMPLE
CONTAINERIZATION, PRESERVATION AND HOLDING TIMES

Analysis	Bottle Type	Preservation [a]	Holding Time [b]
Volatile Organic Compounds (VOCs)	Wide-mouth glass w/ Teflon lined cap	Cool to 4°C	14 days
Other Organic Compounds [c]	Wide-mouth glass w/ Teflon lined cap	Cool to 4°C	14 days*
Metals	Wide-mouth plastic or glass	Cool to 4°C	6 months, except mercury (28 days)
PCBs	Wide-mouth glass w/ Teflon-lined cap	Cool to 4°C	14 days**

(a) All samples to be preserved in ice during collection and transport.

(b) Days from date of sample collection.

(c) Semi-volatile organic compounds or PCBs.

* Soxhlet or sonication procedures for extraction and concentration of soil/waste samples for SVOCs must be completed within 10 days of VTSR. Extracts of soil samples must be analyzed within 40 days of extraction.

** Procedures for extraction and concentration of soil/waste samples for PCBs must be completed within 14 days of VTSR. Extracts of soil samples must be analyzed within 40 days of extraction.

5.0 SAMPLE TRACKING AND CUSTODY

5.1 INTRODUCTION

This section presents sample custody procedures for both the field and laboratory. Implementation of proper custody procedures for samples generated in the field is the responsibility of field personnel. Both laboratory and field personnel involved in the Chain-of-custody (COC) and transfer of samples will be trained as to the purpose and procedures prior to implementation.

Evidence of sample traceability and integrity is provided by COC procedures. These procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. The sample custody flowchart is shown in Figure 5.1. A sample is considered to be in a person's custody if the sample is:

- In a person's possession;
- Maintained in view after possession is accepted and documented;
- Locked and tagged with Custody Seals so that no one can tamper with it after having been in physical custody; or
- In a secured area which is restricted to authorized personnel.

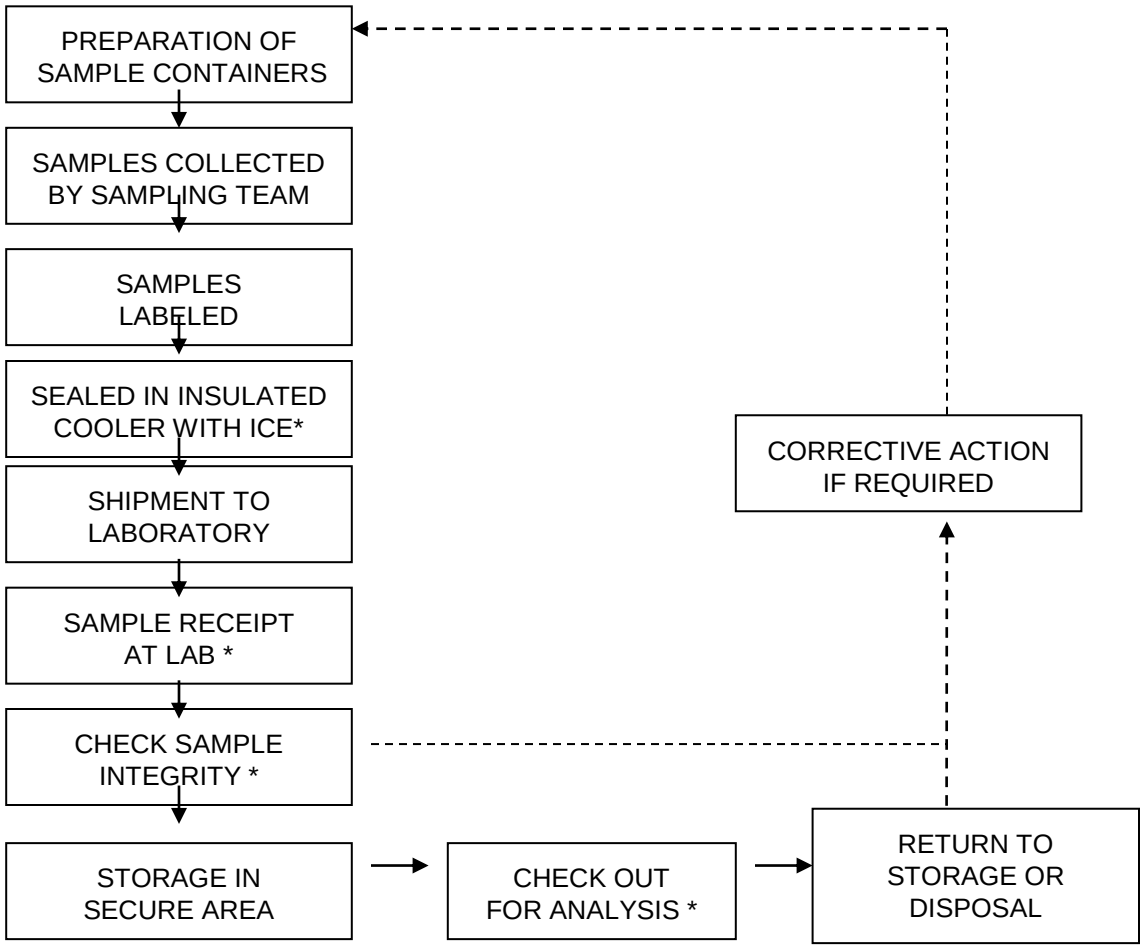
5.2 FIELD SAMPLE CUSTODY

A COC record (Figure 5.2 or similar) accompanies the sample containers from selection and preparation at the laboratory, during shipment to the field for sample containment and preservation, and during return to the laboratory. Triplicate copies of the COC must be completed for each sample set collected.

The COC lists the field personnel responsible for taking samples, the project name and number, the name of the analytical laboratory to which the samples are sent, and the method of sample shipment. The COC also lists a unique description of every sample bottle in the set. If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample.

The REMARKS space on the COC is used to indicate if the sample is a matrix spike, matrix spike duplicate, or any other sample information for the laboratory. Since they are not specific to any one sample point, trip and field blanks are indicated on separate rows. Once all bottles are properly accounted for on the form, a sampler will write his or her signature and the date and time on the first RELINQUISHED BY space. The sampler will also write the method of shipment, the shipping cooler identification number, and the shipper airbill number on the top of the COC.

Figure 5-1 Sample Custody



* REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

LANGAN

Figure 5.2 Sample Chain-of-Custody Form

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CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

PAGE ____ OF

Proj. Name:
Proj. No:
Auth. By:
Site Location:
Phone No:
Sampled By:
Company:

ANALYSIS REQUESTED

Sample Number	Location	Depth	Date	Time	Matrix	Grab Comp.	Inorg/PHC Preserve.	No. of Cont.	COMMENTS

Metals Filtered (Yes/No)? _____ Total No. of Containers: _____
Aq. VOAs Pres. (Yes/No)? _____
Rush T/A, Report format, Contingent analysis: _____

(1) Relinquished By: DATE: Received By:
Company: TIME: Company:

(2) Relinquished By: DATE: Received By:
Company: TIME: Company:

(3) Relinquished By: DATE: Received By:
Company: TIME: Company:

(4) Relinquished By: DATE: Received By:
Company: TIME: Company:

Laboratory Name & Address: _____

Mistakes will be crossed out with a single line in ink and initialed by the author.

One copy of the COC is retained by sampling personnel (notations identifying blind duplicate samples will be added to this copy of the COC but not the others that will go to the laboratory) and the other two copies are put into a sealable plastic bag and taped inside the lid of the shipping cooler. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, and the person relinquishing the samples signs their name across the seal. The seal is taped, and the cooler is wrapped tightly with clear packing tape. It is then relinquished by field personnel to personnel responsible for shipment, typically an overnight carrier. The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager, and the sample will not be analyzed.

5.3 LABORATORY SAMPLE CUSTODY

The Project Manager or Field Team Leader will notify the laboratory of upcoming field sampling activities, and the subsequent shipment of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The following laboratory sample custody procedures will be used:

- The laboratory will designate a sample custodian who will be responsible for maintaining custody of the samples, and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check cooler temperature, and check the original COC documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian will sign the COC record and record the date and time received.
- Care will be exercised to annotate any labeling or descriptive errors. In the event of discrepant documentation, the laboratory will immediately contact the Project Manager or Field Team Leader as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken or leaking bottles. This assessment will be recorded as part of the incoming chain-of-custody procedure.
- The samples will be stored in a secured area at a temperature of approximately 4°C until analyses commence.
- A laboratory tracking record will accompany the sample or sample fraction through final analysis for control.
- A copy of the tracking record will accompany the laboratory report and will become a permanent part of the project records.

6.0 CALIBRATION PROCEDURES

6.1 FIELD INSTRUMENTS

All field analytical equipment will be calibrated immediately prior to each day's use. The calibration procedures will conform to manufacturer's standard instructions. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. Records of all instrument calibration will be maintained by the Field Team Leader. Copies of all the instrument manuals will be maintained on-site by the Field Team Leader.

Calibration procedures for instruments used for monitoring health and safety hazards (e.g., photoionization detector and explosimeter) are provided in the Health and Safety Plan.

6.2 LABORATORY INSTRUMENTS

The laboratory will follow all calibration procedures and schedules as specified in the sections of the USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods given in Section 7.

7.0 ANALYTICAL PROCEDURES

7.1 INTRODUCTION

Samples will be analyzed according to the USEPA SW-846 "Test Methods for Evaluating Solid Waste," November 1986, 3rd edition and subsequent updates. The methods to be used for the laboratory analysis of water and soil samples are presented in Table 7.1. These methods were selected because they attain the desired quantitation limits, which are compiled on Table 7.1.

TABLE 7.1
PROJECT QUANTITATION LIMITS

	Analysis/Compound	Method	Estimated Quantitation Limits RL (mg/L)	MDL(mg/kg)
	Volatile Organics			
1	Methylene Chloride	SW8260B	0.034	0.0028
2	1,1-Dichloroethane	SW8260B	0.0051	0.001
3	Chloroform	SW8260B	0.0051	0.0011
4	Carbon Tetrachloride	SW8260B	0.0034	0.00072
5	1,2-Dichloropropane	SW8260B	0.012	0.00087
6	Dibromochloromethane	SW8260B	0.0034	0.001
7	1,1,2-Trichloroethane	SW8260B	0.0051	0.0013
8	Tetrachloroethene	SW8260B	0.0034	0.001
9	Chlorobenzene	SW8260B	0.0034	0.00064
10	Trichloroflouromethane	SW8260B	0.017	0.0013
11	1,2-Dichloroethane	SW8260B	0.0034	0.00078
12	1,1,1-Trichloroethane	SW8260B	0.0034	0.00092
13	Bromodichloromethane	SW8260B	0.0034	0.0016
14	Trans-1,3-Dichloropropene	SW8260B	0.0034	0.0017
15	Cis-1,3-Dichloropropene	SW8260B	0.0034	0.00082
16	1,1-Dichloropropene	SW8260B	0.017	0.001
17	Bromoform	SW8260B	0.014	0.00083
18	1,1,2,2-Tetrachloroethane	SW8260B	0.0034	0.00076
19	Benzene	SW8260B	0.0034	0.0027
20	Toluene	SW8260B	0.0051	0.0022
21	Ethylbenzene	SW8260B	0.0034	0.0026
f22	Chloromethane	SW8260B	0.017	0.0015
23	Bromomethane	SW8260B	0.0068	0.00089
24	Vinyl Chloride	SW8260B	0.0068	0.0013
25	Chloromethane	SW8260B	0.0068	0.00077
26	1,1-Dichloroethene	SW8260B	0.0034	0.0012
27	Trans-1,2-Dichloroethene	SW8260B	0.0051	0.0014
28	Trichloroethene	SW8260B	0.0034	0.0014
29	1,2-Dichlorobenzene	SW8260B	0.017	0.0017
30	1,3-Dichlorobenzene	SW8260B	0.017	0.0015
31	1,4-Dichlorobenzene	SW8260B	0.017	0.0014
32	Methyl tert butyl ether	SW8260B	0.0068	0.001
33	p/m-Xylene	SW8260B	0.0068	0.0015

TABLE 7.1 (Continued)
PROJECT QUANTITATION LIMITS PROJECT QUANTITATION LIMITS

	Analysis/Compound	Method	Estimated Quantitation Water (mg/L)	Soil (mg/kg)
	Volatile Organics (cont.)			
34	o-xylene	SW8260B	0.0068	0.0014
35	Cis-1,2-Dichloroethene	SW8260B	0.0034	0.001
36	Dibromomethane	SW8260B	0.034	0.0015
37	Styrene	SW8260B	0.0068	0.0025
38	Dichlorodiflouromethane	SW8260B	0.034	0.0013
39	Acetone	SW8260B	0.034	0.011
40	Carbon disulfide	SW8260B	0.034	0.0013
41	2-Butanone	SW8260B	0.034	0.013
42	Vinyl acetate	SW8260B	0.034	0.0026
43	4-Methyl-2pentanone	SW8260B	0.034	0.0028
44	1,2,3-Trichloropropane	SW8260B	0.034	0.0013
45	2-Hexanone	SW8260B	0.034	0.0014
46	Bromochloromethane	SW8260B	0.017	0.001
47	2,2-Dichloropropane	SW8260B	0.017	0.0027
48	1,2-Dibromoethane	SW8260B	0.014	0.0014
49	1,3-Dichloropropane	SW8260B	0.017	0.0019
50	1,1,1,2-Tetrachloroethane	SW8260B	0.0034	0.0011
51	Bromobenzene	SW8260B	0.017	0.00075
52	n-Butylbenzene	SW8260B	0.0034	0.0011
53	Sec-Butylbenzene	SW8260B	0.0034	0.00094
54	Tert-Butylbenzene	SW8260B	0.017	0.0021
55	0-chlorotoluene	SW8260B	0.017	0.0011
56	p-chlorotoluene	SW8260B	0.017	0.0012
57	1,2-Dibromo-3-chloropropane	SW8260B	0.017	0.0029
58	Hexachlorobutadiene	SW8260B	0.017	0.0016
59	Isopropylbenzene	SW8260B	0.0034	0.00061
60	p-Isopropylbenzene	SW8260B	0.0034	0.00094
61	Naphthalene	SW8260B	0.017	0.0026
62	Acrylonitrile	SW8260B	0.034	0.0013
63	n-Propylbenzene	SW8260B	0.0034	0.00097
64	1,2,3-Trichlorobenzene	SW8260B	0.017	0.0014
65	1,2,4-Trimethylbenzene	SW8260B	0.017	0.0027
66	1,3,5-Trimethylbenzene	SW8260B	0.017	0.0021
67	1,2,4-Trimethylbenzene	SW8260B	0.017	0.002

TABLE 7.1 (Continued)
PROJECT QUANTITATION LIMITS

	Analysis/Compound	Method	Estimated Quantitation Limits RL (ug/L)	MDL (ug/kg)
	Volatile Organics (cont.)			
68	1,4-Diethylbenzene	SW8260B	0.014	0.00068
69	4-Ethyltoulene	SW8260B	0.014	0.00033
70	1,2,4,5-Tetramethylbenzene	SW8260B	0.014	0.00062
71	Ethyl ether	SW8260B	0.017	0.0013
72	Trans-1,4-Dichloro-2-butene	SW8260B	0.017	0.0051
	Semivolatile Organics			
1	Acenahpthalene	SW8270C	0.18	0.042
2	1,2,4-Trichlorobenzene	SW8270C	0.22	0.037
3	Hexachlorobenzene	SW8270C	0.14	0.035
4	Bis(2-chloroethyl)ether	SW8270C	0.2	0.043
5	2-Chloronaphthalene	SW8270C	0.22	0.068
6	1,2-Dichlorobenzene	SW8270C	0.22	0.066
7	1,3-Dichlorobenzene	SW8270C	0.22	0.07
8	1,4-Dichlorobenzene	SW8270C	0.22	0.064
9	3,3'-Dichlorobenzidine	SW8270C	0.22	0.081
10	2,4-Dinitrotoluene	SW8270C	0.22	0.06
11	2,6-Dinitrotoluene	SW8270C	0.22	0.074
12	Fluoranthene	SW8270C	0.14	0.029
13	4-Chlorophenyl phenyl ether	SW8270C	0.22	0.031
14	4-Bromophenyl phenyl ether	SW8270C	0.22	0.036
15	Bis(2-chloroisopropyl)ether	SW8270C	0.27	0.072
16	Bis(2-chloroethoxy)methane	SW8270C	0.24	0.051
17	Hexachlorobutadiene	SW8270C	0.22	0.042
18	Hexachlorocyclopentadiene	SW8270C	0.65	0.18
19	Hexachloroethane	SW8270C	0.18	0.032
20	Isophorone	SW8270C	0.2	0.036
21	Naphthalene	SW8270C	0.22	0.072
22	Nitrobenzene	SW8270C	0.2	0.066
23	NitrosoDiPhenylAmine(NDPA/DPA)	SW8270C	0.18	0.056
24	n-Nitrosodi-n-propylamine	SW8270C	0.22	0.063
25	Bis(2-Ethylhexyl)phthalate	SW8270C	0.22	0.047

TABLE 7.1 (Continued)
PROJECT QUANTITATION LIMITS

	Analysis/Compound	Method	Estimated Quantitation Limits RL (mg/L)	MDL (mg/kg)
	Semivolatile Organics (cont.)			
26	Butyl benzyl phthalate	SW8270C	0.22	0.063
27	Di-n-butylphthalate	SW8270C	0.22	0.038
28	Di-n-octylphthalate	SW8270C	0.22	0.061
29	Diethyl phthalate	SW8270C	0.22	0.039
30	Dimethyl phthalate	SW8270C	0.22	0.037
31	Benzo(a)anthracene	SW8270C	0.14	0.045
32	Benzo(a)pyrene	SW8270C	0.18	0.054
33	Benzo(b)fluoranthene	SW8270C	0.14	0.036
34	Benzo(k)fluoranthene	SW8270C	0.14	0.035
35	Chrysene	SW8270C	0.14	0.029
36	Acenaphthylene	SW8270C	0.18	0.058
37	Anthracene	SW8270C	0.14	0.03
38	Benzo(ghi)perylene	SW8270C	0.18	0.057
39	Fluorene	SW8270C	0.22	0.041
40	Phananthrene	SW8270C	0.14	0.038
41	Dibenzo(a,h)anthracene	SW8270C	0.14	0.042
42	Indeno(1,2,3-cd)Pyrene	SW8270C	0.18	0.055
43	Pyrene	SW8270C	0.14	0.037
44	Biphenyl	SW8270C	0.51	0.016
45	4-Chloroaniline	SW8270C	0.22	0.024
46	2-Nitroaniline	SW8270C	0.22	0.041
47	3-Nitroaniline	SW8270C	0.22	0.023
48	4-Nitroaniline	SW8270C	0.22	0.051
49	Dibenzofuran	SW8270C	0.22	0.036
50	2-Methylnaphthalene	SW8270C	0.27	0.089
51	1,2,4-Tetrachlorobenzene	SW8270C	0.22	0.066
52	Acetophenone	SW8270C	0.22	0.072
53	2,4,6-Trichlorophenol	SW8270C	0.14	0.041
54	P-chloro-M-Cresol	SW8270C	0.22	0.046
55	2-Chlorophenol	SW8270C	0.22	0.07

TABLE 7.1 (Continued)

PROJECT QUANTITATION LIMITS

	Analysis/Compound	Method	Estimated Quantitation Limits RL (mg/L)	MDL (mg/kg)
	Semivolatile Organics (cont.)			
56	2,4-Dinitrophenol	SW8270C	0.2	0.066
57	2,4-Dimethylphenol	SW8270C	0.22	0.034
58	2-Nitrophenol	SW8270C	0.2	0.16
59	4-Nitrophenol	SW8270C	0.49	0.096
60	2,4-Dinitro	SW8270C	0.32	0.35
61	4,6-Dinitro-o-cresol	SW8270C	1.1	0.21
62	Pentachlorophenol	SW8270C	0.59	0.053
63	Phenol	SW8270C	0.18	0.066
64	2-Methylphenol	SW8270C	0.22	0.056
65	3-Methylphenol/4-Methylphenol	SW8270C	0.22	0.097
66	2,4,5-Trichlorophenol	SW8270C	0.32	0.052
67	Benzoic Acid	SW8270C	0.22	0.19
68	Benzyl Alcohol	SW8270C	0.73	0.052
69	Carbazole	SW8270C	0.22	0.032
	PCBs			
1	Aroclor-1016	SW8082	0.0469	0.009
2	Aroclor-1221	SW8082	0.0469	0.014
3	Aroclor-1232	SW8082	0.0469	0.01
4	Aroclor-1242	SW8082	0.0469	0.009
5	Aroclor-1248	SW8082	0.0469	0.006
6	Aroclor-1254	SW8082	0.0469	0.007
7	Aroclor-1260	SW8082	0.0469	0.008
	Metals			
1	Aluminum	SW6010B	10	2.3
2	Antimony	SW6010B	5.2	1
3	Arsenic	SW6010B	1	0.36
4	Barium	SW6010B	1	0.09
5	Beryllium	SW6010B	0.52	0.04
6	Cadmium	SW6010B	1	0.07

TABLE 7.1 (Continued)
PROJECT QUANTITATION LIMITS

	Analysis/Compound	Method	Estimated Quantitation Limits RL (mg/L)	MDL (mg/kg)
	Metals (cont.)			
7	Calcium	SW6010B	10	2.3
8	Chromium	SW6010B	1	0.21
9	Cobalt	SW6010B	2.1	0.22
10	Copper	SW6010B	1	1
11	Iron	SW6010B	5.2	1.8
12	Lead	SW6010B	5.2	0.29
13	Magnesium	SW6010B	10	4.7
14	Manganese	SW6010B	1	0.11
15	Mercury	SW7471A	0.1	0.02
16	Nickel	SW6010B	2.6	0.29
17	Potassium	SW6010B	260	84
18	Selenium	SW6010B	2.1	0.34
19	Silver	SW6010B	1	0.17
20	Sodium	SW6010B	210	83
21	Thallium	SW6010B	2.1	0.65
22	Vanadium	SW6010B	1	0.23
23	Zinc	SW6010B	5.2	0.57

TABLE 7.1 (Continued)
PROJECT QUANTITATION LIMITS

	Analysis/Compound	Method	Estimated Quantitation Limits RL (mg/L)	MDL (mg/kg)
	Pesticides			
1	Delta-BHC	SW8081A	0.0029	0.000448
2	Lindane	SW8081A	0.000954	0.000426
3	Alpha-BHC	SW8081A	0.000954	0.000271
4	Beta-BHC	SW8081A	0.00229	0.000868
5	Heptachlor	SW8081A	0.00114	0.000513
6	Aldrin	SW8081A	0.00429	0.000806
7	Heptachlor epoxide	SW8081A	0.00429	0.00129
8	Endrin	SW8081A	0.000954	0.000391
9	Endrin Ketone	SW8081A	0.00229	0.00059
10	Dieldrin	SW8081A	0.00143	0.000715
11	4,4'-DDE	SW8081A	0.00229	0.000529
12	4,4'-DDD	SW8081A	0.00229	0.000816
13	4,4'-DDT	SW8081A	0.0033	0.00184
14	Endosulfan I	SW8081A	0.00229	0.000541
15	Endosulfan II	SW8081A	0.00229	0.000765
16	Endosulfan sulfate	SW8081A	0.000954	0.000436
17	Methoxychlor	SW8081A	0.00429	0.00134
18	Toxaphene	SW8081A	0.0429	0.012
19	Trans-Chlordane	SW8081A	0.00286	0.000756
20	Chlordane	SW8081A	0.0186	0.00758

Notes:

(1) - = No Standard
(2) RL = Reporting Limit
(3) MDL = Minimum Detection Limit
(4) RL and MDL values are taken from representative laboratory reports issued by Alpha Analytical Laboratories
(5) RL and MDL values are estimated and may vary depending on instruments

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

8.1 INTRODUCTION

Data collected during the remedial activities will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format.

The completed copies of the Chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

8.2 DATA REDUCTION

The Analytical Services Protocol (ASP) Category B data packages and an electronic data deliverable (EDD) will be provided by the laboratory after receipt of a complete sample delivery group. The Project Manager will immediately arrange for archiving the results and preparation of result tables. These tables will form the database for assessment of the site contamination condition.

Each EDD deliverable must be formatted using a Microsoft Windows operating system and the NYSDEC data deliverable format for EQuIS. To avoid transcription errors, data will be loaded directly into the ASCII format from the laboratory information management system (LIMS). If this cannot be accomplished, the consultant should be notified via letter of transmittal indicating that manual entry of data is required for a particular method of analysis. All EDDs must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager or Task Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

8.3 DATA VALIDATION

Data validation will be performed in accordance with the USEPA validation guidelines for organic and inorganic data review. Validation will include the following:

- Verification of the QC sample results,
- Verification of the identification of sample results (both positive hits and non-detects),
- Recalculation of 10% of all sample results, and
- Preparation of Data Usability Summary Reports (DUSR).

A DUSR will be prepared and reviewed by the QAO before issuance. The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each SDG will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Target compound identification;
- Chromatogram quality;
- Pesticide cleanup (if applicable);
- Compound quantitation and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;
- Calibrations;
- Blank results;
- Interference check sample;

- Laboratory check samples;
- Duplicates;
- Matrix Spike;
- Furnace atomic absorption analysis QC;
- ICP serial dilutions; and
- Results verification and reported detection limits.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" - Not detected. The associated number indicates the approximate sample concentration necessary to be detected significantly greater than the level of the highest associated blank;
- "UJ" - Not detected. Quantitation limit may be inaccurate or imprecise;
- "J" - Analyte is present. Reported value may be associated with a higher level of uncertainty than is normally expected with the analytical method
- "N" – Tentative identification. Analyte is considered present in the sample;
- "R" – Unreliable result; data is rejected or unusable. Analyte may or may not be present in the sample; and
- No Flag - Result accepted without qualification.

9.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

9.1 QUALITY ASSURANCE BATCHING

Each set of samples will be analyzed concurrently with calibration standards, method blanks, matrix spikes (MS), matrix spike duplicates (MSD) or laboratory duplicates, and QC check samples (if required by the protocol). The MS/MSD samples will be designated by the field personnel. If no MS/MSD samples have been designated, the laboratory will contact the Langan Project Manager for corrective action.

9.2 CALIBRATION STANDARDS AND SURROGATES

All organic standard and surrogate compounds are checked by the method of mass spectrometry for correct identification and gas chromatography for degree of purity and concentration. All standards are traceable to a source of known quality certified by the USEPA or NIST, or other similar program. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions. Concentrations of the solutions are checked for accuracy before release for laboratory

use. Standard solutions are replaced monthly or more frequently, based upon data indicating deterioration.

9.3 ORGANIC BLANKS AND MATRIX SPIKE

Analysis of blank samples verifies that the analytical method does not introduce contaminants or detect "false positives". The blank water can be generated by reverse osmosis and Super-Q filtration systems, or distillation of water containing $KMnO_4$. The matrix spike is generated by addition of surrogate standard to each sample.

9.4 TRIP AND FIELD BLANKS

Trip blanks and field blanks will be utilized in accordance with the specifications in Section 4. These blanks will be analyzed to provide a check on sample bottle preparation and to evaluate the possibility of atmospheric or cross contamination of the samples.

10.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

10.1 INTRODUCTION

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the QAO. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

10.2 SYSTEM AUDITS

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may occur.

10.3 PERFORMANCE AUDITS

The laboratory may be required to conduct an analysis of Performance Evaluation samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

10.4 FORMAL AUDITS

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Non-compliances will be logged, and documented through audit findings, which are attached to and are a part of the integral audit report. These audit-finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

11.0 PREVENTIVE MAINTENANCE PROCEDURES AND SCHEDULES

11.1 PREVENTIVE MAINTENANCE PROCEDURES

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators.

A list of critical spare parts will be established by the operator. These spare parts will be available for use in order to reduce the downtime. A service contract for rapid

instrument repair or backup instruments may be substituted for the spare part inventory.

11.2 SCHEDULES

Written procedures will establish the schedule for servicing critical items in order to minimize the downtime of the measurement system. The laboratory will adhere to the maintenance schedule, and arrange any necessary and prompt service. Required service will be performed by qualified personnel.

11.3 RECORDS

Logs shall be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories. The QAO may audit these records to verify complete adherence to these procedures.

12.0 CORRECTIVE ACTION

12.1 INTRODUCTION

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

12.2 PROCEDURE DESCRIPTION

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;

- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management and staff, such as field teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 12.1 or similar). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

FIGURE 12.1

CORRECTIVE ACTION REQUEST

Number: _____ Date: _____

TO: _____

You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _____

CONDITION:

REFERENCE DOCUMENTS:

RECOMMENDED CORRECTIVE ACTIONS:

_____	_____	_____	_____	_____	_____
Originator	Date	Approval	Date	Approval	Date

RESPONSE

CAUSE OF CONDITION

CORRECTIVE ACTION

(A) RESOLUTION

(B) PREVENTION

(C) AFFECTED DOCUMENTS

C.A. FOLLOWUP:

CORRECTIVE ACTION VERIFIED BY: _____ DATE:_____

13.0 REFERENCES

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USEPA, 1992a. CLP Organics Data Review and Preliminary Review. SOP No. HW-6, Revision #8, dated January 1992. USEPA Region II.

USEPA, 1992b. Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW 3/90. SOP No. HW-2, Revision XI, dated January 1992. USEPA Region II.