AECOM Environment

Prepared for:
Consolidate Edison of New York, Inc.
New York, NY

Prepared by:
AECOM
Chestnut Ridge, NY
60278022.200
November 26, 2012

Remedial Investigation Work Plan Former Astoria Manufactured Gas Plant Site

Former Astoria Manufactured Gas Plant Site
Astoria, New York

NYSDEC Permit No. 2-6301-00006/00002-0

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Prepared By Anna Sullivan, Senior Geologist

Reviewed By Eleanor Vivaudou, P.E.

Report Certification

I, Eleanor P. Vivaudou, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan for the Former Astoria Manufactured Gas Plant Site was prepared in accordance with all applicable statutes and regulation and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Eleanor P.Vivaudou, P.E.

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1.0 Introduction

This document presents the Remedial Investigation Work Plan (RIWP) for the former Astoria Manufactured Gas Plant (MGP) Site located in Astoria, New York. The former Astoria MGP site is located on Consolidated Edison Company of New York, Inc.'s (Con Edison's) Astoria facility at 31st Street and 20th Avenue in Astoria (Queens), New York. The Astoria facility is under the Resource Conservation and Recovery Act (RCRA) Corrective Action Program being conducted by Con Edison in accordance with the New York State Department of Environmental Conservation (NYSDEC) 1994 Consent Order (NYSDEC Index No. R2-1023-88-06) and the most recent RCRA Corrective Action Permit (NYSDEC Permit No. 2-6301-00006/00002-0). The former MGP site is a separate area of concern (AOC) within the RCRA Facility. A Site Characterization (SC) of the former MGP was performed and completed with a Draft Former MGP AOC Site Characterization Report submitted to NYSDEC in 2005 (ENSR, 2005). Investigations of the RCRA Facility were initiated in 1993 and continued through mid 2007. The RCRA Facility Investigation (RFI) activities and results are compiled in a report submitted to NYSDEC in 2008 (AECOM, 2008a). Additionally, investigations adjacent to two former manufactured gas holders, subsequently used as settling tanks for wastewater treatment, were performed and completed with an Addendum to the Draft RCRA Facility Investigation (RFI) Report submitted to NYSDEC in 2008 (AECOM, 2008b).

Data collected during the SC and settling tank investigation revealed exceedances of the NYSDEC developed Remedial Program Soil Cleanup Objectives (SCOs) included in the New York Code of Rules and Regulations (NYCRR) 6 NYCRR Subpart 375-6 for Restricted Use (Industrial Use) in soil and the NYSDEC Ambient Water Quality Standards and Guidance Values (AWQSGVs) in overburden and bedrock groundwater. This RIWP is designed to address July 8, 2009 NYSDEC comments on the draft former MGP SC report (ENSR, 2005) and the Addendum to the draft RFI report (AECOM, 2008b) regarding the former gas holders/settling tanks and to further characterize and delineate exceedances of NYSDEC criteria identified during previous investigations. This RIWP also addresses other areas of the facility where MGP-related impacts have been identified during RFI activities, or during facility operations. Ultimately, data collected will be used to further develop the dataset necessary to allow preparation of an Alternative Analysis Report (AAR) to evaluate and select possible remedial alternatives for the former MGP site clean-up. The Remedial Investigation (RI) will be performed in accordance with the agreements by and between Con Edison and the NYSDEC and NYSDEC guidance documents including 6NYCRR Part 375, DER-10, and Draft DER-22.

This RIWP outlines the proposed investigation activities and the methods and guidelines for sample collection. Two companion documents were developed to support the RI field efforts. A Quality Assurance Project Plan (QAPP) is included as Appendix A and specifies procedures for data collection and quality control in the field and in the laboratory. The Site Specific Health and Safety Plan (HASP) is included as Appendix B and provides a description of the procedures to be followed during the RI to protect the health and safety of the field-personnel and the public in the vicinity of the site. In addition, Con Edison Utility Clearance Processes are provided in Appendix C and AECOM field methods and procedures for the RIWP are compiled in Appendix D.

2.0 Project Background

2.1 Site Location and Description

The former Astoria MGP site is located on Con Edison's Astoria facility at 31st Street and 20th Avenue in Astoria (Queens), New York. Figure 2-1 is a photogrammetric image of the facility. The former MGP consists of approximately 124 acres that are part of a larger 316-acre contiguous parcel containing industrial and power generating facilities. The entire 316-acre parcel is identified as Block 850, Lots 1 and 2 (which is occupied by Con Edison, NRG Energy, Inc., US Power Gen, and the New York Power Authority [NYPA]) and is bounded by the East River to the northwest and northeast, Luyster Creek and athletic fields to the southeast, and 20th Avenue to the southwest. Across 20th Avenue from the site are residents and commercial businesses.

Over the course of its operating history, Con Edison has transferred (divested) portions of its original Astoria property to others. The current Con Edison Astoria facility boundaries and adjacent properties that were formerly Con Edison property (*i.e.*, pre-divestiture 1999) are depicted in Figure 2-2. Environmental liabilities associated with the properties were transferred to NRG Energy, Inc. and US Power Gen, however Con Edison retains the environmental liability associated with MGP-related impacts on the property divested to NYPA.

The Astoria former MGP was located within the central-western portion of the greater Astoria facility. Figure 2-3 illustrates the former MGP structures as well as the current facility structures and property boundaries. During the years of operation, the MGP consisted of inclined and horizontal retort houses, a primary gas generator house and associated structures. These associated structures included the light oil scrubbing facilities, compressor buildings, purifiers, and associated tar management facilities. The majority of the former MGP structures (the retort houses, boiler house, extractor houses and exhauster houses) were concentrated within the footprint of the area currently occupied by the Astoria West Substation, Building 136, the Spare Transformer Yard, and outdoor storage and parking areas. In addition, various portions of the site were utilized for the processing and storage of by-products and process material associated with MGP operations. Process materials and by-products included coal, coke, ash, slag, oxide, ammonia, liquors, tars, and light oil. Tar processing equipment including two 400,000 gallon storage tanks, separators, pumps and piping were located in the present location of the northwest corner of the Pipe Yard. Various purifier houses, scrubbers, condensers, sampling houses, and associated structures were also located on the property.

2.2 Site History

The following summary provides information gathered during the Site History Research Report (ENSR, 2002) for the former MGP and included in the SC Report (ENSR, 2005).

The MGP was originally built on 376 acres of land. Before construction of the MGP facility began, extensive grading was conducted in 1903 to address the irregularities in the natural grade of the property. Grading involved the removal of approximately 485,000 cubic yards of earth from the high ridges on the facility and the re-application of the excavated soil onto the low-lying portions of the property. MGP site operations began between 1905 and 1907 during which time the Astoria facility was owned and operated as an oven gas plant by the Astoria Light, Heat and Power Company. The

Astoria Light, Heat and Power Company, a subsidiary of the Consolidated Gas Company of NY, operated the facility from 1906 to 1937. During the 1920s, the property was considered the world's largest gas manufacturing plant, producing up to 86 million cubic feet of gas per day. During this time, the Consolidated Gas Company of NY assumed ownership and control of MGP operations. In 1936, the Consolidated Gas Company of NY became the Consolidated Edison Company of NY and the MGP operations were subsequently enlarged and modified to include water gas, producer gas, and LP-Air process capability. In addition to the 30 years during which Astoria Light, Heat and Power Company operated the MGP, the Consolidated Edison Company of NY operated the coal gasification plant at the site for approximately 25 years ending in the early 1960s. Records indicate that the Astoria MGP utilized a variety of gas manufacturing processes over the years; however, detailed information on these manufactured gas operations is very limited.

2.3 Previous Investigations

2.3.1 Pre-Site Characterization

Prior to the SC, Con Edison performed site investigations of portions of the Astoria Facility associated with the RFI. Previous sampling performed within the area of the MGP AOC included 70 soil samples and 16 groundwater samples. The locations of these samples are shown on Figure 2-4. The analytical results for all analyzed constituents are provided in Appendix C of the SC Report (ENSR, 2005).

2.3.2 Site Characterization (SC)

SC field activities were conducted between October 2004 and March 2005 and included test pit excavation, soil boring advancement and monitoring well installation. The sampling program included collecting samples of subsurface soil, groundwater, and soil gas for laboratory analysis. The SC investigation locations are illustrated on Figure 2-4. MGP-related impacts were observed in the overburden soil and groundwater. The SC investigation results are presented in the SC report (ENSR, 2005), were reviewed to help develop this RIWP, and will be incorporated with the RI results in the RI report.

2.3.3 RCRA Facility Investigation (RFI)

The RFI program was initiated in 1993 and continued through mid 2007. The overall intent of the RFI program is to characterize environmental impacts that resulted from operational activities and spills during the facility's 100-plus-year history of operation. Sequential phases of the RFI have been conducted to continually refine the nature and extent of environmental impacts. In total, 41 study areas (40 individual areas and property-wide groundwater) were designated as part of the current RFI program. The investigation activities and results for these areas are presented in the RFI Report (AECOM, 2008a). RFI results pertinent to the MGP AOC were reviewed to help develop this RIWP and will be incorporated in the RI report for the former MGP.

2.3.4 Groundwater Quality Investigation, Central Wastewater Treatment Facility (CWTF)

The Astoria Central Wastewater Treatment Facility (CWTF) has been designated as a Solid Waste Management Unit (SWMU) by the NYSDEC. This facility includes a wastewater treatment building, a neutralization chamber situated within the wastewater treatment building and two large settling tanks that were originally used as the gas holder foundations during MGP operations. The standing water

and sediment within both tanks were removed by Con Edison during 2005/2006 under the direction of NYSDEC. A closure report was developed and submitted to NYSDEC (Brown and Caldwell, 2006).

The settling tanks are each approximately 300 feet in diameter and 50 feet deep. The bases of the tanks are below or near the top of bedrock. Water was observed infiltrating the basins through cracks in the cement walls during sludge removal activities conducted by Brown and Caldwell. The cracks were reportedly near the bottom of the basins, indicating that the water may have originated from fractures within the bedrock. Therefore, an expanded assessment of groundwater quality in the bedrock adjacent to the settling tanks was proposed. The expanded assessment included a desktop geologic review and field reconnaissance, installation and sampling of overburden and bedrock monitoring wells, and short duration pump tests to assess bedrock hydraulic interconnectivity. The results of the assessment are included in the Addendum to the Draft RFI Report (February 2008), Groundwater Quality Investigation Report Central Wastewater Treatment Facility (CWTF) (AECOM, 2008b) and were reviewed to help develop this RIWP and will be incorporated in the RI report for the former MGP.

2.4 Environmental Setting

The following Environmental Setting information is summarized from the SC Report (ENSR, 2005) and the RFI Report (AECOM, 2008a).

2.4.1 Topography

The Astoria facility lies in a relatively flat area abutting the East River to the northwest and north. The north-northwestern portion of the Astoria facility is primarily fill material, which typically consists of construction and demolition debris mixed with sand, gravel, rock, coal ash, slag, and cinders. The fill has been used historically in this region to extend and reinforce shorelines and to eliminate swampy areas. The overall elevation of the site and the surrounding properties slopes from the south to the north at approximately 35 feet above mean sea level (AMSL) along 20th Avenue to approximately 8 feet AMSL along the East River.

2.4.2 Geology

According to USGS geologic maps, the northern portion of the Astoria facility lies on fill materials, while the central portion of the property is situated on glacial till. The boundary between these surficial materials is generally reflected in the site topography, with the higher site elevations corresponding to areas overlying glacial till. The fill materials in the northern portions of the site overlie shore and salt marsh deposits (organic silt, peat, and clay), since fill materials were generally used in this area to extend and reinforce shorelines and to eliminate swampy areas.

Based on the SC borings, the overburden beneath the site consists of a fill unit underlain by a sand unit. The fill unit contains building debris including brick, concrete, gravel, metal, and coal/coal ash. This unit is present across the site to depths of approximately 4 to 10 feet (ft) below ground surface (bgs). The fill unit encountered at the Astoria West Substation is 4 to 5 ft thicker than the rest of the MGP footprint. The sand unit beneath the fill ranged in thickness from 10 to 35 ft with the bottom of the unit ranging from 16 to 45 ft bgs. Silty clay and/or clay layers are present within the sand unit and were found at depths between 10 to 16 and 28 to 42 ft bgs.

The bedrock underlying the majority of the Astoria facility and surrounding properties is mapped as Member A of the Fordham Gneiss. Bedrock underlying the eastern portion of the site is mapped as the Hartland Formation which consists of gneiss. Bedrock cores collected during the CWTF

investigations indicate that the bedrock beneath the site is crystalline igneous and metamorphic rock, primarily a granodiorite or granitic gneiss. Bedrock was encountered between 25 ft bgs and 82 ft bgs during the investigations at the CWTF. Bedrock was encountered between 35 ft bgs and 71 ft bgs in deep borings drilled north of the CWTF in the 1960s.

2.4.3 Hydrogeology

The site is underlain by unconsolidated sediments overlying bedrock. Only the southern portion of the site is underlain by one of the aquifers of in the Brooklyn/Queens Aquifer System. The Upper Glacial Aquifer in this location consists of glacial till. The unconsolidated sediments and glacial till aquifer underlying the property are relatively thin (approximately 35 to 45 feet thick) and rest directly upon the bedrock surface. Based on previous investigations, groundwater is generally encountered between 3 and 15 ft bgs. The general direction of groundwater flow follows the site topography, from the south-central portion of the site towards the East River (north and northwest) and towards Luyster Creek (northeast). Groundwater elevations in onsite monitoring wells suggest a groundwater divide is present at the facility. Previous investigations determined that the difference between mean high water and mean low water in the East River is approximately 6 feet and that the East River has a tidal influence on overburden groundwater for approximately 250 feet inland of the river in the western portion of the facility and Luyster Creek has a tidal influence of up to 575 feet inland of the creek in the eastern portion of the facility.

2.5 MGP Impacts and RI Objectives

Previous SC and RFI investigations and facility operation activities have encountered MGP-related impacts in the overburden soils and overburden and bedrock groundwater at the facility. Many of these impacts include concentrations of compounds exceeding the 6 NYCRR Subpart 375-6 SCOs (Restricted Use – Industrial) and the AWQSGVs. In addition to the MGP-related impacts identified during the SC and CWTF investigations, MGP-related impacts have been observed in other areas of the facility during RFI activities and during other facility operations such as excavation for water lines, transmission lines, etc. In order to identify the area(s) of MGP-related impacts at the facility that may require additional characterization and delineation during the RI, previous investigation reports, analytical data, and boring logs were compiled and reviewed and a summary of impacted areas encountered during facility operations was provided by Con Edison. Because MGP impacts are frequently visible and have a characteristic odor, a summary of visible and olfactory impacts was developed and is presented on Figure 2-5 and Table 2-1. As illustrated on Figure 2-5 and detailed in Table 2-1, MGP-related impacts have been encountered within the former MGP footprint as well as further east and southeast. Although MGP-related impacts have not been observed in bedrock beneath the site, MGP-related compounds, specifically benzene and naphthalene, have been detected in bedrock groundwater. Therefore, the objective of the RI of the former MGP is to further characterize and delineate the extent of MGP-related impacts in overburden soil and bedrock, and in groundwater within the overburden and bedrock. The RI will also address the July 8, 2009 NYSDEC comments on the draft former MGP SC report (ENSR, 2005) and the Addendum to the draft RFI report (AECOM 2008b) regarding the former gas holders/settling tanks.

2.6 Remedial Investigation Work Plan Objectives

The goals for the RI of the former Astoria MGP site are to:

1) Further characterize and delineate potential soil, bedrock, and groundwater impacts associated with specific former MGP structures (as requested in NYSDEC's July 2009 Comments).

2) Characterize and delineate the extent of MGP-related soil and groundwater impacts encountered in areas of the Astoria facility outside of the MGP footprint.

3) Further assess bedrock quality beneath the former MGP footprint, in the vicinity of the CWTF, and in other areas of the facility where overburden MGP impacts have been encountered.

4) Further develop the dataset necessary to allow preparation of an AAR to evaluate and select possible remedial alternatives for site clean-up.

The RI field activities proposed in this RIWP will be performed during one mobilization. The proposed work in this RI may require additional soil borings and/or wells, as appropriate based on field observations and analytical results, to delineate the full extent of contamination at the site and to facilitate remedial action evaluations. RI investigation locations are proposed in the vicinity of former MGP structures on NYPA property. Access will have to be acquired to perform investigations at these locations and may require a separate mobilization. In addition, there are plans to dismantle the NYPA power plant in the area of the former MGP structures in 2012. RI field activities may be performed more efficiently after the power plant is dismantled in 2012 to allow better access to former structures. Excavation activities were performed between April and November 2010 in the pipe yard area of the Astoria facility, east of the former MGP footprint. The excavation activities occurred within the transmission area of the Astoria Phase II Power Plant project performed by NYPA. MGP-related impacts were encountered in this area during previous RFI activities and facility operations and were removed as part of the excavation efforts. The location and occurrence of MGP impacts were documented during the excavation activities. This information was used to modify investigation locations proposed in the draft RIWP. Three additional borings, MGP159 through MGP161, have been added to the RI scope of work presented in this final work plan to further evaluate the nature and extent of MGP impacts in this area of the facility. Any proposed modifications to this RIWP will be communicated with NYSDEC prior to implementation. All additional work, whether performed at on-site or off-site locations, will be coordinated under the direction of NYSDEC and NYSDOH oversight. Daily updates will be provided via email to the NYSDEC Project Manager during RI field activities to communicate project findings, status, and any proposed modifications to activities proposed in the RIWP.

3.0 Scope of Work

The additional investigative work outlined in this RIWP includes the following tasks:

- Locating and evaluating existing monitoring wells
- Locating underground utilities in the new investigation areas
- Community air monitoring during invasive drilling activities
- Indoor air monitoring during invasive drilling activities performed within Building 136
- Advancement of soil borings and collection of subsurface soil samples for laboratory analysis
- Advancement/coring of bedrock boreholes
- Isolation of water-bearing bedrock fractures with packers and discrete groundwater sampling
- Bedrock borehole geophysical surveys
- Installing FLUTe liners in bedrock holes
- Monitoring well installation
- Monitoring well development
- Water level monitoring
- Groundwater sampling
- Surveying of all new sampling points
- Investigation residuals management

All field work will follow methods and guidelines provided in this RIWP, the QAPP (Appendix A), HASP (Appendix B), Con Edison Utility Clearance Process (Appendix C), and Field Sampling Procedures (Appendix D).

The proposed sampling locations for this RI are presented in Section 4 and were selected to characterize and delineate the extent of MGP residuals identified during the SC, RFI, and facility operations. If soil observations and photoionization detection (PID) screening results indicate that the proposed soil borings and monitoring wells do not adequately define the extent of MGP residuals, additional investigation locations will be selected in the field in consultation with NYSDEC.

A summary of the proposed RI field investigation activities is included in the following section.

4.0 Remedial Investigation Field Activities

As stated in Section 2.6, the RI field activities proposed in this RIWP will be performed during one mobilization, (except possibly the investigations on NYPA property). Data generated during the field investigations will be reviewed and analyzed during the field efforts. Modifications to the field efforts may be recommended based on data generated. All recommended modifications to field activities will be presented to and discussed with NYSDEC prior to modifying the activities. Daily updates will be provided to NYSDEC via email and will include activities performed and any proposed changes to the RIWP.

4.1 Monitoring Well Reconnaissance Survey

More than 130 monitoring wells have been installed at the Astoria facility during previous investigations. Table 4-1 presents a summary of the monitoring wells including the date of installation, total depth, top of casing elevation, and screened depth interval. Figure 4-1 illustrates the monitoring well locations as well as overburden groundwater elevation contours (as presented in the RFI report [AECOM2008]). The condition of many of the monitoring wells is uncertain and it is unknown if many are accessible or could be used during future investigation efforts. Therefore, a monitoring well survey will be performed during the RI to locate and assess the condition of each monitoring well listed in Table 4-1 to determine which wells may be useful in evaluating the nature and extent of MGP-related groundwater impacts at the Astoria facility. The reconnaissance survey will include locating the well, and if found, measuring the depth to the bottom of the well and the depth to water (to the nearest 0.1 foot) to evaluate whether the well is accessible and if it has been damaged or silted in so that it would require repairs or redevelopment for future use. Product thickness, if encountered, will also be gauged using an oil-water interface probe. All downhole equipment will be decontaminated between monitoring wells in accordance with procedures in Appendix D. Investigation derived waste (IDW) generated during this task will be managed in accordance with procedures in Appendix D.

4.2 Underground Utility Clearance

Prior to the initiation of intrusive field work, AECOM will follow the Con Edison Utility Clearance Process for Intrusive Activities EH&S Remediation Program (Appendix C) and contact Dig Safely New York to arrange for the location and marking of all underground utilities in the vicinity of the proposed soil boring and monitoring well locations. Utility clearance will include identifying known utilities on the Pope and Evans drawings obtained from Con Edison. Copies of available city sewer and water maps from the site vicinity will also be obtained and reviewed during underground utility clearance procedures. Following review of the utilities in the site area, AECOM will contract a private company to locate all underground electric and gas utilities in the vicinity of each proposed subsurface sampling location using geophysical methods. Lastly, all boring/well locations will be hand or vacuum excavated to a depth of 5 feet to check for any utilities not located by Dig Safely or geophysical methods.

Prior to drilling in Building 136, as-built drawings will be obtained and reviewed. Based on SC investigations, these drawings show that the building is constructed on piles located approximately 5 feet apart and that the floor is reinforced with internal rebar variably spaced between 4 and 8 inches apart. The closer rebar spacing spans from pile to pile. To ensure that the SC borings did not encounter the pilings and to minimize the potential of encountering rebar, GPR was used to locate the

pilings and the rebar and a grid of locations was marked on the floor. The grid will be remarked on the floor during RI activities and building utilities will also be located. Proposed borings will be placed between rebar and pilings and away from utilities. All locations within Building 136 will be cleared first by coring through the floor and then hand-clearing to approximately 5 ft bgs.

4.3 Air Monitoring Program

4.3.1 Community Air Monitoring Program

Community air monitoring requires real-time monitoring for volatile organic compounds (VOCs), particulates (*i.e*., dust), and MGP related odors at the downwind perimeter of each designated work area when certain activities are in progress at the site. The community air monitoring is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (*i.e*., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative work activities. The Community Air Monitoring Plan provided as Amendment 001 to the HASP specifies action levels which require increased monitoring, corrective actions to abate emissions, and/or work shutdown for the RI.

4.3.2 Indoor Air Monitoring Program

Indoor air monitoring will be conducted while advancing soil borings in Building 136 to provide a measure of protection for workers within the exclusion zone and for building occupants. Drilling activities will be conducted on weekends to reduce the disturbance to building operations. Measures will be taken during drilling to mitigate dust, odors, and vapor generation. These measures will include lining all work surfaces with polyethylene sheeting and shutting of the drill rig when not in use. Adequate ventilation to reduce potential exposure via inhalation of dust and/or vapors from the subsurface will be achieved using fans and ducted vent blowers to direct dust and vapors to the exterior through doorways and roof vents. The exhaust from the drill rig will be vented to the exterior via a vent blower and ductwork positioned at the exhaust pipe.

The following constituents will be monitored continuously during indoor drilling activities (with respective action levels noted in parentheses):

- VOCs (1 ppm based on the potential presence of benzene in the subsurface);
- Carbon monoxide – CO (25 ppm); and
- Particulate (2.5 mg/m^3).

VOCs will be measured with a MiniRAE 2000 PID equipped with a 10.6 eV lamp to monitor vapor generation from the subsurface. CO levels will be measured with a VRAE 7800 Gas Surveyor meter to monitor the potential build up of exhaust gas within and around the work area inside the building. Particulate levels will be measured with a MIE Data-RAM total dust meter to monitor dust generation.

If the action levels listed above are exceeded, work will be stopped and the area will be vented until levels drop below action levels. Additional blowers, venting, and wetting of surfaces will be performed to mitigate dust/vapor.

4.4 Overburden Soil Sampling and Analysis

Sixty-five soil boring locations are proposed to investigate former MGP structures, evaluate the extent of observed MGP impacts within the former MGP-footprint area, and to further characterize and evaluate the extent of MGP impacts encountered in other areas of the Astoria facility. Additional borings may be proposed for step-out delineation purposes based on field observations during advancement of the proposed borings. If additional borings are proposed, their location and rationale will be presented to NYSDEC in the daily updates via email. Of the 65 proposed soil boring locations, 7 locations will be cored into bedrock and FLUTe lined for future evaluation (as detailed in subsection 4.5 below). Two of the 7 bedrock locations will also include a nested pair of overburden monitoring wells and one of the seven bedrock locations will include the installation of a monitoring well screened at the overburden-bedrock interface. Six boring locations will be completed as clusters of overburden monitoring wells (one screened at the water table and one screened above the overburden-bedrock interface). Nineteen of the 65 boring locations will be completed as deep overburden monitoring wells (screened at the overburden-bedrock interface), 14 of which will be paired with an existing shallow overburden monitoring well, and 33 borings will be tremie-grouted to land surface. The proposed RI boring and monitoring well locations are illustrated on Figure 4-2 and summarized in Table 4-2. Table 4-2 includes boring location ID, location rationale, soil analytical sample depth/rationale, analyses and boring completion type.

Actual soil sample intervals and the number of samples chosen for laboratory analysis will be selected in the field based on field conditions and biased to provide characterization and delineation. In general, two or three samples will be collected from each boring location; one at the depth interval with the greatest observed impact based on olfactory and visual observations and PID readings, one below the deepest observed impacts for vertical delineation purposes, and one at the overburden-bedrock interface to characterize soil quality at the top of bedrock. In the event that olfactory and visual observations and PID readings do not indicate impacts at a location (mostly at horizontal delineation points), a minimum of two samples will be collected; one at the approximate elevation interval corresponding to the greatest impact observed in the nearest adjacent boring(s) for horizontal delineation purposes, and one at the top of bedrock. The soil samples will be analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) using United States Environmental Protection Agency (EPA) Method 8260B, polycyclic aromatic hydrocarbons (PAHs) using EPA Method 8270C, 8 RCRA metals using EPA series 6000/7000, polychlorinated biphenyls (PCBs), using EPA Method 8080 and total cyanide using EPA Method 9012A. In addition, some impacted samples will be fingerprinted by META Environmental, Inc. to attempt to identify the source of the impacts, especially in the areas east and southeast of the MGP footprint. A subset of proposed locations include fingerprint analysis as summarized in Table 4-2 and is focused in the areas to the east and southeast of the former MGP footprint where MGP and other impacts have been encountered during RFI activities or facility operations. Fingerprint samples will be collected and analyzed based on field conditions and will only be collected at locations where impacts are encountered and only if the impact is not clearly MGP-related (*i.e.*, it is not tarry and/or does not have the characteristic MGP odor).

During the SC, drilling methods (geoprobe, hollow stem auger (HSA) with split-spoons, and air rotary) did not consistently provide adequate sample recovery and resulted in uncertainty in subsurface conditions in many areas of the former MGP. Therefore, during the RI, soil borings will be advanced using sonic vibratory methods in accordance with the drilling, subsurface soil sampling, and decontamination procedures provided in Appendix D. Sonic methods will allow better advancement and sampling through debris and subsurface obstructions and will penetrate into and provide a sample of the top 3 to 5 feet of bedrock to confirm the depth of bedrock beneath the site. Soil borings will be drilled using a rubber tracked mini-sonic drill rig to allow maximum accessibility in tight spaces

and within Building 136. Sonic drill rigs vibrate casing and core barrel into the ground using harmonic wave energy. The boreholes will be drilled by first advancing core barrel to obtain core samples, followed by advancement of an outer casing over the core barrel to stabilize the borehole and limit vertical migration. The inner core barrel will be retrieved after advancement of the outer casing and the core sample will be extruded into polyethylene bags. Continuous soil samples will be collected from five ft bgs into the top 3 to 5 feet of bedrock or to the base of structures and the soils will be field screened with a PID and visually described for textural composition and any contaminant characteristics. Visible impacts will be described in accordance with the protocol presented in Appendix D. If oil-like material or tar-like material (OLM or TLM) is noted at the base of structures, an additional boring will be drilled outside and adjacent to the presumed downgradient edge of the structure to evaluate potential leakage of the structure contents into the surrounding soil. The additional borings will be drilled 3 to 5 feet into the top of bedrock. If OLM/TLM is noted at the overburden/bedrock interface at any of the RI soil boring locations, the overburden impacts will be cased off and drilling/coring activities (as described in subsection 4.5 of this RIWP) will commence in the bedrock to evaluate the vertical extent of the overburden impacts. Coring will be terminated at the shallowest fracture set that does not contain visible impacts or 20 feet into the top of competent bedrock, whichever is shallower. If drilled, a determination will be made in the field as to whether to tremie-grout these borings to ground surface upon completion, or to set permanent casing and complete the boring as an openhole bedrock well. The type of completion will be proposed in the daily updates to NYSDEC. These bedrock borings will provide information on the depth to the bedrock surface and the nature of any fractures in the bedrock that might provide a migration pathway. The borings will also provide information to map the top of the bedrock surface and to evaluate whether MGP residuals are pooling on or migrating along the bedrock surface.

In addition to drilling into bedrock if OLM/TLM impacts are noted at the interface to evaluate vertical extent, additional step-out delineation borings may be proposed to further evaluate the horizontal extent of impacts encountered during the RI. These boring locations, rationale for their placement, and soil sampling and analysis will be proposed in the daily updates provided to NYSDEC via email and will be drilled and sampled as described above.

Upon completion, soil borings will either be tremie-grouted to ground surface, FLUTe-lined, or completed as monitoring wells to aid in the groundwater investigation as summarized in Table 4-2. IDW will be managed in accordance with Appendix D.

4.5 Bedrock Investigation

Seven deep (1400 to nearly 2500 ft bgs) bedrock holes were cored on the Astoria facility in the 1960s, northeast of the former gas holder/settling tanks at the CWTF. MGP-related impacts were not reported in the core logs for these locations and bedrock was encountered between 35 and 71 ft bgs. Bedrock groundwater was investigated in the CWTF area through the drilling/coring of 4 clusters of bedrock wells (2 wells in each cluster). MGP impacts were not noted in the bedrock cores, however a coal tar odor was noted in the rotary blowout during advancement of boring F110BR2. In addition, benzene and naphthalene were detected in bedrock groundwater samples collected from some of the overburden and bedrock wells during the CWTF bedrock investigation. Therefore, additional bedrock investigations are proposed as part of the RI to further evaluate the extent of MGP-related impacts in bedrock in the MGP footprint as well as in other areas of the Astoria facility.

Bedrock investigations are proposed at 7 locations during the RI as illustrated on Figure 4-2 and summarized in Table 4-2. The proposed bedrock locations include MGP120, MGP121, and MGP122 in the CWTF area, FR33BR3 west of the CWTF area, MGP114 and MGP155 northeast of the CWTF

area in the footprint of the former MGP, and MGP154 in the vicinity of Blue Dog Lake, east of the former MGP. The bedrock borings in and west of the CWTF are proposed to further evaluate the presence, character, and distribution of MGP-related impacts detected in bedrock groundwater in this area. The bedrock borings to the northeast of the CWTF are proposed to evaluate bedrock quality beneath other former MGP operation areas/structures where significant MGP impacts were encountered during the SC (beneath Building 136) and to help evaluate the source of impacts detected in bedrock groundwater in the CWTF. The bedrock boring proposed in the vicinity of Blue Dog Lake is to provide bedrock quality information beneath an area of overburden MGP impacts situated outside of the former MGP footprint. These borings will also provide geologic information for a broader area of the Astoria facility than the CWTF.

Bedrock investigation location MGP120 will be advanced adjacent to the most impacted bedrock open hole cluster (F110BR/BR2). At this location, the overburden will be drilled and continuously sampled as described in subsection 4.4. The top of bedrock will be determined by sampler contents and the outer isolation casing will be advanced 5 feet into the top of bedrock. Because this location is situated adjacent to F110BR2, which was cored to 80 ft bgs, the borehole will then be advanced by air rotary methods to 80 ft bgs. A Schedule 40, 4-inch diameter steel casing will be grouted into bedrock to 80 ft bgs. At each of the remaining 6 proposed bedrock locations, the overburden will be drilled and continuously sampled as described in subsection 4.4. The top of bedrock will be determined by sampler contents and the outer isolation casing will be advanced 5 feet into the top of bedrock. A Schedule 40, 4-inch diameter steel casing will be grouted into the top 5 feet of bedrock. After the grout has cured for a minimum of 24 hours, the boreholes will be advanced using a HQ ($3\ ^{7}/_{8}$-inch diameter) wireline rock core barrel equipped with a diamond cutting bit. Bedrock borings will be advanced to a depth of 150 ft bgs. If visible indications of impacts (*i.e.*, OLM/TLM) are noted at this depth, drilling and sampling will be continued to a depth of 200 ft bgs.

The core barrel will be advanced by drill rod in intervals or 'runs' of up to 5 feet in length. After each 5-foot run is complete, the core will be extracted from the borehole and placed into a wooden core storage box. The field geologist will photograph the core and log the core for:

- Length of rock recovered
- Percent of the run recovered
- Rock quality designation (RQD)
- Rock type
- Evidence of weathering and the presence and orientation of fractures and voids
- Any visible or olfactory evidence of MGP residuals

If fracture zones containing significant mobile OLM/TLM are encountered during drilling, appropriate measures will be taken to prevent the downward migration of the impacts. These measures may include backfilling the boring and drilling a new boring using telescoping casing techniques or overdrilling the boring and using telescoping casing techniques.

During the coring process it will be necessary to continuously circulate water to cool the diamond bit and to clear the drill cuttings from the borehole. Potable water for this task will be provided from a fire hydrant and transported to the drilling location by hose or support truck. Circulation water will be either lost to the formation or brought back to the ground surface via pumping and contained in a tub. At the conclusion of coring, water retained in the tub will be containerized in drums for proper off-site disposal. Samples of rock core will not be collected for laboratory analysis.

Following the completion of the drilling/coring to the total depth of the boring, a FLUTe™ blank liner with an inner NAPL liner will be everted into the borehole according to the manufacture's specifications (provided in Appendix D). The blank and NAPL liners will be removed from the borehole and the NAPL liner will be separated from the blank liner and evaluated for the presence of NAPL. The blank liner will be everted back into the hole and filled with potable water to keep the borehole open and prevent vertical migration. .

Downhole geophysics will be performed in each bedrock boring drilled during the RI. The geophysical tools to be employed include acoustic caliper, fluid temperature and resistivity, optical and acoustical televiewers, and a heat pulse flow meter. These tools will provide fracture depth, size, trend (strike and dip) and flow characteristics to aid in mapping fracture sets and help evaluate fracture interconnectivity to assist in delineating bedrock impacts. Core and NAPL liner observations and geophysical results will be used to select specific water-bearing zones for dual-packer isolation purging and sampling in the bedrock wells. These groundwater samples will be analyzed for VOCs and SVOCs using EPA Methods 8260B and 8270C. Fracture conductivity and interconnectivity testing may be performed depending on field conditions and data collected. Any additional testing or bedrock boring locations will be proposed in the daily updates to NYSDEC.

4.6 Groundwater Investigation

Additional groundwater investigation will be performed through the reconnaissance of existing wells, the installation of 43 monitoring wells (8 overburden clusters [each cluster consists of one well screened across the water table and one well screened at the overburden-bedrock interface], 20 deep overburden wells [screened at the overburden-bedrock interface and generally paired with an existing shallow overburden well] and 7 FLUTe-lined open bedrock wells), the gauging of wells, and collection and analysis of groundwater samples. The locations of the monitoring wells to be installed during the RI are shown on Figure 4-2. Rationale for the RI monitoring wells is provided in Table 4-2.

All wells will be installed using either sonic or HQ rock coring methods in accordance with monitoring well installation and development procedures provided in Appendix D. All overburden wells will be constructed of two inch PVC with 10-foot well screens with a two-foot sump at the base of the well to collect any denser than water non-aqueous phase liquid (DNAPL) that may be present. Each overburden monitoring well cluster will consist of one shallow (S) well with a 10-foot screen across the water table and one deep (D) well with a 10-foot screen at the overburden bedrock interface. If NAPL is encountered at a location to be completed as a monitoring well, the well will be constructed with 0.020 slot screen to prevent clogging of the screen interval with product, otherwise monitoring wells will be constructed with 0.010 slot screens. Quartz sand will be emplaced to a minimum of one-foot above the screened interval of the well and a two-foot bentonite seal will be emplaced above the sand pack. Grout will be emplaced above the bentonite seal to grade. Flush-mounted, limited access road boxes will be used at the ground surface to complete the wells and the surface will be restored to pre-existing conditions.

Following installation, all monitoring wells will be developed to evacuate silts and other fine-grained sediments which may have accumulated within the well during its installation. Well development will not be performed for a minimum of 48 hours after well installation. A number of techniques may be used, including surging using a plunger, bailing, or pumping until the turbidity (less than 50 NTU if possible) or pH, temperature, and specific conductivity have stabilized. Special care will be taken to develop the wells properly in order to ensure adequate hydraulic connection between the monitor well and the aquifer and to obtain representative groundwater samples for chemical analysis.

Following development, wells will be allowed to stabilize for two weeks or more prior to groundwater sampling. All newly installed RI wells (except the FLUTe-lined bedrock holes which will be sampled by zone during boring advancement or via dual packer isolation sampling), previously installed SC wells, and several previously installed RFI wells that do not contain NAPL will be sampled in accordance with the low-flow groundwater sampling procedures provided in Appendix D. Table 4-3 provides a list of the monitoring wells to be sampled and the analyses to be performed during the RI. Figure 4-3 illustrates the locations of the monitoring wells to be sampled during the RI. Existing facility monitoring wells may be added to or deleted from this list depending on field observations. Any modifications to the proposed list of monitoring wells to be sampled will be provided to NYSDEC in the daily updates.

Prior to groundwater sampling efforts, depth to water and NAPL thickness (if present) measurements will be made to the nearest 0.01 foot at each well location. All wells not containing NAPL will be sampled with either a peristaltic pump or submersible pump using low-flow sampling methods with the tubing or pump placed at the approximate midpoint of the screened or open interval or the approximate midpoint of the wetted portion of the screened interval in water table wells. At the ground surface, the water will pass through a sealed chamber containing probes which will measure the water temperature, pH, conductivity, and oxidation-reduction potential. Samples of water discharging from the chamber will be collected at regular intervals and analyzed for turbidity using a hand-held field meter. After passing through this chamber, the water will be discharged to a calibrated 5-gallon bucket where the pumping rate will be calculated. When this bucket is full, the water will be transferred into a 55-gallon drum where it will be stored for future disposal. Pumping rates will be set below the maximum sustainable flow rate so as not to significantly lower the water level in the well. Groundwater analytical samples will be collected when water quality parameters have stabilized.

Samples will be analyzed for VOCs, SVOCs, PCBs, 8 RCRA metals, and total cyanide using the laboratory methods presented on Table 4-3. All development and purge water will be managed in accordance with Appendix D.

4.7 Site Survey

A site survey of the investigation sampling points and other features of interest will be conducted at the end of the fieldwork by a New York State-licensed surveyor under the direct supervision of AECOM. All locations will be tied into the existing base map developed for the facility.

After the monitoring wells are installed, a notch or mark will be made at the top of each inner casing. The vertical location of this point will be surveyed to a reference point determined in the field with accuracy of 0.01 of a foot.

All elevations will be referenced to the North American Vertical Datum of 1988 (NAVD88). The horizontal locations of each point will be surveyed in the New York State Plan Coordinate System – East Zone NAD83.

4.8 Investigation Residuals Management

All investigation waste generated during the RI will be collected in properly labeled 55-gallon drums grouped by environmental matrix (soil, groundwater, construction debris [inclusive of personnel protective equipment]) and staged in a secure area. Subsequently, the drums will be characterized with laboratory analyses and properly disposed in accordance with Appendix D.

5.0 Remedial Investigation Report

At the completion of the RI field activities, the results of the investigation will be drafted into a RI Report for the former MGP. The RI report will include:

- Executive summary
- Site background
- Descriptions of field activities performed
- Field observations, field measurements, and laboratory analytical data summarized in tabular format
- Plan-view and cross-section figures presenting laboratory analytical data and/or field observations of overburden soil, bedrock core, overburden and bedrock groundwater
- Geologic profiles summarizing both field observation and laboratory results
- Integration of field observations and measurements with laboratory analytical data to refine the site conceptual model
- Qualitative exposure assessment

Appendices to the reports will include all pertinent data used to support the RI efforts, including validated laboratory analytical results, stratigraphic boring logs, and all field sampling sheets.

6.0 Project Schedule

The anticipated schedule for the RI is outlined on Figure 6-1. The schedule assumes NYSDEC approval of the RIWP by September 21, 2012 The field work will be scheduled within the last quarter of 2012 and will begin as soon as possible based on subcontractor availability. Due to the industrial use of the site, careful planning and coordination of activities will have to be performed around operational logistics and constraints. Assumptions have been made in the schedule regarding turnaround times for document review and for the duration of the field tasks. Anticipated schedules for any additional investigation work will be prepared as necessary and included in daily updates to NYSDEC.

7.0 References

AECOM 2008a. Draft RCRA Facility Investigation Report, Con Edison, Astoria, NY, February 2008.

AECOM 2008b. Addendum to the Draft RCRA Facility Investigation (RFI) Report, May 2008.

Brown and Caldwell Associates 2006. East and West Tank Cleanout and Inspection Report. September 2006.

ENSR, 2002. Astoria Former MGP Site History Research, July 2002.

ENSR, 2005. Draft Former MGP AOC Characterization Report, August 2005.

NYSDEC, 2009. Comments on the Draft Former MGP SC report (ENSR, 2005) and the Addendum to the draft RFI report (AECOM, 2008b), July 8, 2009.

Tables

Table 2-1
Visible Impact Summary
Remedial Investigation - Former Astoria MGP
Astoria, New York

AECOM

Boring /Well ID	Date Installed	Total Depth	Refusal		Visible Impacts		Comments
		ft bgs	Depth ft bgs	Material	Depth ft bgs	Description	
BH-2	8/21/2009	15	NE	end of boring	8-10	brown product splotches, stains	
BH-3	8/26/2009	15	NE	end of boring	6-8 12-15	tar like product - sticky staining	odor 6-8
BH-7	8/18/2009	15	NE	end of boring	0-2	sheen	odor 0-2
BH-9	8/18/2009	15	NE	end of boring	4-6 6-8 10-15	sheen sticky product coal tar like product	odor 4-15
BH-10	8/17/2009	15	NE	end of boring	8-15	black product sticky, sheen	odor 4-15
BH-11	8/3/2009	15	NE	end of boring	8-15	black product sticky, sheen	
BH-12	8/3/2009	15	NE	end of boring	10-15	stiff black coal tar product	odor 8-15
BH-13	8/5/2009	15	NE	end of boring	unknown	unknown	color-coded as impacted but details not provided in GZA report
BH-14	8/13/2009	15	NE	end of boring	8-15	coal tar product	odor 4-15
BH-15	8/11/2009	15	NE	end of boring	10-15	black sticky product	odor 8-15
BH-17	8/14/2009	15	NE	end of boring	none	none listed	slight odor 8-15
BH-18	8/6/2009	15	NE	end of boring	0-2	black stain	strong petroleum odor 0-2
BH-19	8/10/2009	15	NE	end of boring	2-4	coal tar	odor 2-6 and 12-15
E-42	3/22/2012	9	NE	end of boring	1.2 - 9	stain	very slight tar like odor 5-9
E-43	3/22/2012	9	NE	end of boring	1-8.5	stain	burnt like odor 8.5-9
E-44	3/20/2012	30.5	NE	refusal	1.5-7.5 7.5-11 12-14	stain bluish greasy coating stain	slight to strong tar/naphthalene odor 6-24
E-45	3/22/2012	19.4	NE	refusal	1.75-5 5-8	stain tar-like coating	slight to moderate tar odor 3-19.4
E-46	3/29/2012	9	NE	end of boring	2-3	stain	slight tar like odor 2-3
E-47	3/21/2012	9	NE	end of boring	0.7 - 2 4-8.5	stain stain	slight naphthalene like odor 4-9
E-48	3/21/2012	9	NE	end of boring	3-9	stain	slight tar like odor 5-9
E-49	3/21/2012	9	NE	end of boring	1-9	stain	slight naphthalene like odor 1-4
E-50	3/21/2012	9	NE	end of boring	2-9	stain	no odor
E-51	3/19/2012	10	NE	end of boring	0.8-2	stain	slight tar like odor 0.8-2
E-52	3/19/2012	9	NE	end of boring	1.7-2.5	stain	no odor
E-57	3/19/2012	9	NE	end of boring	1-3.5	stain	moderate naphthalene like odor 1-3.5
E-58	3/19/2012	9	NE	end of boring	1-3	stain	slight tar like odor 1-2: sweet solvent like odor 5-9
E-59	3/20/2012	9	NE	end of boring	0.75-3	stain	moderate tar like odor 0.75-3
E-60	4/4/2012	13	NE	end of boring	4-9 8.8-8.9	stain piece of hard tar	slight tar like odor 8.5-12 and 12.5-13 and creosote odor 12-12.5
E-62	4/2/2012	9	NE	end of boring	0.7-3	stain	slight tar like odor 0.7-3

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AECOM

Boring /Well ID	Date Installed	Total Depth	Refusal		Visible Impacts		Comments
		ft bgs	Depth ft bgs	Material	Depth ft bgs	Description	
E-63	3/29/2012	10	NE	end of boring	0.9-2 2-3.5	stain tar-like coating	slight to strong tar like odor 0.9 - 10
E-64	3/30/2012	9	NE	end of boring	0.75-3	stain	slight to strong tar like odor 0.75-5 and slight chlorine like odor 5-9
E-65	4/3/2012	13	NE	end of boring	0.75-8.5	stain-tar pieces at 5.5 and 7.8	slight tar like odor 5-11.5
E-66	4/3/2012	9	NE	end of boring	2-9	stain	no odor
E-67	4/3/2012	9	NE	end of boring	5-9	stain	no odor
E-68	3/30/2012	6	NE	end of boring	2-6	stain	no odor
E-69	4/5/2012	9	NE	end of boring	0.9-2	stain	slight tar like odor 0.9 - 5
E-70	4/5/2012	9	NE	end of boring	0.75-2	stain	sweet pungent detergent like odor 0.75-9
E-72	4/6/2012	9	NE	end or boring	1-9	stain	slight tar like odor 1-2 and slight burnt odor 5-9
F04	6/14/1995	10	NE	end of boring	6-10	strong petroleum odor and visible product	screened 4.75-10
F11	6/27/1995	53.5	53.5	refusal on bedrock	10-10.5	NAPL	
F13	6/6/1995	12	NE	end of boring	6-8	coal tar	screened 5.5-10.5 , Sheen after 8 no split spoon
F15	6/14/1995	10	NE	end of boring	6-10	strong petroleum odor and visible product	screened 4.75-10
F16B	9/11/2003	13	NE	end of boring	11-13	light sheen	screened 3 13- Strong petroleum odor 11-13
F17	7/10/1995	19	NE	end of boring	11-18.5	separate phase liquid	liquid not defined-piezometer installed PZ17
F18B	4/18/2006	15	NE	end of boring	9-13.5	sheen	heavy oil petroleum odor 2-5 -screened 10 feet - interval not provided
F25	7/8/1995	45	45	auger and spoon refusal - weathered rock in tip of spoon	16-18	none noted but see comment	odor 6-10.5, strong odor 10.5 - , log notes state that the 16-18 interval was the worst visually but no description of visible impact provided - Notes also say a piezometer PZ25 was installed 5' north of this location
F26	7/5/1995	10	NE	end of boring - geoprobe	8	sheen noted	odor noted at 8 feet - completed as pz F26
F44D	8/26/2003	44	NE	end of boring	15-17	some oily residue	screened 33-38 - not continuous sampled
F46	9/9/2003	22	NE	end of boring	15-17	sticky soil with some Knapl?	log notes that well installed at 20 ft but no details are provided. Petroleum odor 2-5. Odor 11-17. No recovery deeper than 17.
F47	8/9/2005	17	NE	end of boring	7-9	coal tar - not enough to sample	screened 6-16
F50B	6/19/2007	16	NE	end of boring	??not listed	NAPL saturated soil	screened 2-12 - NAPL type not identified
F52	5/31/2005	5	NE	end of boring	2-4 4-5	coal tar, NAPL saturated NAPL saturated	MGP odor 2-4, petroleum odor 4-5. Fingerprints of BS and CS indicate pyrogenic and petrogenic (weathered heavy oil)
F53	8/11/2005	18	NE	end of boring	2 5-7	trace coal tar possible coal tar	screened 7-17

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Boring /Well ID	Date Installed	Total Depth	Refusal		Visible Impacts		Comments
		ft bgs	Depth ft bgs	Material	Depth ft bgs	Description	
F54	7/12/2005	15	NE	end of boring	3.8 7-9.2	sheen on water table tr NAPL spots on spoon exterior	strong oily odor at 3.8, no other odors noted - notes at bottom of log states "coal tar seeps' but no other details - screened 5-15
F54A	7/12/2005	15	NE	end of boring	7-15	NAPL observed in spoons	MGP odor 5 - 15, log notes indicate coal tar seeps and well F54 offset.
F55	7/11/2005	15	NE	end of boring	5-15	NAPL saturated coal ash	strong MGP odor 4-15 - listed as permanent perimeter MW but screened interval not reported on log. Fingerprint of ES and IS indicated tar - ES predominantly petrogenic - mineral insulating oils, light lube oil, and residual oils,
F58	6/7/2005	13	NE	end of boring	9-13 11-13	sheen trace coal tar	screened 2-12, MGP odor 7-15
F60	9/21/2005	16	NE	end of boring	4-6 & 8-10	coal tar and ash	screened 5-15, MGP odor 4-12, preclear log not included. Fingerprint of ES indicates mixture - pyrogenic and oils, gasoline, asphalt derivatives.
F68	12/14/2004	20	NE	end of boring	8-12	acetate liner has slight sheen	screened 3-13; petroleum odor 0-15
F71	1/4/2005	18	NE	end of boring	12-14 16-17	sheen sheen in spoon	screened 2.5 - 17.5, petroleum odor 4-8, strong odor 12 - 17, brackish odor 17-18
F73	6/23/2005	13	NE	end of boring	5 and 13	sheen on groundwater at 5 and coal tar in tip of spoon at 13	screened 2-12
F75	6/29/2005	13	NE	end of boring	7-9	coal tar saturated - sheen 9-11	screened 2-12
F84	11/4/2004	16.5	16.5	spoon and auger refusal	14-16	black stained sand, few NAPL globules (stains gloves)	screened 11.5-16.5
F85	9/4/2003	19	NE	end of boring	11-13	sheen on wood	screened -17 - no samples between 13 and 17
K48	11/19/1997	6.75	NE	end of boring	3-5	oily sheen and odor	screened 1.75-6.75
K49	11/20/1997	5.75	NE	end of boring	3-5	oily soil	screened 1-5.45 notes indicate oily soil above w/t(4.25) and gw had smell and globs of product, spoon coated with oily residue no specific lense of product
K50	11/30/1997	6.5	NE	end of boring	5.5	quarter-sized globs of oil at water table	screened 1.7 - 6.2
K51	11/20/1997	6	NE	end of boring	5	sheen on water table	screened 1.2-5.7
K112	7/11/2005	13	NE	end of boring	2.5 & 4.5-5	coal tar	screened 6-11 - Spill 73 temp well
K120	7/7/2005	9	NE	end of boring	7-9	slight sheen	screened 4-9, petroleum odor 5-9. - temp well for spill 92.
K121	7/8/2005	11	NE	end of boring	5-11	sheen	screened 5-10 - MGP odor 9-11
K128	7/7/2005	13	NE	end of boring	9-13	sheen in spoons	screened 6-11 - MGP odor 8-13 - Spill 91 Temp well

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Boring /Well ID	Date Installed	Total Depth	Refusal		Visible Impacts		Comments
		ft bgs	Depth ft bgs	Material	Depth ft bgs	Description	
K129	7/7/2005	13	NE	end of boring	7-9 9-13	NAPL saturated sheen in spoon	screened 6-11 - petroleum odor 5-7, MGP odor 7-13 - Spill 91 Temp well
K135	9/20/2005	12	NE	end of boring	4.5-5	coal ash and tar	screened 6-11 - MGP odor 4-6 and 8-10
MGP5	11/8/2004	17.5	17.5	Auger Refusal	15.9-17.5	OLM -viscous like cold honey	
MGP10	12/2/2004	45	45	Spoon and auger refusal with rock fragments > 2"	6-8 12-14	sheen on water spotty sheen	mild naphthalene odor 8 - 20
MGP11	11/18/2004	34.5	34.5	Auger Refusal	12-13.5	spotty sheen on water	See TP Log for soil above 9' - Mild naphthalene odor 9 - 13.5, 20-24, 32-34.5
MGP14	12/16/2004	23	23	7" weathered hard rock	1-4	TLM surrounding bricks and pipe	TLM odor strong to faint 4-23
MGP15	12/15/2004	17.5	17.5	Geoprobe refusal	0.71-1.5	tar chunks, asphalt like consistency	Mothball like odor noted 0.75 to 1.5, strong petroleum odor noted 3-10
MGP18	12/1/2004	10.5	10.5	Auger refusal - tooth broke on auger	10-10.5	piece of brick with sheen, brown oily stain,brown water	not enough recovery for sample from 6-10 - mild naphthalene odor 10-10.5
MGP20	1/11/2005	27.5	27.5	Spoon and auger refusal	6.5-12	product observed during air rotary drilling	
MGP23	11/3/2004	22	22	Auger refusal	5-7 7-9 9-11	layers of black stain NAPL staining with few globules few globules	mothball like odor 5 - 22
MGP28	12/7/2005	44.5	44.5	spoon and auger refusal	1-2	pocket of very viscous, brittle TLM	
MGP29	12/6/2004	39	39	spoon and auger refusal	2-2.5	black fibrous material with mild naphtha like odor	mothball like odor 8-10
MGP30	3/5/2005	19	19	geoprobe refusal	8-12	staining on sleeve	Petroleum odor 5 - 10 , MGP odor 10 - 16
MGP31	3/5/2005	24	24	Geoprobe refusal	11-13	staining on sleeve	slight MGP odor 7-8, strong MGP odor 8 - 14, MGP odor 14-18, strong petroleum (NAPL) odor 18-20, MGP odor 20-24
MGP41	3/6/2005	17	17	Geoprobe refusal with rock/concrete lodged in basket	12-17	staining on sleeve and NAPL product - only 8" recovery between 12-16 and 1' recovery 16-17	MGP odor 5-12, strong MGP odor
MGP46	3/20/2005	23.5	23.5	geoprobe refusal	5.5-6.5	dark gray stain	mild chemical - non naphthalene odor from 20 to23.5
Y03	7/5/1995	8	NE	end of boring - geoprobe	6-8	oil sheen	odor 6-8
Y13A	6/29/2005	10	NE	end of boring - geoprobe	2-2.5	black tar like material	odor - 2-2.5

Table 2-1
Visible Impact Summary
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Boring /Well ID	Date Installed	Total Depth	Refusal		Visible Impacts		Comments
		ft bgs	Depth ft bgs	Material	Depth ft bgs	Description	
Y14	6/29/1995	10	NE	end of boring - geoprobe	2-8 8-10	black staining black tar like material	petroleum odor 2-8
Y16	7/21/1995	20	NE	end of boring	7.25 8-19.5	petroleum staining petroleum observed	strong petroleum odor 7.25 - 19.5, sheen at 12 ft
Y17	7/21/1995	16	NE	end of boring	6-15 15-15.5	sheen saturated with product	type of product not noted
Y18	7/20/1995	21	NE	end of boring	0-3 5-5.75 7-19.5	black staining product saturated product saturated	strong petroleum odor 5 - 21
Y21	7/19/1995	18	NE	end of boring	8-17	sheen	
Y22	7/21/1995	20	NE	end of boring	7.5 8-19.5	stained black sheen	
Y23	7/20/1995	20	NE	end of boring	8-10	sheen	
Y24A	6/27/1995	10	NE	end of boring - geoprobe	2-10	black staining noted	faint petroleum odor 0-2
Y25	6/26/1995	6	NE	end of boring	1.0	stained black	
Y27	6/26/1995	6	NE	end of boring	5.62	free product	strong odor 5.2
Y31	5/24/2005 -preclr 6/16/05 -drill	21	NE	end of boring	4-6 7-8 11-13 13-15 15-19	sheen on groundwater coal tar coal tar in matrix and NAPL stain NAPL saturated NAPL? Poor recovery	2- MGP odor noted - fingerprint for Y31CS Noted - auger removal indicates had been driving wood fragments through impacted material. Fingerpint Samples of GS and JS
Y31EP							
Y32EP	2/15/1999	14	NE	end of boring - geoprobe	4-14	stains	odor 4-14.
Y32	5/25/05 preclear 6/15/05 drill	15	NE	end of boring	4-6 9-15	slight sheen on water coal tar saturated material	4-15 strong MGP odor .Fingerprint samples of CS and GS indicate coal tar.
Y33EP	9/15/1999	11	NE	end of boring - geoprobe	6-11	wood with stains	odor from 4-11
Y33	5/27/?? Preclear 6/17/05 drill	21	NE	end of boring	4.5 12-19.1	some coal tar coal tar, NAPL saturation	MGP odor 9 - Fingerprint of CS indicates coal tar and GS indicates tar and fuel oil
Y34EP	3/3/1999	16	NE	end of boring - geoprobe	6-12	stained wood	creosote odor 6-12 - lost recovery from 12-16
Y34	5/25/05 preclear 6/13/05 drill	21	NE	end of boring	13-17.4	tar/NAPL saturated ash and sand, sludge	MGP odor 6- 20. Fingerprint of HS indicates tar
Y35EP	3/9/1999	11	11	refusal - geoprobe	3.8-4	black stained sand	coal tar odor at 11.
Y35	5/26/06 preclear 6/14/04 drill	19	NE	end of boring	2-4 7-18	coal tar - NAPL in soil coal tar, NAPL saturation, NAPl in matrix	MGP odor 7-18. Fingerprint of BS, ES, GS, and JS all indicate tar and some petrogenic material - BS and GS not shown on log.

Table 2-1
Visible Impact Summary
Remedial Investigation - Former Astoria MGP
Astoria, New York

Boring /Well ID	Date Installed	Total Depth	Refusal		Visible Impacts		Comments
		ft bgs	Depth ft bgs	Material	Depth ft bgs	Description	
Y36EP	3/3/1999	16	NE	end of boring - geoprobe	7-8	stained	some odors noted but not defined
Y37EP	3/3/1999	16	NE	end of boring	3.5-6.3	yellow, orange, green stains	odor 7-11 - not defined
Y37	5/26/2005	21	21	spoon refusal - weathered rock	8-17.7	coal tar in soil, NAPL saturation	MGP odor 3-21. Fingerprints of FS and JS indicate tar.
Y38	5/26/05 preclear 6/15/05 drill	15	NE	end of boring	7-12	coal tar in matrix - NAPL saturation 9-11	MGP odor 0 - 13. Fingerprint of FS indicates tar
Y39EP	3/3/1999	12	NE	end of boring-geoprobe	11-12	product - NAPL	odor 11-12
Y41	3/3/1999	8	NE	end of boring - geoprobe	7-8	trace staining	
Y43	11/26/2003	16	16	refusal - geoprobe - clay	10-11	oily soil	petroleum odor 6-16
Y46	11/26/2003	17	NE	end of boring	11-16	sheen on water and dark oily soil	completed as F101 well, high petroleum odor 10-16
Y48	8/16/2004	11	NE	end of boring	8-11	oily soil	some odor 2-4, heavy petroleum odor 6-11
Y55	6/27/2005	19	NE	end of boring	7.7-13.2 13-17.2	sheen lenses of NAPL saturation	MGP odor 7-17.2, sample includes NAPL lense
Y56	6/27/2005	17	NE	end of boring	7-7.75 9-15 15-15.6	NAPL Saturated and Sheen Sheen NAPL lense	MGP odor 7-15.6
Y57	6/28/2005	19	NE	end of boring	7.2-7.6 9-15.5	some NAPL NAPL Saturation	slight gasoline odor 0-6, poor recovery with depth - visible impact range questionable-MGP odor 7 -15.6
Y58	7/19/05 preclear 9/7/2005 drill	11	NE	end of boring	7-11	coal tar	odor present 0-4, MGP odor 5-11
Y68	7/25/2005	2.5	NE	end of boring	0-2	coal tar 'nogules'?	
Y69	7/20/2005	1.5	NE	end of boring	0-1.5	1" layer of coal tar	
Y74	7/28/2005	3	NE	end of boring	0-2	NAPL saturated	notes strong MGP odor - spill 89
Y75	7/28/2005	3	NE	end of boring	0-3	NAPL saturated and coal tar	strong MGP odor-spill 89
Y94	7/15/2005	6	NE	end of boring	2-5	coal tar sludge	Petroleum odor 1-2, MGP odor 2-5. Fingerprint
Y98	7/19/05preclear	12	NE	end of boring	4-8	coal ash and tar	MGP odor 2-12 - sample area NOT visibly
Y133	6/28/2005	9	NE	end of boring	4-6	trace coal tar	MGP odor 6-9
Y135	7/21/2005	6	NE	end of boring	4-6	coal tar	petroleum odor 0-4, strong MGP odor 4-6
Y154	8/24/2005	4	NE	end of boring - vibracore	0-2	sheen	naphthalene-like odor 0-4

Table 2-1
Visible Impact Summary
Remedial Investigation - Former Astoria MGP
Astoria, New York

Boring /Well ID	Date Installed	Total Depth	Refusal		Visible Impacts		Comments
		ft bgs	Depth ft bgs	Material	Depth ft bgs	Description	
Y155	8/24/2005	4	4	refusal - vibracore	0-2 4	sheen staining and tar	petroleum like odor 0-2
Y220	10/17/2005	12	NE	end of boring	0-2	some coal tar and gravel	
Y222	10/17/2005	12	NE	end of boring	6-8	tr possible coal tar	
Y226	9/8/2005	19	NE	end of boring	4-6 12-15	some coal tar NAPL saturated	MGP odor 12-15 - slight MGP odor 15-19. Fingerprint of HS indicates tar.
Y227	9/9/2005	17	NE	end of boring	5-16.3	Coal tar, NAPL saturated	MGP odor 5-17. Fingerprints of DS, HS, IS indicate tar.
Y228	9/21/2005	16	NE	end of boring	4-6.1 12-14	stain and tar on exterior of sample NAPL saturated	MGP odor 4-6.1. Fingerprint of GS indicates pyrogenic - unweathered - tar.
Y311	10/11/2005	20	NE	end of boring	10-12 12-14 16-18	sheen on water coal tar NAPL saturated	Fingerprint of GS and IS indicate tar.
Y312	10/17/2005	20	NE	end of boring	6-14	coal tar	MGP odor. Fingerprints of ES and FS indicate tar
Y318	5/23/2006	20	NE	end of boring	10-20	sheen	Slight coal like odor 4-6, slight petroleum odor 6-8,
Y319	5/23/2006	20	NE	end of boring	9.5-16	sheen	
Y320	5/22/2006	20	NE	end of boring	8-20	sheen	
Y329	9/28/2006	16	NE	end of boring	8-9	staining and petroleum odor	direct drilled to 8 ft bgs
Y358	12/6/2007	6.5	NE	end of boring	6.5	sheen on water table	slight odor 1-4 strong petroleum odor 4 -6.5
Y385	3/5/2009	15	15	geoprobe refusal	10-11	slight sheen	
Y426	8/12/2009	2	NE	end of boring	0.5-1.5	coal tar	strong coal tar odor 0.5-1.5

NOTES:

sheen

stain

product/NAPL - generally MGP - sometimes may be petroleum or mix

Table 4-1
Astoria Facility Monitoring Well Summary
Remedial Investigation - Former Astoria MGP
Astoria, New York

Well ID	Date Installed	Well Depth ft bgs	Top of Casing Elevation (AMSL)	Screened Interval (ft bgs)
B02	11/16/1994	11.00	24.83	6 - 11 ft
F01	6/10/1995	10.30	13.66	6 - 10.3 ft
F02	6/28/1995	12.80	14.59	8.5 - 12.8 ft
F02B	11/14/2002	18.20	14.86	3.15 - 18 ft
F03	6/13/1995	10.50	15.04	6 - 10.5 ft
F04	6/29/1995	12.01	15.16	7 - 11.3 ft
F05	6/13/1995	7.00	11.37	2 - 7 ft
F06	7/6/1995	16.75	17.12	11.75 - 16.75 ft
F06B	11/14/2002	16.80	16.57	7.5 - 16.5 ft
F07	7/18/1995	16.60	21.06	6.75 - 16.6 ft
F08	7/12/1995	15.00	15.33	10 - 14.3 ft
F08B	10/4/2005	23.00	15.67	12-22 ft
F09	7/11/1995	11.30	13.16	7 - 11.3 ft
F09B	2/16/1999	17.00	12.23	7 - 17 ft
F09D	9/15/2003	35.00	9.23	30 - 35 ft
F10	7/5/1995	10.00	12.14	5 - 9.3 ft
F100	8/19/2004	40.00	19.41	34 - 39 ft
F101	8/17/2004	20.00	20.95	7 - 17 ft
F102	8/17/2004	15.00	20.24	5 - 14.5 ft
F103	1/20/2005	20.50	19.36	5 - 20 ft
F104	1/21/2005	19.50	24.63	4 - 19 ft
F105	2/15/2005	18.50	15.06	3 - 18 ft
F106	3/17/2005	15.00	17.85	5 - 15 ft
F107	12/22/2004	20.50	16.16	5 - 20 ft
F108	1/20/2005	21.00	20.13	5.75 - 20.75 ft
F109	11/9/2007	16.50	16.06	6.5 - 16.5 ft
F109BR	11/26/2007	43.00	16.12	Open Hole 30-43
F109BR2	12/21/2007	55.00	16.12	Open Hole 43-55
F11	6/27/1995	13.00	22.69	8 - 12.3 ft
F110	11/12/2007	16.50	17.56	6 - 16 ft
F110BR	11/19/2007	83.00	17.47	Open Hole 60-70
F110BR2	12/11/2007	80.00	17.92	Open Hole 70-80
F111	11/9/2007	20.50	24.32	10.5 - 20 ft
F111BR	11/20/2007	82.00	26.41	Open Hole 69-82
F111BR2	12/19/2007	94.50	26.77	Open Hole 82-94.5
F11B	9/11/2003	19.00	19.22	9 - 19 ft
F12	6/15/1995	20.00	23.34	14.75 - 19.75 ft
F12B	9/10/2003	24.20	19.64	14 - 24 ft
F13	6/6/1995	10.50	16.43	5.5 - 9.8 ft

Table 4-1
Astoria Facility Monitoring Well Summary
Remedial Investigation - Former Astoria MGP
Astoria, New York

Well ID	Date Installed	Well Depth ft bgs	Top of Casing Elevation (AMSL)	Screened Interval (ft bgs)
F14	7/8/1995	8.00	17.82	3 - 7.3 ft
F15	6/14/1995	10.00	15.48	4.75 - 9.75 ft
F16	6/26/1995	10.00	14.88	3.75 - 8.75 ft
F17	7/22/1995	18.00	19.24	6 - 17.6 ft
F18	6/26/1995	12.00	17.26	6.75 - 12 ft
F18B	5/26/2006	15.00	15.25	5 - 15 ft
F19	6/14/1995	17.25	25.89	12 - 17.25 ft
F19D	10/21/2003	29.00	22.13	23.75 - 28.75 ft
F20	7/7/1995	12.00	22.71	7 - 11.3 ft
F21	7/9/1995	14.00	22.00	9 - 13.3 ft
F22	7/13/1995	16.96	17.90	12 - 16.3 ft
F22B	9/22/2005	20.00	13.33	10 - 20 ft
F23	7/7/1995	6.00	9.91	1.5 - 5.3 ft
F24	6/15/1995	10.00	17.42	4.75 - 9.75 ft
F25	7/8/1995	12.00	19.01	7 - 11.3 ft
F26	7/6/1995	10.00	24.23	4.75 - 9.75 ft
F27	7/6/1995	13.00	19.46	7.75 - 12.75 ft
F28	2/19/1996	22.10	37.54	16.9 - 21.9 ft
F29	2/19/1996	30.27	45.60	25 - 30 ft
F30	2/20/1996	22.10	38.00	16.8 - 21.8 ft
F32	11/14/2002	15.93	13.92	5.9 - 15.75 ft
F33	11/14/2002	7.95	16.77	4 - 11.9 ft
F33BR	1/8/2008	49.50	13.51	Open Hole 43-49.5
F33BR2	1/21/2008	59.50	13.51	Open Hole 49.5 - 59.5
F34	11/14/2002	12.59	11.06	2.6 - 12.3 ft
F40S	9/9/2003	12.20	8.69	2 - 12 ft
F41BS	8/19/2003	17.00	10.50	2 - 17 ft
F41D	2/18/1999	31.00	11.93	23 - 31 ft
F41S	2/18/1999	15.00	NL	6 - 15 ft
F42D	3/6/1999	40.00	16.76	30 - 40 ft
F42S	3/6/1999	17.00	16.67	7 - 17 ft
F43D	9/10/2003	36.00	11.20	31 - 36 ft
F43S	2/22/1999	17.48	13.61	8 - 18 ft
F44D	9/12/2003	38.00	17.85	33 - 38 ft
F44S	2/17/1999	21.13	21.14	11 - 21 ft
F46	9/9/2003	20.20	22.26	10 - 20 ft
F47	9/8/2003	15.20	13.55	5 - 15 ft
F48	9/9/2003	12.20	10.97	2 - 12 ft
F49	10/21/2003	12.00	17.31	2 - 11.75 ft
F50B	6/19/2007	16.00	17.37	2-12 ft

Table 4-1
Astoria Facility Monitoring Well Summary
Remedial Investigation - Former Astoria MGP
Astoria, New York

Well ID	Date Installed	Well Depth ft bgs	Top of Casing Elevation (AMSL)	Screened Interval (ft bgs)
F51	9/10/2003	14.00	19.68	4 - 14 ft
F52	8/10/2005	15.50	16.79	5 - 15 ft
F53	8/11/2005	17.50	17.38	7 - 17 ft
F54	7/12/2005	15.50	15.88	5 - 15 ft
F55	7/11/2005	15.50	11.71	5 - 15 ft
F56	6/22/2005	12.50	11.08	2 - 12 ft
F57	7/13/2005	14.50	13.41	4 - 14 ft
F58	6/24/2005	12.50	11.66	2 - 12 ft
F59	7/12/2005	16.50	16.86	6 - 16 ft
F60	9/21/2005	15.50	21.84	5 - 15 ft
F62	1/19/2005	13.50	13.04	3 - 13 ft
F64	7/13/2005	15.50	18.12	5 - 15 ft
F66	6/21/2005	14.50	9.79	4 - 14 ft
F67	7/7/2005	13.50	12.82	3 - 13 ft
F68	12/14/2004	20.00	NL	3 - 13 ft
F69	12/20/2004	17.00	12.79	3.5 - 13.5 ft
F70	1/26/2005	20.00	18.23	5 - 15 ft
F71	12/21/2004	18.00	11.97	2.5 - 17.5 ft
F72	7/5/2005	15.50	18.35	5 - 15 ft
F73	7/5/2005	12.50	12.02	2 - 12 ft
F74	6/23/2005	12.50	13.04	2 - 12 ft
F75	6/29/2005	12.50	11.25	2 - 12 ft
F76	7/5/2005	12.50	11.44	2 - 12 ft
F77	7/12/2005	15.50	16.16	5 - 15 ft
F78	6/22/2005	17.50	15.17	7 - 17 ft
F79	9/4/2003	17.00	11.04	2 - 17 ft
F80	8/9/2005	15.50	14.17	5 - 15 ft
F81	10/5/2005	22.00	16.79	10 - 20 ft
F82	11/15/2004	35.00	20.67	5 - 15 ft
F83	12/9/2004	17.00	18.03	3.75 - 13.75 ft
F84	11/4/2004	16.50	17.94	11.5 - 16.5 ft
F85	9/4/2003	17.00	12.59	2 - 17 ft
F87	5/20/2005	13.50	17.27	3 - 13 ft
F88	10/6/2005	20.50	25.46	10 - 20 ft
MGP21	1/21/2005	21.00	NL	5.75-20.75
N01	12/1/1994	14.00	26.10	9 - 13.8 ft
N02	11/21/1994	13.84	25.41	9 - 14 ft
N03	11/22/1994	10.90	25.95	5.9 - 10.9 ft
N04	11/22/1994	11.00	NL	6 - 10.8 ft
N05	12/3/1994	12.50	27.50	7.5 - 12.5 ft

Table 4-1
Astoria Facility Monitoring Well Summary
Remedial Investigation - Former Astoria MGP
Astoria, New York

Well ID	Date Installed	Well Depth ft bgs	Top of Casing Elevation (AMSL)	Screened Interval (ft bgs)
N08	1/19/1995	13.00	26.22	8 - 13 ft
N09	2/24/1996	8.00	22.92	2.8 - 7.8 ft
N10	2/21/1996	10.20	24.09	5 - 10 ft
S04	4/25/1995	9.50	14.55	5 - 9.02 ft
S08	4/25/1995	9.00	15.08	5 - 8.52 ft
S16	4/25/1995	10.50	14.23	5 - 10.02 ft
W03	6/9/2005	19.30	36.19	15 - 19.3 ft
W03B	11/14/2002	25.10	37.24	12.1 - 21.8 ft
W06	6/28/1995	11.00	16.43	6 - 10.3 ft
Y23	7/20/1995	12.00	18.90	7 - 11.3 ft

NOTES:
ft bgs - feet below ground surface
ASML - feet above mean sea level
NL - Not Listed

Table 4-2
Summary of Proposed Soil Borings and Monitoring Well Locations, Rationale, and Analyses
Remedial Investigation - Former Astoria MGP
Astoria, New York

ID	Rationale	Total Depth	Soil Sample Interval	Proposed Soil Analysis	Completion Type
MGP101	Downgradient of F84 and MGP34 to evaluate the extent of impacts potentially associated with the tar emulsion tank and former holders beneath Building 136 and to evaluate the soil and groundwater quality at the overburden-bedrock interface. Will form nested pair of wells with F84.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP102	Situated within the footprint of the former western holder beneath Building 136 to evaluate potential presence, contents, and integrity of the holder	Holder bottom	most impacted, if no impacts observed, sample from base of structure	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP103	West-southwest of the western holder to evaluate the integrity of the holder and the quality of soils adjacent to and beneath the structure.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP104	Northeast of western holder and northwest of eastern holder beneath Building 136 to evaluate integrity of holders and quality of soils adjacent to and beneath structures.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP105	West of eastern holder beneath Building 136 to evaluate integrity of holder and quality of soils adjacent to and beneath the holder structures.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP106	Adjacent to monitoring well F70 to evaluate the quality of soil associated with the inclined retort house and downgradient of the tar tank between the retort houses and to further evaluate the vertical and lateral extent of impacts associated with the tar emulsion tank and holders beneath Building 136. Will form nested pair of wells with F70.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP107	Northwest of the emulsion storage tank to evaluate the lateral and vertical extent of impacts noted in MGP5 and to evaluate the source of sheen in F68.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP108	Southwest of the emulsion storage tank, within the western purifier house footprint, near previous boring MGP6, to evaluate the lateral and vertical extent of impacts noted in MGP5 and to evaluate the source of tar noted in F13 to the southwest.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP109	Adjacent to monitoring wells F13 and F33 to delineate vertical extent of impacts observed in F13 and lateral extent of impacts noted in proposed MGP108 and MGP110, if any. Will form nested pair of wells with F33.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP110	Southwest of MGP5 and southeast of F13 to evaluate lateral and vertical extent of impacts noted at MGP108 and MGP109 (if any) and F13 and north of the western settling tank to evaluate soil quality north of the tank.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP111	South-southwest of MGP15 and west of/adjacent to MGP23/F14 to evaluate extent of benzene exceedances noted in soil samples collected from MGP15 and visible impacts noted in MGP23. Will form nested pair of wells with F14.B6	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP112	Adjacent to boring MGP12 to evaluate the subsurface soil quality to the top of bedrock in the area of the former water gas tar extractor.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP113	Adjacent to monitoring well F83 to evaluate the lateral extent of impacts associated with the oil tank area and the vertical extent of impacts noted in F83. Will form nested pair of wells with F83.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP114	North of MGP10 and south of MGP23 to further evaluate the lateral and vertical extent of impacts noted in MGP10 and MGP23 and to evaluate bedrock quality between the former holders and tar structures beneath Building 136 and the bedrock groundwater impacts in the CWTF area.	150 ft*	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	Open Hole- FLUTe lined
MGP115	Adjacent to boring MGP20 to evaluate the presence, type, and vertical extent of product noted in MGP20.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP116	Adjacent to monitoring well F04/F105 to evaluate the vertical extent of impacts noted at F04, the lateral extent of impacts at MGP20/MGP115, and the potential for MGP-related impacts to be migrating to the NYPA property. Will form nested pair of wells with F105.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface

Table 4-2
Summary of Proposed Soil Borings and Monitoring Well Locations, Rationale, and Analyses
Remedial Investigation - Former Astoria MGP
Astoria, New York

ID	Rationale	Total Depth	Soil Sample Interval	Proposed Soil Analysis	Completion Type
MGP117	Adjacent to boring MGP18 within the footprint of the former tar separator to evaluate its potential presence, contents, and integrity. The boring will be advanced to the base of the structure if present or to the top of bedrock if the structure is not present.	Bottom of structure	most impacted, if no impacts observed, sample from base of structure	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP118	Situated east and outside of the footprint of the former tar separator to evaluate the quality of soil adjacent to and beneath the former structure. This boring will be advanced only if the former tar separator structure is present so that boring MGP117 cannot be drilled to the top of bedrock. A nested pair of monitoring wells will be installed.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	cluster of overburden MWs with 10-foot screen at water table and 10-foot screen at overburden-bedrock interface
MGP119	Adjacent to MGP11 to evaluate the vertical extent of impacts noted at the water table as requested by NYSDEC.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP120	Adjacent to the F110 well cluster to evaluate overburden quality and to determine the vertical extent of bedrock groundwater impacts detected in F110BR and F110BR2.	150 ft*	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	Open Hole-FLUTe lined
F110D	Adjacent to the F110 well cluster and proposed MGP120 to evaluate overburden soil and groundwater quality at the overburden-bedrock interface. Will form a nested pair of wells with F110.B9	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP121S	Adjacent to former F104, upgradient and northeast of eastern settling tank to evaluate soil and groundwater quality in the shallow overburden and to replace F104.	15 ft bgs**	none - samples to be collected from MGP121D	None	MW with 10-foot screen across water table
MGP121D	Adjacent to MGP121S upgradient and northeast of the eastern settling tank to evaluate soil and groundwater quality in the deep overburden.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP121BR	Adjacent to the MGP121S/D well cluster to evaluate bedrock quality east of the settling tanks and evaluate extent of groundwater impacts detected in F110BR/BR2.	150 ft*	none - samples to be collected from MGP121D	None	Open Hole-FLUTe lined
MGP122S	Adjacent to damaged W03B, upgradient and southeast of the eastern settling tank to evaluate soil and groundwater quality in the shallow overburden and to replace W03B.	15 ft bgs**	none - samples to be collected from MGP121D	None	MW with 10-foot screen across water table
MGP122D	Adjacent to MGP122S upgradient and southeast of the eastern settling tank to evaluate soil and groundwater quality in the deep overburden.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP122BR	Adjacent to the MGP122S/D well cluster to evaluate bedrock quality east of the settling tanks and evaluate extent of groundwater impacts detected in F111BR/BR2.	150 ft*	none - samples to be collected from MGP122D	None	Open Hole-FLUTe lined
F33BR3	West of the F33 well cluster to further delineate bedrock groundwater impacts.	150 ft*	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	Open Hole-FLUTe lined
MGP123	Adjacent to F82 along the western property boundary to evaluate vertical extent of groundwater impacts in F82 and quality of groundwater at the downgradient property boundary. Will form nested pair of wells with F82.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP124S	Situated between tar tanks in the eastern-central portion of the former MGP footprint to evaluate shallow overburden groundwater quality.	15 ft bgs**	none - samples to be collected from MGP124D	None	MW with 10-foot screen across water table
MGP124D	Situated adjacent to MGP124S to evaluate deep overburden groundwater quality.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP125S	Situated north and downgradient of the former MGP process area to evaluate downgradient shallow overburden groundwater quality.	15 ft bgs**	none - samples to be collected from MGP125D	None	MW with 10-foot screen across water table
MGP125D	Situated adjacent to MGP124S to evaluate downgradient deep overburden groundwater quality.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP126	Northeast of BH-2 to evaluate northern and vertical extent of impacts noted in BH-2.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted

Table 4-2
Summary of Proposed Soil Borings and Monitoring Well Locations, Rationale, and Analyses
Remedial Investigation - Former Astoria MGP
Astoria, New York

ID	Rationale	Total Depth	Soil Sample Interval	Proposed Soil Analysis	Completion Type
MGP127	Northeast of BH-3 to evaluate northern and vertical extent of impacts noted in BH-3.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP128	South of BH-3 to evaluate southern and vertical extent of impacts noted in BH-3.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP129	Northeast of F16/Y27 area along the northern ConEdison property boundary to evaluate the northern and vertical extent of MGP and other impacts noted in these borings and the quality of material at the property boundary.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	grouted
MGP130	Northeast and adjacent to F55 to characterize and evaluate lateral and vertical extent of impacts noted in F55. Will form nested pair of wells with F55.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	MW with 10-ft screened interval at overburden-bedrock interface
MGP131	Adjacent to F73 to characterize and evaluate the vertical extent of impacts noted in F73. Will form nested pair of wells with F73.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	MW with 10-ft screened interval at overburden-bedrock interface
MGP132	Adjacent to F75 to characterize and evaluate the vertical extent of impacts noted in F75. Will form nested pair of wells with F75.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	MW with 10-ft screened interval at overburden-bedrock interface
MGP133	Northeast of BH-9 and southwest of the LNAPL area to evaluate the lateral and vertical extent of MGP impacts and to characterize the nature of impacts in the area.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	MW with 10-ft screened interval at overburden-bedrock interface
MGP134	East and downgradient of the LNAPL and coal tar seep areas along the northern edge of the Eastern Parcel to evaluate the lateral and vertical extent of MPG and other impacts noted to the west.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	cluster of overburden MWs with 10-foot screen at water table and 10-foot screen at overburden-bedrock interface
MGP135	East and downgradient of the coal tar seep and transmission line area to evaluate the lateral and vertical extent of MGP impacts noted in these areas.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	grouted
MGP136	East of the former MGP tar separators in the vicinity of coal tar seeps in the western portion of the pipe yard to evaluate the lateral and vertical extent of MGP impacts noted in the pipe yard. Will form nested pair of wells with Y59.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	MW with 10-ft screened interval at overburden-bedrock interface
MGP137	In the central-eastern portion of the pipe yard, east of Blue Dog Lake to characterize and evaluate the vertical extent of impacts noted in this area of the pipe yard.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	MW with 10-ft screened interval at overburden-bedrock interface
MGP138	In the western portion of the pipeyard, west of Blue Dog Lake to characterize and evaluate the lateral and vertical extent of impacts noted near Blue Dog Lake.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	grouted

Table 4-2
Summary of Proposed Soil Borings and Monitoring Well Locations, Rationale, and Analyses
Remedial Investigation - Former Astoria MGP
Astoria, New York

ID	Rationale	Total Depth	Soil Sample Interval	Proposed Soil Analysis	Completion Type
MGP139	Southwest of Y312 and Blue Dog Lake to evaluate the lateral and vertical extent of impacts noted near Blue Dog Lake.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	MW with 10-ft screened interval at overburden-bedrock interface
MGP140	In the southern corner of the pipeyard, southeast of Blue Dog Lake and the area where impacts were noted in a water line excavation to evaluate the extent of MGP impacts noted in the vicinity of Blue Dog Lake and to evaluate the source of the staining noted in borings along the western side of the fill mound area of the Eastern Parcel. Will form nested pair of wells with F87.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	MW with 10-ft screened interval at overburden-bedrock interface
MGP141	Southeast of the Blue Dog Lake area to evalutate the lateral and vertical extent of impacts noted in the pipe yard.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	grouted
MGP142	East of the impacted borings along the western portion of the fill mound area to characterize and evaluate the lateral and vertical extent of impacts and to evaluate the material within the mound area.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	grouted
MGP143	West of F60 located in the auction yard to characterize and evaluate the extent of MGP and other impacts noted in borings in this area and in a recent excavation. Will form nested pair of wells with F60.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	MW with 10-ft screened interval at overburden-bedrock interface
MGP144	West-southwest of F101 where tar was recently identified in the monitoring well to evaluate lateral and vertical extent of tar. Will form nested pair of wells with F101.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	MW with 10-ft screened interval at overburden-bedrock interface
MGP145	East-northeast of F101 where tar was recently identified in the monitoring well and east of impacts noted in borings along the southwestern edge of the fill mound area to charactaerize and evaluate the lateral and vertical extent of impacts.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	grouted
MGP146	South of F101 where tar was identified in the monitoring well to evaluate the southern and vertical extent of impacts.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	To be completed as an overburden monitoring well cluster if no impacts are encountered, otherwise grouted.
MGP147	Within the area where tar was reported to evaluate its characteristics and vertical extent.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	grouted
MGP148	Within the area where during the excavation activities for the Astoria Energy LLC interconnection project, MGP-waste was discovered at the south-east corner of the Cable Yard, near the Auction Yard to evaluate its characteristics and vertical extent.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted

Table 4-2
Summary of Proposed Soil Borings and Monitoring Well Locations, Rationale, and Analyses
Remedial Investigation - Former Astoria MGP
Astoria, New York

ID	Rationale	Total Depth	Soil Sample Interval	Proposed Soil Analysis	Completion Type
MGP149	Adjacent to boring K135 where coal ash and tar were noted between 4.5 and 5.5 ft bgs.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP150	Within the southeastern portion of the Astoria East Substation to evaluate the characteristics and vertical extent of tar reportedly seeping to the surface in this area of the facility.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP151	Adjacent to and north of F44D where oily residue was reported from 15 to 17 ft bgs to evaluate its characteristics and vertical extent (continuous sampling was not performed at F44D).	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample	grouted
MGP152	North of the former lake area between Y17 and Y56 to evaluate the nature and vertical extent of impacts observed in this area of the facility.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample	grouted
MGP153	East-northeast of MGP152 to evaluate the horizontal extent of impacts in this area of the facility.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs, and fingerprint of impacted sample only	To be completed as a MW with 10-foot screen at the overburden-bedrock interface if no impacts are encountered, otherwise grouted.
MGP154	In the center of the Pipe Yard, north of former Blue Dog Lake, adjacent to Y37 to evaluate the vertical extent of MGP impacts and to evaluate bedrock quality beneath the MGP impacts and provide bedrock data for this area of the facility.	150 ft*	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	Open Hole- FLUTe lined
MGP155	West of the former holders and tanks beneath Building 136 to evaluate bedrock quality in the vicinity of the former structures and in the northern portion of the former MGP.	150 ft*	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	Open Hole- FLUTe lined
MGP156	North and downgradient of the large rectangular tar tank beneath the NYPA building to the west of the ConEdison property to evaluate the potential presence, contents, and integrity of the former structure.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP157	North of and downgradient of the former tar tanks beneath the NYPA building to evaluate the downgradient soil and groundwater qualtiy associated with the former structures.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	cluster of overburden MWs with 10-foot screen at water table and 10-foot screen at overburden-bedrock interface
MGP158	Within the former waste pit to evaluate its potential presence, contents, and integrity.	Base of structure or, if not present, top of bedrock	most impacted, if no impacts observed, sample from base of structure	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP159	North of the duct bank between borings BH-9 and BH-10 where mobile MGP impacts were observed during duct bank excavation activities to evaluate the vertical extent of impacts and to provide additional data to define the geometry of the impacts in this area of the site.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP160	North of the GIS building fence and south of the road to evaluate the vertical extent of impacts observed during building construction activities (excavation and piles) and to provide additional data to define the geometry of the impacts in this area of the site.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted

Table 4-2
Summary of Proposed Soil Borings and Monitoring Well Locations, Rationale, and Analyses
Remedial Investigation - Former Astoria MGP
Astoria, New York

ID	Rationale	Total Depth	Soil Sample Interval	Proposed Soil Analysis	Completion Type
MGP161	South of the GIS building and west of BH19 to define the vertical extent of observed impacts and provide additional data to define the geometry of impacts in this area of the site.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
MGP162	Situated in the North Storage Yard to evaluate the vertical extent of coal tar noted during a PCB cleanup job.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
E76	Situated in the East Yard, east of where MGP impacts were noted in a concrete box and where hardened tar was observed in the North Storage yard and southwest of boring E45 where tar coating was noted from 7 to 8 ft bgs to evaluate the presence and extent of MGP impacs in this area of the site.	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted
E83	Situated in the East Yard, near boring E63 where tar coating was noted from 2 to 3 ft bgs to evaluate the presence and extent of MGP impacs in this area of the site. A7	Top of Bedrock	most impacted, vertical extent, & top of bedrock	BTEX, PAHs, CN, 8 RCRA metals, PCBs	grouted

Notes:
MW - Monitoring Well
ft bgs - feet below ground surface
BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes Using EPA Method 8260B
PAHs - Polycyclic Aromatic Hydrocarbons Using EPA Method 8270B
8 RCRA Metals - includes arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver using EPA 6000/7000 Series
CN - Total Cyanide Using EPA Method 9012A
PCBs - Polychlorinated Biphenyls Using EPA Method 8080
Fingerprint - Fingerprinting Analysis to Evaluate Source by META Environmental, Inc.
* - Bedrock open holes will be drilled to 150 ft bgs. However, if visible impacts are apparent at 150 ft bgs, the borehole will be advanced to 200 ft bgs.
** - Total Depth may be modified based on depth to water table. Well will be constructed so that the 10-foot well screen straddles the water table.

Table 4-3
Monitoring Wells to be Sampled during the RI
Remedial Investigation - Former Astoria MGP
Astoria, New York

Monitoring Well ID	Unit	Analyses
F106	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F107	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F15	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F27	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F68	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F69	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F71	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F82	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP21	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP101	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F84	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP106	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F70	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP109	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F33	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP111	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F14	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP113	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F83	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP116	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F105	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP118S	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP118D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP119	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F110D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F110	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP121S	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP121D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP122S	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP122D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP123	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F62	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP124S	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP124D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP125S	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP125D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP130	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F55	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP131	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F73	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP132	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F75	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP133	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs

Table 4-3
Monitoring Wells to be Sampled during the RI
Remedial Investigation - Former Astoria MGP
Astoria, New York

Monitoring Well ID	Unit	Analyses
F25	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP134S	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP134D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP136	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F59	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F18B	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP137	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F53	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP139	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP140	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F87	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP143	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F60	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP144	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F101	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP146S	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP146D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP153	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP157S	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
MGP157D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F41S	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F41D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F42S	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F42D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F44S	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F44D	Deep Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F109	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F109BR	Shallow Bedrock	VOC, SVOC, 8 RCRA metals, CN, PCBs
F109BR2	Deep Bedrock	VOC, SVOC, 8 RCRA metals, CN, PCBs
F110BR	Shallow Bedrock	VOC, SVOC, 8 RCRA metals, CN, PCBs
F110BR2	Deep Bedrock	VOC, SVOC, 8 RCRA metals, CN, PCBs
F111	Shallow Overburden	VOC, SVOC, 8 RCRA metals, CN, PCBs
F111BR	Shallow Bedrock	VOC, SVOC, 8 RCRA metals, CN, PCBs
F11BR2	Deep Bedrock	VOC, SVOC, 8 RCRA metals, CN, PCBs
F33BR	Shallow Bedrock	VOC, SVOC, 8 RCRA metals, CN, PCBs
F33BR2	Deep Bedrock	VOC, SVOC, 8 RCRA metals, CN, PCBs

NOTES:
VOC - Volatile Organic Compounds Using EPA Method 8260B
SVOC - Semi-volatile Organic Compounds Using EPA Method 8270C
8 RCRA Metals - Using EPA 6000/7000 Series
CN - Total Cyanide Using EPA Method 9012A
PCBs - Polychlorinated Biphenyls Using EPA Method 8080

Figures

J:\Indl_Service\Project Files\ConEd 1869\GIS\Projects\MGP RIW\PFigure 2-1 Photogrammetric Image Of Facility.mxd

AECOM

0 2,200 4,400
Feet

N
W E
S

CONSOLIDATED EDISON COMPANY
OF NEW YORK, INC.
60146427.100

PHOTOGRAMMETRIC IMAGE OF FACILITY
FORMER ASTORIA MGP
ASTORIA, NEW YORK

DATE: 03/15/10	DRWN: J.E.B.		FIGURE 2-1

LEGEND

- CON EDISON PROPOERTY
- NEW YORK POWER AUTHORITY
- NRG ENERGY
- US POWER GEN

0 400 800 Feet

N W E S

AECOM

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. 60146427.100			PROPERTIES IN VICINITY OF FACILITY FORMER ASTORIA MGP ASTORIA, NEW YORK	
DATE: 03/15/10	DRWN: J.E.B.			FIGURE 2-2

J:\Indl_Service\Project Files\ConEd 1869\GIS\Projects\MGP R\WP\Figure 2-2 Properties In Vicinity Of Facility.mxd

EAST RIVER

A-10 DOCK AREA

A-11 DOCK AREA

PURGE OIL TANKS SWMU

TANK FARM

AOC SOUTH OF FUEL OIL TANK FARM

TRIANGLE AREA AOC

LNG FACILITY

L.N.G. STORAGE TANK

LUYSTER CREEK

NEW YORK POWER AUTHORITY (NYPA) CHARLES POLETTI POWER PROJECT

POWER HOUSE

COKE STORAGE BINS

GAS TURBINE FACILITY

ASTORIA WEST SUBSTATION

COKE POCKETS

COAL POCKETS

GENERATOR HOUSE

ASH CONVEYOR

ASH HOUSE

CONDENSERS

BLDG. #136 WAREHOUSE

WATER GAS SEPARATORS

TAR EMULSION TANK

1M FT³ GAS HOLDER

TAR SEPARATORS

480K GAL. TAR TANK

7M GAL. WATER TANK

TAR PLANT

FIRE BRICK SHED

TAR PROCESS TANKS

PIPE YARD SWMU

BLUE DOG LAKE

BUILDING 139 SWMU

EASTERN PARCEL

STORAGE HOUSE

OIL TANKS

TAR TANKS

WASTE PIT

CYANOGEN PLANT

ASTORIA GENERATING STATION

ASTORIA TO HELLGATE TUNNEL

LIQUEFIED PETROLEUM PLANT

STORM SEWER SYSTEM SWMU

DISCHARGE TUNNEL

SALT WATER PUMP HOUSE

CONTROL HOUSE

ENGINE ROOM

TUNNEL HEAD HOUSE

BOOSTER HOUSE

TUNNEL HEAD HOUSE AOC

CHEMISTRY LAB

CHEMISTRY LAB WASTE OIL UST SWMU

CORPORATE TRANSPORTATION UST AREA

PRINTERS SHED

TRANSPORTATION DEPARTMENT FORMER WASTE OIL USTs A & B SWMU

PRINT STORAGE

TRANSPORTATION BLDG. #137

TRANSFORMER STORAGE YARD AOC

SPARE TRANSFORMER YARD AOC

CHEMICAL LABORATORY

CABLE STORAGE YARD AOC

ASTORIA EAST SUBSTATION

EAST YARD SWMU

NORTH STORAGE YARD SWMU

ASTORIA TRANSFORMER SHOP

TRANSFORMER YARD

GATE HOUSE

OIL TANKS

AOC WEST OF MAIN GATE

AOC SOUTH OF TRANSFORMER SHOP

CENTRAL WASTEWATER TREATMENT FACILITY SWMU

20th AVENUE

RESIDENTIAL

US POWER GEN
(FORMERLY RELIANT ENERGY)
ASTORIA TANK FARM (12.513 ACRES) ASTORIA GENERATING STATION (19.304 ACRES)

NRG ENERGY, INC.
ASTORIA GAS TURBINES, LLC
(15.1 ACRES)

NEW YORK POWER AUTHORITY (NYPA)
CHARLES POLETTI POWER PROJECT
(46.9 ACRES)

CON EDISON COMPANY OF NEW YORK
ASTORIA FACILITY (203.7 ACRES)
EASTERN PARCEL (20.9 ACRES)

NOTES:
1. MGP STRUCTURES BASED ON INFORMATION OBTAINED FROM SANBORN ATLASES: 1896, 1898, 1915 (■), 1936 (■), 1950, 1977, AND 1986 (■).

Figure not printed to scale. Final figure will be printed as E size to scale.

150 0 150 300
SCALE IN FEET
1" = 150'

FILENAME: 01869-090-105.DWG

REVISIONS

NO:	DESCRIPTION:	DATE:	BY:

DESIGNED BY:
DRAWN BY: J.C.B.
CHECKED BY: C.D.
APPROVED BY: D.S.

2 TECHNOLOGY PARK DRIVE
WESTFORD, MASSACHUSETTS 01720
PHONE: (978) 589-3000
FAX: (978) 589-3100
WEB: HTTP://WWW.ENSR.COM

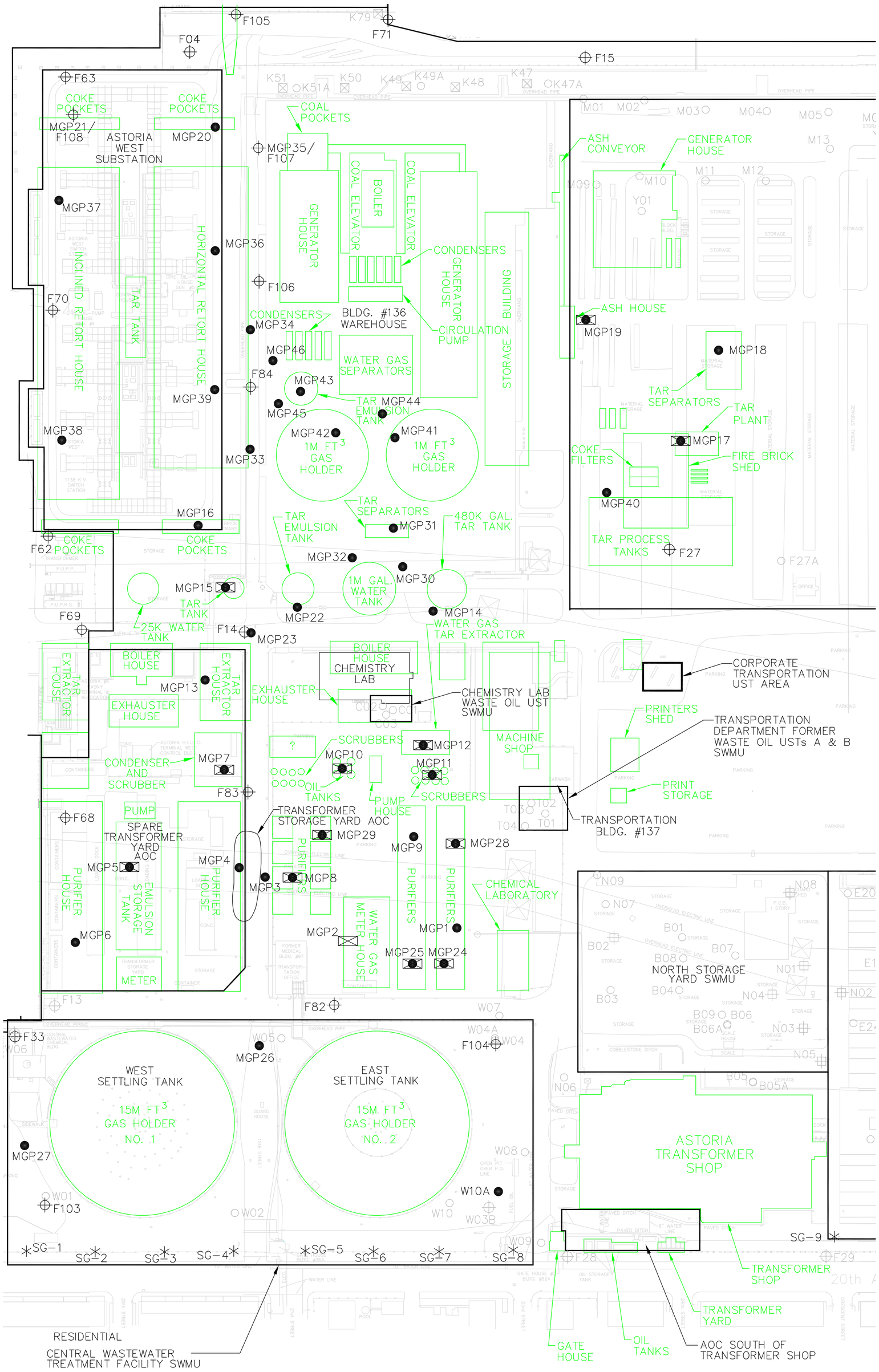
CON EDISON FACILITY
ASTORIA, NEW YORK

PROJECT NUMBER: 01869-090-200
DATE: 03/17/10
SCALE: 1" = 150'

DRAWING NUMBER: 2-3

SHEET NUMBER: 1

FILENAME: 01869-090-11E.DWG



80 0 80 160

SCALE IN FEET
1" = 80'

Figure not printed to scale. Final figure will be printed as E size to scale.

LEGEND
- MONITORING WELL LOCATION
- BORING LOCATION
- PHASE IID SOIL GAS SAMPLE (GOVE-SORBER)
- TESTPIT LOCATION
- HISTORICAL SOIL SAMPLE LOCATION
- HISTORICAL TEMPORARY MONITORING WELL LOCATION
- HISTORICAL PIEZOMETER LOCATION
- HISTORICAL MONITORING WELL LOCATION

SHEET NUMBER: 1

DRAWING NUMBER: 2-4

SAMPLING LOCATIONS
FORMER MGP AOC, PHASE II RFI
CON EDISON, ASTORIA, NEW YORK

SCALE:	DATE:	PROJECT NUMBER:
1" = 80'	03/17/10	01869-090-200

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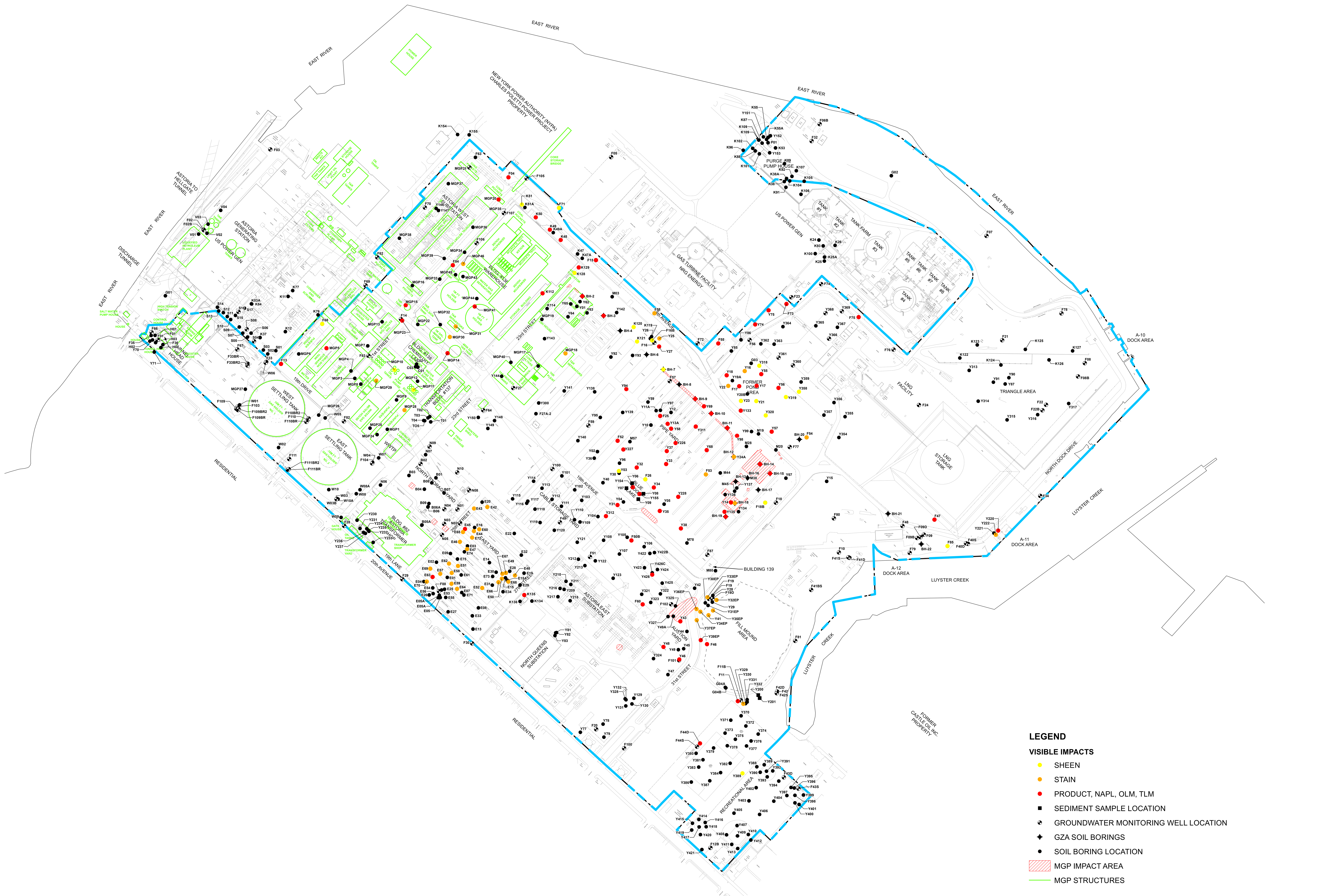
DESIGNED BY:	REVISIONS			
	NO.:	DESCRIPTION:	DATE:	BY:
DRAWN BY: J.E.B.				
CHECKED BY: C.D.				
APPROVED BY: D.S.				



LEGEND

VISIBLE IMPACTS

- SHEEN
- STAIN
- PRODUCT, NAPL, OLM, TLM
- SEDIMENT SAMPLE LOCATION
- GROUNDWATER MONITORING WELL LOCATION
- GZA SOIL BORINGS
- SOIL BORING LOCATION
- MGP IMPACT AREA
- MGP STRUCTURES

0 170 340 510 Feet

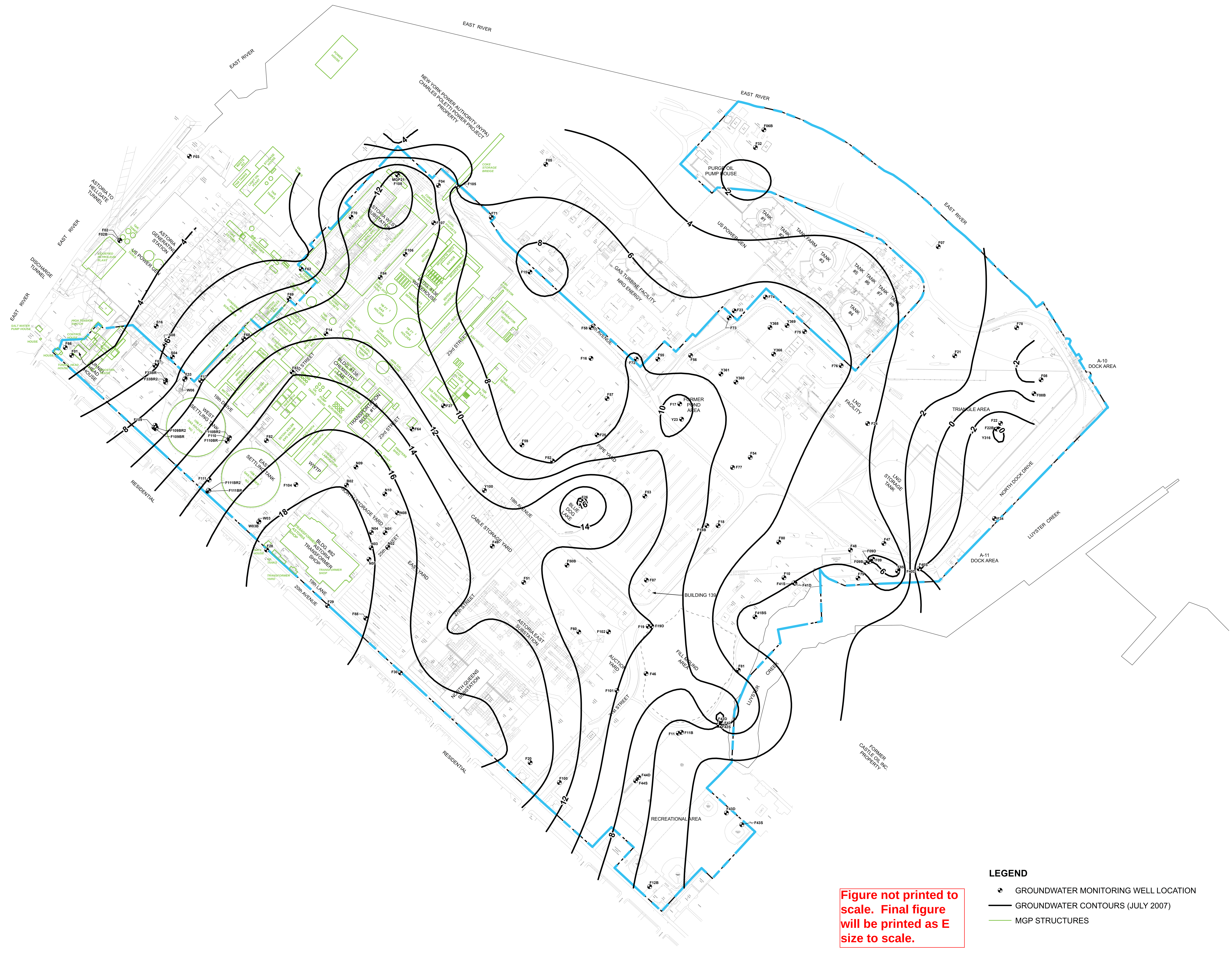
AECOM

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

60278022.200

VISIBLE MGP-RELATED IMPACTS
FORMER ASTORIA MGP
ASTORIA, NEW YORK

DATE: 10/10/12 | DRWN: J.E.B. | FIGURE 2-5



LEGEND

- GROUNDWATER MONITORING WELL LOCATION
- GROUNDWATER CONTOURS (JULY 2007)
- MGP STRUCTURES

Figure not printed to scale. Final figure will be printed as E size to scale.

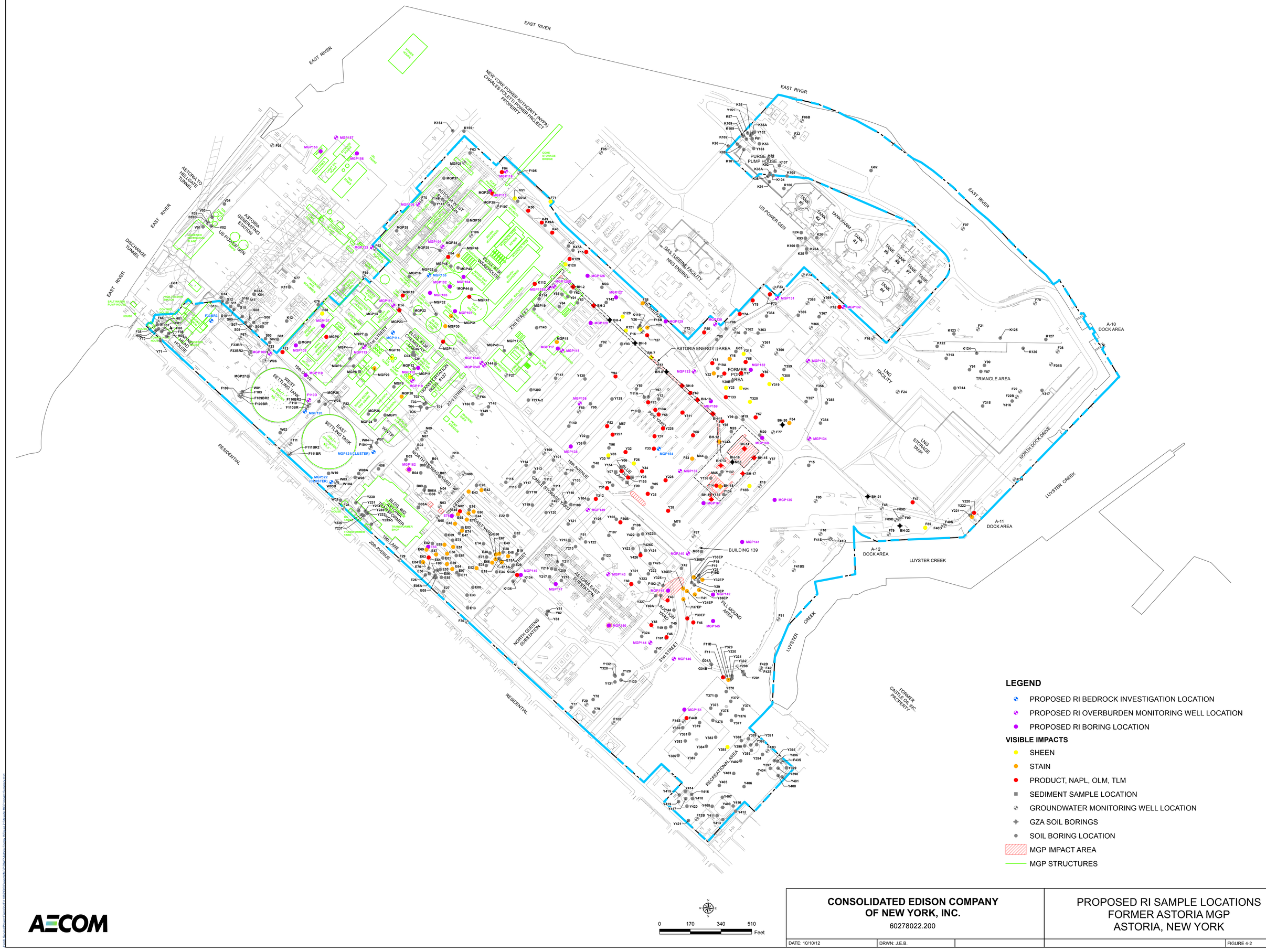
AECOM

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

60146427.100

ASTORIA FACILITY MONITORING WELL LOCATIONS AND OVERBURDEN GROUNDWATER ELEVATIONS CONTOURS
FORMER ASTORIA MGP
ASTORIA, NEW YORK

DATE: 03/17/10	DRWN: J.E.B.	FIGURE 4-1



LEGEND

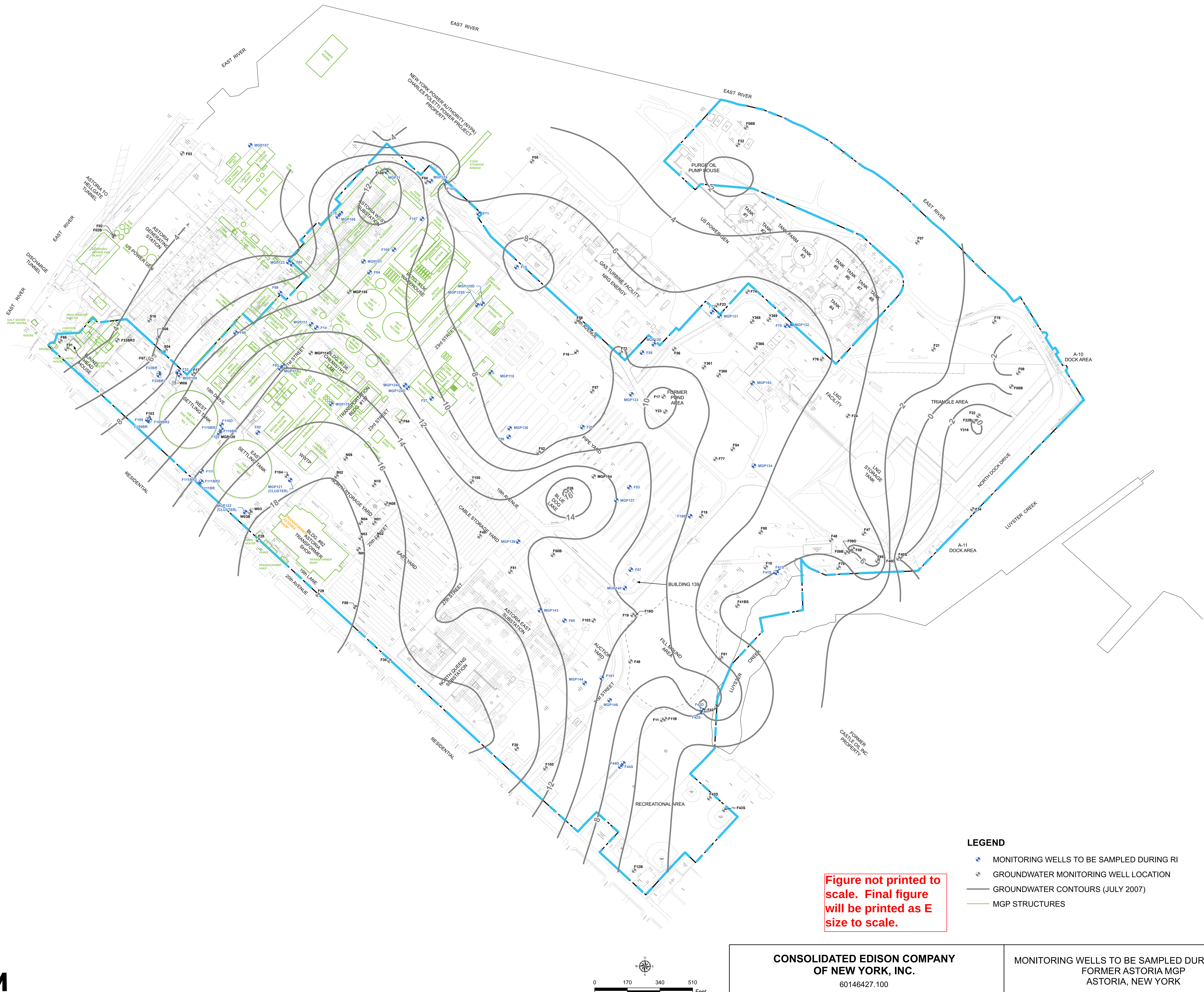
- PROPOSED RI BEDROCK INVESTIGATION LOCATION
- PROPOSED RI OVERBURDEN MONITORING WELL LOCATION
- PROPOSED RI BORING LOCATION

VISIBLE IMPACTS

- SHEEN
- STAIN
- PRODUCT, NAPL, OLM, TLM
- SEDIMENT SAMPLE LOCATION
- GROUNDWATER MONITORING WELL LOCATION
- GZA SOIL BORINGS
- SOIL BORING LOCATION
- MGP IMPACT AREA
- MGP STRUCTURES

AECOM

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. 60278022.200			PROPOSED RI SAMPLE LOCATIONS FORMER ASTORIA MGP ASTORIA, NEW YORK
DATE: 10/10/12	DRWN: J.E.B.		FIGURE 4-2



LEGEND

- MONITORING WELLS TO BE SAMPLED DURING RI
- GROUNDWATER MONITORING WELL LOCATION
- GROUNDWATER CONTOURS (JULY 2007)
- MGP STRUCTURES

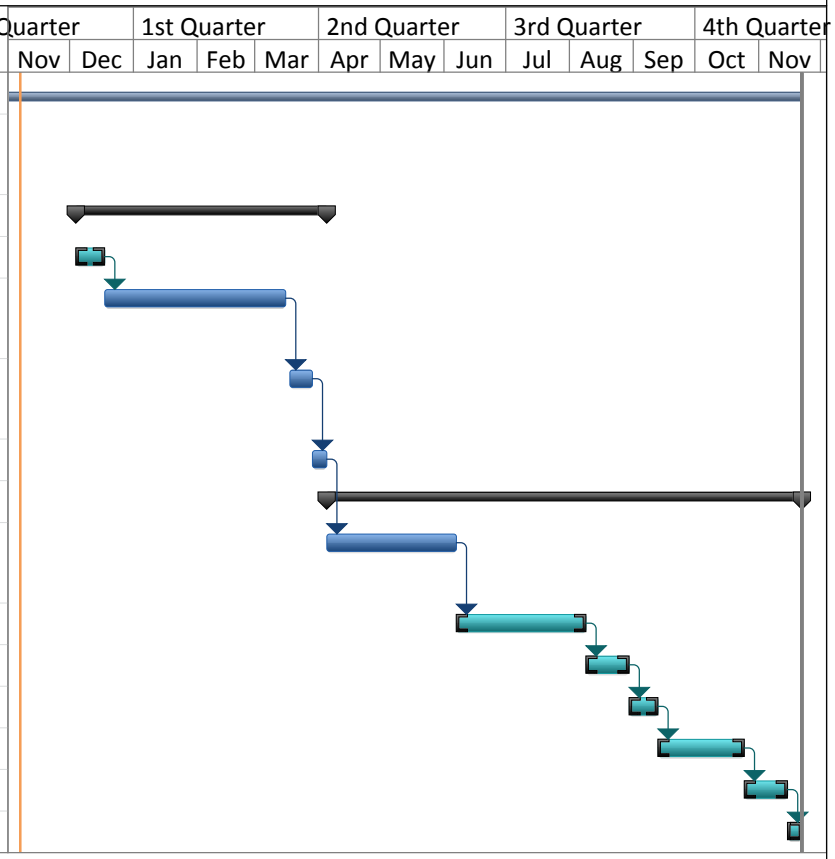
Figure not printed to scale. Final figure will be printed as E size to scale.

AECOM

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. 60146427.100	MONITORING WELLS TO BE SAMPLED DURING THE RI FORMER ASTORIA MGP ASTORIA, NEW YORK
DATE: 03/17/10 DRWN: J.E.B.	FIGURE 4-3

Figure 6-1
Project Schedule
Remedial Investigation
Astoria Former MGP

ID	Task Name	Duration	Start	Finish
1	**Astoria MGP RIWP**	**0 days**	**Wed 7/7/10**	**Wed 7/7/10**
2	Final NYSDEC Review and Approval	0 days	Wed 7/7/10	Wed 7/7/10
3	**RI Fieldwork**	**88 days**	**Tue 12/4/12**	**Thu 4/4/13**
4	Mobilization	10 days	Tue 12/4/12	Mon 12/17/12
5	Drilling, Soil Sampling, Bedrock Investigations	64 days	Tue 12/18/12	Fri 3/15/13
6	Groundwater gauging/sampling, Locations Survey	9 days	Mon 3/18/13	Thu 3/28/13
7	IDW disposal, Demobilization	5 days	Fri 3/29/13	Thu 4/4/13
8	**RI Report**	**165 days**	**Fri 4/5/13**	**Thu 11/21/13**
9	Data Validation andReduction, Appendices	45 days	Fri 4/5/13	Thu 6/6/13
10	Text, Figures, Table Development	45 days	Fri 6/7/13	Thu 8/8/13
11	Con Edison Report Review	15 days	Fri 8/9/13	Thu 8/29/13
12	RI Report Revisions	10 days	Fri 8/30/13	Thu 9/12/13
13	NYSDEC Review	30 days	Fri 9/13/13	Thu 10/24/13
14	Address NYSDEC Comments	15 days	Fri 10/25/13	Thu 11/14/13
15	Final RI Report to NYDEC	5 days	Fri 11/15/13	Thu 11/21/13



Project: Project Schedule
Date: Wed 11/7/12

Task	External Milestone		Manual Summary Rollup
Split	Inactive Task		Manual Summary
Milestone	Inactive Milestone		Start-only
Summary	Inactive Summary		Finish-only
Project Summary	Manual Task		Deadline
External Tasks	Duration-only		Progress

Appendix A

Quality Assurance Project Plan (QAPP)

Remedial Investigation QAPP

Contents

List of Tables

List of Figures

1.0 Project Description

This Quality Assurance Project Plan (QAPP) specifies analytical methods to be used to ensure that data from the proposed Remedial Investigation (RI) are precise, accurate, representative, comparable, and complete.

1.1 Introduction

The Astoria former manufactured gas plant (MGP) site is located within the footprint of the current Astoria Facility in the County of Queens, New York. The site itself contains various utilities and structures below the ground surface (bgs) as well as commercial buildings above ground.

1.2 Objectives

The goals for this RI are to:

1) Further characterize and delineate potential soil, bedrock, and groundwater impacts associated with specific former MGP structures (as requested in NYSDEC's July 2009 Comments).
2) Characterize and delineate the extent of MGP-related soil and groundwater impacts encountered in areas of the Astoria facility outside of the MGP footprint.
3) Further assess bedrock quality beneath the former MGP footprint, in the vicinity of the CWTF, and in other areas of the facility where overburden MGP impacts have been encountered.
4) Further develop the dataset necessary to allow preparation of an AAR to evaluate and select possible remedial alternatives for site clean-up.

1.3 Scope of Work

The investigative work outlined in the RIWP includes the following field tasks:

- Locating and evaluating existing monitoring wells
- Locating underground utilities in the new investigation areas
- Community air monitoring during invasive drilling activities
- Indoor air monitoring during invasive drilling activities performed within Building 136
- Advancement of soil borings and collection of subsurface soil samples for laboratory analysis
- Advancement/coring of bedrock boreholes

- Isolation of water-bearing bedrock fractures with packers and discrete groundwater sampling
- Bedrock borehole geophysical surveys
- Installing blank FLUTe liners in bedrock holes
- Monitoring well installation
- Monitoring well development
- Water level monitoring
- Groundwater sampling
- Surveying of all new sampling points
- Investigation residuals management

The scope of work at the site is described in the project Remedial Investigation Work Plan (RIWP) dated March 2010. Samples will be collected from soil borings and groundwater monitoring wells. The majority of these samples will be analyzed using the United States Environmental Protection Agency (USEPA) SW-846 "Test Methods for Evaluating Solid Waste," November 1986, 3rd edition (and subsequent updates).

Specifically, the soil and groundwater samples will be analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by USEPA Method 8260B, TCL semivolatile organic compounds (SVOCs)by USEPA Method 8270C, RCRA metals using USEPA Methods 6010 and 7471, PCBs using USEPA method 8082, and cyanide by USEPA Method 9012A.

1.4 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements to ensure that data of known and appropriate quality are obtained during sampling and analysis activities. Data developed during the site investigation will be used to fulfill the overall objectives of the program. These objectives include:

- To evaluate the extent of residuals from gas plant operations in the subsurface soil and overburden and bedrock groundwater. These chemicals include volatile and semi-volatile organic compounds, metals, PCBs and cyanide.
- To evaluate whether contaminated groundwater is migrating onto and off of the site either through natural groundwater flow or along the bedding materials outside of utility lines or subsurface structures.

1.4.1 Data Quality Levels

There are five analytical levels of data quality which may be used to accomplish these site objectives. They are typically designated as follows:

- Level I - Field screening or analysis using portable instruments, calibrated to non-compound specific standards;
- Level II - Field analysis using portable instruments, calibrated to specific compounds;
- Level III - Non-Contract Laboratory Program (CLP/ASP) laboratory methods;
- Level IV - ASP-CLP Routine Analytical Services methods; and
- Level V - Non-standard analytical methods.

To meet the specific objectives of this project, Levels I, IV, and V data quality levels will be utilized.

1.4.1.1 Level I – Field Screening Methods

Level I screening will be performed for health and safety purposes according to procedures provided in the site specific Health and Safety Plan (HASP). The tests are classified as field screening evaluations, even though the results are not typically used as part of any site characterization.

1.4.1.2 Level IV – CLP/ASP Methodologies

Soil and groundwater samples will be analyzed according to CLP protocols described in the most recent edition of the New York State Analytical Services Program (ASP). This level of data quality will ensure the generation of legally and technically defensible data for project use. Laboratory data will be reported in the New York State Department of Environmental Conservation (NYSDEC) ASP Category B deliverables format. Level IV data will also be provided for the hazardous waste classification. Available cyanide testing is not a CLP/ASP method, however, a CLP-equivalent data package will be prepared for this analysis. Level IV data will also be provided for soil gas and outside air analytical results.

1.4.1.3 Level V – Non-Standard Methodologies

Hydrocarbon “fingerprint” testing is performed using non-standard analytical methods. Wide range hydrocarbon fingerprints will be determined using GC/FID (EPA Method 8100 modified).

2.0 Project Organization

This RI will be completed for Con Edison by AECOM Environment, an environmental contractor (the Contractor), who will arrange for the drilling and analytical services and provide an on-site field representative to perform the soil logging, soil sampling, surveying, and groundwater sampling. The Contractor will also perform the data interpretation and reporting tasks.

2.1 Key contacts for this project are as follows:

2.1.1 Con Edison Project Manager:

Chris Hughes

Telephone: 718-204-4295

Fax: 718-932-2687

2.1.2 Contractor Project Manager (AECOM):

Jennifer Pfeiffer

Telephone: 212-796-8549

Fax: 212-510-2599

2.1.3 Laboratory Representatives:

Patricia Grieco (Test America)

Telephone 732-593-2507

Fax: 732-549-3679

3.0 Quality Assurance/Quality Control Objectives for Measurement of Data

3.1 Introduction

The quality assurance and quality control (QA/QC) 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 Quantitation Limits (CRQLs) are provided 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

Analytical Parameters	Analytical Method (a)	Matrix Spike (MS) Compounds	Laboratory Accuracy and Precision				Surrogate % Recovery
			MS/MSD (b) % Recovery	MS/MSD RPD (c)	LCS (d) % Recovery	Surrogate Compounds	
VOCs (e)	8260B	1,1-Dichloroethane	61-145	14	NA	Toluene-d8	88-110
		Trichloroethene	71-120	14	NA	Bromofluorobenzene	86-115
		Benzene	76-127	11	NA	1,2-Dichloroethane-d4	76-114
		Toluene	76-125	13	NA		
		Chlorobenzene	75-130	13	NA		
SVOCs (f)	8270C	Phenol	12-110	42	NA	Nitrobenzene-d5	35-114
		2-Chlorophenol	27-123	40	NA	2-Fluorobiphenyl	43-116
		1,4-Dichlorobenzene	36-97	28	NA	Terphenyl-d14	33-141
		N-Nitroso-di-n-propylamine	41-116	38	NA	Phenol-d5	10-110
		1,2,4-Trichlorobenzene	39-98	28	NA	2-Fluorophenol	21-110
		4-Chloro-3-methylphenol	23-97	42	NA	2,4,6-Tribromophenol	10-123
		Acenaphthene	46-118	31	NA	2-Chlorophenol-d4	33-110 (g)
		4-Nitrophenol	10-80	50	NA	1,2-Dichlorobenzene-d4	16-110 (g)
		2,4-Dinitrotoluene	24-96	38	NA		
		Pentachlorophenol	9-103	50	NA		
		Pyrene	26-127	31	NA		
PCBs (h)	8082	Aroclor 1016	65-166	20 (g)	56-149	Tetrachloro-m-xylene	35-137
		Aroclor 1260	65-161	20 (g)	66-147	Decachlorobiphenyl	17-156
RCRA Characteristics	EPA SW 1311/8260B (NY ASP OLM04.2) EPA SW 1311/8270C (NY ASP OLM04.2) EPA SW 1311/6010B/7470A (NY ASP ILM04.1) Ignitability: EPA SW 1010 Corrosivity: EPA SW 9040B/9045C Reactivity: Cyanide §7.3.3.2, Sulfide §7.3.4.2						
Inorganics (i)	Series 6000-7000 (metals)	Inorganic Analyte	75-125 (j)	20 (k)	80-120	NA	NA
	9012 (cyanide)		75-125 (j)	20 (k)	80-120	NA	NA

Notes for Table C-1

NA - Not Applicable

(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) Inorganics (RCRA metals and cyanide)

(j) Matrix spike only

(k) Laboratory duplicate RPD

Table 3-2 Quality Control Limits For Soil Samples

Analytical Parameter	Analytical Method (a)	Matrix Spike (MS) Compounds	Laboratory Accuracy and Precision				Surrogate % Recovery
			MS/MSD (b) % Recovery	MS/MSD RPD (c)	LCS (d) % Recovery	Surrogate Compounds	
VOCs (e)	8260B	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)	8270C	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		
PCBs (h)	8082	Aroclor 1016	29-198	35 (g)	53-142	Tetrachloro-m-xylene	10-166
		Aroclor 1260	15-198	35 (g)	65-138	Decachlorobiphenyl	10-165
RCRA Characteristics	EPA SW 1311/8260B (NY ASP OLM04.2) EPA SW 1311/8270C (NY ASP OLM04.2) EPA SW 1311/6010B/7470A (NY ASP ILM04.1) Ignitability: EPA SW 1010 Corrosivity: EPA SW 9040B/9045C Reactivity: Cyanide §7.3.3.2, Sulfide §7.3.4.2						
Inorganics (i)	Series 6000-7000 (metals)	Inorganic Analyte	75-125 (j)	20 (k)	80-120	NA	NA
	9012/9010A (cyanide)		75-125 (j)	20 (k)	80-120	NA	NA

Notes for Table C-2

NA - Not Applicable

(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) Inorganics (RCRA metals and cyanide)

(j) Matrix spike only

(k) Laboratory duplicate RPD

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 C.1 through C.3.

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 that 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 Appendix D of the RIWP. 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 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 all 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 sampling program will provide data concerning the presence and the nature and extent of contamination of soil and groundwater. 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 to be taken are given in Table 4.1.

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 tagged and the appropriate preservatives will be added. The types of containers are identified in Tables 4.2, 4.3, and 4.4.

Samples shall be preserved according to the preservation techniques given in Tables 4.2 and 4.3. 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 4oC with ice or “blue ice,” and delivered to the laboratory within 48 hours of collection. Chain-of-custody (COC) procedures are described in Section 5.

4.3 Sample Holding Times

The sample holding times for organic and inorganic parameters are given in Tables 4.2, 4.3, and 4.4 and must be in accordance with the NYSDEC ASP requirements. Holding times for Toxicity Characteristic Leaching Procedure (TCLP) samples are given in Table 4.5. The NYSDEC ASP holding times must be strictly adhered to by the laboratory. Any holding time exceedances must be reported to Con Edison.

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/MSD). 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 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. It is a sample of deionized, distilled water provided by the laboratory that has passed through a decontaminated bailer 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. Laboratory prepared air will be used to collect a field blank of the soil gas sampling equipment.

The duplicates will consist of:

a. Coded Field Duplicate - To determine the representativeness of the sampling methods, coded field duplicates will be collected. 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. Coded field duplicate samples will be taken at a frequency of one per 10 field samples.

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 Summary Of Samples And Analyses

Matrix	Parameter	Analytical Method	Field Samples				QC Blanks		Total
			Field Samples	Field Duplicate	MS/MSD[(a)] (Total)	Sub-Total	Trip Blank	Rinse Blank	
Soil Boring Samples	BTEX	EPA SW 8260B (NY ASP OLM04.2)	195	20	10	235	40	10	285
	PAHs	EPA SW 8270C (NY ASP OLM04.2)	195	20	10	235			235
	PCB's	EPA SW 8082	195	20	10	235			235
	Total Cyanide	EPA SW 9012A (NY ASP ILM04.1)	195	20	10	235			235
	RCRA Metals	EPA SW 6000 Series (NY ASP ILM04.1)	195	20	10	2355			235
	Hydrocarbon Fingerprint	GC/FID (EPA Method 8100 modified)	22	0	0	22			22
Groundwater Samples	VOCs	EPA SW 8260B (NY ASP OLM04.2)	170	17	9	205	34	9	248
	SVOCs	EPA SW 8270C (NY ASP OLM04.2)	170	17	9	205			205
	PCBs	EPA SW 8081A/8082	79	8	4	91			91
	RCRA Characteristics	EPA SW 1311/8260B (NY ASP OLM04.2)	10			10			106
		EPA SW 1311/8270C (NY ASP OLM04.2)	10			10			10
		EPA SW 1311/6010B/7470A (NY ASP ILM04.1)	10			10			10
		Ignitability: EPA SW 1010	10			10			10
		Corrosivity: EPA SW 9040B/9045C	10			10			10
		Reactivity: Cyanide §7.3.3.2, Sulfide §7.3.4.2							
	Total Cyanide	EPA SW 9010A (NY ASP ILM04.1)	79	8	4	91			91
	RCRA Metals	EPA SW 6000/7000 Series (NY ASP ILM04.1)	79	8	4	91			91
Waste Characterization (soils)	TCLP VOCs	EPA SW 1311/8260B (NY ASP OLM04.2)	10	-	-	10	-	-	10
	TCLP SVOCs	EPA SW 1311/8270C (NY ASP OLM04.2)	10	-	-	10	-	-	10
	TCLP Metals	EPA SW 1311/6010B/7470A (NY ASP ILM04.1)	10	-	-	10	-	-	10
	Ignitability:	EPA SW 101	10			10			10
	Corrosivity:	EPA SW 9040B/9045C	10			10			10
	Reactivity	Cyanide §7.3.3.2, Sulfide §7.3.4.2	10			10			10

Notes
TCLP - Toxicity Characteristic Leaching Procedure
(a) Matrix spike / matrix spike duplicate for organic analyses; matrix spike and laboratory duplicate for inorganic analysis.

Table 4-2 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	HCl to pH < 2 Cool to 4°C	14 days
Semivolatile Organic Compounds (SVOCs)	1-1000 mL glass w/ Teflon® lined cap	Cool to 4°C	7 days to extraction; 40 day to analysis
PCBs	1-1000 mL amber glass w/ Teflon® lined cap	Cool to 4°C	7 days to extraction; 40 day to analysis
Metals	1-1000 mL plastic bottle	Nitric Acid to pH < 2 Cool to 4°C	6 months, except mercury (26 days)
Cyanide	1-500 mL plastic bottle	NaOH to pH > 12 Cool to 4°C	14 days
RCRA Characteristics	2-1000 mL amber glass w/ Teflon® lined cap	Cool to 4°C	14 days to TCLP ext[(c)]
TCLP VOCs		14 days to analysis	
TCLP SVOCs			7 days to extraction; 40 day to analysis
Ignitability		Cool to 4°C	Not Regulated
Corrosivity		Cool to 4°C	Not Regulated
Reactivity		Cool to 4°C	Not Regulated
TCLP Metals	1-1000 mL plastic bottle	6 months, except mercury (26 days)	

Notes
(a) All samples to be preserved in ice during collection and transport.
(b) Holding times listed assume that the appropriate chemical preservative was used.
(c) 14 days to TCLP extraction, then use determinative method holding times.

Table 4-3 Soil and Waste Sample Containerization 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*
PCBs	8 oz. wide-mouth glass w/ Teflon® lined cap	Cool to 4°C	14 days extraction; 40 days to analysis
Metals	Wide-mouth plastic or glass	Cool to 4°C	6 months, except mercury (26 days)
Cyanide	Wide-mouth plastic	Cool to 4°C	14 days
RCRA Characteristics	32 oz. wide-mouth glass w/Teflon® lined cap		
Ignitability		Cool to 4°C	Not Regulated
Corrosivity		Cool to 4°C	Not Regulated
Reactivity		Cool to 4°C	Not Regulated
TCLP Organic Compounds	Wide-mouth glass w/ Teflon® lined cap	Cool to 4°C	See Table 4.4
TCLP Metals	Wide-mouth plastic or glass	Cool to 4°C	See Table 4.4
Hydrocarbon Fingerprint	8 oz. wide-mouth glass Teflon® lined cap	Cool to 4°C	7 days

Notes:

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

(b) Days from date of sample collection.

(c) Semivolatile organic compounds or PCBs.

* Sohxlet or sonication procedures for extraction and concentration of soil/waste samples for SVOCs must be completed within 5 days of VTSR. Sohxlet or sonication procedures for extraction and concentration of soil/sediment/waste samples for PCBs must be completed within 14 days of VTSR. Extracts of soil samples must be analyzed within 40 days of extraction.

Table 4-4 TCLP Sample Holding Times

Analytical	From: Sample Collection	From: TCLP Extraction	From: Preparative Extraction
Parameter	**To: TCLP[(a)] Extraction***	**To: Preparative Extraction**	**To: Determinative Analysis**
Volatiles	7 days	NA	7 days
Semivolatiles	5 days	7 days	40 days
Mercury	5 days	NA	28 days
Metals (except Mercury)	180 days	NA	180 days

(a) Toxicity Characteristic Leaching Procedure.
NA - Not Applicable.
*Times shown are from verified time of sample receipt.

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 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

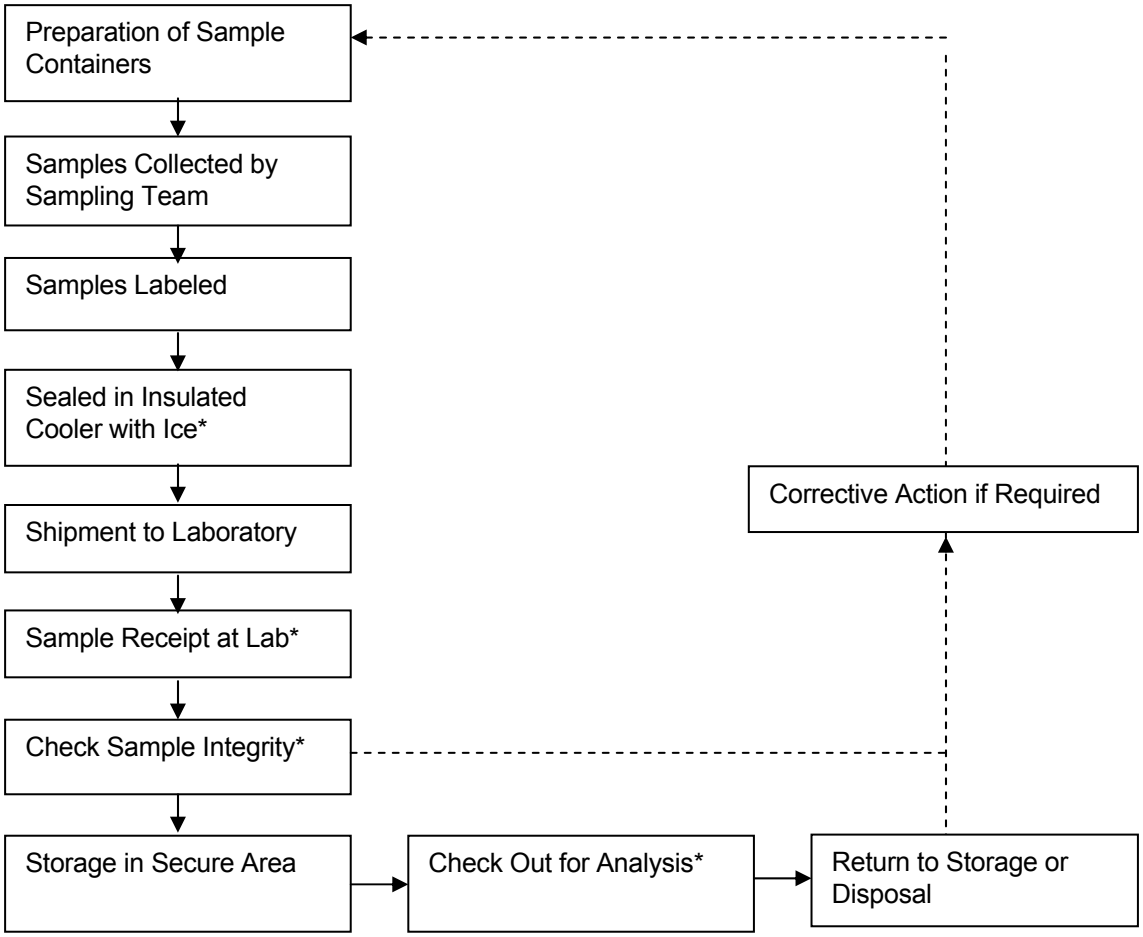
A COC record (Figure 5.2 or similar) accompanies the sample containers from selection and preparation at the laboratory, during shipment to the field for sample containment and preservation, and during return to the laboratory. Triplicate copies of the COC must be completed for each sample set collected.

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

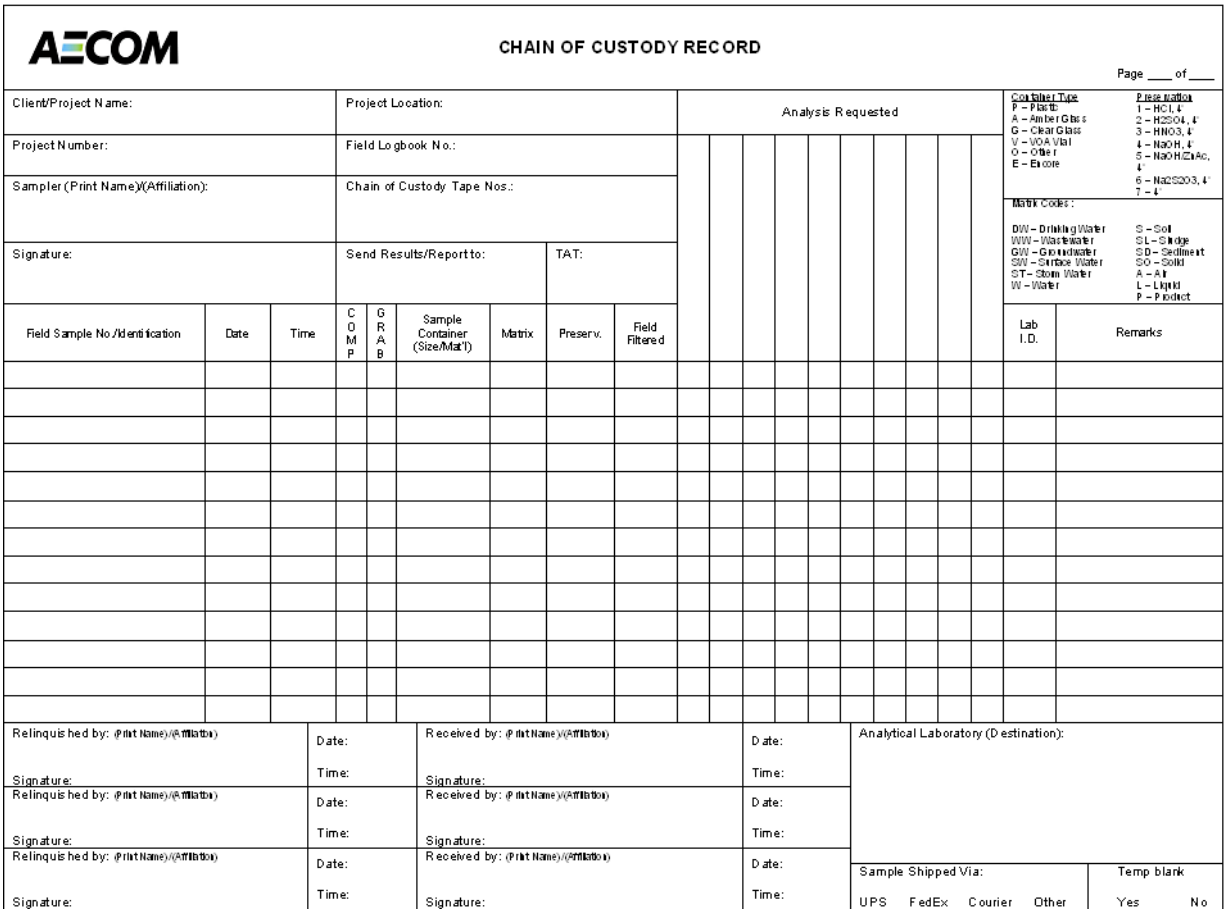
One copy of the COC is retained by sampling personnel and the other two copies are put into a sealable plastic bag and taped inside the lid of the shipping cooler. The cooler lid is closed, custody seals provided by the laboratory are affixed to the latch and across the back and front lids of the cooler, 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.

Figure 5-1 Sample Custody Flowdown



* Requires sign-off on Chain-Of-Custody form

Figure 5-2 Chain-of-Custody Record



AECOM

CHAIN OF CUSTODY RECORD

Page ___ of ___

Client/Project Name:	Project Location:	Analysis Requested	Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore	Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°
Project Number:	Field Logbook No.:			
Sampler (Print Name)/(Affiliation):	Chain of Custody Tape Nos.:		Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product	
Signature:	Send Results/Report to: TAT:			

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Lab I.D.	Remarks

Relinquished by: (Print Name)/(Affiliation)	Date: Time:	Received by: (Print Name)/(Affiliation)	Date: Time:	Analytical Laboratory (Destination):
Signature:		Signature:		
Relinquished by: (Print Name)/(Affiliation)	Date: Time:	Received by: (Print Name)/(Affiliation)	Date: Time:	
Signature:		Signature:		
Relinquished by: (Print Name)/(Affiliation)	Date: Time:	Received by: (Print Name)/(Affiliation)	Date: Time:	Sample Shipped Via: UPS FedEx Courier Other — Temp blank: Yes No
Signature:		Signature:		

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 to 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 COC procedure.
- The soil and water samples will be stored in a secured area at a temperature of approximately 4 degrees Celsius 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 and are described in the Appendix D of the RIWP. 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 (PID) and four gas meter) are provided in the HASP. More frequent calibration may be needed depending on conditions encountered in the field.

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

Most 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 Tables 7-1 and 7-2. These methods were selected because they attain the quantitation limits and DQOs required by the project, which are compiled on Tables 7-1 through 7-2.

Table 7-1 Project Quantitation Limits

Compound	Method	Quantitation Limits		State of New York Standards - Unrestricted Use
Volatile Organics (BTEX) - Soil - (ug/Kg)				
Benzene	SW8260B	1	0.15	60
Toluene	SW8260B	1	0.14	700
Ethylbenzene	SW8260B	1	0.17	1000
m&p-Xylene	SW8260B	2	0.59	NL
o-Xylene	SW8260B	1	0.19	NL
Xylenes, Total	SW8260B	3	0.67	260
1,2-Dichloroethane-d4 (Surr)	SW8260B	NL	NL	NL
Bromofluorobenzene	SW8260B	NL	NL	NL
Toluene-d8 (Surr)	SW8260B	NL	NL	NL
Semivolatile Organic Compounds (PAHs) (GC/MS) - Soil - (ug/kg)				
Naphthalene	8270C	330	38.3	12000
Acenaphthylene	8270C	330	39.1	100000
Acenaphthene	8270C	330	48.2	20000
Fluorene	8270C	330	42.3	30000
Phenanthrene	8270C	330	42.1	100000
Anthracene	8270C	330	40.2	100000
Fluoranthene	8270C	330	44.1	100000
Pyrene	8270C	330	27.7	100000
Benzo[a]anthracene	8270C	33	2.31	1000
Chrysene	8270C	330	38.6	1000
Benzo[b]fluoranthene	8270C	33	2.09	1000
Benzo[k]fluoranthene	8270C	33	2.51	800
Benzo[a]pyrene	8270C	33	2.34	1000
Indeno[1,2,3-cd]pyrene	8270C	33	6.15	500
Dibenz(a,h)anthracene	8270C	33	4.17	330
Benzo[g,h,i]perylene	8270C	330	24.5	100000
Nitrobenzene-d5	8270C	NL	NL	NL
Terphenyl-d14	8270C	NL	NL	NL
2-Fluorobiphenyl	8270C	NL	NL	NL

Metals (ICP) - Soil (mg/kg)				
Arsenic	6010B	1	0.94	13
Barium	6010B	40	1.14	350
Cadmium	6010B	1	0.148	2.5
Chromium	6010B	2	0.86	NL
Lead	6010B	1	0.86	63
Selenium	6010B	2	1.32	3.9
Silver	6010B	2	0.2	2
Cyanide, Total and/or Amenable - Soil - (mg/Kg)				
Cyanide, Total	9012A	0.1	0.055	27
Mercury (CVAA) - Soil (mg/Kg)				
Mercury	7471A	0.033	0.022	0.18
Polychlorinated Biphenyls (PCBs) by Gas Chromatography - Soil (ug/Kg)				
Aroclor 1016	8082	67	12	NL
Aroclor 1221	8082	67	12	NL
Aroclor 1232	8082	67	12	NL
Aroclor 1242	8082	67	12	NL
Aroclor 1248	8082	67	12	NL
Aroclor 1254	8082	67	15	NL
Aroclor 1260	8082	67	15	NL
Aroclor 1262	8082	67	15	NL
Aroclor 1268	8082	67	15	NL
DCB Decachlorobiphenyl	8082	NL	NL	NL
Compound	Method	**Quantitation Limits**		**NYSDEC - Ambient Water Quality Standards and Guidance Values**
Volatile Organic Compounds (GC/MS) - Overburden and Bedrock Groundwater - (ug/l)				
Chloromethane	8260B	1	0.1	5
Bromomethane	8260B	1	0.18	5
Vinyl chloride	8260B	1	0.14	2
Chloroethane	8260B	1	0.17	5
Methylene Chloride	8260B	1	0.18	5
Acetone	8260B	5	2.68	50
Carbon disulfide	8260B	1	0.13	60
Trichlorofluoromethane	8260B	1	0.15	NL

1,1-Dichloroethene	8260B	1	0.09	5
1,1-Dichloroethane	8260B	1	0.13	5
trans-1,2-Dichloroethene	8260B	1	0.13	NL
cis-1,2-Dichloroethene	8260B	1	0.18	5
Chloroform	8260B	1	0.08	7
2-Butanone	8260B	5	2.31	50
1,2-Dichloroethane	8260B	1	0.19	5
1,1,1-Trichloroethane	8260B	1	0.06	5
Carbon tetrachloride	8260B	1	0.06	5
Benzene	8260B	1	0.08	1
Bromoform	8260B	1	0.19	50
Styrene	8260B	1	0.12	5
m&p-Xylene	8260B	2	0.25	NL
o-Xylene	8260B	1	0.13	NL
Ethylbenzene	8260B	1	0.1	5
Chlorobenzene	8260B	1	0.11	5
Cyclohexane	8260B	1	0.16	NL
Isopropylbenzene	8260B	1	0.08	5
2-Hexanone	8260B	5	0.5	50
MTBE	8260B	1	0.14	NL
Freon TF	8260B	1	0.08	NL
Methyl acetate	8260B	2	0.34	NL
1,4-Dioxane	8260B	50	36	NL
Trichloroethene	8260B	1	0.09	5
Toluene	8260B	1	0.15	5
trans-1,3-Dichloropropene	8260B	1	0.24	0.4
4-Methyl-2-pentanone	8260B	5	0.99	NL
cis-1,3-Dichloropropene	8260B	1	0.18	0.4
1,2-Dichlorobenzene	8260B	1	0.21	NL
1,3-Dichlorobenzene	8260B	1	0.14	NL
1,4-Dichlorobenzene	8260B	1	0.23	NL
1,2,4-Trichlorobenzene	8260B	1	0.34	NL
1,2,3-Trichlorobenzene	8260B	1	0.51	NL
1,2-Dichloropropane	8260B	1	0.09	1
Methylcyclohexane	8260B	1	0.14	NL
Tetrachloroethene	8260B	1	0.1	5
1,2-Dibromo-3-Chloropropane	8260B	1	0.4	NL

1,1,2,2-Tetrachloroethane	8260B	1	0.16	5
1,1,2-Trichloroethane	8260B	1	0.19	1
Dibromochloromethane	8260B	1	0.2	5
1,2-Dibromoethane	8260B	1	0.28	NL
Dichlorodifluoromethane	8260B	1	0.22	NL
Bromochloromethane	8260B	1	0.27	NL
Bromodichloromethane	8260B	1	0.12	50
1,2-Dichloroethane-d4 (Surr)	8260B	NL	NL	NL
Toluene-d8 (Surr)	8260B	NL	NL	NL
Bromofluorobenzene	8260B	NL	NL	NL
Semivolatile Organic Compounds (GC/MS) - Overburden and Bedrock groundwater (ug/L)				
Phenol	8270C	10	0.81	1
2-Chlorophenol	8270C	10	2.2	NL
2-Methylphenol	8270C	10	1.8	NL
4-Methylphenol	8270C	10	1.6	NL
Benzaldehyde	8270C	10	2	NL
Acetophenone	8270C	10	2.7	NL
Bis(2-chloroethyl)ether	8270C	1	0.28	NL
2,2'-oxybis[1-chloropropane]	8270C	10	2	NL
N-Nitrosodi-n-propylamine	8270C	1	0.25	50
Nitrobenzene	8270C	1	0.3	0.4
Hexachloroethane	8270C	1	0.25	5
Isophorone	8270C	10	2.7	50
2-Nitrophenol	8270C	10	2.4	NL
2,4-Dimethylphenol	8270C	10	3.4	50
2,4-Dichlorophenol	8270C	10	2.6	5
Bis(2-chloroethoxy)methane	8270C	10	2.6	5
Naphthalene	8270C	10	2.7	10
4-Chloroaniline	8270C	10	2	5
Hexachlorobutadiene	8270C	2	0.57	0.5
Caprolactam	8270C	10	2.5	NL
4-Chloro-3-methylphenol	8270C	10	2.5	NL
2-Methylnaphthalene	8270C	10	3	NL
Hexachlorobenzene	8270C	1	0.29	0.4
Hexachlorocyclopentadiene	8270C	10	1.7	5
2,4,6-Trichlorophenol	8270C	10	2.4	NL
2,4,5-Trichlorophenol	8270C	10	2.6	NL

Diphenyl	8270C	10	2.8	NL
2-Chloronaphthalene	8270C	10	2.7	10
2-Nitroaniline	8270C	20	4.9	5
2,6-Dinitrotoluene	8270C	2	0.61	5
Dimethyl phthalate	8270C	10	2.8	50
Acenaphthylene	8270C	10	2.7	NL
3-Nitroaniline	8270C	20	5	5
Acenaphthene	8270C	10	2.7	NL
4-Nitrophenol	8270C	30	6.7	NL
2,4-Dinitrophenol	8270C	30	5.4	10
Dibenzofuran	8270C	10	2.8	NL
Diethyl phthalate	8270C	10	2.9	50
Fluorene	8270C	10	2.8	50
Fluoranthene	8270C	10	3.2	50
Di-n-butyl phthalate	8270C	10	2.9	50
2,4-Dinitrotoluene	8270C	2	0.47	5
4-Chlorophenyl phenyl ether	8270C	10	2.5	NL
4-Nitroaniline	8270C	20	5.8	5
4,6-Dinitro-2-methylphenol	8270C	30	4.7	NL
4-Bromophenyl phenyl ether	8270C	10	2.5	NL
Atrazine	8270C	10	3	NL
Anthracene	8270C	10	2.8	50
Carbazole	8270C	10	3.2	NL
Phenanthrene	8270C	10	3.1	50
Pentachlorophenol	8270C	30	5.3	1
Pyrene	8270C	10	2.9	50
Chrysene	8270C	10	3.1	0.002
Benzo[k]fluoranthene	8270C	1	0.26	0.002
Benzo[g,h,i]perylene	8270C	10	2	NL
Benzo[b]fluoranthene	8270C	1	0.26	0.002
Benzo[a]pyrene	8270C	1	0.14	NL
Benzo[a]anthracene	8270C	1	0.27	0.002
N-Nitrosodiphenylamine	8270C	10	2.9	50
Butyl benzyl phthalate	8270C	10	2.5	50
Bis(2-ethylhexyl) phthalate	8270C	10	2	5
Di-n-octyl phthalate	8270C	10	1.5	NL
Indeno[1,2,3-cd]pyrene	8270C	1	0.15	0.002

Dibenz(a,h)anthracene	8270C	1	0.09	NL
3,3'-Dichlorobenzidine	8270C	20	4.9	5
1,2,4,5-Tetrachlorobenzene	8270C	10	2.6	NL
2,3,4,6-Tetrachlorophenol	8270C	10	2.5	NL
Nitrobenzene-d5	8270C	NL	NL	0.4
Phenol-d5	8270C	NL	NL	1
Terphenyl-d14	8270C	NL	NL	NL
2,4,6-Tribromophenol	8270C	NL	NL	NL
2-Fluorophenol	8270C	NL	NL	NL
2-Fluorobiphenyl	8270C	NL	NL	NL
Polychlorinated Biphenyls (PCBs) by Gas Chromatography - Overburden and Bedrock groundwater - (ug/L)				
Aroclor 1016	8082	0.5	0.13	NL
Aroclor 1221	8082	0.5	0.28	NL
Aroclor 1232	8082	0.5	0.12	NL
Aroclor 1242	8082	0.5	0.12	NL
Aroclor 1248	8082	0.5	0.24	NL
Aroclor 1254	8082	0.5	0.17	NL
Aroclor 1260	8082	0.5	0.15	NL
Aroclor 1262	8082	0.5	0.12	NL
Aroclor 1268	8082	0.5	0.12	NL
DCB Decachlorobiphenyl	8082	NL	NL	NL
Metals (ICP) - Overburden and Bedrock groundwater (ug/L)				
Arsenic	6010B	5	3.729	25
Barium	6010B	200	5.944	1000
Cadmium	6010B	5	0.818	5
Chromium	6010B	10	4.46	50
Lead	6010B	5	4.012	25
Selenium	6010B	10	5.758	10
Silver	6010B	10	1.339	50
Mercury (CVAA) - Overburden and Bedrock groundwater (ug/L)				
Mercury	7470A	0.2	0.16	0.7
Cyanide, Total - Overburden and Bedrock groundwater (mg/l)				
Cyanide, Total	335.4	0.01	0.004	200

Notes:

N/A – Not Applicable

(a) – Ambient Water Quality Standards and Guidance Values (AWQSGVs) provided in the NYSDEC - Division of Water – Technical Operation Guidance Series (TOGS) (1.1.1) [NYSDEC, 1998, with addendums] (b) – *NYSDEC Rules and Regulations, 6 NYCRR Subpart 375-6, Remedial Program Soil Cleanup Objectives*", dated December 14, 2006 [NYSDEC, 2006) – The Unrestricted Use Objectives

RL - reporting limit

MDL - minimum detection limit

NL - no limit

ug - microgram

mg - milligram

Kg - kilogram

L -liter

Table 7-2 Practical Quantitation Limits

TCLP VOLATILE	SW-846 Analysis	Water (ug/L)
Benzene	8260B	5
Carbon Tetrachloride	8260B	5
Chloroform	8260B	5
1,2-Dichloroethane	8260B	5
1,1-Dichloroethene	8260B	5
2-Butanone	8260B	100
Tetrachloroethene	8260B	5
Trichloroethene	8260B	5
Vinyl Chloride	8260B	100

TCLP SEMIVOLATILE	SW-846 Analysis	Water (ug/L)
2-Methylphenol	3510 / 8270B	10
3 & $-Methylphenol	3510 / 8270B	10
1,4-Dichlorobenzene	3510 / 8270B	10
2,4-Dinitrotoluene	3510 / 8270B	10
Hexachlorobutadiene	3510 / 8270B	10
Hexachloroethane	3510 / 8270B	10
Hexachlorobenzene	3510 / 8270B	10
Nitrobenzene	3510 / 8270B	10
Pentachlorophenol	3510 / 8270B	50
Pyridine	3510 / 8270B	ND
2,4,5-Trichlorophenol	3510 / 8270B	10
2,4,6-Trichlorophenol	3510 / 8270B	10

TCLP METALS	SW-846 Analysis	Water (ug/L)
Arsenic	3010 / 6010	0.05
Barium	3010 / 6010	0.002
Cadmium	3010 / 6010	0.004
Chromium	3010 / 6010	0.007
Lead	3010 / 6010	0.04
Selenium	3010 / 6010	0.07
Silver	7760 / 6010	0.007
Mercury	7470	0.0002

ND – Not Determined

8.0 Data Reduction, Assessment, and Reporting

8.1 Data Reduction

Data collected during the field investigation will be reduced in accordance with SW-846 protocols and reviewed by the laboratory QA personnel. 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.

8.2 Data Quality Assessment

NYSDEC recommends two levels of data review. The basic review is a Data Usability Summary Report (DUSR). Current NYSDEC policy is to require this level of review for analytical data from investigations on most sites. Full data validation is called for at sites where the data will be used in litigation, or where problems are expected with data quality (such as where matrix interference is expected to be significant). The laboratory deliverables (i.e., NYSDEC ASP Category B) are the same in both cases, and a DUSR can be upgraded to full validation at a later time if necessary. For this investigation a DUSR will be performed.

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

- "U" - Not detected at given value;
- "UJ" - Estimated not detected at given value;
- "J" - Estimated value;
- “N” – Presumptive evidence at the value given;
- "R" - Result not useable; and
- No Flag - Result accepted without qualification.

Trained and experienced data assessors, who meet NYSDEC approval criteria, will perform the data review. Résumés of people who will perform the DUSR will be provided to NYSDEC for review and approval.

8.2.1 Data Usability Summary Report (DUSR)

Data for this investigation will be evaluated accordance with the USEPA National Functional Guidelines for Superfund Organic Methods Data Review, June 2008, with additional reference to USEPA National Functional Guidelines for Organic Data Review, October 1999, and USEPA Validation Functional Guidelines for Inorganic Data Review, October 2004. A DUSR will be generated in accordance with USEPA Region II guidelines.

The DUSR will include a review and an evaluation of all the analytical results. To ensure compliance with the analytical method protocols the following will be reviewed:

- Chain-of-custody forms
- Holding times
- Initial and continuing calibrations
- Blanks
- Laboratory control standards and matrix spikes
- Surrogate recoveries
- Matrix interference checks
- Field and laboratory duplicates
- Sample data

The DUSR will contain a description of the samples and parameters reviewed. Any deficiencies identified during the review will be noted and the effect on the generated data will be discussed. Any re-sampling or re-analysis recommendations will be then be made to the investigation's Project Manager. The results of the evaluation will be incorporated into the final investigative report.

8.2.2 Data Validation

The determination to validate data will be made based on the presence of data anomalies, suspect data, or laboratory issues. Data will be validated in accordance with the USEPA National Functional Guidelines for Superfund Organic Methods Data Review, June 2008, with additional reference to USEPA National Functional Guidelines for Organic Data Review, October 1999, and USEPA Validation Functional Guidelines for Inorganic Data Review, October 2004. If applicable, a data validation report will be prepared and reviewed by the Quality Assurance Officer (QAO) before issuance. The data validation report 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 sample delivery group 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
- Field duplicate results

- Target compound identification
- Result calculations
- Pesticide cleanup (if applicable)
- Compound quantitation and reported detection limits
- System performance
- 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(s)
- Furnace atomic absorption analysis QC
- ICP serial dilutions
- Results verification and reported detection limits
- Result calculations

8.3 Data Reporting

The data package provided by the laboratory will contain all items discussed above in a "CLP-equivalent" format. Data quality issues will be discussed in a case narrative included with the data report. The completed copies of the COC 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.

Two copies of the analytical data packages and an electronic disk deliverable will be provided by the laboratory approximately 30 days after receipt of a complete sample delivery group. A separate electronic data deliverable (EDD) will be emailed to the AECOM database manager. The Project Manager will immediately arrange for filing one package. A second copy and the disk deliverable will be used for data validation. The EDD will be used by the database manager to form the database and generate summary tables for assessment of the site contamination condition.

The electronic deliverable format required is an EQuIS EFW2 4 file ASCII comma-delimited file with the fields and character lengths summarized in Table 8.1. Alternatively, a comma-delimited MS Excel file may be issued.

Each diskette deliverable must be formatted and copied using an MS-DOS operating system. 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 diskette deliverables 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 nonconformance issues are resolved prior to use of the data.

Table 8-1 Field And Character Lengths

Description	Length	Format
Field Sample ID (as shown on COC)	15	Character
CAS. No. (including -'s)	10	Character
Parameter Name	31	Character
Concentration	13	Numeric
Qualifier	4	Character
Units	8	Character
SDG	8	Character
Lab Sample ID	15	Character
Date Sampled (from COC)	D	Date
Matrix (soil/water/air)	5	Character
Method Detection Limit	13	Numeric
Method Code	8	Character
Lab Code	6	Character

9.0 Internal Quality Control Checks and Frequency

9.1 Quality Assurance Batching

Each set of up to 20 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 AECOM 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, 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 KMnO4. 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 project 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 them, additional audits may occur.

10.3 Performance Audits

The laboratory may be required to conduct an analysis of Performance Evaluation (PE) 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 noncompliant shall be identified at exit interviews conducted with the involved management. Noncompliances will be logged and documented through audit findings that 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
- As required by USEPA SW-846 and subsequent updates, or by the NYSDEC ASP

Project management and staff, such as field investigation 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 closeout 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

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

USEPA, 1986. SW-846 "Test Method for Evaluating Solid Waste," dated November 1986. U.S. Environmental Protection Agency, Washington, D.C.

Taylor, J. K., 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Inc., Chelsea, Michigan

USEPA, 1987. Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7- U.S. Environmental Protection Agency, Washington, D.C.

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.

Appendix B

Site Specific Health and Safety Plan (HASP)

Prepared for:

Con Edison
Astoria, New York

Health and Safety Plan

RCRA Facility Investigation (RFI) and Other Investigative Activities

Consolidated Edison Company of New York

Astoria, New York Facility

March 2012

AECOM, Inc.
March 2012
Document No.: 60136643-0036

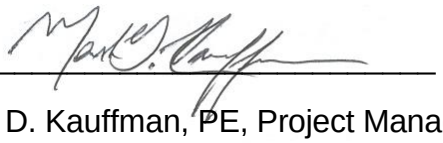
Project Health and Safety Plan

This project Health and Safety Plan (HASP) was prepared for employees performing a specific, limited scope of work. It was prepared based on the best available information regarding the physical and chemical hazards known or suspected to be present on the project site. While it is not possible to discover, evaluate, and protect in advance against all possible hazards, which may be encountered during the completion of this project, adherence to the requirements of the HASP will significantly reduce the potential for occupational injury.

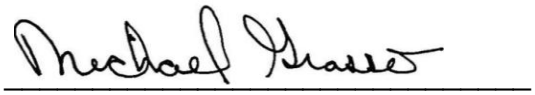
This HASP was recently revised in January 2012 to update emergency contacts and Consolidated Edison Health and Safety Requirements. During March 2012, new Con Edison policies and procedures went into effect requiring these changes be incorporated into this March 2012 version. These changes include:

- Adding the latest version of the Con Edison *Work Area Protection and Traffic Control Field Manual*, February 2011;
- Removing CEHSP A11.03 because it is not relevant to this project;
- Adding the following Con Edison Health and Safety Procedures:
  - CEHSP E08.02 – Noise Construction and Utility Activities,
  - CEHSP S05.03 – Personal Protective Equipment – Protective Clothing,
  - CEHSP S12.00 – Lock Out / Tag Out Procedures,
  - CEHSP S17.01 – Electrical Enclosed Spaces, and
  - CEHSP A28.00 – Calling a Time Out.
- Adding the Con Edison Contractor Injury Report.

By signing below, I acknowledge that I have reviewed and hereby approve the March 2012 HASP for the RCRA Facility Investigation (RFI) and Other Investigative Activities at the Consolidated Edison Company Astoria, New York facility.

Approved by: 

Mark D. Kauffman, PE, Project Manager

Approved by: 

Michael Grasso, CIH, AECOM SH&E Manager

Prior Versions and Updates:
January 2012
January 2010
September 2009
May 2005
September 2002

HEALTH AND SAFETY PLAN AMENDMENT RECORD

Client: Consolidated Edison Company of New York		
Project No.: 60146427.100		
Project Manager: Jennifer Pfeiffer		
Site Safety Officer: Stephen Wright		
Amendment No.	**Date**	**Description**
001	03/29/10	CAMP during RI work at former MGP
002	10/01/12	CAMP during RI work at former MGP

Table of Contents

Tables

Figures

Attachments

EMERGENCY REFERENCES

If the injury or illness is severe or life-threatening, dial **9-1-1** and seek medical attention immediately. Then, contact the AECOM employee's supervisor and the Con Edison Operations Control Center Supervisor (OCCS) Desk at **718-204-4100**.

For other injuries or illnesses (not severe or life-threatening), contact the AECOM employee's supervisor and the Con Edison OCCS Desk at **718-204-4100**.

If the incident involves a gas main, contact Gas Control Queens at **718-319-2320**.

Con Edison Main Gate Security	718-204-4350
Ambulance	9-1-1
Mount Sinai Hospital of Queens:	718-932-1000 (general); 718-267-4285 (emergency)
Directions to Hospital:	Leave through the main gate of the Con Edison complex. Cross over 20th Avenue and continue straight on 31st Street. Pass over the highway and take the 3rd right onto 30th Ave. The hospital emergency room is on the left-hand side of the street at 25-10 30th Avenue; it is approximately 1.5 miles from the Con Edison Astoria facility.

REPRESENTATIVES:

- Phil Platcow (AECOM RSM)	mobile: 617-899-5403
- Mike Grasso (AECOM DSM)	607-282-0175
- Scott Wozniakowski (AECOM Field Lead)	978-905-2466 (mobile: 978-496-6000)
- Mark Kauffman (AECOM PM)	978-905-2262 (mobile: 978-846-5201)
- Matt Madsen (Con Edison PM)	718-267-3866

1.0 INTRODUCTION

1.1 AECOM Environment Safety Policy

AECOM Environment (AECOM) is committed to providing our employees with a safe and healthy work environment, and ensuring that safety to our clients. It is our firm belief that all work-related injuries and illnesses are preventable, and it is therefore our goal to have a workplace that is free from occupational injuries and illnesses. Every attempt shall be made to eliminate the possibility of injuries and illnesses. No aspect of the company's activities, including expediency and cost, shall take precedence over the health and safety of our employees.

In addition to this HASP, AECOM will comply with Con Edison Astoria guidance and policies. The following documents provided by Con Edison are attached to this HASP for reference as Attachments A, B and C:

- Astoria Guidance No. 100: Guidance for the Management of Excavated Materials; and
- Astoria Guidance No. 200: Guidance for the Management of Groundwater in Excavations and Subsurface Structures.
- Astoria Guidance No. 300: (Guidance for Working in Subsurface Structures) is also attached.

However, it should be noted that AECOM will not conduct work in subsurface structures without the prior approval of Con Edison and the approval of a task-specific Job Safety Analysis by the AECOM Project Manager and Regional Safety Manager.

In addition to the above-referenced guidance documents, Con Edison policy is that all activities that may potentially generate elevated noise require a Noise Mitigation Plan per NYCDEP requirements. A copy of the Noise Mitigation Plan is provided under a separate cover.

1.1.1 Maximum Duration of the Workday for Field Activities

An employee may not work a shift that exceeds 16 hours in duration. For the purpose of this policy, the work shift includes time spent at lunch and on break. If an employee works more than one shift during the course of a calendar day, the total number of hours worked in that day cannot exceed 16 hours. Exception: If work is to be done continuously in ambient air temperatures of less than 20 degrees F, the Site Safety Officer and Field Manager will use a guideline of limiting work shifts to 10 hours in duration, including 8 hours of time working outdoors and 2 hours of time spent at lunch, breaks, and travel. Refer to Section 5.0, Cold Stress, for further workday guidelines.

1.1.2 Short Service Employee

A Short Service Employee (SSE) is an employee with fewer than six months of experience working supervised on field projects or an employee who has not completed required training or received required certifications.

Short Service Employees will not be assigned to this project unless they are supervised on site by a qualified person.

1.2 Purpose

This Health and Safety Plan (HASP) was developed by AECOM Corporation (AECOM). It establishes the health and safety procedures required to minimize any potential risk to personnel involved with the RCRA

Facility Investigation (RFI) activities at the Consolidated Edison Company of New York, Inc. (Con Edison), Astoria, New York facility. This HASP is the same as the HASP approved by Con Edison on August 11, 2009 with an updated "Rules We Live By" table per the request of Con Edison, and some minor updates for listed contact personnel and telephone numbers.

1.3 Scope and Application

The provisions of this HASP apply to AECOM personnel and subcontractor personnel who will be potentially exposed to safety and/or health hazards associated with the tasks outlined in Section 3.0 of this HASP.

This HASP has been written to comply with OSHA's Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). All activities covered by this HASP must be conducted in complete compliance with all applicable federal, state and local health and safety regulations, as well as Con Edison's contractor safety requirements. Personnel covered by this HASP who cannot or will not comply with these requirements will be excluded from site activities.

1.4 Approval and Dissemination

All AECOM personnel and subcontractors covered by this HASP must receive a copy of it and return the HASP Sign-off Sheet (Attachment D) to the AECOM Project Manager (PM) or AECOM Site Safety Officer (SSO) prior to the start of on-site activities.

1.5 Responsibilities

The successful implementation of this HASP depends on the coordinated efforts of the AECOM PM, the AECOM Regional SH&E Manager (RSM), AECOM's SSO, and the field staff performing the RFI activities, as well as selected subcontractors.

1.5.1 Project Manager

The AECOM PM (Mark Kauffman) is, by designation, the individual who has the primary responsibility for ensuring the overall health and safety of this project as well as preparing and approving the NYCDEP Construction Noise Mitigation Plan. The PM, therefore, has the primary responsibility for ensuring the implementation of the requirements of this HASP. Some of the PM's specific responsibilities include:

- Assuring that all personnel to whom this HASP applies, including subcontractors, have received a copy of it;
- Providing the RSM with updated information regarding environmental conditions at the site and the scope of site work;
- Providing adequate authority and resources to the on-site SSO to allow for the successful implementation of all necessary safety procedures;
- Supporting the decisions made by the SSO and RSM;
- Maintaining regular communications with the SSO and, if necessary, the RSM; and
- Coordinating the activities of all AECOM subcontractors and ensuring that they are aware of the pertinent health and safety requirements for this project.

1.5.2 AECOM Regional Safety, Health & Environment Manager

The AECOM DSM (Mike Grasso) is the individual responsible for the preparation, interpretation, and modification of this HASP. Modifications to this HASP that might result in less stringent precautions cannot be undertaken by the PM or the SSO without the approval of the RSM. Specific duties of the RSM include:

- Writing, approving and amending the HASP for this project;
- Advising the PM and SSO on matters relating to health and safety on this site;
- Recommending appropriate personal protective equipment (PPE) and respiratory equipment to protect personnel from potential site hazards;
- Assisting with incident investigations;
- Maintaining regular contact with the PM and SSO to evaluate site conditions and new information which might require modifications to the HASP; and
- Conducting random project audits.

1.5.3 Site Safety Officer

All AECOM field technicians are responsible for implementing the safety requirements specified in this HASP. However, one field technician will serve as the SSO. The SSO will be on site during all activities covered by this HASP. The SSO is responsible for enforcing the requirements of this HASP once work begins. The SSO has the authority to immediately correct all situations where non-compliance with this HASP is noted and to immediately stop work in cases where an immediate danger is perceived. Some of the SSO's specific responsibilities include:

- Interfacing with Con Edison's Project Manager when necessary;
- Securing daily work permits from Con Edison;
- Assuring that all personnel to whom this HASP applies have received a copy of it and have submitted a completed copy of the HASP Sign-Off Form;
- Assuring that all personnel to whom this HASP applies have attended a pre-entry briefing prior to entering a restricted area;
- Procuring the air monitoring instrumentation required and performing air monitoring for AECOM activities;
- Procuring and distributing the PPE needed for AECOM employees;
- Verifying that all PPE and health and safety equipment used by AECOM employees is in good working order;
- Verifying that contractors have brought the required PPE and safety equipment to the site;
- Verifying that all AECOM employees and contractor employees have secured applicable New York City Fire Department Certificates of Fitness for the proposed scope of work, if necessary;
- Setting up and maintaining the cleanup zone within the restricted areas and assuring proper cleanup of all site personnel;
- Notifying the PM of all non-compliance situations and stopping work in the event that an immediate danger situation is perceived;
- Monitoring and controlling the safety performance of all personnel within the established restricted areas to ensure that required safety and health procedures are being followed, and correcting any deficiencies;

- Conducting incident investigations and preparing incident investigation reports;
- Conducting the pre-entry briefing as required by Section 10.0 of the HASP;
- Notifying the Con Edison Project Manager in the event of an injury, a spill, or the discovery of significant contamination during field activities;
- Coordinating the management and storage of investigation-derived wastes (IDW) with the Con Edison Project Manager;
- Initiating emergency response procedures in accordance with Section 11.0 of this HASP; and
- Conducting daily pre-work health and safety briefings and having all field personnel sign an attendance sheet, as discussed in Section 10.0.

1.5.4 Field Personnel

All AECOM field personnel and subcontractor personnel are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading this HASP in its entirety prior to the start of on-site work;
- Submitting a completed HASP Acceptance Form and documentation of medical surveillance and training to the AECOM PM prior to the start of work;
- Attending the pre-entry briefing (prior to beginning on-site work) and daily safety meetings, as discussed in Section 10.0;
- Bringing forth any questions or concerns regarding the content of the HASP to the PM or the RSM prior to the start of work or the SSO during ongoing field activities;
- Reporting all incidents, injuries, and illnesses, regardless of their severity, to the AECOM SSO; and
- Complying with the requirements of this HASP and the requests of the SSO.

1.5.5 Contractors

Additionally, subcontractors are responsible for:

- Reading the HASP in its entirety prior to the start of on-site work;
- Ensuring, via daily inspections, that their equipment is in good working order;
- Operating their equipment in a safe manner;
- Appointing an on-site safety coordinator to interface with the AECOM SSO;
- Securing applicable New York City Fire Department Certificates of Fitness for the proposed scope of work, if necessary;
- Providing AECOM with copies of Material Safety Data Sheets (MSDS) for all hazardous materials brought on site; and
- Providing all the required PPE and safety equipment for their employees.

1.6 SH&E Expectations

Commitment to safety, health, and environmental excellence requires that all work proceed only after it is safe and environmentally sound to do so. The responsibility for ensuring that this takes place rests with every

worker present at this property. Effectively meeting these responsibilities depends upon open communication between individuals and their supervisors prior to work beginning, and – in certain cases – after safety, health and/or environmental issues are identified. Completing a Job Safety Analysis (JSA) to aid in planning safe work performance will be an integral part of meeting safety, health and environment (SHE) expectations.

The safety and health of on-site personnel will take precedence over cost and schedule considerations for all project work. All AECOM personnel have the authority to stop work they see a potential or actual hazard that may threaten the safety of people or the environment. Upon stopping work, the SSO must be immediately notified and provided with information regarding the nature of the safety, health or environmental concern. The SSO should meet with the worker with the intent of resolving the worker's concerns. Once the concerns are resolved to the satisfaction of the worker, work can proceed.

If the concerns are not resolved to the satisfaction of the worker and/or the SSO, work does not proceed. The AECOM RSM will be contacted to obtain assistance in resolving the concerns. Using his/her expertise, safety, health, and environmental rules, regulations, and procedures, the AECOM RSM will attempt to resolve the matter with all parties involved. Work will not resume until this criterion is met.

1.7 Management of Change and HASP Modifications

1.7.1 Management of Change

The specific chemical hazards that are known or anticipated for the proposed investigations are based on information collected by AECOM during the Phase I RFI and subsequent investigations at the Astoria facility, including the Phase IIA, Phase IIB, Phase IIC, and Phase IID RFIs. Every effort has been made to address the chemical hazards that may be encountered during the implementation of the proposed investigation. Similarly, this document also discusses the physical hazards associated with the proposed activities. However, unanticipated site-specific conditions or situations may occur during the implementation of this project. Also, AECOM and/or the chosen contractor may elect to perform certain tasks in a manner that is different from what was originally intended, due to a change in field conditions. As such, this HASP must be considered a *working document* that is subject to change in order to meet the needs of this dynamic project.

AECOM and/or AECOM's contractors will complete a Job Safety Analysis (JSA) form when new tasks, or different investigative techniques not addressed in the HASP, are proposed. The use of new techniques will be reviewed and, if new hazards are associated with the proposed changes, they will be documented on the JSA form. An effective control measure must also be identified for each new hazard. JSAs will be reviewed by the SSO prior to being implemented. Once approved, the JSAs will be reviewed with all field staff during the daily safety meeting. A blank JSA form is presented as Attachment E.

1.7.2 HASP Modifications

Should significant information become available regarding potential on-site hazards, it may be necessary to modify this HASP. All proposed modifications to this HASP, including JSAs, must be reviewed and approved by the AECOM RSM and Con Edison before such modifications are implemented. Any significant modifications must be incorporated into the written document as addenda, and the HASP must be reissued. The AECOM PM will ensure that all personnel covered by this HASP receive copies of all issued addenda. Sign-off forms will accompany each addendum and must be signed by all personnel covered by the addendum. Sign-off forms will be submitted to the AECOM PM. The HASP addenda should be distributed during the daily safety meeting so that they can be reviewed and discussed. Attendance forms will be collected during the meeting.

1.7.3 Job Safety Analysis (JSA)

AECOM and/or AECOM's contractors will prepare a Job Safety Analysis (JSA) for each task to be performed prior to commencing work. The use of new techniques will be reviewed and if new hazards are associated with the proposed changes, they will be documented and evaluated on the JSA form. An effective control measure must also be identified for each new hazard. JSA forms will be reviewed by the SSO prior to being implemented. Once approved, the completed forms will be reviewed with all field staff during the daily safety meeting. A blank JSA form is presented as Attachment E.

2.0 SITE HISTORY AND DESCRIPTION

2.1 Site Location

Con Edison's Astoria facility is situated on approximately 316 acres in the northwest portion of Queens County, in New York City. Developed industrial and residential areas surround the site. The East River borders the site to the west and northeast. New York Power Authority's (NYPA) power generating station (Poletti Power Project) is located to the northwest. The site is bordered to the east mostly by Luyster Creek (also known as Steinway Creek). To the south, 20th Avenue borders the site. The site location and surrounding areas are shown in Figure 2-1 of this HASP. Figures 2-2 and 2-3 show the locations of the RFI study areas within the Astoria property.

2.2 Site History

Con Edison or its predecessor companies have owned the site since the late 1890s. The facility has been operated in some form as a power or gas generating facility since the early 1900s. A manufactured gas plant (MGP) was operated on the site from 1906 to 1961. Currently, Con Edison is no longer involved with the generation of electricity at the Astoria facility. In early 1999, Con Edison sold three parcels of land at the Astoria facility as part of divestiture proceedings. Two of these parcels, the Astoria Fuel Oil Tank Farm (12.5 acres) and the Astoria Generating Station (19.3 acres), were purchased by Reliant Energy (formerly Orion Power NY). The third parcel, the Astoria Gas Turbine facility (15.1 acres), was sold to NRG Energy, Inc. The remaining 224 acres of the facility were retained by Con Edison and are currently utilized by several of Con Edison's operating groups (e.g., Gas System and Transmission Operations, Central Field Services, Substations, etc.) as a daily work location. Con Edison also utilizes much of the Astoria facility to warehouse and store the equipment needed for the operation and maintenance of the gas, electric, and steam systems of New York City.

2.3 Environmental History

In accordance with the 1994 Order on Consent, NYSDEC Index No. R2-1023-88-06 (Consent Order), Con Edison is required to undertake and complete investigations and, where necessary, perform remediation to address the impacts from certain spills, which have been listed in Appendix B of the 1994 Consent Order. Following the issuance of the Consent Order, the NYSDEC subsequently agreed to integrate the spill investigation activities required for the Astoria facility with the ongoing RCRA Corrective Action Program. In April 1996, the Revised Draft Data Summary and SWMU/AOC/Spills Evaluation Report (AECOM, April 1996), also referred to as the "Phase I RFI Report" (as referred to hereafter) or the "Draft Data Summary Report (DDS)", summarized the Phase I RFI sampling results and presented an evaluation of spills at the Astoria facility that may warrant further investigation. Subsequent RFI investigations have been completed for the Astoria facility, including but not limited to, the Phase IIA RFI for the North Storage Yard (NSY) (AECOM, April 1995 and June 1996), which has been handled separately from the rest of the facility-wide RFI, the Phase IIB RFI for the Gas Turbine Facility and Former Pond Area (AECOM, June 1998), the Phase IIC RFI (AECOM, August 1998), and the RFI (AECOM, February 2008).

Interim Corrective Measures (ICM), formerly referred to as Interim Remedial Measure (IRM), status updates have been submitted to the NYSDEC on a regular basis since May, 2001.

There are currently 42 study areas designated as part of the current RFI program for the Con Edison Astoria facility (refer to Figures 2-2 and 2-3 for study area locations). The objective of the RFI program has been (and continues to be) to characterize the nature, extent, direction, rate, movement, and concentration of release(s)

of hazardous waste and/or hazardous constituents at these study areas, which are categorized as solid waste management units (SWMUs), areas of concern (AOCs), or past spill locations at the facility.

A list of the study areas and the chemicals detected in each area is provided in Table 2-1. For additional information on the study areas, see Section 4.0 of the RFI report (AECOM, February 2008).

Table 2-1 Study Areas

Study Area	Chemicals Above Screening Values (1)	General Observations and Rationale for Recommendation Provided in the RFI Report (February 2008)
East Yard SWMU	cPAHs, PCBs	The central portion of this area reveals soil impacts; PCB impacts distinguish this area from the nearby Astoria East Substation Spill Area.
Purge Oil Pump House Spill Area	cPAHs	The pump house exhibits a localized area with PCB impacts; no soil impacts are present in surrounding areas; LNAPL is present in the subsurface southwest of the impacted soil area.
Blue Dog Lake	SVOCs, PCBs, lead, arsenic	Primarily cPAH impacts are present in the former pond footprint.
Former Pond Area	PAHs, PCBs	Impacted soil was detected, with primarily cPAH and non-cPAH impacts in much of former pond footprint; LNAPL is also present northeast of the pond.
Former 25,000 Gallon PCB Waste Oil Tanks	PAHs	There is no evidence of cPAH impacts being exclusively related to the former waste oil tanks; the impacts are likely attributable to Pipe Yard operations.
Former Gas Condensate Tank	cPAHs	There is no evidence of cPAH impacts being exclusively related to the former gas condensate tank; impacts appear to be attributable to Pipe Yard operations.
Former Fire Fighting School	cPAHs, PCBs	It is unclear whether impacts are directly related to former fire fighting activities; the potentially large volume of fuels discharged in the area could have resulted in the residual cPAHs and PCBs that were detected.
Pipe Yard SWMU	PAHs, PCBs	Four distinct areas of soil impacts have been identified within the Pipe Yard (Areas 1, 2, 3 and 4), in addition to Blue Dog Lake and the Former Fire Fighting School.
Pipe Yard SWMU Waste Management Practices	PAHs, PCBs	This area encompasses the six individual areas that should be considered for further action within the Pipe Yard (refer to Pipe Yard SWMU).
Areas Unrelated to Other Waste Management Practices	cPAHs	cPAH impacts in this area are not distinguishable from cPAHs further north at the AOC West of Main Gate.
Astoria Central Wastewater Treatment Facility SWMU	cPAHs	An additional characterization of shallow bedrock groundwater was completed, based on the observations of seeps through the settling basin walls; the investigation results were provided in May 2008 as a supplement to the RFI Report.

Study Area	Chemicals Above Screening Values (1)	General Observations and Rationale for Recommendation Provided in the RFI Report (February 2008)
Tunnel Head House AOC	---	No soil impacts were detected at the Tunnel Head House.
Astoria East Substation Spill Area	PAHs	The majority of PAHs in excess of soil standards were cPAHs; the impacted area is relatively well defined and extends slightly into the East Yard SWMU (which is characterized by the presence of PCB impacts).
North Queens Substation Spill Area	---	No soil impacts were detected at the North Queens Substation.
Astoria West Substation AOC	cPAHs	This area overlaps the MGP AOC; a specific area of cPAH impacted soil is present in the northwestern corner of the area.
Spill No. 69	cPAHs	Samples collected from this area do not show evidence of the former release; nearby locations with cPAH and PCB impacts are included within the Former Pond Area.
Spill Nos. 89 C/D/E	cPAHs	The Spill No. 89C area reveals the presence of LNAPL with no soil impacts; further action is recommended for that area to assess the impacts of LNAPL; the Spill No. 89E area reveals cPAH impacts that may extend north of the Former Pond Area.
Spill No. 92	cPAHs	The cPAHs in this area are not reflective of the former kerosene spill; the impacts are consistent with soil conditions at the nearby Former Gas Condensate Tank.
Spill No. 60	cPAHs	cPAHs in this area are similar to the nearby detections in the northern portion of the Triangle Area; it is unclear whether they're residuals from the No. 6 fuel release.
Coal Tar Seeps	---	The observations of coal tar seeps within the Pipe Yard are consistent with geologic log observations of coal slag and ash in that general portion of the Astoria facility.
Cable Storage Yard AOC	PCBs	The PCB impacts are consistent with operations in that area, where incidental releases of PCB-containing oil from electronic cables could have occurred.
Triangle Area AOC	SVOCs	The SVOCs in the central portion of the Triangle Area include cPAHs and non-cPAHs; this area is recommended for further action, incorporating nearby cPAH impacts in the vicinity of Spill No. 60.
AOC West of Main Gate	cPAHs	cPAH impacts were detected in one location within this study area; similar impacts were detected south of the area at the nearby Areas Unrelated to Other Waste Management Practices.
AOC South of Transformer Shop	---	No soil impacts were detected at the south of the Transformer Shop.
Spill No. 59	---	No soil impacts were detected in the Spill No. 59 area.
Western Pipe Yard Area	cPAHs, PCBs	This area encompasses or overlaps four other study areas; the Pipe Yard SWMU Areas 1, 2 and 3, as well as the Former Fire Fighting School, are recommended for further action.

Study Area	Chemicals Above Screening Values (1)	General Observations and Rationale for Recommendation Provided in the RFI Report (February 2008)
Former Corporate Transportation USTs SWMU	cPAHs	One location revealed soil impacts from cPAHs; no other sources of cPAHs appear to be nearby this particular area; characteristics of unsaturated soil from the depth of 6-15 feet are unclear (soil characterization extended to 6 feet).
Building 139 Septic System SWMU	---	No soil impacts were detected in the vicinity of Building 139.
Spill No. 91	cPAHs	cPAH impacts in the reported dielectric fluid spill location.
A-10 Dock Area	---	Further action for this study area is not anticipated; prior reports and data provided by Aracadis were reviewed and verified for completeness.
A-11 Dock Fire Pump House AOC	PAHs	cPAH and non-cPAH impacts were detected along the length of this dock area, given that three reported releases of unknown fluids were recorded in this area.
Spill No. 70	cPAHs	The fluid released in this spill area is unknown; the cPAH detections spanned the length of the reported spill location; the pattern of cPAH impacts is not consistent with nearby MGP impacts.
Spill No. 73	cPAHs	The cPAHs detected may not necessarily be exclusively attributable to the former spill of dielectric fluid; the recorded spill was relatively large (25,000 gallons of dielectric fluid); the cPAH impacts overlap impacted soil in the Pipe Yard.
Transportation Department Former Waste Oil USTs A & B SWMU	cPAHs, PCBs	cPAH and PCB impacts appear to be localized within the former location of USTs.
Spare Transformer Storage Yard AOC	cPAHs	Relatively low concentrations of benzo(a)pyrene were detected in this area; no other evidence of a potential release was identified; the presence of benzo(a)pyrene is consistent with the characteristics of fill material in many other areas within the facility.
North Storage Yard SWMU	cPAHs, PCBs, lead	PCB-containing equipment and operations within the area are evidenced by the presence of PCBs and other parameters indicative of routine operations and incidental releases.
Eastern Parcel Area	PAHs, arsenic	Four areas within the Eastern Parcel reveal impacts, three within the Auction Yard (refer to the Auction Yard) and one location associated with Outfall G; further action is recommended for these four specific areas.
Auction Yard	PAHs	Three areas with the Auction Yard warrant further action (Auction Yard Areas 1, 2 and 3); all three areas have similarities in the pattern of cPAHs but are not contiguous across the area.
Outfall G	cPAHs, arsenic	Further action in the vicinity of the suspected breach in the stormwater pipeline is recommended; the presence of predominantly cPAHs at that location is indicative of impacts from the breach.
Former MGP	cPAHs	The MGP AOC is relatively large and underlies many other individual

AOC		study areas; no contiguous widespread impacts are present in the MGP area; some impacted portions of the MGP area are recommended for further action as part of other study areas; the remaining impacted portions are grouped based on proximity.
Facility-wide Groundwater	TBD	RFI evaluation groundwater is ongoing.
Recreational Area	cPAHs, metals	The recreational area was identified by the NYSDEC as a new AOC in early 2009. The investigation results were provided in April 2009 as an addendum to the RFI Report.

Notes:
(1) The screening values used for comparison in the RFI program are the New York State Remedial Soil Cleanup Objectives (RSCO) for the protection of industrial workers.

Figure 2-1 Site Location Map

Figure 2-2 RI Study Areas (1 of 2)

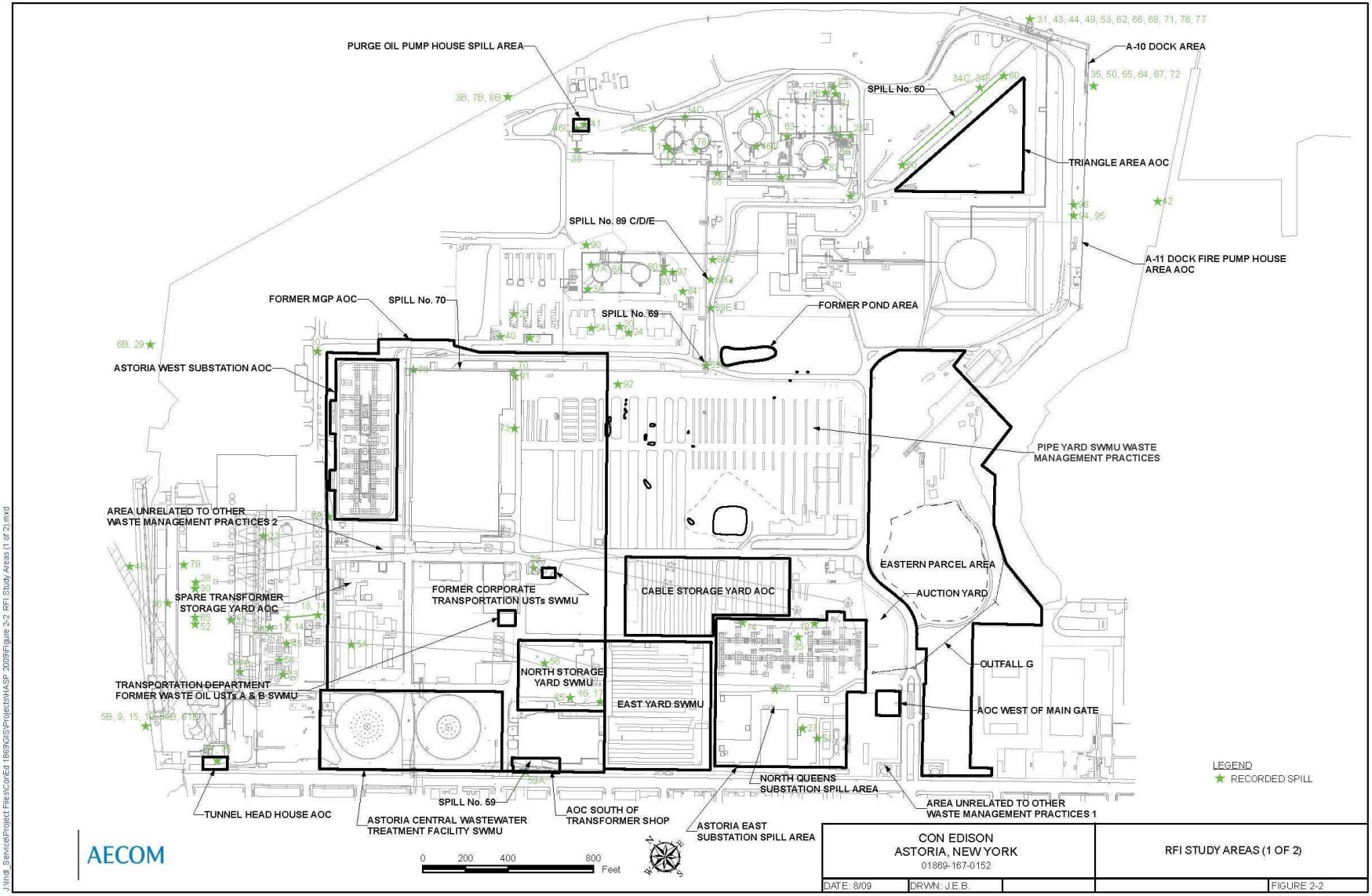
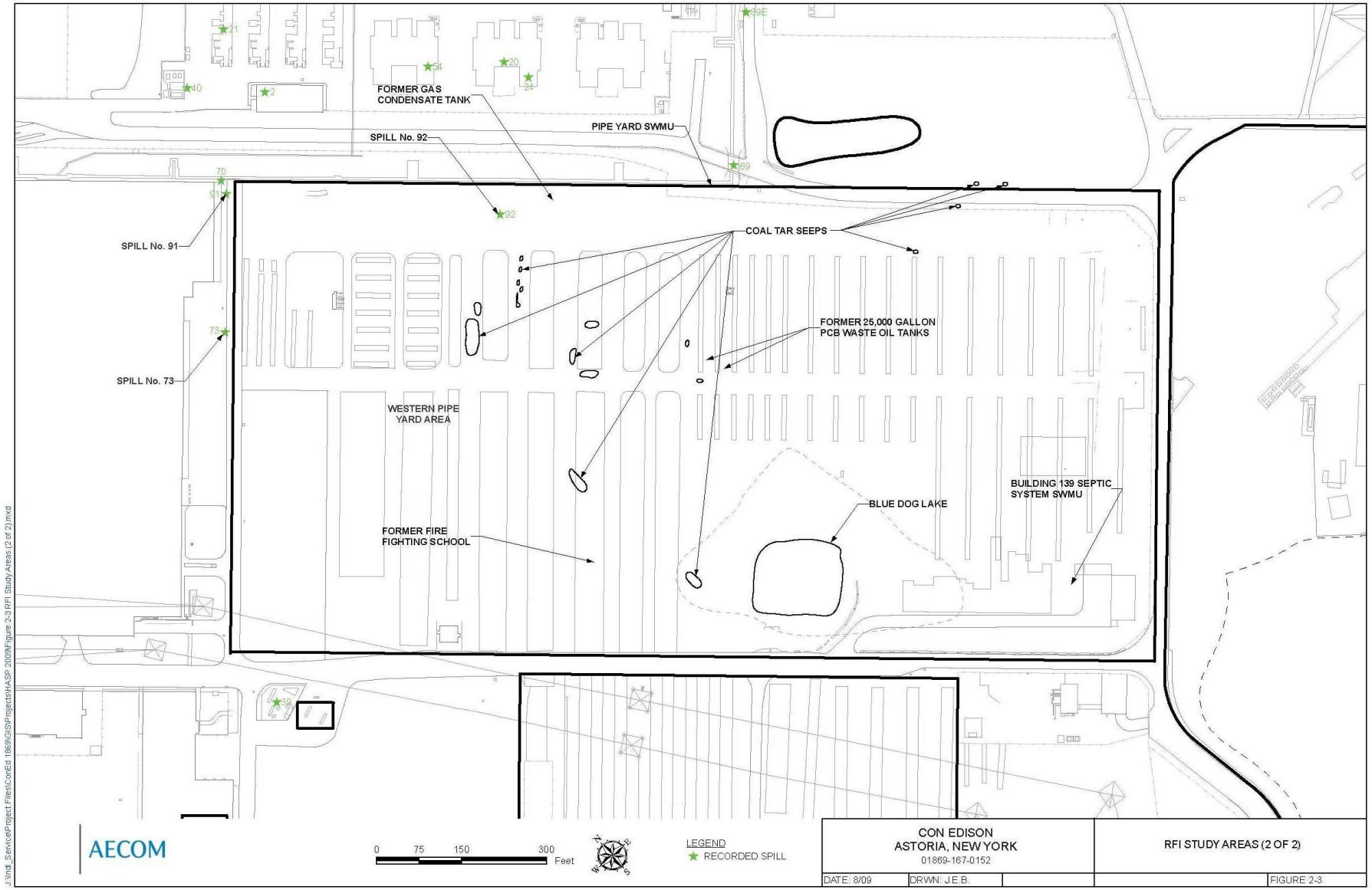


Figure 2-3 RI Study Areas (2 of 2)



3.0 SCOPE OF WORK

3.1 RFI Objectives

The objectives of the RFI at the SWMUs/AOCs/Spills identified in Section 2.0 are as follows:

- To address data gaps identified at certain SWMUs or AOCs which were investigated previously under the RFI Phase I, Phase IIB, Phase IIC and/or Phase IID programs;
- To assess potential impacts to soil and groundwater from spills;
- To conduct an initial assessment of soil and groundwater quality in the area of the former MGP operations;
- To assess groundwater quality at certain SWMUs/AOCs/Spills within the facility and also along the general perimeter of the facility;
- To assess potential impacts to the soil and groundwater from new SWMUs and AOCs; and
- To investigate the soil and groundwater in the area of former USTs.

3.2 Investigative Tasks to Support RFI Objectives

The RFI field programs at the Con Edison Astoria facility have included and/or may include the following activities:

- Utility screening surveys prior to intrusive activities;
- Vacuum excavation (boreholes and "L"-shaped trenches) and soil sampling;
- Drilling (GeoprobeTM, conventional hollow stem auger [HSA], remote-controlled HSA, sonic, and air rotary) and soil sampling;
- Hand augering and soil sampling;
- Monitoring well installation (temporary and permanent);
- Extraction well or recovery trench installation (if warranted);
- Monitoring well development (conventional and small diameter);
- Light non-aqueous phase liquid (LNAPL) sampling;
- Groundwater gauging and sampling (conventional monitoring well and small diameter);
- Sediment and surface water sampling;
- Maintaining photographic log;
- Decontamination of sampling equipment;
- Handling of investigation derived waste (IDW);
- Location and elevation survey of borings and wells; and
- Site restoration.

More detailed information regarding the specific sampling locations within each SWMU, AOC or Spill are provided in RFI Report (February 2008).and associated supplemental addenda.

4.0 HAZARD ASSESSMENT

The following chemical and physical hazard assessment applies only to the proposed tasks described in Section 3.0.

4.1 Chemical Hazards

The following compounds have been identified as the contaminants of concern in the various areas to be investigated during the RFI.

Potential Contaminants of Concern

- Petroleum Hydrocarbons
- Transformer and Dielectric Oils
- Polychlorinated Biphenyls (PCBs)
- Polycyclic Aromatic Hydrocarbon (PAH) Compounds
- MGP-Related Constituents
- Volatile Organic Compounds (VOCs)
  - Benzene
  - Toluene
  - Ethylbenzene
  - Xylene
- Inorganic Lead

4.1.1 Petroleum Hydrocarbons

4.1.1.1 Kerosene

Spill #92 in the Pipe Yard is related to a release of kerosene. Kerosene is a mixture of petroleum hydrocarbons produced from the distillation of crude oil. It consists of hydrocarbons having carbon numbers in the range of C10-C16 and boiling points in the range of 320 to 554 degrees F. Kerosene is a colorless-to-yellow liquid with a strong, characteristic odor. It is classified as a combustible liquid.

The National Institute of Occupational Safety and Health's (NIOSH) recommended exposure limit (REL) for kerosene is 100 mg/m3 as an 8-hour time weighted average (TWA). Inhalation of excessive kerosene vapor and/or mists is irritating to the respiratory passages and can lead to headache, dizziness, nausea, stupor, convulsions, or loss of consciousness, depending on the concentration of vapors and time of exposure. High vapor concentrations or liquid contact can also irritate the eyes. Prolonged or repeated dermal contact of liquid kerosene with the skin can cause defatting irritation and dermatitis.

4.1.1.2 Fuel Oils

No. 2 and No. 6 fuel oils are generally considered to be of moderate-to-low toxicity. Federal or recommended airborne exposure limits have not been established for the vapors of No. 2 or No. 6 fuel oils. However, inhalation of low concentrations of the vapor of either fuel oil may cause mucous membrane irritations. Inhalation of high concentrations of the vapors may cause extensive pulmonary edema. Chronic direct skin contact with the liquids may produce skin irritation as a result of defatting.

4.1.2 Transformer and Dielectric Oils

Transformer and dielectric fluids are electrical insulating oils. There are two broad classes of transformer oils: natural and synthetic. The natural type includes highly-refined mineral oils. The synthetic types are chlorinated aromatics (chlorinated biphenyls, see below), known collectively as askarels. Contact with

petroleum-based transformer oils can cause irritation of the eyes and irritation of the skin when repeated or prolonged.

4.1.2.1 Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs) are a series of mixtures consisting of many isomers and compounds that vary from mobile oily liquids to white crystalline solids to hard non-crystalline resins. PCB oils are typically used in heat transfer applications, hydraulic fluids, and lubricants. Technical products vary in composition and in the degree of chlorination. The higher the degree of chlorination, the greater the toxicity. Dermal contact with liquid PCBs may produce skin irritation or a rash. Prolonged or repeated skin contact may cause dermatitis or "chloracne." Studies suggest that chronic exposure to PCBs may be toxic to the liver. The OSHA PEL for PCBs (42% chlorine) and PCBs (54% chlorine) is 1 mg/m3 and 0.5 mg/m3, as an 8-hr TWA

4.1.3 Polycyclic Aromatic Hydrocarbons

The semi-volatile organic compounds identified in the soils and groundwater are referred to as polycyclic aromatic hydrocarbon (PAH) compounds. PAH compounds are a family of multiple ring aromatic compounds commonly found in fossil fuels and formed from the incomplete combustion of organic materials. Repeated contact with PAH compounds may cause photosensitization of the skin, producing skin burns after subsequent exposure to ultraviolet light. Certain PAHs as a group are considered potential human carcinogens (CPAH). OSHA regulates PAHs as coal tar pitch volatiles (CTPV) and has established a PEL for CTPV of 0.2 mg/m3, as an 8-hr TWA.

4.1.4 Volatile Organic Compounds

The volatile organic compounds (VOCs) detected in certain site soils and/or groundwater, as well as sediments, are the aromatic hydrocarbons benzene, ethylbenzene, toluene, and xylenes. Exposure to the vapors of these compounds, above their respective OSHA PELs, may produce irritation of the mucous membranes of the upper respiratory tract, nose, and mouth. Overexposure may also result in the depression of the central nervous system. Symptoms of such exposure include drowsiness, headache, fatigue, and “drunken-like” behaviors. Chronic and prolonged overexposure to the vapors of benzene may cause damage to the blood-forming organs and is known to cause leukemia in humans.

The OSHA PELs for ethylbenzene, toluene, and xylene are 100 ppm, 200 ppm, and 100 ppm, respectively. The OSHA PEL for benzene is 1 ppm. The American Conference of Governmental Industrial Hygienists (ACGIH) has recommended a threshold limit value (TLV) of 50 ppm for toluene and a TLV of 0.5 ppm for benzene.

4.1.5 Inorganic Lead

There is a possibility, due to the lead content of the cables stored at the Astoria site, that lead contamination is present in the Cable Storage Area. The OSHA PEL for inorganic lead is 50 µg/m^3 and is recommended to be 40 µg/m^3 if workers are of reproductive age. In general, the inhalation of metal dusts is irritating to the upper respiratory tract and nasal mucous membranes. Most metal dusts cause dermatitis and/or eye irritation. The early symptoms of lead poisoning, as a result of overexposure (either through ingestion or inhalation), include fatigue, sleep disturbance, headache, aching bones and muscles, digestive irregularities, abdominal pains, and decreased appetite. Chronic overexposures to lead affect the central nervous system and male and female reproductive systems. Lead has also been identified as a fetotoxin.

4.1.6 MGP-Related Wastes

The hazardous constituents of the materials potentially released to the soil at the site during former MGP operations could include aromatic volatile organic compounds (VOCs), such as BTEX, PAHs, purifier box waste (potentially containing cyanide complexes or compounds), and certain trace metals.

A typical coal gasification byproduct is coal tar. Coal tar is a black, viscous liquid or semi-solid with a strong odor and sharp, burning taste. Coal tar, depending upon the degree of distillation, typically contains high percentages of polycyclic aromatic hydrocarbons and VOCs, including BTEX. The hazards of these constituents have been discussed previously.

Blue staining is the characteristic associated with the presence of oxide box wastes (ferrocyanide). Therefore, the presence of this material is very easily identified during field investigations. The cyanides associated with oxide box wastes are present in a form that is generally unavailable or complexed with metals such as iron, which makes the cyanide more stable. Thus, the reported effects of free cyanide are not applicable. OSHA has not established a PEL for ferro/ferri cyanide compounds. Similarly, the ACGIH has not recommended a TLV for these compounds

4.2 Asbestos

Asbestos-containing debris has been discovered during previous investigations at the Con Edison Astoria facility. Asbestos was used in a wide variety of construction materials, including thermal system insulation and fireproofing, as well as many commercial products, including floor tiling. Asbestos is a naturally-occurring mineral fiber (magnesium silicate). Airborne asbestos fibers can be dangerous, even in concentrations that may not be visible. A scarring of the lungs called asbestosis is caused by heavy exposure to asbestos. Cancer of the lung may also be caused by asbestos exposure. A rare cancer of the lining of the chest cavity, called mesothelioma, can occur, even from low-level exposures. Although the primary rout of exposure to asbestos is by inhalation, it can also be inadvertently ingested as a result of poor hygiene practices. The OSHA PEL for asbestos is 0.1 fibers per cubic centimeter of air (f/cc) as an 8-hour TWA.

4.3 Dust

Dust generated during coring or cutting of concrete, boring, or excavations can be hazardous to the respiratory system and irritating to the eyes. Dust can also carry the contaminants of concern potentially exposing workers by skin contact and inhalation. The ACGIH has established an eight-hour exposure limit for dust at 3 mg/M^3. The concentrations of the chemicals of concern in the soil are low enough that inhalation of dust would not by itself be an exposure hazard. However, contamination of skin and clothing can provide additional exposures. Therefore the generation and contact with dust should be minimized.

Water or other methods should be used to control dust during dusty operations; however care must be used to prevent electrical shock if electric tools are used in the same area. If dusts become irritating and engineering controls such as the application of water cannot be used, respirators should be donned as discussed in Section 7.

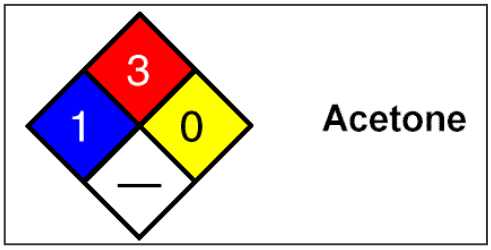
4.4 Summary of Hazardous Properties of Potential Contaminants

Chemical Name	PEL[1]	TLV[2]	VP[3]	VD[4]	SG[5]	SOL[6]	FP[7]	LEL[8]	UEL[9]
Benzene	1	0.5	75	2.8	0.88	<1	12	1.2	7.8
Toluene	200	50	21	4	0.87	<1	40	1.1	7.1
Ethyl Benzene	100	100	7	4	0.87	<1	55	0.8	6.7
Xylene	100	100	9	4	0.86	<1	81	1.1	7.0
PCBs	0.1	0.1	50	9.3	1.38	<1	356	Not known	Not known
Lead	50 µg/m^3	50 µg/m^3	NA	NA	11.3	NA	NA	NA	NA
Asbestos	0.1f/cc	0.1 f/cc	?	?	NA	Insol	NA	NA	NA

[1] Permissible Exposure Limit in ppm
[2] Threshold Limit Value in ppm
[3] Vapor Pressure in mm Hg
[4] Vapor Density (air = 1)
[5] Specific Gravity (water = 1)
[6] Solubility in Water in %
[7] Flash Point in □F
[8] Lower Explosive Limit in % by volume
[9] Upper Explosive Limit in % by volume
NA = Not Applicable
C = Ceiling limit not to be exceeded

4.5 Hazardous Substances Brought On-Site by AECOM or Subcontractors

A Material Safety Data Sheet (MSDS) must be available for each substance that AECOM or its subcontractors bring on the property. MSDSs must be provided to Con Edison prior to AECOM or their subcontractors' bringing any substances onto the Astoria facility. This includes solutions and/or chemicals that will be used to decontaminate sampling equipment as well as calibration gases. All containers of hazardous materials must be labeled in accordance with OSHA's Hazard Communication Standard. Either the original manufacturer's label or an NFPA 704M label, specific for the material (as shown below), is considered to be an acceptable label.



4.6 Chemical Hazard Potential/Control

4.6.1 Chemical Hazard Potential

The most significant potential for employee exposure to the contaminants of concern is during the investigation of oil-saturated soils and/or NAPL (i.e., LNAPL and/or DNAPL) and during the collection of sediment and surface water samples. Exposure will also increase if test-pitting or excavation activities are being used in suspected NAPL areas, since a larger surface area of the subsurface would be exposed.

Due to the extremely low vapor pressures of PCBs and PAH compounds, an inhalation hazard is not likely to exist during investigative activities conducted in areas where these contaminants are present, unless it is made airborne via dust generation. Because of the relatively low vapor pressure of No. 2 and No. 6 fuel oils and the low ppb concentrations of VOCs previously detected in soils and/or groundwater, overexposure to the vapors of these materials is not expected to occur in the outdoor environment.

There is the potential to encounter buried asbestos-containing materials during the proposed investigations. The performance of vacuum excavation activities to clear soil borings for potential utilities is the most likely activity that could result in the release of asbestos fibers. Specific procedures for how to handle the discovery of asbestos-containing materials are detailed in Section 4.4.3.

The most likely routes of potential chemical exposure include the following:

- Direct dermal contact with potentially contaminated soils and groundwater during drilling and sampling;
- Direct dermal contact with sediments and surface water during sampling;
- Direct dermal contact with coal tar residues during coal tar seep investigations;
- Direct dermal contact with NAPL during well gauging and collection of NAPL and oil-saturated soil samples;
- Inhalation of VOC vapors during sediment sampling;
- Inhalation of NAPL vapors during test trenching, if installed, and NAPL or oil-saturated soil sampling;
- Inhalation of contaminated dusts during excavation activities, if conducted, and during the cleaning of the silt trap on the vacuum excavator; and
- Equipment decontamination activities.

4.6.2 Chemical Hazard Control

The chemical hazards associated with the proposed activities can be controlled in several ways, including:

- Direct-reading air monitoring instrumentation will be used, as described in Section 6.0 of this HASP, to determine the concentration of petroleum hydrocarbon and VOC vapors that may be present in the work area and in the employee's breathing zone during site activities, as described above. If necessary, respiratory protection, as defined in Section 7.0 of this HASP, may be donned to control employee exposure to the vapors of petroleum hydrocarbons and/or VOCs;
- Dusts from contaminated soils may be generated during vacuum excavation operations. If necessary, a light mist of water can be applied to the sidewalls of the excavation to suppress dust generation. This does not apply to the discovery of asbestos containing materials. See Section 4.4.3 for specific procedures related to the discovery of such materials; and
- To reduce the potential for contact with potentially contaminated soils, groundwater, sediment, surface water or NAPL, personal protective equipment (PPE), as described in Section 7.0 of this HASP, will be worn.

4.6.3 Procedure if Asbestos-Containing Materials are discovered

As discussed previously, asbestos-containing materials have been discovered at the facility during prior investigations. Vacuum excavation or hand-digging will be used to either over-bore (i.e., drill a larger size diameter clearance hole) or create an L-trench around each soil boring location to facilitate utility clearance. For test pits, vacuum excavation or hand-digging will be used around at least three sides of the planned test pit or to create an L-trench around each test pit. The contractor will use spotters to look for the presence of asbestos-containing materials during all vacuum excavation work.

If suspect asbestos-containing materials are identified during the implementation of the proposed investigations, AECOM will implement the following procedure:

- Work will cease immediately;
- AECOM's field team leader will notify the Con Edison PM immediately after stopping work;
- The suspect material, to the extent possible, will be covered with plastic sheeting to prevent fiber release until a decision is made as to whether the existing borehole will be continued or the hole will be abandoned and another clearance location selected;
- If it is determined that the existing borehole will be continued, Con Edison will collect samples of the suspect material for laboratory analyses;
- AECOM will suspend work in the area until Con Edison reports the results of the laboratory analyses;
- If the analyses determine that the material contains > 1% asbestos, the L-trench and borehole advancement under remedial investigation field protocols will be stopped. The confirmed asbestos will be called into the Control Center by the Con Edison Construction Manager assigned to the project. Additional work in ACM areas would require a JSA and direction by an approved licensed Asbestos Abatement Contractor using NYSDEP/NYSDOL certified Asbestos Abatement workers. Work performed under remedial investigation field protocols will not be allowed at that location until laboratory analysis confirms the absence of ACM; and
- If the decision is made to move away from the borehole, the original L-trench will be backfilled and/or abandoned and a new L-trench and borehole will be opened. Refer to prior bullet for actions relative to ACM confirmation and associated action.

5.0 PHYSICAL HAZARDS

5.1 Work Permits

All intrusive work at the Astoria facility requires a Work Permit which is issued by Facilities Operations and Maintenance. The AECOM SSO must receive a work permit from a Con Edison representative on a daily basis. The AECOM SSO must verify that AECOM and AECOM's subcontractors are prepared and equipped to satisfy all the conditions of the permit and the requirements of this HASP before work begins. Any work permits obtained by AECOM and/or subcontractors must be maintained at the job location. Con Edison will also inspect the work site prior to each day's scheduled work to ensure that all site-specific safety measures are in place. The AECOM SSO must participate in this inspection and correct any deficiencies immediately.

5.2 Traffic Hazards

The Astoria facility is an active facility where vehicles and machinery are continuously moving or operating. The following precautions will be implemented if work is being performed in a high traffic area (i.e., roadway, parking lot, shipping/receiving area, or loading dock). All are designed to draw attention to the field personnel to warn other people of your presence:

To make certain that motorists are aware of our presence, all employees who are potentially exposed to traffic hazards should wear orange or yellow retro-reflective ANSI Class II or III safety vests. Work area should be delineated with traffic cones to prevent motorists from inadvertently driving through. As for vests, cones or other barrier materials shall be reflectorized.

- Notify the property owner of your work location, dates of work, and the anticipated work times. Suggest and evaluate the possibility of creating a detour around the subject work area;
- Wear an orange or yellow retro-reflective ANSI Class II or III safety vest;
- Set up traffic cones or other suitable warning barriers 50 feet in front of the work area. "Men at Work" signs shall also be placed in a conspicuous area to warn others of your presence; and
- Where it is not feasible to implement such procedures, a standby observer shall be assigned to warn the work crew of any impending traffic hazards.

5.2.1 Work On, Or Adjacent To, Public Roadways

It is not anticipated that work on public roadways will be required at the Astoria facility; however, if work on adjacent areas (e.g., for the collection of background samples) is required, this section applies. For those projects that involve potential exposure to traffic on, or adjacent to, public roadways, Roadway Work Area Protection will be as established either in the *Con Edison Work Area Protection and Traffic Control Field Manual* (Attachments F and G), or the Federal Highway Administration's *Manual on Uniform Traffic Control Devices (MUTCD).*

5.2.2 Flagging/Redirecting Traffic

Specific requirements exist when traffic must be redirected around a work area that is on, or adjacent to, a public roadway. In certain locations, only police officers may redirect traffic. As a minimum, OSHA requires that flaggers be formally trained in accordance with the requirements specified in ANSI D6.1-1971. As a result, AECOM personnel should not redirect traffic on public roadways.

When traffic must be redirected, and the local police do not perform that role, a traffic control firm should be hired (these are frequently listed in the yellow pages under "safety").

5.3 Driving Safety

Drivers must be licensed to drive the class of vehicle they are operating and must be trained in defensive driving. Only AECOM personnel may drive AECOM vehicles, or vehicles rented for AECOM business; client, subcontractor, or other work-related personnel may ride. Drivers and passengers must comply with all traffic laws and posted signs, and will not operate a vehicle if under the influence of impairing medication, alcohol, or any other substance.

Make sure that the following basic safe driving practices are followed at all times while working on this project:

- Always wear a seat belt while operating a motor vehicle or while traveling as a passenger;
- Obey speed limits and local traffic laws at all times;
- Obtain proper directions to the site in advance, and take the route that is most likely to be free of known traffic hazards (e.g., congestion, construction, etc.) and that also avoids travel through potentially dangerous neighborhoods;
- Abstain from distractions while driving (e.g., the use of cell phones, eating or drinking, reading maps, etc.) If necessary, stop the vehicle and pull over to perform such activities safely. AECOM policy is engine on, cell phone off. You must NOT operate a vehicle while talking on your cell phone, regardless of “hands free” or not. If you receive a call, pull over to answer it. Do NOT allow other distractions to interfere with your safe operation of the vehicle;
- Do not operate a motor vehicle if you are tired and/or have not had sufficient rest. AECOM’s H&S policy 1.2 limits the maximum length of the workday to 16 hours for fieldwork. This limit includes the time spent driving to and from a site; and
- All unattended personnel transport vehicles will not be allowed to idle and must be turned off when not in use.

5.3.1 Planning and Preparation

Prior to departure, check traffic reports, weather conditions, road construction, and road closures. If necessary, develop an alternate route and new, approved JMP (Journey Management Plan);

Prior to entering the vehicle, inspect the vehicle; and leave early to allow for contingencies.

5.3.2 DOT

If you operate a vehicle exceeding 10,000 pounds (or vehicle and trailer with a combined weight over 10,000 pounds), or you transport greater than 1,000 pounds of hazardous materials, you MUST comply with DOT regulations. These regulations are NOT addressed in this HASP because this scope is not anticipated. Any vehicle approaching this criterion would require a HASP addendum and/or JSA.

5.3.3 Secure Packing

Do not move your vehicle unless all equipment and supplies are secured. Items and material that may roll, slide, or move about in your vehicle while traveling are a major hazard. Secure the load!

5.3.4 Emergency Procedures

Always move out of traffic if possible, even if those in front of you have stopped. Stopping on an active highway can precipitate being hit from the rear. If you must stop on an active roadway, leave at least one car length in front of you, and watch the rear mirror so that you can ease up if someone behind can't stop. Keep your flashers on in this situation. If you are the only driver coming to a stop on an active roadway, leave the flashers on and, when safe to do so, exit the car and get to a safe location.

If you must stop due to vehicle failure or some other reason, try to coast out of traffic. Put on your flashers and tie a white cloth or similar object on the driver's side door or mirror. If you remain in the vehicle, lock the doors. Use your cell phone to summon help.

5.4 Utility Hazards

If manholes, vaults, etc. will be entered they will be considered Electric Enclosed Spaces and specific Con Edison training will be required prior to making entry. Stray voltage testing will be performed by either Con Edison Electric Operations or Construction Services personnel, with advance notice from AECOM to Con Edison Construction Management.

5.4.1 Underground Utility Hazards

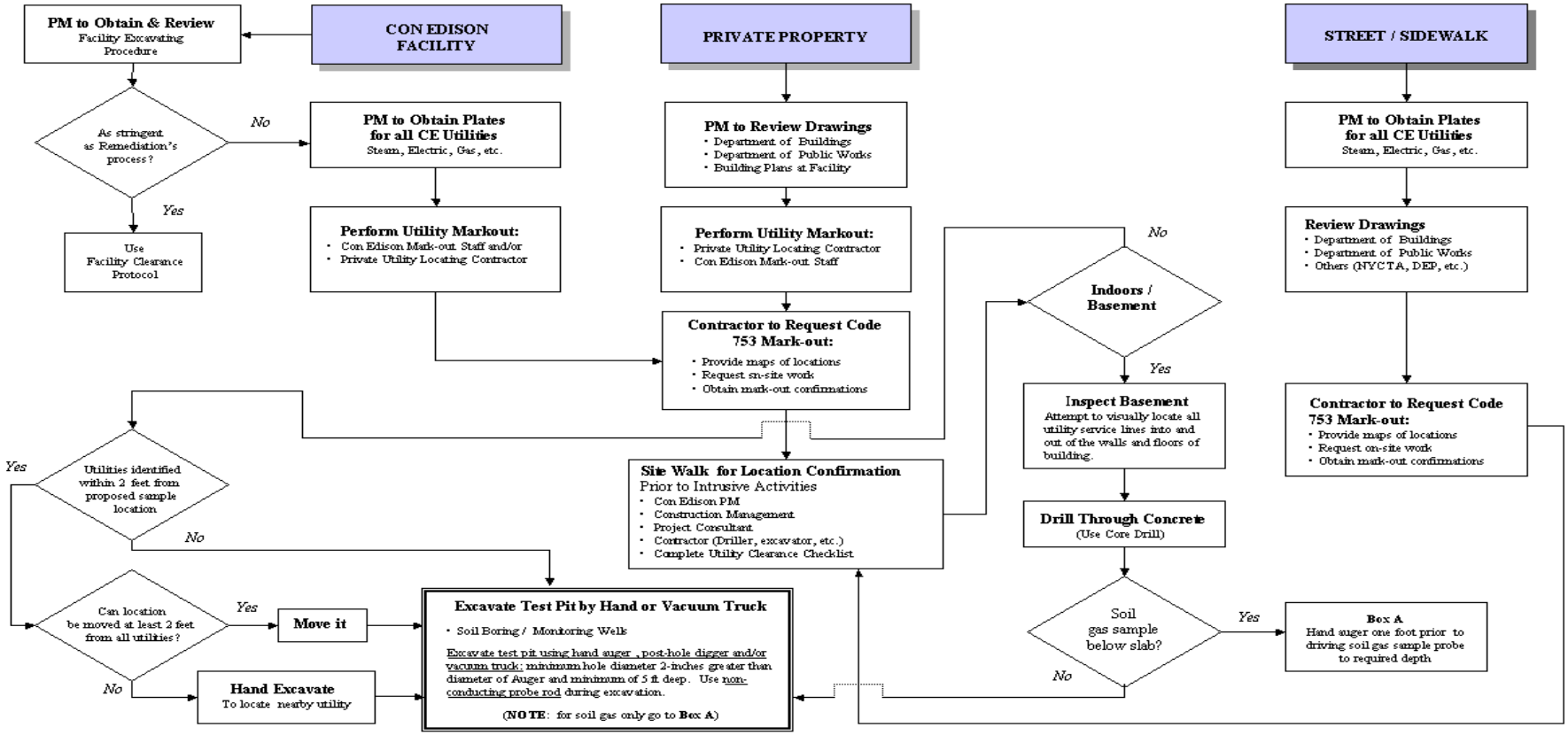
The presence of overhead and subsurface utilities, many of which contain extremely high voltage, is the most critical potential hazard at the Con Edison Astoria facility. New York law requires that a utility clearance be performed at least two (2) days prior to initiation of any subsurface work. The contractor must contact the New York City Long Island One Call Center (**1-800-272-4480**) to request a mark-out of natural gas, electric, telephone, cable television, water and sewer lines in the proposed drilling locations. Work must not begin until the required utility clearances have been performed. Public utility clearance organizations typically do not mark-out underground utility lines that are located on private property. As such, contractors must exercise due diligence and identify the location of any private utilities on the properties being investigated with a geophysical investigation of the areas to be disturbed.

For investigations at the Con Edison Astoria facility, the following actions must be performed, which comply with regulatory, Con Edison and AECOM requirements:

- Review subsurface utility drawings for the areas being investigated, using the Pope and Evans drawings provided by Con Edison;
- Pre-mark proposed investigation locations and contact the New York City Long Island One Call Center (1-800-272-4480);
- Visually inspect the proposed investigation areas with a Con Edison representative to identify any visual hazards;
- Perform a geophysical survey (e.g., m-scope survey) to locate utilities; Con Edison may also conduct a duplicative geophysical survey for heavy utility areas;
- Clearly identify and mark no-work zones; and
- For the first 5 feet, minimally, below the ground surface, hand-dig (using tools with non-conductive handles) and/or vacuum-excavate.

In general, vacuum excavation or hand-digging will be used to either over-bore (i.e., drill a larger size diameter clearance hole) or create an L-trench around each soil boring location to facilitate utility clearance. For test pits, vacuum excavation or hand-digging will be used around at least three sides of the planned test pit or to create an L-trench around each test pit.

Utility Clearance Process During Intrusive Activities
E H & S – Remediation Group



5.4.2 Overhead Utilities

Field personnel should be particularly aware of overhead lines, especially slack lines, in the work area. All equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a minimum clearance of 20 feet (29 CFR 1910.133 I (3) (iii)) is maintained. Operating or erecting any machinery within 20 feet of high-voltage lines is a prohibited activity, as defined in 12 NYCRR Part 57 (high voltage proximity). The conventional drill rig mast must be lowered before moving.

5.5 Use of a Pneumatic Jackhammer

If any piece of equipment is equipped with an air compressor, users of the compressor must hold a New York City Fire Department Certificate of Fitness to operate an air compressor. Pressure safety devices and hose whip devices shall be installed on compressors and tools. If jackhammers are used, the operator will wear metatarsal protectors while using the tool.

5.6 Concrete and Asphalt Coring & Cutting

Cutting and coring concrete and asphalt can involve numerous hazards. The noise generated as a result of the tools used, and adequate hearing protection is necessary when conditions outlined in the Noise section below are encountered. Tools used which can include drills and saws, must be appropriately guarded to prevent hands, PPE, and other objects from being caught-up in the moving parts and drawing employees in. Dust may also be generated while cutting concrete and either respiratory protection or dust suppression will need to be utilized to prevent exposure. Additional consideration must be given chemical hazard concerns that may exist in the materials underlying the concrete.

5.7 Drilling Hazards

5.7.1 Rotary Drilling

Use of a hollow-stem auger (HSA) drill rig for soil boring and well installation will require all personnel in the vicinity of the operating rig to wear steel-toed boots, hardhats, hearing protection, and safety eyewear. Personnel shall not remain in the vicinity of operating equipment unless it is required as part of their work responsibilities.

Additionally, the following safety requirements must be adhered to:

- Drill rigs and other machinery with exposed moving parts must be equipped with an operational emergency stop device. Drillers and geologists 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 stop;
- The driller must never leave the controls while the tools are rotating, unless all personnel are kept clear of rotating equipment;
- A long-handled shovel or equivalent must be used to clear drill cuttings away from the hole and from rotating tools. Hands and feet are not to be used for this purpose;
- 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. If personnel must work near any tools which could rotate, the driller must shut down the rig prior to initiating such work;
- Drillers, helpers and geologists must secure all loose clothing when in the vicinity of drilling operations;

- 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;
- No person shall climb the drill mast while tools are rotating; and
- No person shall climb the drill mast without the use of ANSI-approved fall protection (approved belts, lanyards and a fall protection slide rail) or a portable ladder that meets the requirements of OSHA standards.

5.7.2 Geoprobe™ Hazards

Use of the Geoprobe™ System to collect soil samples will require all personnel in the vicinity of the operating unit to wear steel-toed boots, hardhats, hearing protection and safety eyewear. Personnel shall not remain in the vicinity of operating equipment unless it is required as part of their work responsibilities.

Additionally, the following safety requirements must be adhered to:

- A remote vehicle ignition is located on the control panel of the Geoprobe™ unit. This allows the operator to start and stop the vehicle engine from the rear. This device must be tested prior to job initiation and periodically thereafter. All employees should be aware of how to access and operate the rear ignition;
- The driller must never leave the controls while the probe is being driven;
- Drillers, helpers, and geologists must secure all loose clothing when in the vicinity of drilling operations;
- The Geoprobe™ vehicle shall not be moved any distance with the probe in the extended position. Check for clearance before folding the Geoprobe™ probe out of the vehicle;
- Be sure the parking brake is set before probing;
- Never allow the derrick foot to be lifted more than 6" off of the ground surface;
- Deactivate hydraulics when adding or removing probe rods, anvils or any tool in the hammer; and
- Verify that all threaded parts are completely threaded together before probing.

5.8 Hand Augering

In addition to the precautions listed in the Back Safety discussion below, additional care should be taken to prevent injuries when using hand augers.

- When practical, work as a team of two to advance borings with a hand auger;
- Wear cotton or leather gloves when rotating the auger;
- Avoid putting pressure on the palms of your hands; use a good grip to spread the pressure over the entire hand; and
- Take frequent stretch breaks to stretch and relax your back, arms, and hands.

5.9 Well Development and Groundwater Monitoring

During purging and development of borings into monitoring wells, the PPE indicated in Section 7 below will be worn to avoid chemical contact / exposure, as well as physical trauma. Bailing wells requires proper gloves,

eye protection, and possibly protective coveralls to prevent splashing. Back and lifting precautions outlined in Section 5.19 shall be used to avoid ergonomic injuries.

5.10 Cuts and Lacerations

Geoprobe soil samples are contained within an acetate liner that must be cut open in order to retrieve the sample. As such, employees are at an increased risk of cutting themselves, since a knife or blade is typically used to open the liner and the liner is often placed on an irregular or unstable work surface (i.e., the back of the Geoprobe van or the ground). Additionally, tubing may need to be cut to facilitate groundwater sampling. Tube-cutters are available and should be used to eliminate this hazard. If it is necessary to use knives or blades, follow the safety precautions listed below:

- Keep your free hand out of the way;
- Secure the acetate liner so it won't roll or move while you are cutting;
- Use only sharp blades; dull blades require more force which results in less knife control;
- Pull the knife at an angle to your body; pulling motions outside and away from your body are easier to manage and could prevent injury if slippage occurs;
- Don't put your knife in your pocket;
- Use a hooked knife (i.e. linoleum knife) or a utility knife with a self-retracting blade; and
- Wear leather or Kevlar® gloves when using knives or blades.

5.11 Excavation Hazards

5.11.1 Working Around Heavy Equipment

Although AECOM does not anticipate having to conduct any excavation activities, it may be necessary to install a NAPL recovery trench should such material be encountered. Heavy equipment, including bobcats or excavators, may be used to perform these excavation activities. The use of such equipment poses a potential hazard to the support crew working around the equipment. Use of heavy equipment at the site requires all employees working in the exclusion zone to wear ANSI-approved hard hats, steel-toed safety shoes or boots, safety glasses and hearing protection, as well as traffic vests (as indicated above) when working in high traffic areas.

Operators will inspect the equipment daily before use to ensure safe operating conditions and to determine that the brakes and operating systems are in proper working condition and that all required safety devices are in place and functional (i.e., reverse gear alarms are working properly).

If excavation was conducted, AECOM employees will be overseeing the excavation activities. This will place the spotter within close proximity to the operating machinery. When working around heavy equipment, employees shall:

- make sure that the operator is aware of your presence/activities;
- stay in the operator's line of sight; don't work in his/her blind spot;
- approach areas where equipment is operating from a direction visible to the operator;
- be aware of the swing radius of the excavator;
- do not walk or work underneath loads handled by digging equipment;

- do not ride in buckets of loaders;
- stand away from soil stockpile areas to avoid being struck by any spillage or falling materials; and
- develop a series of hand signals to facilitate communication with the operator.

5.11.2 Cave-In/Trench Collapse

An unshored excavation will remain after a trench is excavated. It is anticipated that samples will be collected remotely or from the bucket of the backhoe, thereby eliminating the need to enter the excavation. If it is does become necessary for AECOM employees to enter the trench, the following precautions must be implemented:

- A stairway, ladder, ramp, or other similar means of egress must be located in trench excavations greater than 4 feet in depth so as to require no more than 25 feet of lateral travel for employees in the trench excavation. Remember that more than one means of egress may be required;
- The excavation must be free of accumulated water before entry is allowed (all removed water will be managed as investigation-derived wastes). If, in the event it is necessary to de-water an excavation, then the first choice would be to use a vacuum truck. If the anticipated volume of water is too large for a vacuum truck, then a frac tank would most likely be used. The necessary confined space entry permits would be obtained from certified AECOM trainers prior to anyone accessing a confined space.
- No person shall enter an excavation greater than 5 feet in depth unless:
  - the walls of the excavation have been sloped back to an angle not steeper than one and-a-half horizontal to one vertical (1.5H:1V), i.e., 34 degrees from the horizontal, as specified in 1926.652(b);

    Example - An excavation that was planned to be 5 feet deep and 3 feet wide at the base would have to be sloped back so that it was 18 feet wide at the top.

  - the walls of the excavation have been shored in accordance with the requirements specified in 29 CFR 1926.652(c), (d), and (e); or
  - the work in the excavation is to be performed within the confines of an approved shield system (e.g., trench box) that has been constructed and is used in accordance with the requirements of 1926.652(g).
- A stand-by employee must be present at all times when employees are in the excavation;
- All materials, including excavated soils, shall be placed at least 2 feet from the edge of the excavation to prevent the material from rolling into the excavation. All personnel should remain 2 feet away from the edge of the excavation while personnel are in the excavation; remembering that fall protection is required at heights of 6 feet and greater; and
- No employee shall walk or work underneath loads handled by digging equipment. Employees must stand away from soil stockpile areas to avoid being struck by any spillage or fallen materials.

5.11.3 Open Excavations

If excavations are to be left open, the perimeter of the excavation must be marked with "Caution-Open Trench" tape. If necessary, metal plates will be placed over the excavations to permit vehicular crossing.

5.12 Preventing Motion of Vehicles

The wheels of all drilling rigs and other heavy vehicles or machinery that may be used for the investigation will be chocked when these vehicles are not in motion.

5.13 Hand Safety

5.13.1 Glove Selection

To protect onsite workers from hand injuries, brightly colored gloves will be used to help emphasize and easily locate the hands. It is recommended that the color of gloves be changed monthly to draw attention to the hands.

Pinch points are found between a moving object and a stationary object, or between two continuously moving objects. Yellow hand stickers will be placed on equipment to remind workers of pinch points.

5.13.2 Working with Glassware

Glass bottles, laboratory equipment, and VOA vials can break and cause lacerations and puncture wounds. The follow preventive measures should be taken to reduce the potential for broken glassware.

- Package all glassware such that there is no glass to glass contact during transportation or storage;
- Assume that any time glass strikes another object it is damaged;
- Inspect all glassware for cracks, scratches, and other damage before using;
- Lids and caps should be “finger tight” unless there is a torque specification and you use a torque wrench;
- Never fill a glass container (other than VOA vials with a septum) liquid full, always leave an air space to buffer thermal expansion of the liquid; and
- Avoid rapid temperature changes when filling glass containers.

Glass often has flaws that cannot be detected by visual inspection and the force needed to open and tighten lids can cause these flaws to fracture the glass. Any time force is applied to glass, workers should wear leather or preferably Kevlar® gloves. Kevlar® glove liners are available for use under Nitrile or cotton gloves.

5.13.3 Hand Tools

Rules for the safe use of hand tools:

- Select the right size tool for the job. Don’t use “cheaters” and avoid pulling old tools from the waste stream. There’s a reason why they were thrown away!
- All hand tools must be in safe condition.
- Handles must be sound, straight and tight-fitting.
- Always inspect tools before use and replace or repair worn or damaged tools.
- Always keep the cutting edges sharp and never test a cutting edge with your finger.
- When working on an elevated surface (ladder, truck, scaffold), ensure your tools are secure. Falling tools can cause serious injury.
- Always carry your tools correctly and never put sharp or pointed tools in your pocket.

- When carrying hand tools, always point the cutting edge to the ground.
- Always keep your tools in a dry place to prevent rust.
- Cutting tools must be kept sharp and properly shaped.
- Secure work pieces prior to cutting or drilling.
- Keep the unused hand and other people away from the tool.

5.13.4 Specific Tool Use

5.13.4.1 Screwdrivers

Most screwdrivers are not designed to be used on electrical equipment. Use an insulated screwdriver for electrical work.

Do not hold an object in the palm of one hand and press a screwdriver into it; place the object on a bench or table. Never hammer with a screwdriver. Never use a screwdriver with a broken handle, bent or burred blade, etc.

5.13.4.2 Pliers

Do not use pliers as a substitute for hammers, wrenches, pry bars, etc. Use insulated pliers when doing electrical work. Inspect the pliers frequently to make certain that they are free of breaks or cracks.

Use the right type of pliers for the specific task – adjustable, locking (Vise Grip®), standard, bolt size fit, pipe wrench.

5.13.4.3 Hammers

Use the correct hammer for the specific type of striking work (task) to be done. Always wear safety glasses when using a hammer to strike an object. Always use the claw portion of a hammer to remove nails and not as a pick or awl. Have an unobstructed view and swing when using a hammer. Watch for overhead interference on back and forward swing. Use a good grip and use something other than your hand to hold a nail when starting hammering. Check for defects on the handle and head before using. If the hammer head shows signs of mushrooming, replace it immediately.

Handles may be wood, tubular/solid steel or fiberglass. Replace any hammer with a loose handle before the head flies off and causes injury to you or someone else. Tighten loose handles with the proper wedges; never use nails or staples for wedges. If a steel or fiberglass handle is loose replace it, since it is more difficult to repair than a wooden one. Some fiberglass handles can be tightened with the aid of a repair kit with epoxy materials.

5.13.4.4 Wrenches

Select the correct size of wrench for the job. Never use a pipe wrench as a wrench handle extension. Too much leverage can ruin a tool and cause injury.

To avoid sudden slips, stand in a balanced position and always pull on the wrench instead of pushing against the fixed jaw, particularly when a pinch point is created. Wear gloves when using a wrench in a confined space.

Whenever possible use a box end wrench instead of an open end wrench to avoid slipping.

5.13.4.5 Chisels

Always wear safety goggles or a face shield when using a chisel. Drive chisels outward and away from your body. Do not use chisels to pry. Keep edges sharp for most effective work and protect when not in use. Driven tools (chisels, punches, etc.) must be dressed to remove any mushrooming. Use the proper hammer when using a chisel.

5.13.4.6 Knives

Always perform a thorough Job Safety Analysis (JSA) to define the proper cutting tool for the task.

Always place the item to be cut on a solid surface, attempt to hold the cut item without your hand and cut in a direction away from the body and hand.

Always keep hands and body clear of the knife stroke. Always keep the cutting tool blades sharp.

Make sure there is plenty of open space around you when using any cutting tool.

Use the following safer tools in replace of fixed open blade knives (FOBK) whenever possible:

- Self-retracting utility knives
- Guarded utility knives
- Shears, snips, and/or scissors
- Concealed blade cutters
- Pipe cutters
- Specialty cutters (e.g. Geoprobe Acetate Liner Cutter)
- Ratcheting tools

5.14 Heavy Equipment

The use of heavy equipment for earth moving work poses potential hazards to employees. Such equipment can cause trauma injuries to the operator or nearby workers. It may also roll over, or fall on sloped ground or unstable soil. AECOM personnel are to remain clear of operating heavy equipment to the extent feasible.

Operators of earth moving equipment must be experienced or trained in the use of the equipment. They must inspect the equipment each day before use to assure that it is in safe operational condition. The equipment must be set up in a stable configuration, with the outriggers fully extended and supported on stable soil to prevent rollover. The rear swing-radius must be barricaded to prevent injuries to persons passing behind the equipment. When employees must work near the equipment, eye contact and clear communication must be maintained.

5.15 Heavy Equipment – Drill Rigs

Drill rigs are considered to be heavy equipment, and therefore precautions must be incorporated into job activities when working in close proximity to drill rigs. In addition the wearing the PPE that has been determined to be necessary for the project, employees will need to ensure that Drill Rig Operators conduct inspections of the drill rig on a daily basis. A drill rig inspection is included as part of the JSA which is included in Attachment E. Focal points of the inspection should include checking hydraulic lines, tools and drilling

equipment, emergency stop switches, and other parts of the equipment to insure that they are maintained in a safe operating condition.

Employees will also consider the staging their work area so that they are not within the shadow of the drill rig's mast. Working within this area creates a potential to be contacted by the drill rig if it were to tip over on its side. Likewise, when establishing a drilling location, the rig shall be positioned so that it won't clip overhead power lines should it tip over.

5.16 Vacuum Trucks and Trailers

Use of a vacuum to remove material from a tank, excavation or during air-knife operations can create hazard for the operator and the work crew.

It's possible for the operator to get stuck on the suction end of the hose. If the suction isn't broken quickly, the skin can rupture under the high vacuum and fluids can be sucked from the body. Vacuum trucks should have either a suction breaking device or an additional operator near the intake valve. Workers at the site must know where the intake valve and suction breaking device are located and how to operate them in event of an emergency.

If the vacuum is used to remove flammable materials, an explosive atmosphere can be created in the vacuum tank. Vacuum systems used for flammable materials must be rated for flammable materials. Truck engines are an ignition source, they must be operated upwind of any source of vapor including the vacuum pump vent and the work area containing the flammable material. With nonconductive hose, any exposed metal, such as a hose flange, can accumulate static electricity and act as an ignition source if the metal touches or comes close to ground. If nonconductive hoses are used to vacuum or discharge a flammable liquid, the metal parts shall be bonded, the hose and the tank or receiving vessel shall be bonded, and the bonding system shall be grounded.

When volatile flammable or toxic liquids are loaded, the vacuum pump exhaust should be extended downwind by attaching a length of hose sufficient to allow venting to a hazard-free area away from people and ignition sources.

Prior to operating the vacuum system the operator should complete an inspection including:

- All valves are operating freely.
- Floats for liquid-level indicators are working properly.
- Rubber stoppers on scrubber shutoffs are in good condition and seated properly.
- Dome gaskets are in good condition and seated tightly when the domes are closed (this can be checked by applying pressure to the tank).
- Hoses, connections, and fittings are in good condition, and the materials of construction are appropriate for the application.
- All connections and other equipment are leak-free and in good working order.

5.17 Electrical Hazards

5.17.1 Grounding Cables

All mechanical equipment that enters the ground, including drill rigs, jackhammers, and backhoes, must be electrically grounded with a 4-AWG cable. All electrical connections must be free of corrosion (i.e., bare metal to bare metal).

5.17.2 Working Around Active Transformers in Substations

AECOM will not be conducting investigations in the Astoria East and West substations. If work is necessary in the substations, it may not commence until a JSA that has been approved by the Project Manager and Regional Safety Manager is available. One of the most obvious hazards in a substation or switchyard is the danger associated with electricity. Any energized conductor or equipment, such as transformers and circuit breakers, can be electrical hazards. Voltages in switchyards or substations, depending upon the type of facility, can range from hundreds of volts to hundreds of thousands of volts.

When a person comes in contact with an energized conductor, the current will attempt to pass through the person's body. Electrical shock is the physical reaction to a significant amount of current flow through the human body. The effects that an electrical shock will have on an individual will depend upon the type of circuit, its voltage, resistance and amperage, the pathway through the body, and the duration of contact.

The amount of resistance that an individual body offers to the flow of current can vary from one minute to the next. Resistance is affected by such factors as the moisture that may or may not be on a person's skin. Dry skin offers more resistance than wet skin.

Although some injuries will only involve minor shocks and burns, many victims suffer disabling effects; some are killed by electrocution, and others die from indirect injuries. In addition to the shock hazard, electricity poses other hazards to employees. When a short circuit occurs or current flow is interrupted, hazards are created from the resultant arcs. If the current is great enough, these arcs can cause burns.

It is not possible to visually determine when a conductor is energized. The safest approach is to assume that all conductors are energized until it can be proven that they are not (see Section 1.0). In most cases, preventing contact with the equipment can minimize the hazards associated with electrical equipment. Remember, the danger is in contacting an energized circuit.

In accordance with OSHA regulation 29 CFR 1910.133 (c), AECOM personnel are not qualified and, therefore, cannot work on exposed live parts or equipment (involving either direct contact or contact by means of tools or material) that have not been de-energized. AECOM will request beforehand that Con Edison de-energize any transformers that are located close to the proposed sampling location.

In most substations, energized equipment connections and conductors outside of the control house are raised up above the ground. When possible, AECOM personnel should stay on the ground and should not carry objects that can contact overhead conductors. Inside the control house, energized equipment and conductors are typically enclosed in protective cabinets. However, AECOM personnel will not enter a caged area unless escorted by knowledgeable facility personnel. AECOM personnel must abide by all requirements and instructions posted on signs within the facility that warn of electrical hazards.

Prior to working near energized equipment, AECOM personnel should request that facility personnel inspect the equipment and verify the absence of faulty insulation, improper grounding, loose connections, defective parts, and unguarded live parts, especially if the equipment is undergoing maintenance.

Everyone who works near energized circuits should avoid wearing any objects that could conduct electricity. Keys, rings, necklaces, metal buckles, metal tools in pockets, metal eyeglass frames, and metal zippers and snaps are all potential current paths. These current paths can cause severe burns, even if current does not penetrate the body.

Flammable materials, such as sampling equipment decontamination solutions, should not be handled or stored near energized equipment.

5.17.3 Electrically-Powered Tools

When using electrically powered tools, the following precautions must be implemented:

- Electrical outlets used to supply power during field operations are of the three-wire grounding type;
- Extension cords used for field operations should be of the three-wire grounding type and designed for hard or extra-hard usage. This type of cord uses insulated wires within an inner insulated sleeve and will be marked S, ST, STO, SJ, SJO or SJTO;
- NEVER remove the ground plug blade to accommodate ungrounded outlets;
- Do not use extension cords as a substitute for fixed or permanent wiring. Do not run extension cords through openings in walls, ceilings, or floors;
- Protect the cord from becoming damaged if the cord is run through doorways, windows, or across pinch points;
- Examine extension and equipment cords and plugs prior to each use. Damaged cords with frayed insulation or exposed wiring and damaged plugs with missing ground blades MUST BE REMOVED from service immediately. Extension cords shall be free of taped repairs.
- All portable or temporary wiring that is used outdoors or in other potentially wet or damp locations must be connected to a circuit that is protected by a ground fault circuit interrupter (GFCI). GFCI's are available as permanently installed outlets, as plug-in adapters, and as extension cord outlet boxes. DO NOT CONTINUE TO USE A PIECE OF EQUIPMENT OR EXTENSION CORD WHICH CAUSES A GFCI TO TRIP;
- When working in flammable atmospheres, be sure that the electrical equipment being used is approved for use in Class I, Division I atmospheres; and
- Do not touch a victim who is still in contact with a current. Separate the victim from the source using a dry, nonmetallic item such as a broomstick or cardboard box. Be sure your hands are dry and you are standing on a dry surface. Turn off the main electrical power switch and then begin rescue efforts.

5.18 Noise

Use of heavy machinery may expose the field team to noise levels that exceed the OSHA PEL of 90 dBA for an 8-hour day. Exposure to noise can result in the following:

- Temporary hearing losses where normal hearing returns after a rest period;
- Interference with speech communication and the perception of auditory signals;
- Interference with the performance of complicated tasks; and
- Permanent hearing loss due to repeated exposure, resulting in nerve destruction in the hearing organ.

A separate NYCDEP Construction Noise Mitigation Plan has been prepared and will be implemented during this field program. Noise monitoring will be performed as part of that plan. If noise monitoring was not being

conducted, employees would follow this general rule of thumb: If the noise levels are so loud that you must shout at someone who is two feet away from you, you need to be wearing hearing protection. AECOM employees can wear either disposable earplugs or earmuffs, but all hearing protection must have a minimum noise reduction rating (NRR) of 27 db.

5.19 Back Safety

Using the proper techniques to lift and move heavy pieces of equipment, such as drums of investigation-derived wastes or sample coolers, is important to reduce the potential for back injury. The following precautions should be implemented when lifting or moving heavy objects:

- Bend at the knees, not the waist. Let your legs do the lifting;
- Do not twist while lifting;
- Bring the load as close to you as possible before lifting;
- Be sure the path you are taking while carrying a heavy object is free of obstructions and slip, trip, and fall hazards;
- Use mechanical devices to move objects, such as drums of investigation derived wastes or generators, that are too heavy to be moved manually; and
- If mechanical devices are not available, ask another person to assist you.

5.20 Inclement Weather

The Site Safety Officer will check the weather forecast for the project area each morning prior to mobilization. Predicted weather conditions will be included in the Job Safety Analysis. Weather changes should initiate a review and update of the JSA as necessary.

Severe weather can occur with little warning. The employee must be aware of the potentials for lightning, flash flooding and high wind events.

Be prepared; know what is coming your way

- Listen to the radio for severe weather alerts.
- Check the Storm Prediction Center's web page for alerts and warnings.

  http://www.spc.noaa.gov/products/wwa/

- Pay attention to the weather in your area, up wind of your location, and in the watershed upstream from your location.
- When in the field, be aware of the route you must take to get to shelter.
- When working in low areas be aware of the potential for flash flooding and the route to higher ground.

5.21 Thermal Stress

Field investigations could be performed throughout the year. Therefore, the hazards of both heat and cold stress are addressed in this HASP.

5.21.1 Heat Stress

Types of Heat Stress

Heat related problems include heat rash, fainting, heat cramps, heat exhaustion, and heat stroke. Heat rash can occur when sweat isn't allowed to evaporate, leaving the skin wet most of the time and making it subject to irritation. Fainting may occur when blood pools to lower parts of the body and, as a result, does not return to the heart to be pumped to the brain. Heat-related fainting often occurs during activities that require standing erect and immobile in the heat for long periods of time. Heat cramps are painful spasms of the muscles due to excessive salt loss associated with profuse sweating.

Heat exhaustion results from losing large amounts of fluid, and from losing excessive amounts of salt through profuse sweating. The skin will be clammy and moist, and the affected individual may exhibit giddiness, nausea and headache.

Heat stroke occurs when the body's temperature regulatory system has failed. The skin is hot, dry, red, and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. Early recognition and treatment of heat stroke are the only means of preventing brain damage or death. A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling.

Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks.

Early Symptoms of Heat-Related Health Problems:

- Decline in task performance;
- Lack of coordination;
- Decline in alertness;
- Unsteady walk;
- Excessive fatigue;
- Reduced vigilance;
- Muscle cramps; and
- Dizziness.

Susceptibility to Heat Stress Increases Due To:

- Lack of physical fitness;
- Lack of acclimation;
- Increased age;
- Dehydration;
- Obesity;
- Drug or alcohol use;
- Sunburn; and
- Infection.

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in PPE need to gradually adjust to the heat.

The Effect of Personal Protective Equipment

Sweating normally cools the body as moisture is removed from the skin by evaporation. However, wearing certain personal protective equipment (PPE), particularly chemical protective coveralls (e.g., Tyvek), reduces the body's ability to evaporate sweat and thereby regulate heat buildup. The body's efforts to maintain an acceptable temperature can, therefore, become significantly impaired by the wearing of PPE.

Measures to Avoid Heat Stress

The following guidelines should be adhered to when working in hot environments:

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom);
- Identify a shaded, cool rest area;
- Rotate personnel and alternate job functions;
- Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink less fluids than needed because of an insufficient thirst. Do not depend on thirst to signal when and how much to drink. For an 8-hour work day, drink 50 ounces of fluids;
- Eat lightly salted foods or drink salted drinks, such as Gatorade, to replace lost salt;
- Save the most strenuous tasks for non-peak heat hours, such as the early morning or night;
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration; and
- Avoid double shifts and/or overtime.

The implementation and enforcement of the above-mentioned measures will be the joint responsibility of the AECOM project manager, on-site field coordinator, and health and safety officer. Potable water and fruit juices should be made available each day for the field team.

Heat Stress Monitoring Techniques

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

Check the radial pulse rate using fore- and middle fingers and by applying light pressure to the pulse in the wrist for one minute at the beginning of each rest cycle. If the pulse rate exceeds 110 beat/minute, shorten the next work cycle by one-third and keep the rest period the same. If, after the next rest period, the pulse rate still exceeds 110 beats/minute, shorten the work cycle again by one-third.

5.21.2 Cold Stress

Types of Cold Stress

Cold injury is classified as either localized, as in frostbite, frostnip or chilblain, or generalized, as in hypothermia. The main factors contributing to cold injury are exposure to humidity and high winds, contact with wetness, and inadequate clothing.

The likelihood of developing frostbite occurs when the face or extremities are exposed to a cold wind in addition to cold temperatures. The freezing point of the skin is about 30 degrees F. The fluids around the cells

of the body tissue freeze, causing the skin to turn white. This freezing is due to exposure to extremely low temperatures. As wind velocity increases, heat loss is greater and frostbite will occur more rapidly.

Symptoms of Cold Stress

The first symptom of frostbite is usually an uncomfortable sensation of coldness, followed by numbness. There may be a tingling, stinging or aching feeling in the affected area. The most vulnerable parts of the body are the nose, cheeks, ears, fingers and toes.

Symptoms of hypothermia, a condition of abnormally-low body temperature, include uncontrollable shivering and sensations of cold. The heartbeat slows and may become irregular, the pulse weakens, and the blood pressure changes. Pain in the extremities and severe shivering can be the first warning of dangerous exposure to cold.

Maximum severe shivering develops when the body temperature has fallen to 95 degrees F. This must be taken as a sign of danger, and exposure to cold must be immediately terminated. Productive physical and mental work is limited when severe shivering occurs.

Methods to Prevent Cold Stress

When the ambient temperature, or a wind chill equivalent, falls to below 40 degrees F (American Conference of Governmental Industrial Hygienists recommendation), site personnel who must remain outdoors should wear insulated coveralls, insulated boot liners, hard hat helmet liners, and insulated hand protection. Wool mittens are more efficient insulators than gloves. Keeping the head covered is very important, since 40% of body heat can be lost when the head is exposed. If it is not necessary to wear a hard hat, a wool knit cap provides the best head protection. A facemask may also be worn.

Persons should dress in several layers rather than one single heavy outer garment. The outer piece of clothing should ideally be windproof and waterproof. Clothing made of thin cotton fabric or synthetic fabrics, such as polypropylene, is ideal, since it helps to evaporate sweat. Polypropylene is best at wicking away moisture while still retaining its insulating properties. Loose-fitting clothing also aids in sweat evaporation. Denim is not a good protective fabric. It is loosely woven, which allows moisture to penetrate. Socks with a high wool content are best. If two pairs of socks are worn, the inner sock should be smaller and made of cotton, polypropylene, or a similar type of synthetic material that wicks away moisture. If clothing becomes wet, it should be taken off immediately and a dry set of clothing put on.

If wind conditions become severe, it may become necessary to shield the work area temporarily. The SSO and the PM will determine if this type of action is necessary. Heated break trailers or a designated area that is heated should be available if work is performed continuously in the cold at temperatures, or equivalent wind chill temperatures, of 20^{o} F.

Dehydration occurs in a cold environment and may increase the susceptibility of the worker to cold injury, due to significant change in blood flow to the extremities. Drink plenty of fluids, but limit the intake of caffeine.

5.22 Slip, Trip and Fall Hazards

Maintaining a work environment that is free from accumulated debris is the key to preventing slip, trip, and fall hazards at construction sites. Essential elements of good housekeeping include:

- orderly placement of materials, tools and equipment;
- placing trash receptacles at appropriate locations for the disposal of miscellaneous rubbish;

- prompt removal and secure storage of items that are not needed to perform the immediate task at hand; and
- awareness on the part of all employees to walk around, not over or on, equipment that may have be stored in the work area.

5.23 Biological Hazards

During the course of this sampling program, there is the potential for workers to come in contact with biological hazards, including poisonous plants and insects when working in heavily grassed or wooded areas of the property.

5.23.1 Poisonous Plants

Employees are encouraged to review *AECOM SHE SOP 610 – Biological Hazards Injury & Illness Prevention*, for detailed discussion on working around poisonous plants within the workplace and on procedures that can be used to minimize and prevent exposure.

All undeveloped property potentially has poison ivy, oak, or sumac growing in areas where vegetation is not controlled. These plants can also be found in cultivated and landscaped areas. Perform a hazard analysis appropriate for the working conditions and consider the existence of poisonous plants. Use appropriate PPE to prevent exposure, including but not limited to, full-length clothing, Tyvek coveralls, and dermal barrier creams.

Poison Ivy Grows in West, Midwest, Texas, East. Several forms – vine, trailing shrub, or shrub. Three leaflets (can vary 3-9). Leaves green in summer, red in fall. Yellow or green flowers. White berries.	 
Poison Oak Grown in the East (NJ to Texas), Pacific Coast. 6-foot tall shrubs or long vines. Oak-like leaves, clusters of three. Yellow berries.	 

Poison Sumac Grows in boggy areas, especially in the Southwest and Northern states. Shrub up to 15 feet tall. Seven to 13 smooth-edged leaflets. Glossy pale yellow or cream-colored berries.	 

If you must enter areas containing such plants, wear protective clothing, such as Tyvek® coveralls, Nitrile or latex gloves, and boot covers. The use of a barrier cream, such as Ivy Block, can prevent the active agent in poisonous plants from affecting skin, and Tecnu cleansing wipes can remove the plant oil from exposed skin.

Avoid using mowers and weed trimmers in areas where poison ivy and oak are likely. Additional care should be taken during early winter after the leaves have fallen from the poisonous plants; the poison still exists in the vines and stubble remaining above the ground. Wash any contaminated skin immediately with cold water and mild soap.

5.24 Insects, Spiders, Wasps, and Bees

Employees are encouraged to review *AECOM SHE SOP 610 – Biological Hazards Injury & Illness Prevention* for detailed discussion on working around insects within the workplace and procedures that can be used to minimize and prevent exposure.

5.24.1 Ticks

Ticks are bloodsuckers, attaching themselves to warm-blooded vertebrates to feed. Deer ticks are the most common carriers of Lyme disease, which is a bacterial infection that is transmitted to humans through the tick's bite.

Personnel should carefully inspect themselves each day for the presence of ticks or any rashes. This is important, since prompt removal of the tick can prevent disease transmission. Female deer ticks are about one-quarter inch in length and are black and brick red in color. Males are smaller and all black.

Removal of the tick is important because the tick should not be crushed, and care must be taken so that the head is also removed. If the head is not completely removed, or if the tick is allowed to remain for days feeding on human blood, a condition known as tick paralysis can develop. This is due to a neurotoxin that the tick apparently injects while engorging. This neurotoxin acts upon the spinal cord, causing loss of coordination, weakness, and paralysis.

One characteristic symptom of Lyme disease is a bulls-eye rash that develops around the bite site. The rash appears in about 60-80% of all Lyme disease cases. Contact your emergency contact representatives listed in Section 11.0 of this HASP if you develop such a rash.

Tick season typically lasts from April through October; peak season is May through July. Seasons can vary, depending on climate. Wear light-colored clothing (easier to spot ticks) with long sleeves, and make sure that shirts are tucked into pants and pants are tucked into socks or boots. Ticks have a tendency to crawl upwards, and these procedures will make it more difficult for a tick to reach your skin.

Studies have determined that repellants containing DEET as a main ingredient are most effective against mosquitoes and ticks. DEET can be directly applied to the exposed skin of adults and/or clothing. Products containing DEET can't be used with Fire Resistant Clothing (FRC), as it diminishes the garments' capacity to resist ignition in a fire. Permethrin is another repellent; however, it can only be directly applied to clothing.

5.24.2 Mosquitoes

Mosquitoes, carriers of the West Nile virus, Yellow Fever and other diseases, are indigenous to the area. As mentioned above, DEET is an effective mosquito repellent and is recommended. Although concentrated DEET formulations protect longer than those that are more dilute, little improvement is offered by concentrations of the active ingredient higher than 50 percent. Adverse effects, though documented, are infrequent and are generally associated with gross overuse of the product. Users should avoid the temptation to apply the most concentrated product available. The transient protection offered by more dilute preparations can be extended by reapplication. When using DEET, care should be taken to reapply the repellant when its effectiveness wears off.

5.24.3 Spiders

Spiders and wasps may be found in derelict buildings, sheltered areas, and even on open ground. Exercise care when collecting samples, and avoid reaching into areas where visibility is limited. If bitten by a spider, notify a co-worker or someone who can help if you should you have an allergic reaction or develop other symptoms related to spider venom. Stay calm and treat the area with ice or cold water. Seek medical attention if you have any reactions to the bite, such as developing a rash, excessive swelling or pain at the site of the bite or sting, or any swelling or numbness beyond the site of the bite.

Black Widow Spider

- Abdomen usually shows hourglass marking.
- The female is 3-4 centimeters in diameter.
- Has been found in well casings and flush-mount covers.
- Not aggressive, but more likely to bite if guarding eggs.
- Light, local swelling and reddening of the bite are early signs of a bite, followed by intense muscular pain, rigidity of the abdomen and legs, difficulty breathing, and nausea.
- If bitten, see physician as soon as possible.

Brown Spider (Recluse)

- Central and South U.S., although in some other areas as well.
- ¼-to-½-inch-long body, and size of silver dollar.
- Hides in baseboards, ceiling cracks, and undisturbed piles of material.
- Bite either may go unnoticed or may be followed by a severe localized reaction, including scabbing, necrosis of affected tissue, and very slow healing.
- If bitten, see physician as soon as possible.

Studies have determined that repellants containing DEET as a main ingredient are most effective against mosquitoes and ticks. DEET can be directly applied to the exposed skin of adults and/or clothing. Products containing DEET can't be used with Fire Resistant Clothing (FRC) as it diminishes the garments' capacity to resist ignition in a fire. Permethrin is another repellent; however, it can only be directly applied to clothing.

5.24.4 Wasps and Bees

Wasps (hornets and yellow-jackets) and bees (honeybees and bumblebees) are common insects that may pose a potential hazard to the field team if work is performed during spring, summer, or fall. Bees normally build their nests in the soil. However, they use other natural holes, such as abandoned rodent nests or tree hollows. Wasps make a football-shaped, paper-like nest either below or above the ground. Yellow-jackets tend to build their nests in the ground, but hornets tend to build their nests in trees and shrubbery. Bees are generally more mild-mannered than wasps and are less likely to sting. Bees can only sting once, while wasps sting multiple times because their stingers are barbless. Wasps sting when they feel threatened. By remaining calm and not annoying wasps by swatting, you lessen the chance of being stung.

Wasps and bees inject a venomous fluid under the skin when they sting. The venom causes a painful swelling that may last for several days. If the stinger is still present, carefully remove it with tweezers or by scraping a credit card or other blunt object against the sting site in the opposite direction in which the stinger is embedded. Some people may develop an allergic reaction, i.e. anaphylaxis, to a wasp or bee sting. If such a reaction develops, seek medical attention at once. Persons who are allergic to bee and wasp stings should carry an epinephrine pen (epi-pen) with them that is prescribed by a doctor and used to help abate swelling that occurs due to their allergy. Even if employees utilize their epi-pen, they still need to seek medical attention for follow-up care and observation.

5.25 Sediment Sampling

AECOM and subcontract employees will not enter standing or flowing water (either by wading or in a boat) deeper than three feet unless they are tethered to a stationary object located at least ten feet from the edge of the water with a sturdy rope and body harness. Similarly, if employees are collecting sediment samples from a (steep) embankment adjacent to a water body, from which the employee may fall into the river if they slip or trip, the employee will be tethered to a fixed object using an appropriate fall protection device, e.g. no body belts. In all cases employees entering water greater than three feet deep will wear personal flotation devices and a second person will be stationed on the shore to assist during emergencies. If it can reasonably be expected for an employee to enter the water should they slip, trip or fall, the employee will be required to wear a personal floatation device. Do not enter water unless you know the maximum depth in the area you are working.

A throwable flotation device with tether will be in the boat or on shore when ever AECOM or AECOM subcontractors are working in, over or adjacent to water.

Note that the water can contain bacteria and fungal organisms that can cause infections on the skin and internally. Employees should avoid direct contact with the. If splashing water is produced during the operations face shields, chest waders, and/or aprons should be considered.

5.26 Confined Spaces

No confined space entries are planned or allowed on this project.

When working in industrial settings, it is common to need to enter a confined space to make observations, collect samples, or perform other duties. AECOM employees or sub contractors must not enter any confined space containing a hazard.

A confined space is defined as any space that meets the following criteria:

- Is not designed for human occupancy
  (excludes vehicles, elevator cabins etc,)
  (includes elevator shafts and wells, tanks, vaults, etc.)
- Is large enough to physically enter with the whole body, and
- Has a restricted exit path (you must climb over pipes, through man ways, etc.)

If the confined space contains any hazard, entry may only be made if permitted in writing by the space owner or the Regional Health and Safety Manger, the entry is monitored by an observer, and with the prior written approval of the AECOM Regional Health and Safety Manager.

Typical hazards include but are not limited to:

- Flammable materials
- Toxic materials
- Corrosive materials
- Exposed electrical circuits
- Falls greater than six feet
- Moving machinery
- Oxygen deficient atmosphere

If there is any doubt about whether a space meets the above criteria, call the AECOM Health and Safety Staff.

6.0 AIR MONITORING

6.1 Direct Reading Instrumentation

As a precautionary measure, the PID will be used to screen the work area for VOCs during subsurface investigations. If the PID indicates sustained (5-minute) breathing zone vapor concentrations in excess of 1 unit or more, when working in areas where BTEX contamination has been documented, Level C respiratory protection, as described in Section 7.0 of this HASP, will be donned.

If the PID indicates sustained (5-minute) breathing zone vapor concentrations in excess of 5 ppm as isobutylene in areas where fuel oil has been documented, respiratory protection, as described in Section 7.0, will be donned.

The RFI requires the use of vacuum-excavation techniques, due to the presence of underground utilities. This excavation technique produces little dust. However, if necessary, a light mist of water can be applied to the sidewalls of the excavation to suppress dust generation. Dust is likely to be produced during concrete and asphalt cutting operations and wet-cutting methods will be used to minimize the potential for dust to be generated. If visible dust is generated even after these engineering controls have been implemented, respiratory protection, as described in Section 7.0 of this HASP, will be donned. However, this procedure does not apply if asbestos-containing materials are discovered. The procedures described in Section 4.0 will be implemented if asbestos is detected.

6.2 Personal Exposure Monitoring

The need for personal air sampling is not anticipated by AECOM during the activities covered by this HASP. The AECOM Project Manager, or Regional Safety Manager can prescribe personal air sampling based on observations or concerns recognized during the project.

6.3 Calibration and Recordkeeping

The PID will be calibrated to a 100 ppm isobutylene-in-air mixture on a daily basis, in accordance with AECOM's Standard Operating Procedures (SOPs). All PID readings will be recorded in the field notebook or on dedicated air monitoring result sheets. In addition, all calibrations must be recorded.

7.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) will be worn during RFI field activities to prevent on-site personnel from being injured by the safety hazards posed by the site and/or the activities being performed. In addition, chemical protective clothing will be worn to prevent direct dermal contact with the site's chemical contaminants.

Per Con Edison's policy, hard hats are to be worn at all times by all field personnel while performing work at the site. **Please note that contractors working at Astoria are not permitted to wear white hard hats. AECOM employees will be issued yellow hard hats for this program.**

7.1 Protective Clothing

Protective clothing includes proper head protection, hand protection and body protection. The table of PPE presented in this section shows the required protection for each task anticipated to be part of Con Edison Astoria field programs. The task descriptions and additional notes follow the table.

Table 7-1 PPE Requirements

PPE Item	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Task 8
Hard Hat (**Yellow)**	✓	✓	✓	✓	✓	✓	✓	✓
Rubber Steel-Toed Boots	***	***	***	***			***	✓
Steel-Toed Safety Shoes	✓	✓	✓	✓	✓	✓	✓	
Steel Metatarsal Shoes	✓							
Safety Glasses with Side Shields	✓	✓	✓	✓	✓	✓	✓	✓
Personal Flotation Device								✓
Traffic Vests (when working in high traffic area)	✓	✓	✓	✓	✓	✓	✓	
Tyvek Coveralls	*	✓	✓	*		✓	*	
Polycoated Tyvek Coveralls	**	✓	✓			*	✓	✓
Leather or Kevlar Gloves	✓	*	✓	****	****			
Inner PVC/Outer Nitrile Gloves	✓	✓	✓	✓	✓	✓	✓	✓
Hearing Protection		✓	✓	✓			✓	✓

Task 1 – Hand-Digging, Hand-Augering, and Equipment Cleaning

* Tyvek® is necessary if contaminated materials could come into contact with street clothing or skin

** Polycoated Tyvek® is necessary if coal tar-impacted materials could come into contact with street clothing or skin

** Metatarsal protection is required if pneumatic devices, such as jack-hammers or pressure washers, are used

*** Rubber boots are necessary if contaminated materials may come into contact with footwear.

Con Edison requires anyone performing hand-digging activities or anyone entering excavations (not anticipated for this investigation) to wear Tyvek® coveralls, in addition to disposable booties and gloves.

Task 2 – Soil Boring Using Geoprobe

* Wear Kevlar gloves when cutting open acetate soil liners

*** Rubber boots are necessary if contaminated materials may come into contact with footwear.

Task 3 – Soil Boring/Well Installation Using Rotary Drilling

*** Rubber boots are necessary if contaminated materials may come into contact with footwear.

Task 4 – Soil Sampling during Augering and Boring

*** Rubber boots are necessary if contaminated materials may come into contact with footwear.

**** Select appropriate gloves for protection against pinching and laceration hazards that still allow for needed dexterity to perform the assigned task.

Task 5 – Monitoring Well Development/Groundwater Sampling

**** Select appropriate gloves for protection against pinching and laceration hazards that still allow for needed dexterity to perform the assigned task.

Task 6 – LNAPL Sampling/Recovery

* Polycoated Tyvek® is necessary if LNAPL could come into contact with street clothing or skin. If this occurs, the suit must be replaced with a new coverall after 20 minutes.

Task 7 – Vacuum Excavation/Extraction Well or Recovery Trench Installation

Wear tyvek if significant dusts are generated

*** Rubber boots are necessary if contaminated materials may come into contact with footwear.

Task 8 – Sediment and Surface Water Sampling

7.2 Respiratory Protection

As described in Section 6.0 of this HASP, direct reading instrumentation will be used to screen the breathing zone of employees during subsurface investigations and sampling activities conducted in areas where VOCs and/or petroleum hydrocarbons are known, or expected to be, present. Exceedance of the following action limits will require the wearing of Level C respiratory protection, as described below.

Table 7-2 Respiratory Protection Requirements

Contaminant	Action Limit	Respirator Selection
BTEX	1-10 units on PID **>10 units on PID, sustained for 5 minutes**	Half-mask air-purifying respirator with organic vapor cartridges. **STOP WORK !**
Fuel Oil	5-10 units on PID **>10 units on PID, sustained for 5 minutes**	Half-mask air-purifying respirator with organic vapor cartridges. **STOP WORK !**
Visible Dust	NA	Use engineering controls – apply light mist of water to sidewalls and bottom of excavation. If engineering controls are not sufficient, don half-face, air-purifying respirator with P-100 filters.

Level C respiratory protection should also be donned if odors become objectionable at any time or if respiratory tract irritation is noticed.

All personnel who are expected to don respiratory protection must have been successfully fit-tested, either qualitatively or quantitatively, for the respirator brand and size that they plan to wear for this project. Fit test records will be made available to Con Edison.

If worn, respirators will be cleaned after each use with respirator wipe pads and will be stored in plastic bags after cleaning. Respirators will be thoroughly cleaned, using disinfectant material, within one week following any respirator use. Refer to the cleaning instructions provided with the respirator or specified by Appendix B-2 to the OSHA regulations at 29 CFR 1910.134.

7.3 Other Safety Equipment

The following additional safety equipment will be brought to the site:

- Portable eye wash;
- First Aid kit;
- Cellular telephone;

- Type A-B-C fire extinguisher (it is sufficient to have such an extinguisher on the back of the drill rig and other machinery). Fire extinguishers must be inspected monthly, with the initials of the person inspecting them and the date on the inspection tag;
- Fire blanket,
- Emergency air horn,
- Drinking water, ice and cups,
- Caution tape or traffic cones,
- Traffic cones or barricades,
- Flashlight/lantern, and
- Spill containment kit.

8.0 SITE CONTROL

To prevent exposure to unprotected personnel and migration of contamination due to tracking by personnel or equipment, work areas along with PPE requirements will be clearly defined.

8.1 Designation of Zones

The following zones will be established in order to maintain site control:

- Exclusion or "Hot" Zone;
- Contamination Reduction Zone (CRZ); and
- Support Zone.

8.1.1 Exclusion Zone

An exclusion zone will be established around each subsurface activity location as well as around each sampling location. This zone will serve to protect AECOM employees from facility traffic and will protect Con Ed employees from any chemical or physical hazards that are associated with the proposed activities. Since the wells may be located in traffic areas, these same zones will be established during groundwater sampling. The perimeter of the exclusion zone will be marked with Caution tape or indicated by traffic cones. All personnel entering these areas must wear the prescribed level of protective equipment.

8.1.2 Contamination Reduction Zone

A mini-contamination reduction zone (CRZ) will be established immediately adjacent to each exclusion zone to facilitate prompt removal of contaminated PPE. This is where personnel will begin the sequential decontamination process (see Section 9.0 this HASP) when exiting the exclusion zone. If necessary, contaminated PPE, such as boots, will be rinsed free of gross contamination, scrubbed clean in a detergent solution, and then rinsed clean. To facilitate this sort of decontamination process, it may be necessary to establish a three-basin wash system on site. To prevent cross-contamination and for accountability purposes, all personnel will enter and leave the exclusion zone through the contamination reduction zone.

8.1.3 Support Zone

The support zone will consist of those areas around the exclusion zone where equipment is staged.

8.2 Safety Measures/Precautions

The following measures are designed to augment the specific health and safety guidelines provided in this plan:

- The "buddy system" will be used at all times by all field personnel. Each team member must be intimately familiar with the procedures for initiating an emergency response;
- Avoidance of contamination is of the utmost importance. Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces or materials. Walk around (not through) puddles and discolored surfaces. Do not kneel on the ground or set equipment on the ground. Protect air monitoring equipment from water by bagging;

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in the immediate work area and the decontamination zone;
- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking, or any other activities;
- Beards or other facial hair that interfere with respirator fit are prohibited;
- The use of alcohol or illicit drugs is prohibited during the conduct of field operations;
- All equipment must be decontaminated or properly discarded before leaving the site, in accordance with the RFI Workplan; and
- Safety equipment described in Section 7.0 of this HASP will be required for all field personnel, unless otherwise approved by the Regional Health and Safety Manager.

8.3 Communications

During the investigation, AECOM employees will direct all questions from on-site employees and visitors to the appointed Con Edison representative. A communications link with Con Edison safety personnel will be established prior to field work.

A cell phone will also be used by the AECOM field crews to communicate with each other and with Con Edison, and to report any emergencies, spills, etc.

9.0 DECONTAMINATION

9.1 Personnel Decontamination

Proper decontamination is required of all personnel and equipment before leaving the site. The extent of personnel decontamination will depend on the amount of contamination encountered. Personnel decontamination will be accomplished by following a systematic procedure of cleaning (when necessary) and removing PPE. If necessary, contaminated PPE, such as boots, will be rinsed free of gross contamination, scrubbed clean in a detergent solution, and then rinsed clean. To facilitate this decontamination process, it may be necessary to establish a three-basin wash system on site.

Regardless of the type of decontamination system required, if washing facilities are unavailable, a container of potable water and liquid soap must be made available so that employees can wash their hands and face before leaving the site for lunch or for the day.

9.2 Equipment Decontamination

9.2.1 Sampling Equipment

AECOM will use an Alconox (or similar non-phosphate) solution to decontaminate sampling equipment. Visibly contaminated equipment cannot enter or leave the Astoria property prior to being properly decontaminated.

9.2.2 Heavy Equipment

Drill rig augers and spilt spoons will be rinsed on site. Alconox or a similar non-phosphate detergent will be used, if necessary, based on visual contamination. Steam-cleaning may also be used, if necessary, based on visual contamination. If other heavy machinery is used during the proposed subsurface investigation, it too will be steam-cleaned. Steam-cleaning will take place over a temporary decon pad that is constructed by the contractor (i.e., plastic sheeting that is bermed on all sides) to sufficiently contain the rinse water. Rinse water will then be pumped into 55-gallon drums for subsequent disposal.

9.3 Management of Investigation-Derived Wastes

Investigation-derived wastes (IDW) will include soil cuttings and water used for the decontaminating of heavy equipment, as well as well purge water. All drums of IDW will be labeled as such. The label will further indicate that disposal is pending the return of analytical results. AECOM will coordinate with Con Edison's Project Manager to determine where the drums of IDW should be staged and stored until final disposition is determined. Con Edison will be responsible for management and disposal of the drums. AECOM will collect IDW characterization samples per Con Edison's direction.

9.4 Spill Prevention

All stationary vehicles and fluid-containing equipment involved on this project site will be parked over polyethylene sheeting for the full width and length of the vehicle and equipment. All nearby storm sewers, catch basins, drains, and related structures will be protected from being impacted from investigation-related runoff and/or releases to the environment. Prevention methods, such as booms, berms or other effective materials, will be used as necessary to ensure proper mitigation.

10.0 MEDICAL/TRAINING REQUIREMENTS

10.1 Medical Surveillance

All personnel performing activities covered by this HASP must be active participants in AECOM's medical monitoring program or in a similar program that complies with 29 CFR 1910.120(F). Each individual must have completed an annual surveillance examination and/or an initial baseline examination within the last year prior to performing any work covered by this HASP.

10.2 Training

10.2.1 HAZWOPER

All personnel performing activities covered by this HASP must have completed the appropriate training requirements specified in 29 CFR 1910.120(E). Each individual must have completed an annual 8-hour refresher-training course and/or initial 40-hour training course within the last year prior to performing any work covered by this HASP. Also, on-site managers and supervisors directly responsible for supervising individuals engaged in hazardous waste operations must have completed the specified 8-hour manager's training course. (Note that AECOM corporate policy requires that, whenever three or more AECOM employees are performing work on the same site, at least one of these individuals must have completed the manager's training course.)

10.2.2 New York City Fire Prevention Department Certificates of Fitness

Contractor personnel must hold a New York City Fire Department Certificate of Fitness to operate an air compressor.

10.2.3 Competent Person for Excavation Work

If excavation of trenches is necessary during the proposed investigation, the contractor is responsible for assigning a competent person, as defined in OSHA's Trenching and Excavation Standard, to this project to ensure that the requirements of that standard are successfully implemented, as applicable.

10.3 Pre-Entry Briefing

Prior to the commencement of the RFI activities, a site safety meeting will be conducted by the SSO and the Con Edison Project Manager to review the specific requirements of this HASP. Attendance at this pre-entry briefing is mandatory and will be documented (see Attachment H). Safety concerns will be addressed as needed at the daily meeting (see Section 10.4).

10.4 Daily Safety Meetings

Daily meetings will also be held by the field team leader or on-site coordinator to ensure that all workers are prepared for, and knowledgeable of, that day's scope of work. Safety concerns will also be discussed at these meetings. All field employees must be present and must sign the attendance sheet.

11.0 EMERGENCY RESPONSE

OSHA defines emergency response as any "response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance." According to AECOM policy, AECOM personnel shall not participate in any emergency response where there are potential safety or health hazards (i.e., fire, explosion or chemical exposure). AECOM response actions will be limited to making adequate notifications to Con Edison as well as evacuation and medical/first aid as described within this section below. As such, this section of the HASP has been written to comply with 29 CFR 1910.38 (a).

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

11.1 Training, Alarms, and Escape

Employee Training: Employees must be instructed in the specific aspects of emergency evacuation applicable to the site as part of the pre-entry briefing prior to the commencement of all on-site activities. On-site refresher or update training is required any time escape routes or procedures are modified or personnel assignments are changed.

Alarm Systems/Emergency Signals: An emergency communication system must be in effect at all sites. The most simple and effective emergency communication system in many situations will be direct verbal communications.

Employees should not rely on access to telephone facilities at the facility. Therefore, additional communications equipment is required. Each field team should also be able to communicate with the other field team and/or with Con Edison in the event of an emergency at any sampling location. Therefore, each field crew will be equipped with a cellular phone.

Escape Routes and Procedures: The SSO will verify the escape routes from the specific work location. The escape routes will be reviewed in the pre-entry briefing.

11.2 Equipment and Rescue

Critical Operations and Equipment: All equipment and operations are required to cease in the event of site evacuation. The only exception will be related to health and safety. The PM or SSO must determine, at the time of an emergency, if health and safety will be jeopardized by immediate stoppage of any particular piece of equipment or personal activities. If such a determination is made, personnel involved in critical duties must be minimized, and special instructions must be established.

Rescue and Medical Duty Assignments: Prior to initiating work at the site, an AECOM field team member, usually the SSO, shall be appointed to activate emergency response actions. The SSO must be present during all field activities. In the event that an injury or illness requires more than first aid treatment, that individual will accompany the injured person to the medical facility and will remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the on-site project manager and the RSM.

If the injured employee can be moved from the incident area, he or she will be brought to the CRZ, where their PPE will be removed. If the person is suffering from a back or neck injury, the person will not be moved, and the requirements for decontamination do not apply. The SSO must familiarize the responding emergency personnel about the nature of the site and the injury. If the responder feels that the PPE can be cut away from the injured person's body, this will be done on site. If this not feasible, decontamination will be performed after the injured person has been stabilized.

11.3 Incident Reporting

Incident Reporting/Investigation: If an AECOM employee is injured, his or her supervisor must be notified immediately (see the *Emergency Contact Phone Tree*). If the Project Manager is not on site, he or she should also be notified. An AECOM Incident Investigation report (see Attachment I) must be completed as soon as possible and submitted to AECOM's RSM.

If an AECOM subcontractor is injured, he or she should report to his or her supervisor immediately, who in turn must report the injury to the AECOM SSO.

In addition, Con Edison must be notified immediately of any incident. AECOM must provide Con Edison with a completed Contractor Injury Form within 24 hours of the incident. Additionally for injuries, accidents, or close calls to anyone on site, AECOM will be required to prepare a Root Cause Investigation Report with Preventative Action Plan (RCIR/PAP). AECOM is not to perform any work on the task or activity where the incident occurred until Con Edison considers their RCIR/PAP acceptable. They can, however, perform work on all other tasks or activities on the project while awaiting Con Edison's acceptance of the aforementioned documents.

Designation of Responsible Parties: The SSO is responsible for initiating an emergency response. In the event that the SSO cannot fulfill this duty, the alternate SSO will take charge. All personnel on site are responsible for knowing the escape route from the site.

Employee Accounting Method: The on-site project manager or SSO is responsible for identifying all AECOM and subcontractor personnel on site at all times. On small, short duration jobs, this can be done informally, as long as accurate accounting, via a head-count, is possible.

AECOM Medical Records and Medical Consultant: In the event of a non-critical injury, and once preliminary reporting been completed, if the injured employee desires or needs to speak with a medical professional to consult on the nature of his or her injury and treatment options, the employee may contact Work Care directly, even if 1) they have not been directed to call Work Care, 2) have been contacted by Work Care directly, or 3) they have been unable to speak directly with any of the personnel identified in the Emergency Contact Phone Tree provided on the next page.

Work Care North
Alameda, CA 94502
Telephone: 510-748-6900
Fax: 510-748-6915

Emergency Contact Phone Tree

1) Employee Immediately Calls….

   a. Field Operations Leader, Scott Wozniakowski – mobile: **978-496-6000**

   b. Employee's Supervisor

2) Employee and/or Employee's Supervisor Call(s)….

   a. DSM, Mike Grasso – **607-277-5716** (mobile: **607-282-0175**)

   b. SH&E Reporting Hotline – **800-348-5046**

   c. Employee's Office Manager

   d. Project Manager, Mark Kauffman – mobile: **978-846-5201**

11.4 Emergency Contact Information

If the injury or illness is severe or life-threatening, dial 9-1-1 and seek medical attention immediately. Then, contact the AECOM employee's supervisor and the Con Edison Operations Control Center Supervisor (OCCS) Desk at 718-204-4100.

For other injuries or illnesses (not severe or life-threatening), contact the AECOM employee's supervisor and the Con Edison OCCS Desk at 718-204-4100.

If the incident involves a gas main, contact Gas Control Queens at 718-319-2320.

Refer to the front of this HASP – prior to the INTRODUCTION – for a full list of emergency references on page 1.

ATTACHMENT A

Astoria Guidance No. 100 - Management of Excavated Materials

Astoria Guidance No. 100

Con Edison Astoria Facility Guidance for the Management of Excavated Materials	**Date:** March 8, 2006
	Author(s): EH&S Remediation - Kenneth J. Kaiser, PE
	Department: Environment, Health & Safety - Remediation

I. PURPOSE AND APPLICABILITY

This guidance has been created to provide the many Con Edison organizations located at the Astoria Facility, including their contractors, with a uniform procedure to adequately manage potentially contaminated soil generated during site projects requiring excavation. This guidance is specific to Astoria and was developed in consultation and agreement with the New York State Department of Environmental Conservation (NYSDEC) to specifically allow Con Edison to manage excavated material at the Astoria Facility. This guidance describes the minimum Personal Protective Equipment (PPE) required for excavation work at Astoria, and the guidelines by which excavation and backfill should occur. This guidance also describes how surplus/waste soil (soil that is not reused in the same excavation) is to be characterized for disposal. **When planning, performing, supervising or inspecting any projects requiring excavation work at Astoria, this guidance is to be followed in addition to all existing applicable Corporate Environmental Procedures (CEPs) and General Environmental Instructions (GEIs). These include, but may not be limited to: Hazardous Waste Management (CEP 04.00); PCB Management (CEP 06.00); Non-Hazardous Waste Management (GEI 05.00); Hazardous Waste Management (GEI 06.00); and PCB Waste Management (GEI 07.00).**

All intrusive work at the Astoria Facility requires a WORK PERMIT that is issued by Facilities Operations and Maintenance. A copy of the required WORK PERMIT form is attached to this guidance document; it must be completed and submitted for approval to Joe Vincento of Facilities Operations and Maintenance prior to the start of the work.

Con Edison is performing a site-wide environmental investigation of the Astoria Facility under the RCRA Corrective Action Program. This investigation is required by the NYSDEC under Module III of the Part 373 Hazardous Waste Management Permit for the PCB Storage Shed managed by Central Field Services (CFS).

Since PCB contamination issues are being addressed under the RCRA Corrective Action Program, NYSDEC has agreed to allow Con Edison to reuse excavated soil as backfill in the same excavation provided the guidance set forth herein is followed. The rationale behind this agreement is that at some future date, NYSDEC will determine what, if any, remediation will be required to address historic leaks and spills. In order to implement this agreement, Con Edison Environment, Health and Safety's Remediation Department (EH&S Remediation) is providing the following guidance. **This guidance does not apply to new spill cleanup wastes. Excavated soil associated with new spills must be properly managed, characterized and disposed of, and may not be used as backfill.**

If you have any questions regarding this guidance, or would like a copy, please contact the EH&S Remediation Group at (718) 204-4140 or Kenneth J. Kaiser, P.E. at (718) 267-3881.

For the purpose of this guidance, the term excavation means any/all digging or removal of soil/gravel from the ground surface and below using manual tools or mechanical equipment. Such digging would occur during site projects including, but not limited to, construction or maintenance of subsurface utilities (electric, telecommunication, sanitary, etc.) or other structures (manholes, vaults, etc.), and even during simple landscaping activities.

II. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Before beginning work, determine, based on available site-specific Astoria information, what potential hazards may exist and select the appropriate level of protection necessary. **As a minimum, PPE to eliminate dermal contact is required.** Good hygiene practices, i.e. washing hands prior to eating, drinking or smoking is recommended while working in and around an excavation area. Contact your supervisor or local EH&S representative if you are not sure which PPE to select, or do not have PPE readily available to you.

PPE **required**, as a minimum, while excavating at Astoria include:

- Coveralls
- Vinyl Disposable Cover Boots or Rubber Boots capable of being decontaminated
- Latex, Nitrile or Neoprene Gloves

III. RELEASE REPORTING REQUIREMENTS

Upon discovery of soil or bluestone in an excavation that is saturated with petroleum, coal tar or other potentially hazardous substances, notify the Astoria Operations Control Center Supervisor at 718.204.4100 or 718.214-4400. Also, notify you supervisor or Con Edison representative. The discovery of such condition will require notifications in accordance with CEP 10.1 and GEI 2.01 as well as notification to the EH&S Remediation Group 718.204.4140 or Kenneth J. Kaiser at 718.267.3881 and your local EH&S representative.

IV. GUIDANCE:

1.) SEGREGATION

The ongoing RCRA investigation has shown that the highest concentrations of PCB contamination at the Astoria Facility have generally been found within the top 2 feet of soil. Therefore, soil excavated from the 0 to 2 foot interval must be **segregated** and **managed** separately from soil excavated in excess of two feet below ground surface (bgs). Excavated soil must remain segregated until such time that it is used as backfill (in accordance with Sections 3 & 4 of this guidance) or deemed surplus waste soil and disposed of off-site (in accordance with Section 5).

2.) MANAGEMENT

All excavated soil shall be managed by either being:

a) Placed on impervious tarps or plastic with a bermed perimeter, covered and secured with weighted-down impervious tarps or plastic. Stockpiles that are not constructed with a bermed perimeter should be surrounded by absorbent booms to contain any possible releases from the pile. Soil shall remain covered at all times except when it is actively being added or removed from the pile. If necessary to prevent dust formation from soil that is temporarily uncovered, the soil shall be wetted, as needed;

Or,

b) Containerized in sealed drums or in lined roll-off boxes covered with a waterproof cover. Drummed materials shall have appropriate containment and roll-off boxes shall be placed on impervious tarps or plastic to contain any possible releases. Soil-containing drums and roll-off boxes shall remain covered except when soil is actively being placed into the drum or loaded into roll-off boxes.

3.) BACKFILL CRITERIA

Soil excavated on the Astoria Facility may be used as backfill under the following conditions:

a) Soil has no apparent contamination based on visual and olfactory (sight or smell) determination; soil is not saturated with oil, does not contain coal tar, or have any extreme discoloration or obnoxious odors;

AND,

b) Soil is not generated during a spill cleanup.

If excavated soil does not meet both of the above criteria (i.e. soil displays visual or olfactory evidence of contamination, is saturated with petroleum or other potentially hazardous substances or is generated during spill cleanup), contact your Supervisor or local EH&S representative for guidance.

4.) BACKFILL PROCEDURE

Soil that is excavated on the Astoria Facility and that meets the criteria found in Section 3.0 of this Guidance, will be used to backfill an excavation according to the following procedure:

a.) Backfilling in areas that will be paved or covered with concrete:

i) Soil excavated from depths exceeding 2 ft. shall be placed in the excavation until the fill level is 2 ft. bgs. Excess soil shall be managed, characterized, labeled, stored and disposed of appropriately;

ii) Soil excavated from the top 2 ft. shall then be placed into the excavation until the fill level reaches the bottom of adjoining pavement. Excess soil shall be managed, characterized, labeled, stored and disposed of appropriately;
iii) During backfilling, soil shall be wetted as necessary to prevent dust formation; and,
iv) Backfilled soils shall be compacted to non-movement or to an appropriate degree of compaction (as measured by a modified Proctor test), if required for site reuse.
v) The excavation shall be restored with pavement compatible with the surrounding paved surfaces (i.e., gravel, bluestone, concrete or asphalt).

b.) Backfilling in areas that will not be paved or covered with concrete or asphalt:
i) Soil excavated from depths exceeding 2 ft. shall be placed into the excavation until the fill level is 2 ft. bgs. Excess soil shall be managed, characterized, labeled, stored and disposed of appropriately;
ii) Soil excavated from the top 2 ft. shall then be placed into the excavation until the fill level reaches 6 inches bgs. Excess soil shall be managed, characterized, labeled, stored and disposed of appropriately;
iii) The remaining 6 inches of the excavation shall be backfilled with clean soil, gravel and/or bluestone as appropriate; and,
iv) During backfilling, soil shall be wetted as necessary to prevent dust formation.

Clean fill is required for the top 6 inches in unpaved areas to minimize potential direct contact exposure to contaminated soil. In areas that will be paved or covered with concrete or asphalt, there is no need for this clean 6 inch layer beneath the pavement since the direct contact exposure route has been eliminated by the pavement (i.e., concrete or asphalt). The pavement will prevent exposure to contaminated soil, except during future excavation work, during which time appropriate PPE and health and safety procedures will be used.

5.) WASTE CHARACTERIZATION & DISPOSAL

Contaminated and/or waste soil (surplus soil) that will not be reused as backfill must be properly characterized, labeled, stored and disposed of off-site at a Con Edison approved disposal facility. This waste soil may be characterized based on generator knowledge of soil quality and historic releases (please contact Remediation, pre-existing soil data may be available for such characterization) or based on laboratory analysis. If there is insufficient information to characterize the waste soil based on generator knowledge, collect appropriate samples for waste characterization analysis (if properly trained) or call the ChemLab (non-emergency (718) 204-4124 or for **emergencies only** (718) 204-4125) for sample collection. Guidance on the type(s) of analyses should be provided by the local EH&S representative.

At a minimum, the soil is to be sampled and sent to a Con Edison approved laboratory for PCBs and TCLP Metals analyses. If there is information or indications that there is a potential for gasoline or diesel fuel contamination or the presence of coal tar/ Manufactured Gas Plant (MGP) wastes, the laboratory analysis shall also include TPH, TCLP volatile organic compounds (VOCs) and total (target compound list) VOCs. If there is site-specific information or other evidence (i.e., visible coal tar, coal tar related

products or a characteristic "moth-ball" odor) to suggest potential coal tar contamination from historic MGP operations, in addition to the PCBs, TPH, TCLP and total VOC and TCLP metals, the analytical parameters shall include a fingerprint analysis at a specialty laboratory experienced in the analysis and identification of potential MGP wastes. The Remediation Group will assist in making the determination of potential MGP waste and the required sampling. NOTE: the historic MGP operations at the Astoria Facility occurred in the areas now covered by the Building 136 Warehouse and the western side of the Pipe Yard south to the Former Gas Holders adjacent to 20th Avenue. However, MGP-related waste products have been found in other areas of the Astoria Facility.

The number of samples required to adequately characterize the soil depends upon the actual volume of waste soil. Best professional judgment is needed to determine the most appropriate sampling locations. The objective of the sampling is to characterize the extent of contamination of the piled or containerized soil. Consideration should be given to how the soil was stockpiled. Is the most contaminated soil toward the top? Are areas visibly contaminated? How high and how long is the pile? It may be preferable to divide the pile into manageable segments. Samples should be taken from within the pile. Surface soil should not be used as sampling material. Samples shall be collected in accordance with proper sample collection techniques and in accordance with the applicable GEIs and CEPs. All samples must be collected in laboratory-prepared glass containers with airtight sealable tops.

The number of samples required for an excavated pile will be related to the quantity of soil stockpiled. The table below can be used as a guide in determining the appropriate number of samples. For up to the first 50 cubic yards (which would include drums and roll-off boxes) of waste soil, two (2) samples should be taken and submitted for analysis. One (1) sample is to be a discrete grab sample taken from a point in the stockpile/container which would represent the worst-case sample (most contaminated) based on visual or odor determination. This worst-case discrete grab sample shall be analyzed for PCBs and TCLP Metals. If there is information or indications that there is a potential for gasoline or diesel fuel contamination or the presence of coal tar/ MGP wastes, the laboratory analysis shall also include TPH, TCLP VOCs and total VOCs (Target Compound List). **Note: additional laboratory analyses may be required by the disposal facility. This requirement should be identified prior to sampling so that all required laboratory analytical samples are collected at the same time.** The other one (1) sample is to be a composite sample consisting of a minimum of five (5) discrete, equal volume grab samples randomly taken from the stockpile/container and homogenized prior to placement into the laboratory bottles, for laboratory analysis discussed above. If more than 50 cubic yards of waste soil are generated, use the table below to determine the appropriate number and types (grab or composite) of samples collected for analysis. **NOTE: Additional samples or analyses may be required to fulfill the permit requirements of the disposal facility.**

Recommended Number of Soil Samples		
Sample Type:	**Composite**	**Grab ***
Soil Quantity (yd^3):		
0-50 (includes drums and roll-off boxes)	1	1
50-100	2	2
100-200	3	3
200-300	4	4
300-400	4	4
400-500	5	5
500-800	6	6
800-1000	7	7

NOTES:

*** - Grab samples required for PCBs, TCLP VOCs and Total (Target Compound List) VOCs analyses.**

Analyses:

- **All soil areas: PCBs and TCLP Metals.**
- **Historic gasoline or diesel contamination areas: PCBs, TCLP Metals, TCLP VOCs and Total (Target Compound List) VOCs.**
- **MGP operational areas of MGP-waste areas: PCBs, TCLP Metals, TCLP VOCs, Total (Target Compound List) VOCs and MGP-fingerprinting.**

>**1000** - Proposed Sampling plan should be coordinated with the assistance of the EH&S Remediation Group.

ASTORIA FACILITY WORK PERMIT

Date:	**Permit #:**
Project Name:	Project Location:

CONTRACTOR	**ONSITE CONTACT** (this person is responsible for you while on site)
Name: Phone: Pager: Other:	Name: Phone: Cell: Pager: Other:
Approx. Crew Size: Approx. # of Vehicles:	Inspector (CI/CCI):

Health and Safety Plan (HASP)

Type Required:

- ☐ Type I Generic and Site Specific
- ☐ Type II Generic (no site specific)
- ☐ Type III Generic and Task Specific
- ☐ Type IV No plan required

1. Has the HASP been approved? ☐ Yes ☐ No By: _____
2. Will the work require any excavating or pumping of groundwater? ☐ Yes ☐ No
3. Will the work require entering a manhole or cleaning / pumping of a manhole? ☐ Yes ☐ No

This space if left blank for additional information.

THIS PERMIT MUST BE POSTED AT THE JOBSITE

ONSITE EMRGENCY CALL 911 AND 718-204-4100

ATTACHMENT B

Astoria Guidance No. 200 - Management of Groundwater in Excavations and Subsurface Structures

Astoria Guidance No. 200

Date:	May 1, 2001
Author:	Andrew Fiore, ENSR
Department:	Environment, Health & Safety - Remediation

Con Edison
Astoria Facility Guidance for the Management of Groundwater in Excavations and Subsurface Structures

I. PURPOSE AND APPLICABILITY

This guidance has been created to provide the many Con Edison organizations located at the Astoria Facility with a uniform procedure to adequately manage potentially contaminated groundwater encountered during site projects requiring subsurface work. This guidance is specific to Astoria and was developed in consultation and agreement with the New York State Department of Environmental Conservation (NYSDEC) to specifically allow Con Edison to manage groundwater at the Astoria Facility. **When planning, performing, supervising or inspecting any projects requiring groundwater management at Astoria, this guidance is to be followed in addition to all existing applicable Corporate Environmental Procedures (CEPs) and General Environmental Instructions (GEIs).**

Con Edison is performing a site-wide environmental investigation of the Company's Astoria Complex under the RCRA Corrective Action Program. The investigation is a requirement of the NYSDEC Hazardous Waste Storage Permit for the Astoria PCB Waste Storage Facility. Based on the results of the investigation so far, various levels of contamination have been found in soils around the site. In some areas, groundwater, rainwater, snow runoff, and water from various other sources (groundwater) have been in contact with contaminated soil, resulting in groundwater contamination. The following guidance is to be used to properly manage these potentially contaminated waters.

Note: Pumping of subsurface water (groundwater or water in structures) to catch basins, streets, roadways or anywhere else is NOT permitted without prior authorization from Corporate EH&S.

If you have any questions regarding this guidance, or would like a copy, please contact EH&S Remediation's Andrew Fiore at (718) 204-4173.

II. GUIDANCE:

1. If oil is present, do the following:

- Report the finding in accordance with applicable Corporate CEPs (10. 0) and GEI s (2.01), collect an oil sample for PCBs. Do NOT discharge any water from locations at which oil is found. Call Corporate Transportation to arrange for a >5 0 PPM PCB tanker to remove oily water. Depending upon the percentage of oil encountered, the water should be disposed of at the Astoria Wastewater Purification Plant. If greater than 10 % oil is prese nt, contact Central Field Services to determine feasibility of processing wastewater at the Astoria Purification Plant.

2. If oil is not present, do the following:

- If small quantities of water are to be removed and sampling has not been performed, contact Corporate Transportation and arrange for a >50 PPM PCB tanker. Water should be disposed of at the Astoria Wastewater Purification Plant. A manifest is not required to transport the wastewater on-site.

- If large quantities of water are to be removed, sample water for PCBs to 65 parts per trillion (PPT) and then determine disposal options [Contact EH&S' SPDES Subject Matter Expert (SME), Richard Ramon, (212) 460-2262 for further guidance].

- For work requiring the constant dewatering of a structure, arrange for frac tanks to containerize groundwater, collect samples as necessary, and dispose of the water properly. Water can either be processed in batches at the Astoria Wastewater Purification Plant or it can be disposed of properly off-site.

3. Subsurface Structures

- When working in subsurface structures (catch basins, vaults, electric manholes, etc.) on the Astoria facility, please refer to the *Con Edison Guidance for Working in Subsurface Structures.*

Please contact EH&S Remediation or EH&S Support Services if you have any questions relating to this guidance.

ATTACHMENT C

Astoria Guidance No. 300 - Working in Subsurface Structures

Astoria Guidance No. 300

Con Edison **Astoria Facility Guidance for Working in Subsurface Structures**	**Date:** March 22, 2001
	Author(s): Ron Cosentino Barry Cohen
	Department: Environment, Health & Safety
	Approved by: K. Barouch 5/9/01 CFS Support Services

Please be advised that this is a n interim procedure pertaining to performing work in Electric Distribution Subsurface Structures at or in th e Astoria c omplex. This plan o f action also includes all PLANNED and EMERGENCY w ork, inspections, and removal of equipment, splicing, removal and installation of underground cables in conduit duct lines via ALL electric distribution subsurface structures. The concern is that there ma y be the possibility of PCB contaminated sediment inherent in the duct lines and at the bottom of subsurface structures even thoug h the presence of oil is not visible. This is an ongoing study that involves the Astoria complex site only.

Prior to the start of any work at the Astoria complex, notify the Emergency Site Supervisor at the Astoria Central Field Services Control Center 1(718) 204-4100.

NOTE: Never pump any water out of subsurface structures onto the Astoria complex property.

ACTION PRIOR TO STARTING WORK:

- Before entering the structure, inspect for water, oil and/or sediment.
- Reference: GEI - 2.01 Spill Reporting as required.
- If only water is present, use a ≥50 ppm PCB Co rporate Tanker to remo ve the water, no sample is required.
- If only oil is present, collect an oil sample and send to Chemlab for PCB analysis.
- If water and oil is found in the struct ure, collect as much oil as possib le and send to Chemlab for PCB analysis.
- If sediment is found in the structur e, collect a sediment sample for PCB analysis, even if there are no visible traces of oil in the sediment.

Note: The above sediment sampling procedur e will also a pply after all liquid s have been removed an d sediment has been found even i f no visible traces of oil are found in the sediment.

- All work will start a ssuming 50-499 ppm PCB's pending Chemlab results. Cable manhole sediment is to be treated as lead - 50-499 ppm PCB's pending analysis.

- For emergency conditions/work, drain water from structure using a >_50 ppm PCB corporate Tanker. If oil is visible take sample for PCB analysis. Remove sediments using 55 gallons drums.

- When Chemlab results are available, complete cleanup and manage waste according to Chemlab results.

- If Chemlab sediment results return <50 ppm, sediments without free oil can be removed using a <50 ppm PCB vactor.

- Arrange with Corporate Transportation for pumping of liquids and the onsite removal of generated waste drums. Sediments removed from cable manholes by vactor must be manifested as lead hazardous waste to the flush truck facility using the Astoria site EPA ID #NYD980593636. **DO NOT REMOVE ANY OTHER WASTE OFF THE ASTORIA SITE.**

- In cable manholes, lead contaminated sediment/soil that does not contain free oil and was analyzed as <50 ppm PCB's can be removed via vactor truck and transported to local flush facility for disposal.

CABLE PULLING:

- All employees working on site will don proper PPE for work being performed as per GEIs Appendix B.

- The Cable Operations pulling truck and crew along with Environmental Operations will setup a HOT zone at both structures.

- Protect or seal off any earthen sump opening.

- If possible, protect the floor of clean structure by installing gray hot zone sheeting.

- As the cables are being removed from the structure duct line, Environmental Operation will double wash the cables as 50-499 ppm PCB's.

- Sediment from the duct line and cable can fall back into the structure as it's being washed. Assume that the sediment is 50-499 ppm PCBs. If PILC is involved, treat waste/sediment as lead - 50-499 ppm PCB's.

- The double washed cables can be installed onto the cable reel as clean cable and can be transported and disposed as normal.

- After the cables are removed, jet-rod the duct line from structure to structure with water and cleaning solvents (slix, citrikleen etc).

RE-INSTALLING CABLES:

- Protect or seal off any earthen sump opening.

- If possible, protect the floor of clean structure by installing gray hot zone sheeting.

- As the new cable is being installed, the steel line on the pulling truck will also be double washed prior to being reinstalled onto the drum. Do this by stopping the pulling process periodically and double washing the steel. Repeat the process, as needed, until the entire length of steel has been double washed.

- All cleaning material (rags, absorbents and PPE) associated with the cleanup should be drummed and can be treated as 50 to 499 ppm PCB's. If PILC is involved, treat as Lead - 50-499 ppm PCB's.

- The wash water and sediment in the structures can be treated as 50-499 ppm PCBs. If structure is a cable manhole, treat sediment as lead - 50-499 ppm PCB's; or sample generated sediment for PCB concentration in structure. If the oil and/or sediment results return ≥50 ppm PCB's, all cable manhole waste must be handled as Lead-PCB waste and cleanup/dispose based on Chemlab results. If in Transformer Manhole, Vault or Service Box, treat as PCB waste only.

- Arrange with Corporate Transportation for pumping of liquids and the onsite removal of generated waste drums. Sediments removed from cable manholes by vactor must be manifested as lead hazardous waste to the flush truck facility using the Astoria site EPA ID #NYD980593636. **DO NOT REMOVE ANY OTHER WASTE OFF THE ASTORIA SITE.**

- In cable manholes, lead contaminated sediment/soil that does not contain free oil and was analyzed as <50 ppm PCB's can be removed via vactor truck and transported to local flush facility for disposal.

Please contact CFS Support Services if you have any questions relating to this guidance.

ATTACHMENT D

Health and Safety Plan Sign-off Sheet

Health and Safety Plan Sign-off Sheet

RCRA Facility Investigation (RFI) Activities

Consolidated Edison Co. of New York, Inc.

Astoria, New York Facility

I have received a copy of the Health and Safety Plan prepared for the above-referenced site. I have read and understand its content, and I agree that I will abide by its requirements.

_____

Name

_____

Signature

_____

Company

_____

Date

ATTACHMENT E

Job Safety Analysis

Job Safety Analysis

JSA Type: ☐ Investigation ☐ O&M ☐Office ☐ Construction	☐ New ☐ Revised	**Date**:
Work Activity:		
Personal Protective Equipment (PPE):		

Development Team	Position/Title	Reviewed By	Position/Title	Date

❶ Job Steps[1]	❷ Potential Hazards[2]	❸ Critical Actions[3]	STOP Stop Work Criteria
		•	•
		•	•
		•	•
		•	•
		•	•

ATTACHMENT F

Con Edison - Work Area Protection and Traffic Control Field Manual

conEdison

Work Area Protection and Traffic Control

Field Manual

THE WAY WE WORK IS SAFELY

To All Con Edison Field Forces:

This is your field manual on Work Area Protection and Traffic Control. It is designed to help you achieve a safe work area for our employees, with limited obstruction to traffic, through the use of uniform traffic devices. In addition, it provides protection for pedestrians and motorists.

This edition of the manual has been updated to comply with the current *Manual on Uniform Traffic Control Devices* (MUTCD). The MUTCD is published by the Federal Highway Administration under 23 Code of Federal Regulations, Part 655, Subpart F.

This field manual is based upon three fundamental principles:

- Protection for you and your coworkers while you work in the streets;
- Protection for motorists and pedestrians;
- Safe and expeditious movement of traffic around your work area.

Not all work sites, traffic, or pedestrian situations can be illustrated in this manual. Employees must apply the principles and tools covered in this manual to set up work area protection and traffic-control devices with all applicable traffic regulations in mind.

Table of Contents

Practical and Procedural Considerations

1

Because of the vital nature of our jobs, we must gain access to areas where repair, maintenance, and construction are required. Providing a work area that is safe for everyone is of critical importance.

Basic Principles of Work Area Protection

Traffic conditions in our operating area make it necessary to plan protection for work areas in order to avoid vehicular and pedestrian traffic hazards and thus safeguard the public and our own employees.

The work area protection that you set up at the job site has two main goals:

- To provide suitable work area devices so that pedestrians and drivers of vehicles are aware of work area boundaries;
- To provide bridging over excavations where pedestrian and vehicle traffic must be maintained during the job.

In addition, when planning work area setups, an important company concern is to maintain good relations with the public while maintaining safety in the work area. Employees in the field help create good will by the way they conduct themselves and by the way they arrange and maintain their work areas.

Con Edison's reputation as a good neighbor is important. Do your part to preserve it by always using the work area protection principles described in this document when you are on the job.

Plan the Work and Work the Plan

In order to work efficiently and to minimize possible disruptions for pedestrians and vehicular traffic, it's important to prepare in advance before arriving at a work location. Here are some factors to consider:

Scheduling: When scheduling street work, try to avoid hours of unusually heavy traffic.

Permits: Review the work and Department of Transportation (DOT) permit requirements before planning work. Follow DOT stipulations.

Requirements include:

- Posting of permits to face the nearest curb line at the work area setup. Posted permits must provide the following information: name of the contractor, start and expiration dates, contact telephone number, permit number, and type of work (gas, steam, or electric system). Lettering must be 1 1/2 inches high;
- Determining days and times to perform work;
- Securing permission for lane closings.

Efficient Deployment: Maintain street work areas only for as long as is necessary. Move in quickly and safely, do the job, and move out. Minimize obstruction and excessive exposure to traffic.

Materials: Before leaving the yard, review work orders and make sure that all equipment and supplies are available to complete the job as promptly as possible.

Evaluate the Work Area

Determine how existing conditions will affect the job, and how work area protection must be adapted to the location. The following must be considered:

Vehicular Traffic:

- Assess the volume and speed of traffic.
- Arrange in advance with the appropriate authority to shut down a traffic lane when work must be done at approaches to and exits from tunnels and bridges.
- Allow for the free passage of emergency vehicles, including fire engines and ambulances.

Pedestrian Traffic: Observe the pedestrian routes to crosswalks and bus stops.

Changes in Work Plan: Reassess protective devices and working conditions based on any changes in the traffic patterns or scope of work that may occur during the work operation.

Business Establishments and Other Public Facilities: When excavations are to be made near schools, hospitals, theaters, or large business establishments, where there is substantial pedestrian and vehicular traffic, notify customers in advance so that they will be inconvenienced as little as possible.

Work Area Considerations

Use the following parameters in your planning so that the job setup can occupy the smallest work area consistent with safe operations:

Width of Work Area: Generally should not exceed the width of one traffic lane.

Where this is not possible (e.g., excavations, manholes between two lanes), doing the job in steps should be considered. In congested areas with unusual traffic conditions, notify the local police precinct.

Length of Work Area: Should be separated from oncoming traffic by placing a tool cart, Pel bag, vehicle, or other suitable barrier between the working point and oncoming traffic. For increased protection, a buffer zone (the same width as the work area) should be located in front of the work area. The area in front of the buffer zone will be used to channelize and taper traffic flow away from the work area by using traffic cones and/or stanchions.

Mobilization:

1. Day or night, before moving out into traffic lanes, operate hazard lights on the vehicle. For tool carts, mount the directional arrow signs and appropriate advance-warning flasher; and use channelizing devices (traffic cones and/or stanchions), as well as the required warning signs.
2. Warn oncoming motorists during the move into traffic lanes. When necessary, a crew member equipped with a signaling device and wearing a retroreflective vest should warn oncoming motorists.
3. If a traffic light is present, wait for the light to change before mobilizing equipment in or out of traffic lanes.
4. Some operations require work vehicles to be positioned facing oncoming traffic. Maneuvering a vehicle into such a position can present a risk to workers, the vehicle, and the public, if it is not performed using good judgment and appropriate safety equipment, i.e., a hard hat, flag, and retroreflective clothing.
5. The vehicle's hazard lights must be in operation and visible to all approaching traffic during the maneuver until the vehicle is within a protected work area.
6. Select traffic-control devices to protect the work areas.

Following Through: Setting Up the Street Work Area

In creating the work area protection setup, these elements are a part of the job-site characteristics to consider and the tools to use.

Steps to follow for setting up work area:

- Wear proper PPE (traffic vests, hard hat).
- Dome light/flashers/arrow boards.
- Position vehicle upstream from work site to begin channeling traffic.
- Flaggers to warn traffic, when necessary.
- Place advance warning sign(s); "Men Working" sign is first.
- Begin laying down traffic devices (e.g., cones, stanchions), working your way down to the work site.
- Continue to channel traffic using cones; determine work site termination.
- Establish work site.
- Establish work site termination with cones (downstream).
- Establish pedestrian channeling, when necessary.

Hard Hats and Vests: Employees exposed to vehicular traffic, e.g., when setting up, maintaining, removing, or working outside of work area protection, must wear hard hats and retroreflective safety apparel.

Advance-Warning Signs: Remember – oncoming drivers must be able to see the work area if they are to avoid it. Therefore, night or day, arrange your traffic-warning equipment to provide advance warning to oncoming drivers. Channelizing devices tapered to move traffic away from the work area with a series of warning signs extended in the direction of oncoming traffic must be used.

Traffic Devices: Set up the selected devices to control vehicle and pedestrian traffic and protect the work area. Provide clearly defined boundaries of street and sidewalk work areas throughout the work operation day and night.

Intersections: At intersections, place the most effective warning equipment so that it faces the heaviest oncoming traffic. Set up traffic-control devices on alternate sides of an intersection to control flow around a work area.

Lamp Reels: When taking temporary service from a lamppost, cover the open door with a lamppost apron to protect exposed wiring. (Contractors are required to use generators to obtain power.) ALWAYS lay cord along the curb. AVOID laying cord diagonally across traffic lanes. If necessary, use an extra lamp reel. All cords and hose shall be secured to street surface when crossing lanes of vehicle or pedestrian traffic.

Pedestrian Passageways: Must be 5 feet wide. Where required, protect pedestrian and bus-stop passageways with barricades, planking, steel plates, or shunt boards extending well beyond the defined passageway. Use signage to indicate alternate pedestrian paths and access to bus stops.

Chock Equipment: Vehicles and tool carts at work sites must be chocked.

Hazard-Vehicle Lights: If a vehicle must stand in lanes of moving traffic for work purposes and is not within a protected work area, the hazard-vehicle light(s) must be in operation day and night.

Street Openings: If it is necessary to leave street work areas unattended at night, provide traffic-control devices to include use of Type III barricades around the work area to protect motorists and pedestrians.

Plating: Provide plating or decking when required. All road plates must be pinned and ramped to avoid pedestrian foot injury or injury to motorists due to plate movement.

Floodlights: When it is dark, and when using flaggers, use flood lamps where required for additional protective illumination or work illumination. Lamp glare should not impede motorists or workers.

Subsurface Structure Openings: When opening any underground structure, manhole guardrails or telescoping rails must be in place to prevent persons from falling into the structure and to prevent debris or other materials from entering. In addition, you must follow the appropriate entry procedures for enclosed or confined spaces.

Housekeeping: Good housekeeping is an important item in street work area protection.

Terminating the Job:

Steps to follow for breaking down work area:

- Clean up work area.
- Break down work site.
- Pick up traffic devices in reverse order.
- Work your way back toward the "Men Working" sign.

Moving Out of the Work Area

Just as with setup of the work area, proper procedures must be observed when the job is finished and the site is being cleared.

Hazard-Vehicle Lights: Traffic-warning equipment and hazard-vehicle lights must be in operation while moving from traffic lanes to the curb.

Flagger: A trained member of the crew, wearing a retroreflective vest and hard hat, should warn oncoming motorists with a signaling device where necessary.

Traffic Controls: If a traffic light is present, wait for the red light before moving out of the traffic lane.

Plates: Ensure that all road plates are left pinned and ramped to maximize public safety.

Ongoing Work: If the job is shared by another Con Edison work area setup, make sure to leave the work area protection and the setup in good condition.

Housekeeping: Before leaving the area, inspect the site to be sure that no tools, equipment, or debris are left behind. Always work the job to make the public think well of you and the company. Remember, on the job, ***you are Con Edison.***

Advance-Warning Signage and Equipment for Work Area Protection

2

The purpose of advance warning is to properly alert motorists and pedestrians to physical conditions ahead.

Note: The advance-warning area may vary from a single sign to a series of signs in advance of the temporary traffic-control zone activity area.

Signage distances may be adjusted where necessary, depending on roadway limitations or for more effective warning and guidance.

Signage must effectively warn oncoming traffic, allowing adequate time for driver response. The employee must make the judgments necessary to establish and maintain effective advance warning.

Advance-Warning Signs

Description: Warning signs must have a black legend on an orange background and be reflectorized for nighttime use. Diamond-shaped warning signs are preferred. However, where necessary, the alternate rectangular shape may be used. Minimum sizes for warning signs are 36 inches by 36 inches (diamond) and 36 inches by 24 inches (rectangle).

Signs Displaying the Symbol of a Worker or the Words "Road Work Ahead" or "Utility Work Ahead"

Instructions for Use: These signs are required to be posted for all work done in a traffic lane, parking lane, or on a shoulder. They must be posted first and in front of channelizing devices.

The sign displaying the symbol of a worker (the "worker symbol") may be used for short-duration work areas, while the "Road Work Ahead" and "Utility Work Ahead" signs are to be used for long-duration work areas (i.e., more than three days).

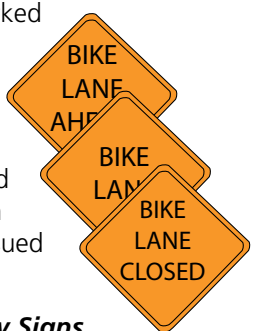
The sign may be mounted on portable "crashworthy" supports and must face oncoming traffic.

For short-duration work that occupies a location for up to three days, such as a manhole operation where workers are present or work in a parking lane, the standard distance between the warning sign and the lane closure or work area is 150 feet.

For long-duration work (more than three days), such as an excavation in a travel lane, the standard distance between the warning sign and the lane closure or work area is 300 feet.

Different distances may be used where necessary for more effective warning and guidance.

Signs placed on the sidewalk should be 2 feet in from the curb and at a height of 7 feet, where the sign is not likely to interfere with pedestrians or be obscured by parked vehicles.

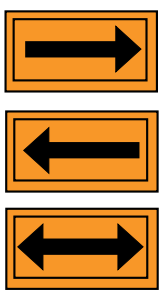


Bike Signs

Use of "Bike Lane" signs are to be used when stipulated on the work permit issued by the city.

Directional-Arrow Signs

Description: Orange reflectorized background at least 3 feet wide and 2 feet high with a clearly recognizable black arrow symbol. Standard or variable arrow signs (as shown) may be used.



Instructions for Use: The arrow may be mounted on a vehicle, tool cart, barricade, or portable supports. It must be mounted at a height of at least 4 feet to the bottom of the sign and must face in the direction of the oncoming traffic. The arrow must indicate the direction in which the traffic may pass.

Note: Arrow signs are intended to give motorists clear information and provide them with effective guidance. Therefore, care must be taken to ensure that the proper message is displayed at all times.

"Flagger Ahead" Signs

Description: The "Flagger Ahead" sign must be diamond shaped, 36 inches by 36 inches, with a black legend and border on an orange background. It shows the silhouette of a person standing with the right arm (facing the viewer) extended horizontally and holding a flagstaff horizontally, with the flag hanging down. The free arm is shown bent with the palm above shoulder level.

Instructions for Use: The "Flagger Ahead" sign shall be placed after the worker symbol or "Road Work Ahead" or "Utility Work Ahead" sign and well before the flagging location.

Lane-Closure Signs

Description: Lane-closure warning signs must have a black legend and border on an orange background.

Instructions for Use: Advance notice of closed lanes must be provided when work areas must interrupt the flow of traffic in through lanes. This sign should be placed after the worker symbol or "Road Work Ahead" sign and may be placed at the beginning of the taper created by the use of channelizing devices.

Street/Road Closed Signs

Description: This is a horizontal rectangular white sign, 36 inches by 36 inches, with a black border and the words "Road Closed" in black on two lines.

Instructions for Use: The "Street Closed Ahead" sign should be used when the roadway is closed to all road users except contractors' equipment or officially authorized vehicles. This sign should be accompanied by appropriate warning and detour signage. This sign should be installed at or near the center of the roadway, on or above a Type III barricade that closes the roadway.

Note: New York City requires closed-street permits from the DOT. Both the police department and the fire department's communications center require notification 24 hours in advance of nonemergency street closings. The local community planning board requires a notification seven days in advance when closing more than 50% of moving lanes per direction. Westchester permits vary by municipality.

"Sidewalk Closed" Signs

Description: This device is used when a sidewalk must be closed in order to conduct work. This is a visual indicator to notify pedestrians that passage though this area is prohibited. Provisions must also be made to indicate redirection of pedestrian traffic.

Persons With Visual Disabilities

Adequate provisions, as determined by an engineering study or by engineering judgment, should be made for persons with visual disabilities. Because printed signs and surface delineations are not accessible to pedestrians with visual disabilities, blocked routes, alternate crossings, and sign and signal information should be communicated to pedestrians with visual disabilities by providing the following: audible information devices, accessible pedestrian signals, and barriers and channelizing devices that are detectable to pedestrians who have low vision or who are traveling with the aid of a long cane. The following three items should be considered when planning for pedestrians:

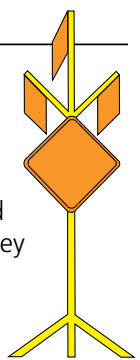
A. Pedestrians should not be led into conflicts with work site vehicles, equipment, and operations.

B. Pedestrians should not be led into conflicts with vehicles moving through or around the work site.

C. Pedestrians should be provided with a reasonably safe, convenient, and accessible path that replicates as nearly as practical the most desirable characteristics of the existing sidewalk(s) or foot path(s). Where pedestrians who have visual disabilities encounter work sites that require them to cross the roadway to find an accessible route, instructions

should be provided using an audible information device. Accessible pedestrian signals with accessible pedestrian detectors might be needed to enable pedestrians with visual disabilities to cross wide or heavily traveled roadways. A pedestrian route should not be severed and/or moved for nonconstruction activities, such as parking for vehicles and equipment.

High-Level Warning Devices



These devices are used in addition to signage. They can be lighted or unlighted as described below, and they provide clear, highly visible warning of the work area for both pedestrians and vehicles.

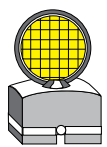
Flag Trees

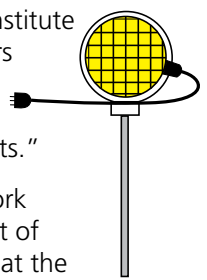
Description: The flag tree should display a minimum of two flags with their lowest corners at a height of 8 feet. Other warning signs may be mounted below the flags to alert and warn traffic in advance of a work area during daylight hours.

Instructions for Use: At work areas where the placement of the advance-warning sign at the standard distances is not practical or is found to be ineffective, a flag tree may be used in conjunction with a worker symbol or road work ahead sign in advance of the work area (also in advance of any arrow boards) to effectively warn traffic. It must be placed at a sufficient distance in front of the work area to warn oncoming drivers.

Advance-Warning Flasher: Type B High-Intensity Flashing Warning Lights

Description: The high-intensity, 7-inch (minimum) warning light (Type B) provides a flashing yellow light in one direction only, for use both day and night. These lights can be mounted on traffic cones, signs, flag trees, or barricades to warn road users. Warning lights must have a minimum mounting height of 30 inches. These warning lights must be in accordance with current Institute of Transportation Engineers (ITE) "Purchase Specification for Flashing and Steady-Burn Warning Lights."





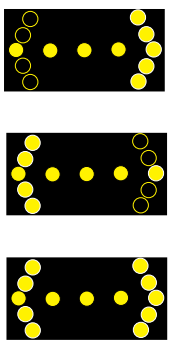
Instructions for Use: At work areas where the placement of the advance warning sign at the standard distances is not practical, or is found to be ineffective, and the advance-warning sign with flag tree is also found to be ineffective, the

advance-warning flasher may be used in conjunction with the advance-warning sign to provide additional warning to oncoming traffic. When mounted on an advance-warning sign, the distance from the roadway to the bottom of the lens of the light must not be less than 8 feet.

Note: The flag tree can be used in conjunction with the advance-warning sign during daylight hours and/or the advance-warning flasher during hours of darkness.

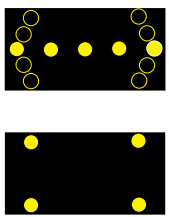
Flashing-Arrow Panel

Description: The unit must consist of a black rectangular background at least 4 feet wide and 2 feet high, with yellow flashing lights at least 4 inches in diameter, which form a clearly recognizable arrow symbol.



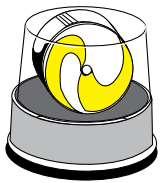
Instructions for Use: The unit may be mounted at a height of at least 7 feet from the bottom of the unit on a trailer or other suitable support. Vehicle-mounted panels should be as high as practicable. This sign can provide additional warning and directional information to assist in merging and controlling traffic around the work area.

If using an arrow panel, the arrow or chevron mode must be used for lane closures on multi-lane streets. If more than one lane is closed, a separate arrow panel must be used for each closed lane. The caution mode must be used in situations where one lane of a two-way street is closed. The caution mode may also be used for work (including surveying) done on shoulders and sidewalks near traffic situations.



Note: Arrow panels may be used in conjunction with warning signs. They may not be used to replace warning signs.

Hazard-Vehicle Light



Description: Vehicle-mounted, revolving (360 degrees) amber light.

Instructions for Use: The light must be displayed and be visible to all approaching traffic when the vehicle is operated at a work site in the roadway and the vehicle is not within a protected work area.

Work Area Protection

Work area protection involves the immediate area in which workers' activities are taking place. Consideration must be given to pedestrian and motorist protection. The work area is generally bordered by:

- stanchions with telescoping rails and/or orange barrier tape, and/or
- barricades Type I, Type II, or Type III.

Traffic-control devices, including channelizing devices, such as stanchions and cones, as well as sign supports and barricades, must conform to new requirements set by the National Cooperative Highway Research Program (NCHRP) Report 350, "Recommended Procedures for the Safety Performance of Highway Features," and are to be constructed of crashworthy materials.

Protection of Pedestrians

Traffic-control devices used to delineate pedestrian walkways must be crashworthy so that if struck by a vehicle, there will be a minimal threat to pedestrians, workers, and the occupants of vehicles.

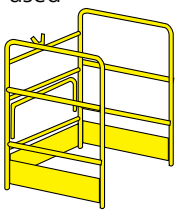
When existing pedestrian paths are disrupted or closed, alternate routes must be provided to crosswalks and bus stops. Signage may be provided to improve recognition of a temporary pedestrian route.

Type II or Type III barricades should be used to channel pedestrians safely around the work area. Such barricades should be detectable to users of canes with a bottom rail no higher than 6 inches aboveground and a top rail at least 36 inches aboveground.

If storing materials outside of the work area setup near pedestrian pathways (sidewalks and crossings), Type III barricades should be used to channel pedestrians safely around these storage areas.

Note: If drums, cones, or stanchions are used to channel pedestrians, there must be no gaps between the bases of these devices (this may be a solid rail between devices), and the devices must be at least 36 inches in height.

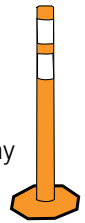
Subsurface Protection Devices



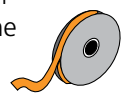
Description: Manhole guardrail and telescoping rails are used to prevent personnel and pedestrians from falling into subsurface structures and is not a traffic-control device. Manhole guardrails are yellow and equipped with three sides and two rails, plus a toe-board. The height of the top rail must not be less than 42 inches. Telescoping rails are mounted onto stanchions. The first rail is placed at the bottom of the stanchions and the second rail is secured at the top.

Instructions for Use: Manhole guardrails are to be used for open manholes. Telescoping rails are to be used for other subsurface structures not accessible by manhole.

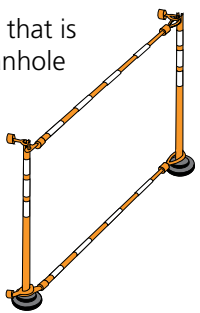
Stanchions, Telescoping Rails, and Boundary Tape



Description: Stanchions must be crashworthy*, must consist of orange uprights at least 42 inches high with bases, and may be of a tubular or cone style. Each must have a minimum of two reflectorized bands near the top of the stanchion. The boundary tape is orange.



Instructions for Use: To outline the boundaries of street work areas such as:



- An open manhole that is protected by a manhole guardrail;
- Vault cage entry;
- Overhead pole work;
- Setup around Vactor/flush trucks.

Note: Type II or Type III barricades or other Temporary Traffic Control (TTC) devices (such as stanchions used together with telescoping rails) consisting of a bottom rail no higher than 6 inches aboveground and a top rail at least 36 inches aboveground should be used to channel pedestrians safely around the work space.

* Temporary Traffic-Control (TTC) devices used to delineate a TTC zone pedestrian walkway must be crashworthy and, when struck by vehicles, present a minimum threat to pedestrians, workers, and occupants of impacting vehicles.

Barricades

Description: Barricades must be crashworthy and are of three types:

Type I – Has one rail that must be a minimum length of 2 feet and a width of 8 inches to 12 inches.

Type II – Has two rails that must each be a minimum length of 2 feet and a width of 8 inches to 12 inches.

Type III – Has three rails that must each be a minimum length of 4 feet and a width of 8 inches to 12 inches.

In addition, for all types:

- Rails must be marked with alternate orange and white stripes at an angle of 45 degrees. Stripes must be 4 inches wide for rails less than 2 feet long and 6 inches wide for rails longer than 3 feet.
- Rails must be reflectorized for night use with a minimum of 270 square inches of reflective area facing traffic.

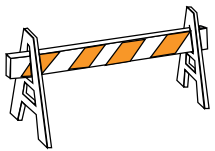
Instructions for Use: Barricades are used to mark an obstruction (work area) in the roadway and are required to outline excavations.

- The Type I barricade is used for temporary or short-duration work and for outlining excavations.

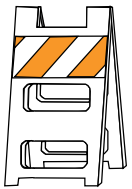
- The Type III barricade is normally used to face oncoming traffic for long-duration work where the barricade is to remain in the roadway for extended periods.
- Type II or Type III barricades may be used to channel pedestrians safely around the work area. Type II or Type III barricades may be used at pedestrian crossings, as well as at sidewalks or other areas where pedestrians would normally come into contact with the work area.
- The stripes of barricades that face oncoming traffic should slope down toward the side on which traffic is to pass.
- Ballasts must not be placed on the top rail and must not consist of nondeformable objects such as rocks or concrete.

Note: The addition of company identification must not detract from the striping on the face of the barricade rail(s) facing oncoming traffic.

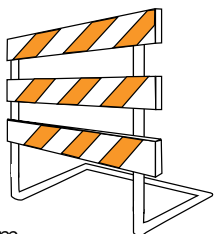
Barricade Panels



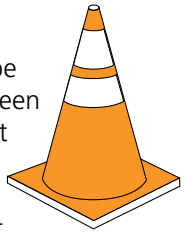
Description: The face of barricade panels must be the same as the face of a barricade rail.



Instructions for Use: A single panel may be placed on the manhole guardrail, a temporary fence, vehicle, or other obstruction in the roadway when the use of a Type I barricade is not practical. The panel must face oncoming traffic, and the top of the panel must be at a minimum height of 3 feet.



Cones



Description: Cones must be orange and must be between 28 and 36 inches in height with two reflectorized bands near the top. For nighttime use, cones must be retroreflectorized or equipped with lighting devices for maximum visibility. Retroreflectorization of cones that are 28 to 36 inches in height must be provided by a 6-inch-wide white band located 3 to 4 inches from the top of the cone and an additional 4-inch-wide white band located approximately 2 inches below the 6-inch-wide band.

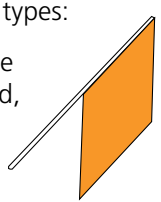
Instructions for Use: The primary function of cones is to channel traffic. The cone should be used to control and direct traffic around or through the work area by gradually narrowing the roadway and indicating the path to be followed. Cones may be used in combination with:

- A flag inserted in the top of the cone to enhance its target value during daylight hours;
- Type B warning lights (high-intensity flashers), which may be used day or night (warning lights must flash when used to warn of a condition);
- Type C steady-burn warning lights when used to channelize traffic.

Signaling Devices

Description: Signaling devices must be one of the following types:

- Signal flag – must be retroreflectorized red, at least 24 inches by 24 inches, securely fastened to a staff 36 inches long.



- Signal light – a steadily burning red or red-orange flashlight wand.

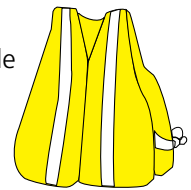
- Paddle – a combination "Stop" and "Slow" sign on an octagonal panel, at least 18 inches wide with letters 6 inches high, securely fastened to a rigid handle. Both faces must be retroreflectorized for nighttime use. The "Stop" face must be red with white letters and border. The "Slow" face must be orange with black letters and border.

Instructions for Use: Signaling devices should be used by flaggers to issue signals to oncoming traffic.

- The signal flag is for use during daylight hours, and the signal light is for use during hours of darkness at locations controlled by a single flagger.
- The "Stop" and "Slow" paddles are used day or night when more guidance to motorists is needed. However, they should not be used where display of the paddle face in the opposite direction would be inappropriate or misleading.
- Use of the "Stop" and "Slow" paddle is preferable in a two-way traffic condition, such as the middle of a street, as opposed to an intersection where traffic may travel in four directions.

Safety Apparel

Description: Flaggers, as well as employees outside of the work area setup, must wear approved safety apparel available in Class & Stock.



Instructions for Use: Vests or compliant apparel must be worn on the outside of all other clothing. Trained employees assigned as flaggers must wear safely apparel when controlling traffic. When leaving or working outside a protected work area, employees exposed to vehicle traffic, e.g., setting up, maintaining, or removing work

area protection, must wear a safety vest. Surveyors and employees working in the roadway with minimum protection must wear a safety vest.

Remember: The value of your safety vest is diminished when you crouch, bend, or move into a position that reduces your visibility or the reflective value of the vest.

Flags (used in conjunction with traffic-control devices)

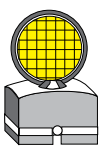
Description: Flags must be orange; a minimum of 16 inches by 16 inches and attached to a staff at least 30 inches long.

Instructions for Use: Flags may be displayed in a manner that does not obscure the legend above any channeling device, on vehicles or tool carts, on stanchions and barricades, and above warning signs.

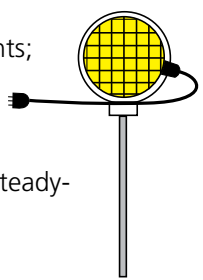
Note: Flags are a supplement to increase the target value and visibility of the work area during daylight hours. Flags may be placed at suitable intervals of not more than 20 feet during daylight hours on barricades used to outline excavations.

Low-Intensity Warning Lights

Description: Low-intensity lighting is for use during nighttime hours only. All warning lights must comply with the ITE "Purchase Specification for Flashing and Steady-Burn Warning Lights," such as:



- Type A low-intensity flashing warning lights;
- Type C steady-burn warning lights;
- Type D 360-degree steady-burn warning lights.



Instructions for Use: On barricades used to outline excavations, one light must be placed on the barricades at suitable intervals of not more than 20 feet. Use during hours of darkness only. (Use Type B high-intensity flashing warning lights for day and night.) Warning lights must have a minimum mounting height of 30 inches.

Traffic Control and Work Area Protection Arrangements

3

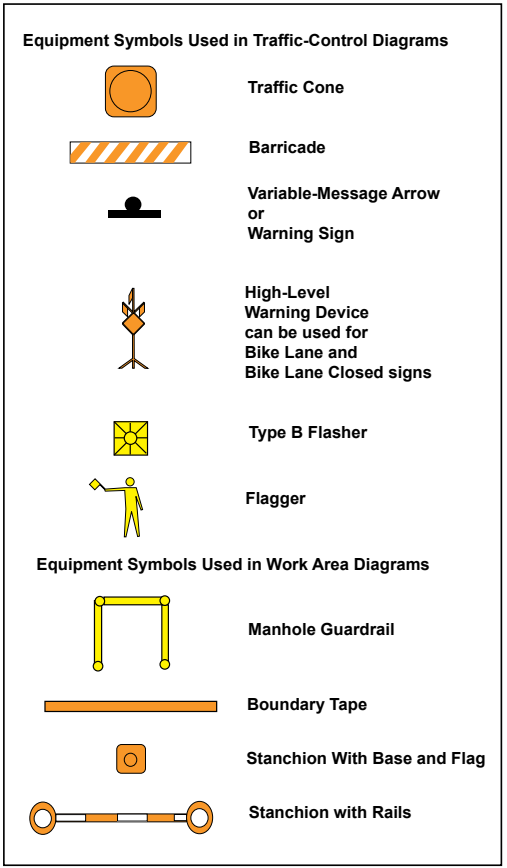
Work Area Protection Diagrams

This section provides graphic diagrams showing a variety of typical work locations. In each case, a scene is provided showing the work area protection properly deployed. In addition, a smaller "blueprint" diagram providing an overhead view of the job site helps to clarify the placement of signage, lights, barriers, and other work area protection equipment.

The arrangements shown in this section do not cover every possible work area configuration. They are intended to provide a representative sample of field conditions and to offer guidance when planning work area protection in similar settings. If you're not sure how to proceed, talk to your supervisor.

Using these diagrams as reference, you must also:

1. Review the DOT permit for conditions of work. Verify information if needed.
2. Select a traffic-control diagram that meets most nearly the requirements to control traffic at the work site.
3. Select a work area protection diagram for your type of operation.
4. Set up the work site in accordance with the arrangements selected. Adapt the arrangements where necessary to meet local conditions.



Work Area Protection Diagrams

These configurations are generally applicable to comparable work areas with similar road conditions.

- Setup for Pole Setting on Four-Lane Road With Two Lanes of Traffic in Each Direction
- Setup for Curved Two-Lane Road With Two-Way Traffic
- Setup in Middle Lane of Three Lanes of Traffic Moving in the Same Direction
- Setup in One Lane of a Four-Lane Road With Two Lanes of Traffic in Each Direction
- Setup at an Intersection With Pedestrian Crosswalks
- Setup at an Intersection With Pedestrian Crosswalks
- Setup Around Subsurface structure in Sidewalk Area
- Setup in Middle of Roadway Diverting Traffic
- Setup in Street Blocking Bike Lane

Setup for Pole Setting on Four-Lane Road With Two Lanes of Traffic in Each Direction

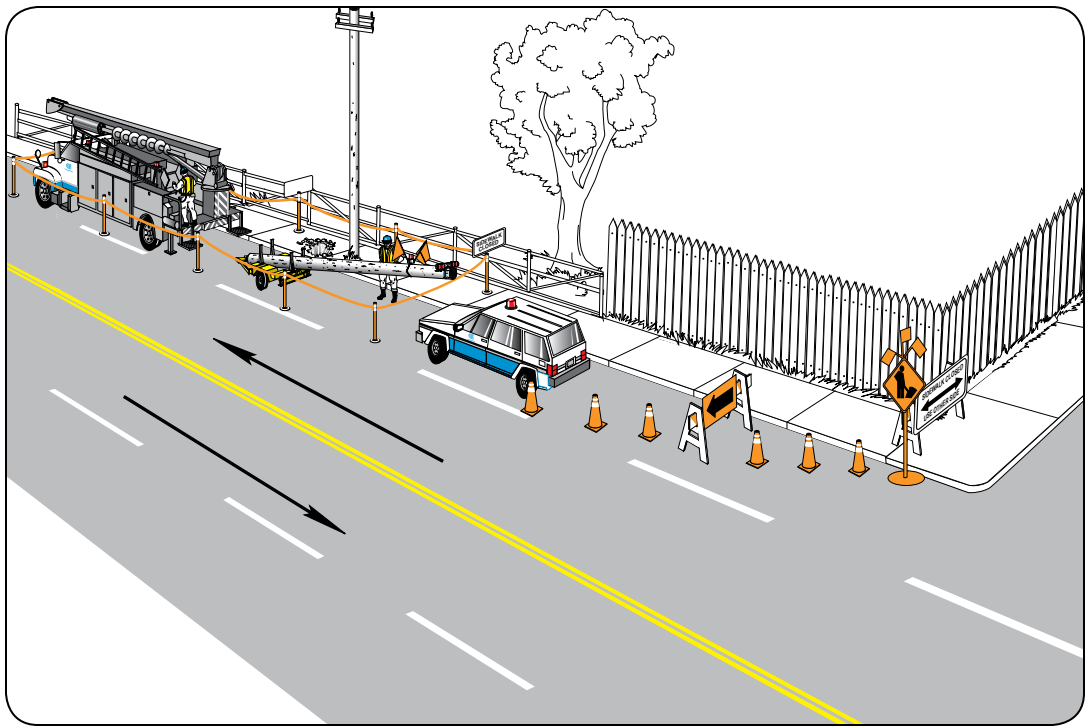
This configuration is generally applicable to comparable work areas with similar road conditions.

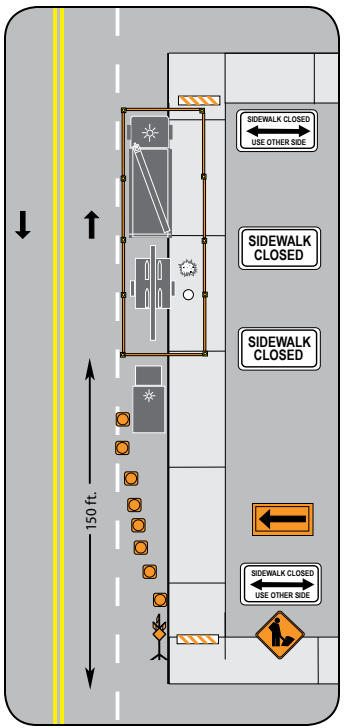
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- Place the advance-warning sign at the beginning of the tapered work zone.
- Place the "Lane Closed" sign to appear in plain view after the advance-warning sign for traffic traveling toward the one closed lane.
- Place traffic cones so that the traffic is tapered away from the work area.
- Set up stanchions and boundary tape. (Tape may be used when pedestrians have restricted access to the work area.)
- Post "Sidewalk Closed" sign near setup (optional).
- Post "Sidewalk Closed — Use Other Side" sign on both sides of the work area, at the nearest corners to restrict pedestrian traffic on the work side of the street.

Equipment

- advance-warning sign ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- Flag tree and flags
- 28" or 36" traffic cones
- lane-closure sign (arrow board or flashing-arrow panel)
- stanchions and boundary tape
- sidewalk-closed signage





Blueprint of work area

Setup for Bucket Truck on Curved Two-Lane Road With Two-Way Traffic

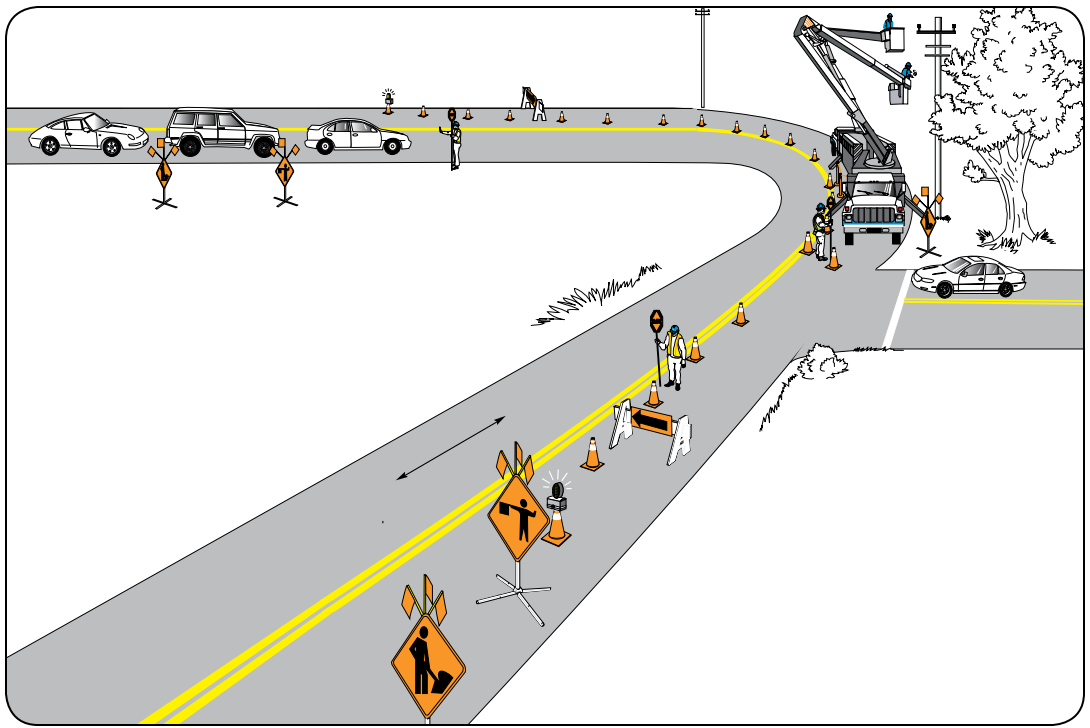
This configuration is generally applicable to comparable work areas with similar road conditions.

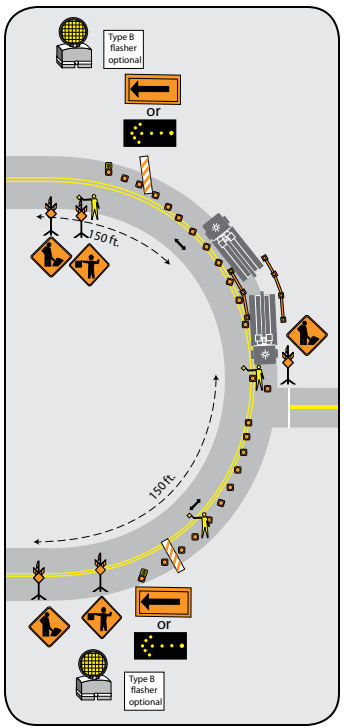
Setup

- Assign three flaggers, one at each end of the work area, and one at a nearby intersection, to control the flow of two-way traffic in one lane. The flagger position should be within a protected area, such as the tapered area.
- Ensure communications among flaggers (walkie-talkies).
- Place the advance-warning sign at the beginning of the tapered work zone for both sides of oncoming traffic.
- Place "Flagger Ahead" signs after the advance-warning sign and well before the flagger position.
- Place the "Lane Closed" sign to appear in plain view after the advanced warning sign for traffic traveling toward the one closed lane.
- Place the "Lane Closed" sign for traffic approaching on the opposite side of the double yellow line (optional).
- Place traffic cones so that upstream and downstream traffic are both tapered away from the work area.
- Set up stanchions and boundary tape to extend around work areas (tape may be used when pedestrians have restricted access to the work area).

Equipment

- 2 advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag trees and flags
- 2 lane-closure signs (arrow board or flashing-arrow panel)
- 2 "Flagger Ahead" signs
- 28" or 36" traffic cones
- stanchions and boundary tape
- Type B flashers (optional)
- 3 sets of flagger-communication equipment
- 3 flagger paddles





Blueprint of work area

Setup for Excavation in Middle Lane of Three Lanes of Traffic Moving in the Same Direction

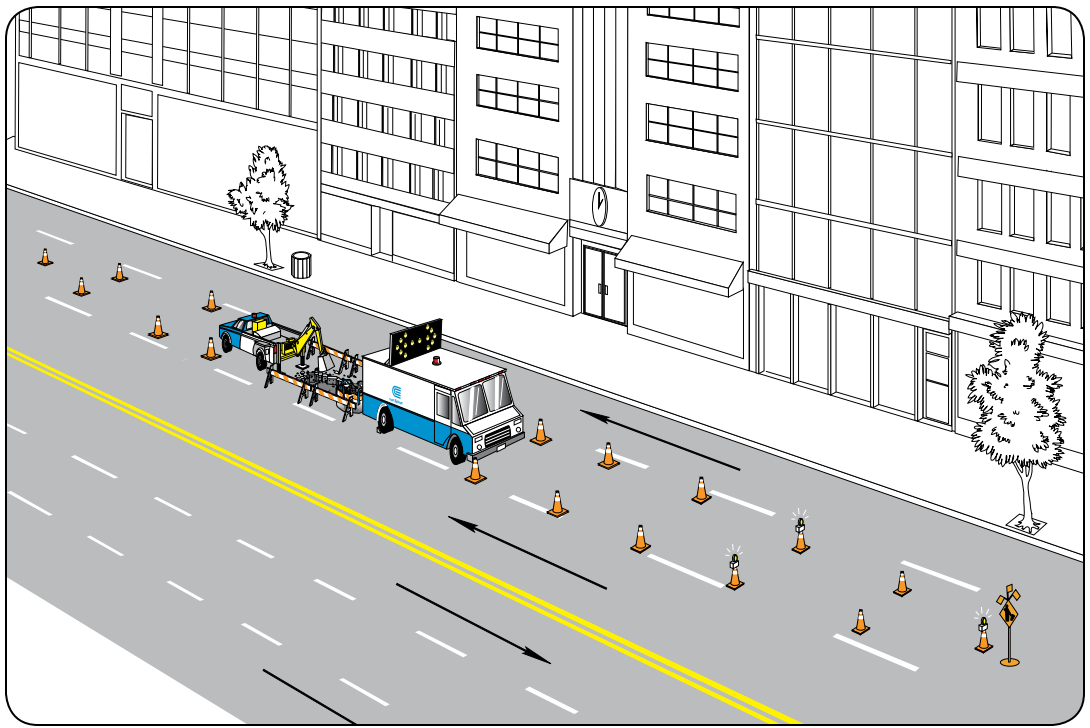
This configuration is generally applicable to comparable work areas with similar road conditions.

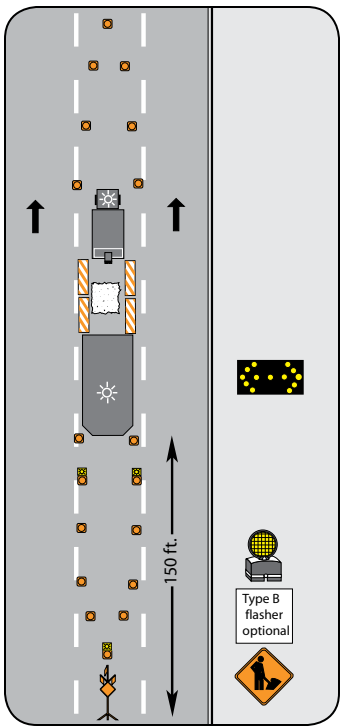
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- Place the advance-warning sign at the beginning of the tapered work zone.
- Place the "Lane Closed" sign in plain view after the advance-warning sign.
- Place traffic cones so that the traffic is tapered away from the work area.
- Place sturdy barricades around the excavation work area.
- Filled Pel bags should be placed inside the work area nearest barricades that are most at risk of impact from oncoming traffic.

Equipment

- advance-warning sign ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- flag tree and flags
- 28" or 36" traffic cones
- lane-closure sign (arrow board or flashing-arrow panel)
- Type B flashers (optional)





Blueprint of work area

Setup for Flush Truck in One Lane of a Four-Lane Road With Two Lanes of Traffic in Each Direction

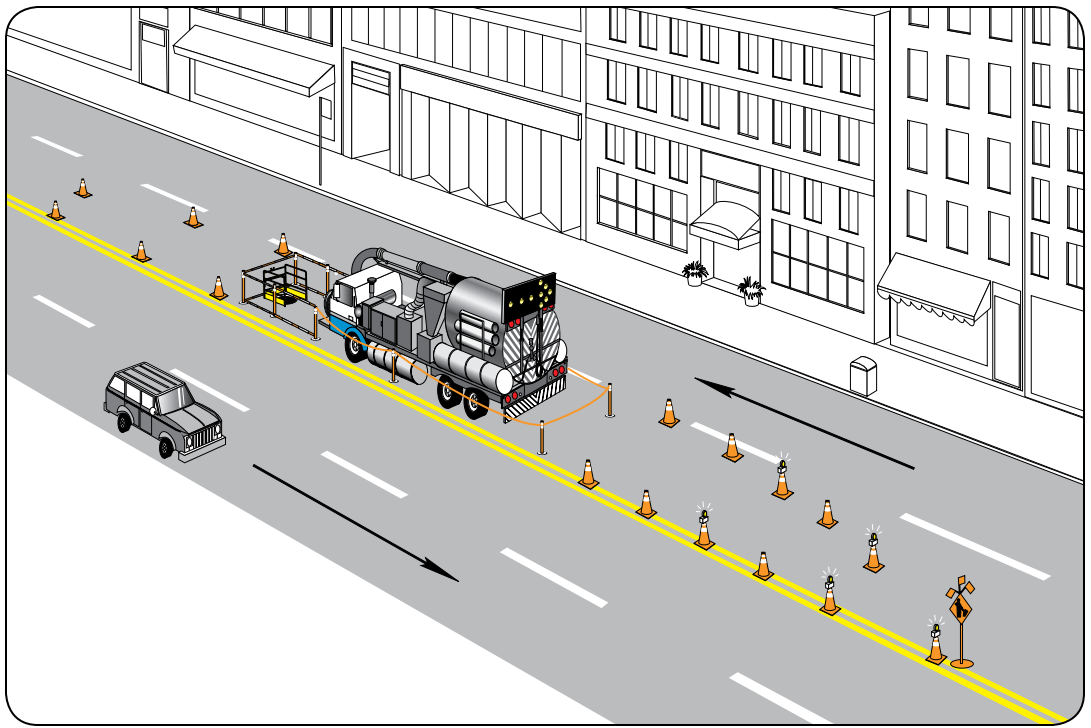
This configuration is generally applicable to comparable work areas with similar road conditions.

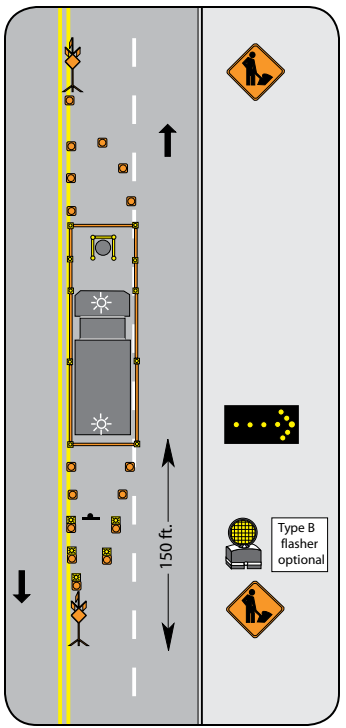
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- Place the advance-warning sign at the beginning of the tapered work zone for both sides of oncoming traffic.
- Place the "Lane Closed" sign to appear in plain view after the advance-warning sign for traffic traveling toward the one closed lane.
- Place the flashing-arrow panel, in the caution mode (no arrow) for traffic approaching on the opposite side of the double yellow line (optional).
- Place traffic cones so that the oncoming traffic is tapered away from the work area.
- Place traffic cones to ease the downstream traffic flow and maintain separation of traffic flowing in the opposite direction.
- Set up stanchions and boundary tape to extend completely around the flush operation. (Tape may be used when pedestrians have restricted access to the work area.)

Equipment

- 2 advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag trees and flags
- 28" or 36" traffic cones
- lane-closure sign (arrow board or flashing-arrow panel)
- flashing-arrow panel, in the caution mode (optional)
- stanchions and boundary tape
- Type B flashers (optional)
- manhole guardrail





Blueprint of work area

Setup for Tool Cart at an Intersection With Pedestrian Crosswalks

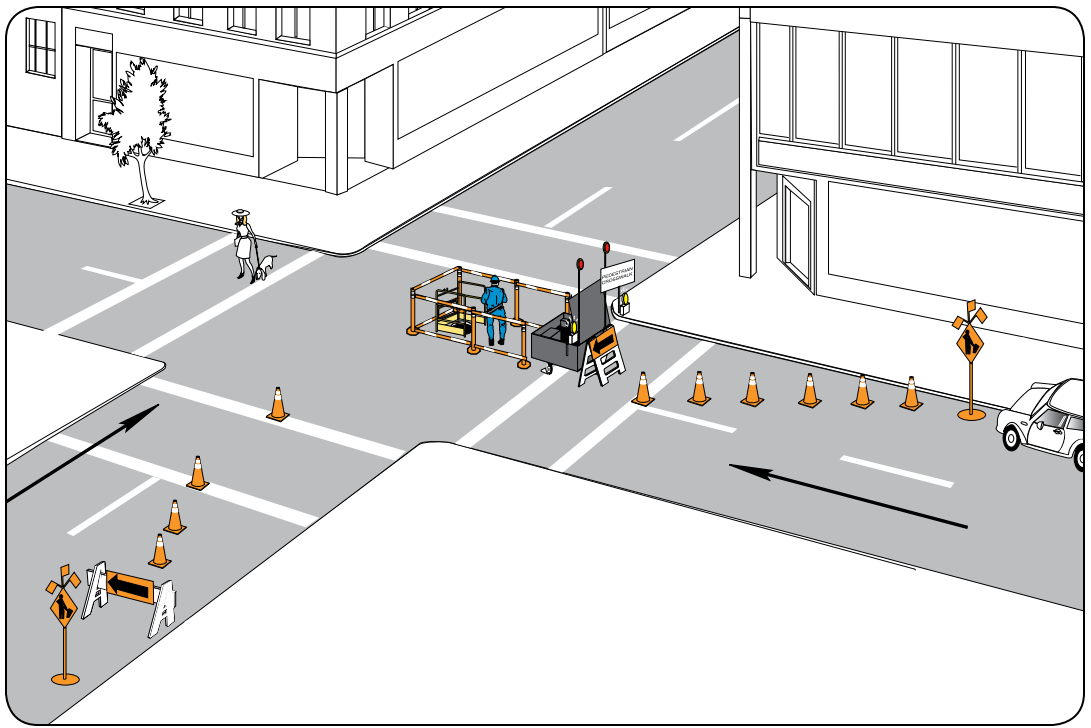
This configuration is generally applicable to comparable work areas with similar road conditions.

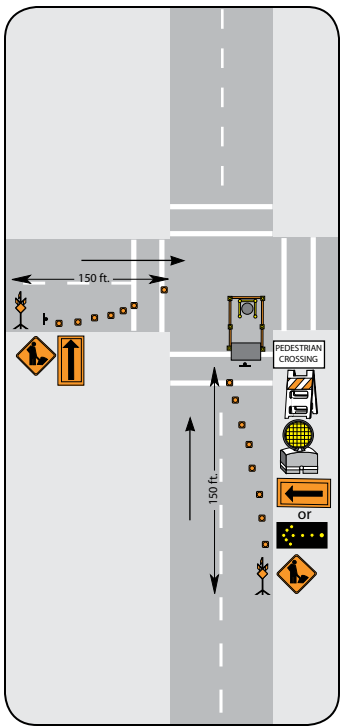
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- This work area is immediately preceded by a parking lane. Place one advance-warning sign in the parking lane and another advance-warning sign for traffic that is restricted to the left of the work area.
- Place the "Lane Closed" sign so that it appears in plain view after the advance-warning sign for traffic that is restricted to the left of the work area. ("Lane Closed" signs are not required for parking lanes.)
- Place traffic cones so that the traffic is tapered away from the work area for oncoming traffic. Maintain pedestrian access to crossings not affected by the work area.
- Maintain pedestrian safety from upstream traffic at all relocated crossings with placement of Type III barricades or with barricades equipped with a bottom rail at most 6 inches above street level and a top rail at least 36 inches high (see Protection of Pedestrians, page 17).
- Place Type B flashers on barricades at pedestrian crossings.
- Post the "Pedestrian Crossing" sign to redirect pedestrian traffic.
- Set up stanchions and boundary tape to extend around work areas. (Tape may be used when pedestrians have restricted access to the work area.)

Equipment

- 2 advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag trees and flags
- 28" or 36" traffic cones
- 1 lane-closure sign (arrow board or flashing-arrow panel)
- Type III barricades or barricades equipped with two rails
- stanchions and boundary tape
- 2 to 4 Type B flashers (required)
- "Pedestrian Crossing" sign (optional)
- manhole guardrail





Blueprint of work area

Setup for Cable Trucks at an Intersection With Pedestrian Crosswalks

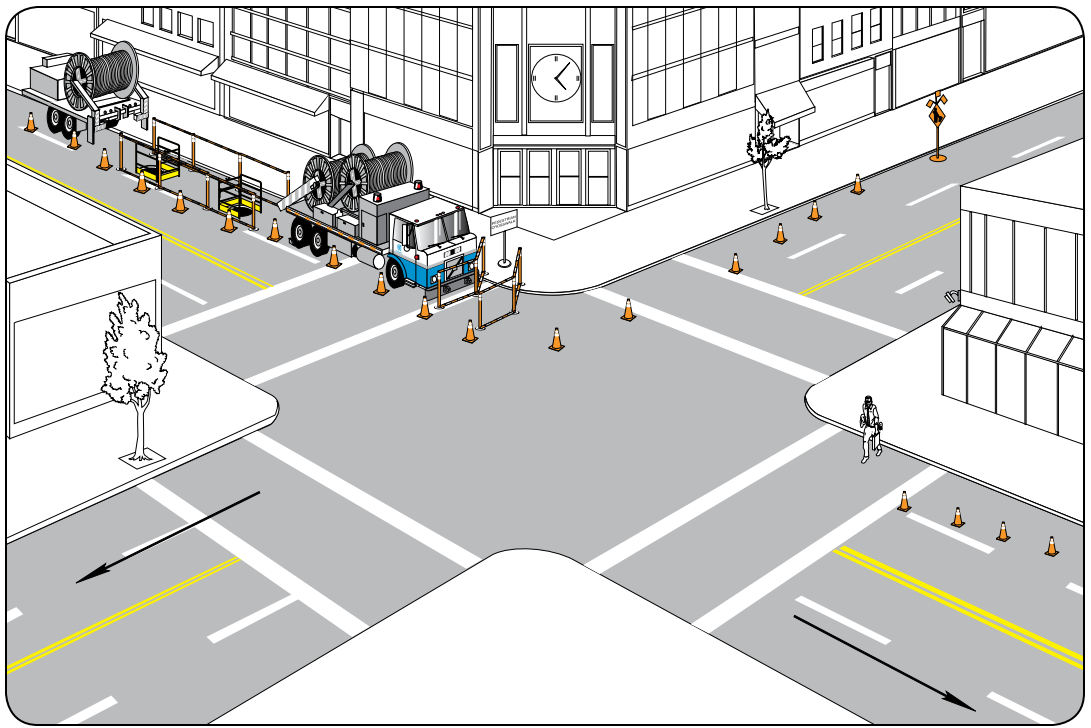
This configuration is generally applicable to comparable work areas with similar road conditions.

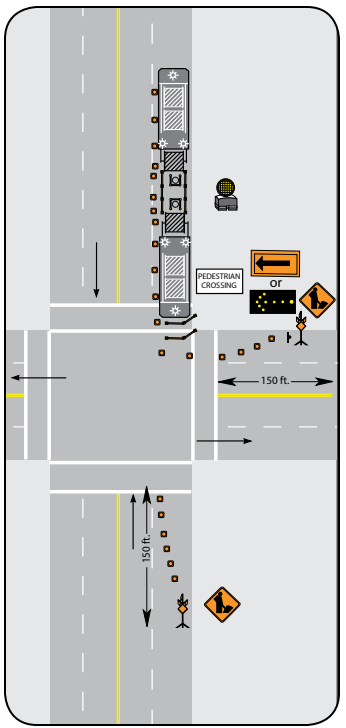
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- Place the advance-warning signs on the far side of the intersection for traffic traveling upstream and for traffic that is restricted from turning into that lane.
- Place the "Lane Closed" sign to appear in plain view after the advance-warning sign for traffic traveling toward the one closed lane.
- Place traffic cones so that the traffic is tapered away from the work area for oncoming traffic.
- Maintain pedestrian access to crossings not affected by the work area.
- Maintain pedestrian safety from upstream traffic at all relocated crossings with placement of Type III barricades or with barricades equipped with a bottom rail at most 6 inches above street level and a top rail at least 36 inches high (see Protection of Pedestrians, page 17).
- Place Type B flashers on barricades at pedestrian crossings.
- Post the "Pedestrian Crossing" sign to redirect pedestrian traffic.
- Set up stanchions and boundary tape to extend around work areas. (Tape may be used when pedestrians have restricted access to the work area.)

Equipment

- 2 advance warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag tress and flags
- 28" or 36" traffic cones
- 2 lane-closure signs (arrow board or flashing-arrow panel)
- Type III barricades or barricades equipped with two rails
- stanchions and boundary tape
- 2 to 4 Type B flashers (required)
- "Pedestrian Crossing" sign (optional)
- manhole guardrail and boundary tape
- "Sidewalk Closed" signage





Blueprint of work area

Job setup on sidewalk

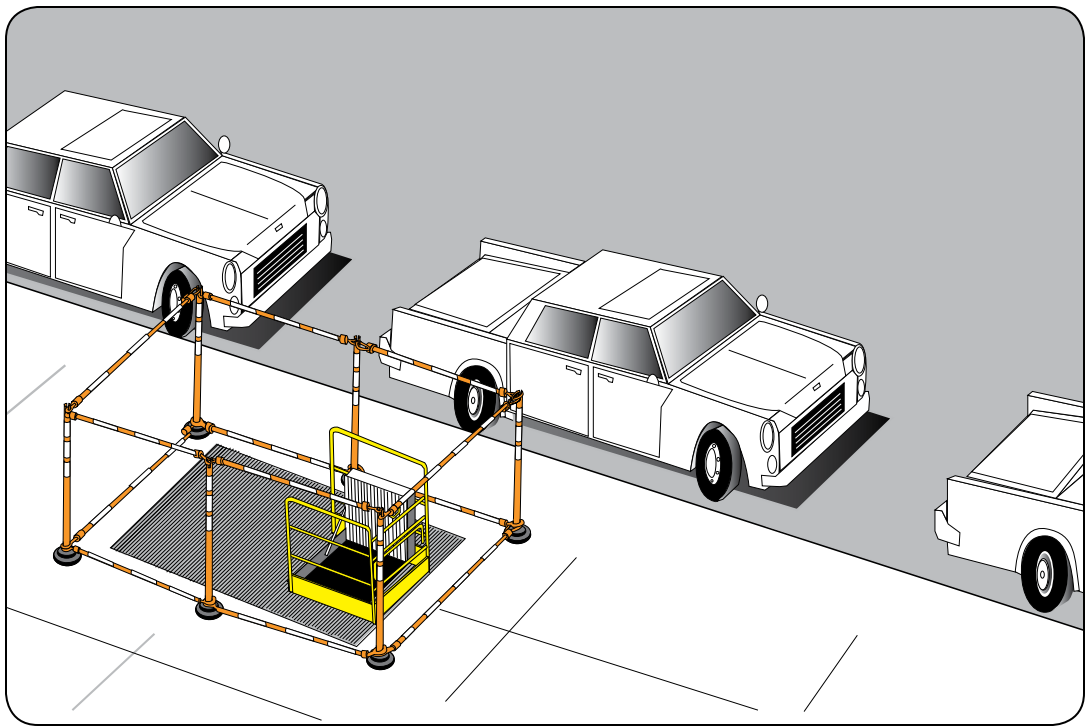
This configuration is generally applicable to comparable work areas with similar sidewalk conditions.

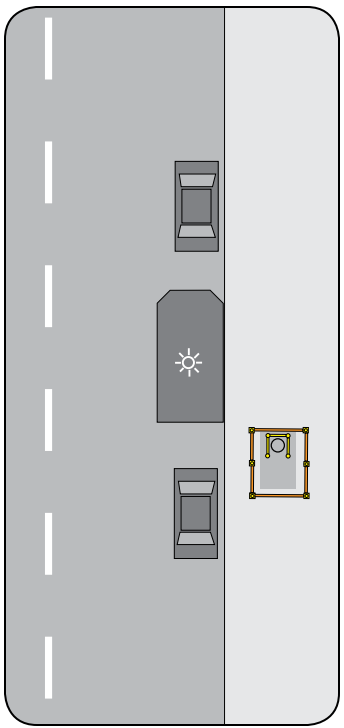
Setup

- Secure area with telescoping rail/stanchion combination.
- Two telescoping rails must be used per section, one on the bottom and the other hung on the top of the stanchions.
- Place cones around setup to give advance warning to pedestrians.
- Open underground structure covers.
- Utilize manhole guardrails, when feasible.

Equipment

- 28" or 36" traffic cones
- stanchions and telescoping rails
- manhole guardrail





Blueprint of work area

Closure/redirection of bike lane

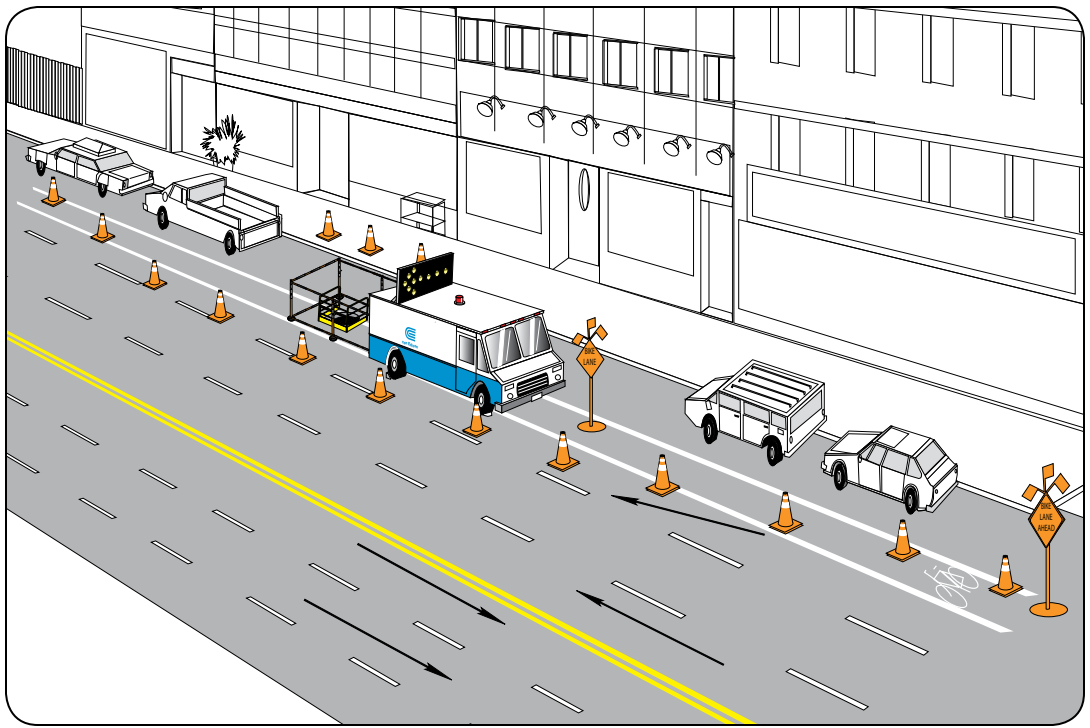
This configuration is generally applicable to comparable work areas with similar road conditions.

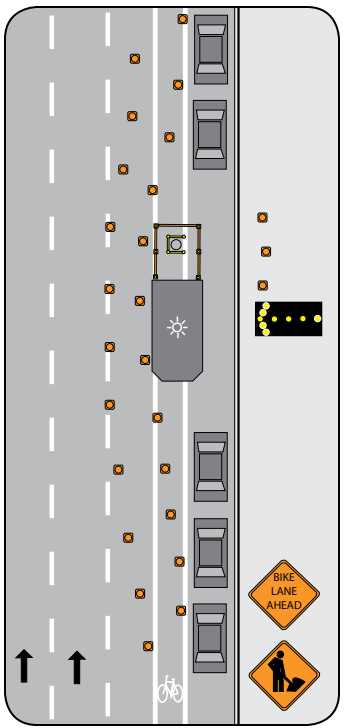
Setup

- Assign two flaggers while the work area is being prepared.
- Place the advance-warning signs on the far side of the intersection for traffic traveling upstream and for traffic that is restricted from turning into that lane.
- Place the "Bike Lane Ahead" sign to appear in plain view to alert all bicyclists to the redirected bike lane.
- Place traffic cones so that the traffic is tapered away from the work area for oncoming traffic, while maintaining the bike lane.
- Maintain pedestrian access to crossings not affected by the work area.
- Set up stanchions with telescoping rails to extend around work areas. (Tape may be used when pedestrians have restricted access to the work area.)

Equipment

- advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- flag trees and flags
- 28" or 36" traffic cones
- 2 lane-closure signs (arrow board or flashing-arrow panel)
- stanchions and telescoping rails
- manhole guardrail and boundary tape





Blueprint of work area

Diverting traffic into an oncoming lane

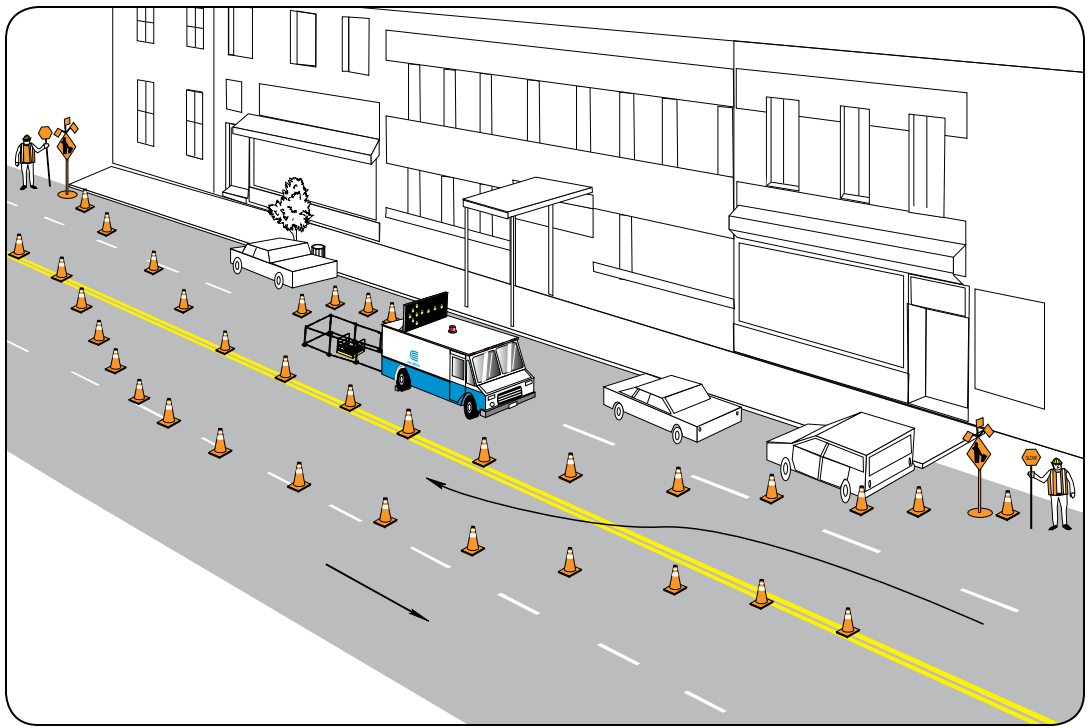
This configuration is generally applicable to comparable work areas with similar road conditions.

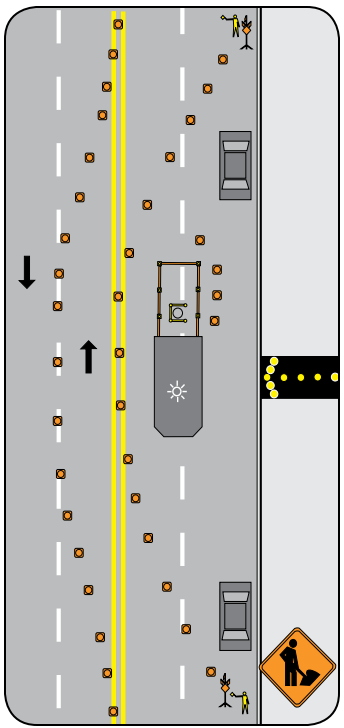
Setup

- Assign two flaggers while the work area is being prepared.
- Place the advance-warning sign at the beginning of both ends of the tapered work zone for both sides of oncoming traffic.
- Place the "Lane Closed" sign to appear in plain view after the advance-warning signs for traffic traveling toward the one closed lane.
- Place the flashing-arrow panel for traffic approaching on both sides of the double yellow line, directing the the traffic away from the work area.
- Place traffic cones so that the oncoming traffic is tapered away from the work area.
- Place traffic cones to ease the downstream traffic flow and maintain separation of traffic flowing in the opposite direction.
- Set up stanchions with telescoping rails around work set up behind the vehicle.

Equipment

- 2 advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag trees and flags
- 28" or 36" traffic cones
- 2 lane-closure signs (arrow board or flashing-arrow panel), whichmust direct traffic coming from both directions
- stanchions and telescoping rails around work area
- manhole guardrail and boundary tape





Blueprint of work area

Setup for Excavations in Sidewalk Area Re-directing Pedestrian Traffic

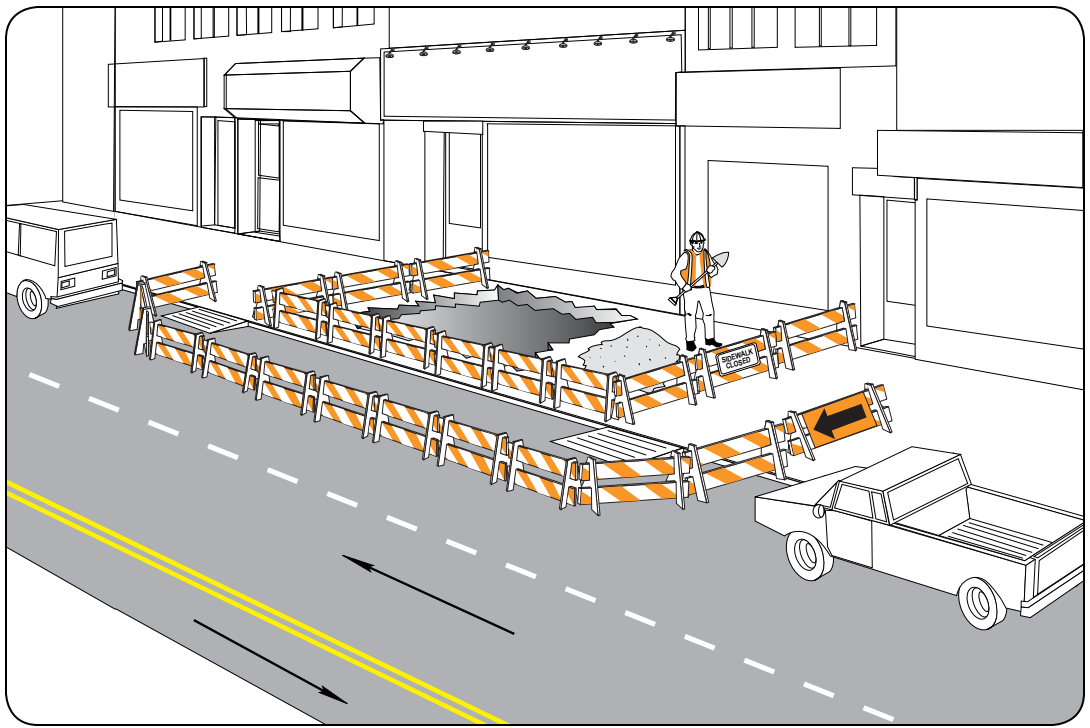
This configuration is generally applicable to comparable work areas with similar road conditions.

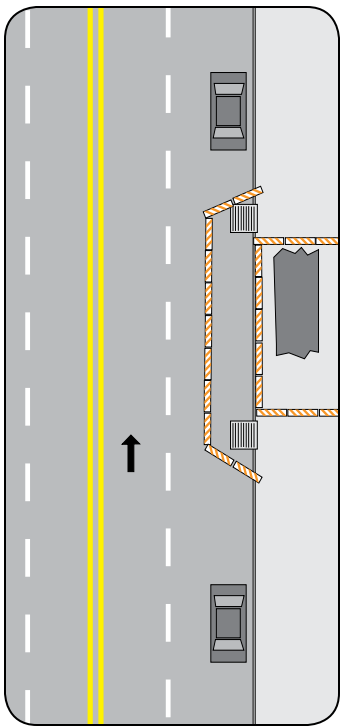
Setup

- Where necessary, assign a flagger while the work area is being prepared.
- Place sturdy barricades around the excavation work area
- Filled Pel bags should be placed in work area
- Post "Sidewalk Closed" sign near setup (optional)
- Post "Sidewalk Closed Use Other Side" sign on both sides of work area, at the nearest corners, to restrict pedestrian traffic on the work side of the street.

Equipment

- Type III barricades or barricade equipped with 2 rails
- Directional-arrow signs
- Sidewalk closed signs





Blueprint of work area

Setup for Excavation Near Curbside in Vehicle Parking Lanes

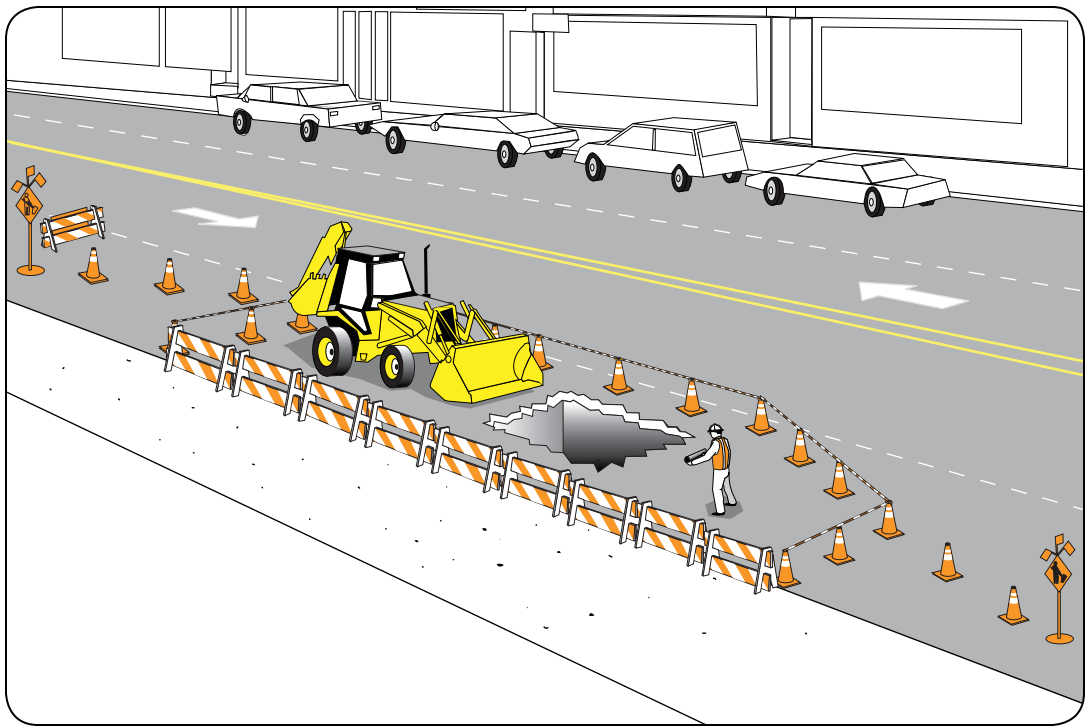
This configuration is generally applicable to comparable work areas with similar road conditions.

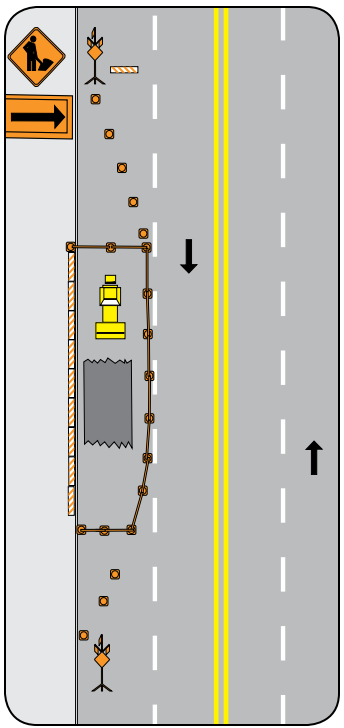
Setup

- Place sturdy barricades around the excavation work area
- Cones with telescoping rails may be used around work area closed to vehicle traffic (optional)
- Lane-closure sign (arrow board or flashing-arrow panel)
- Type B flashers (optional)
- Advance–warning sign at the beginning of the tapered work zone
- Filled Pel bags should be placed inside the work area nearest barricades that are most at risk of impact from oncoming traffic.

Equipment

- Type III barricades or barricade equipped with 2 rails
- Directional-arrow signs
- 28"-36" traffic cones
- Advance–warning sign
- Telescoping rails





Blueprint of work area

Setup for Excavations Near Intersections and Crosswalks While Redirecting Pedestrians

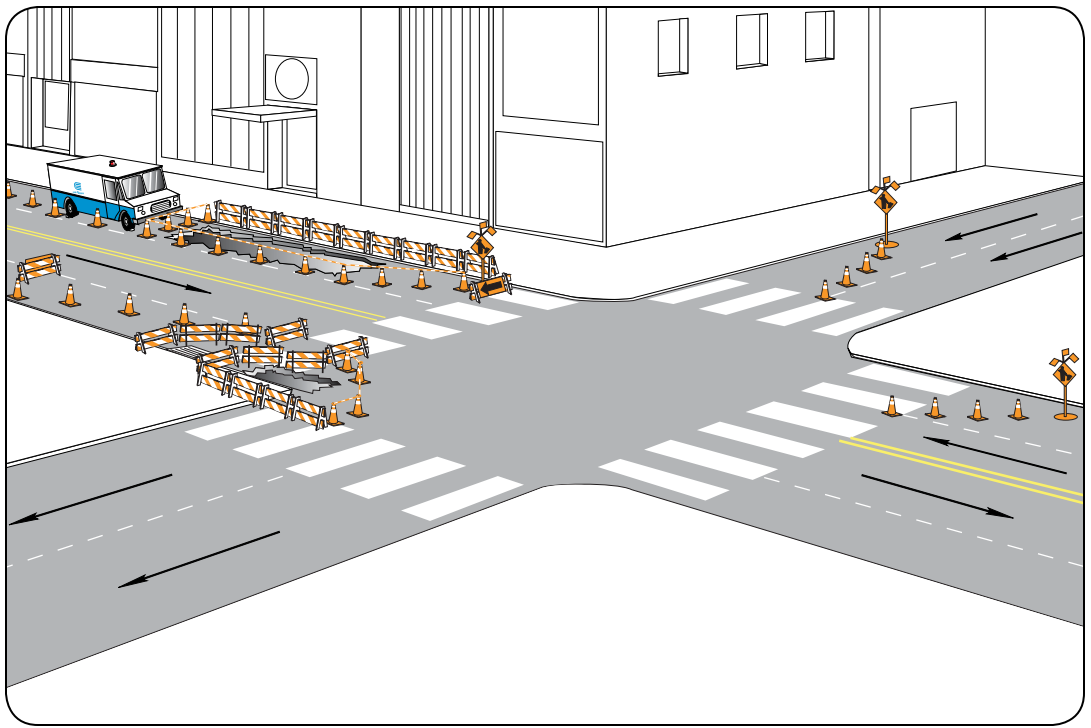
This configuration is generally applicable to comparable work areas with similar road conditions.

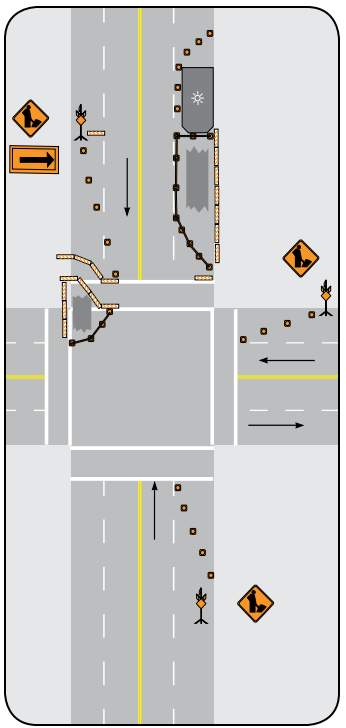
Setup

- Place sturdy type barricades around the excavation work area
- Post the "Pedestrian Crossing" sign to redirect pedestrian traffic
- Place Type B flashers on barricades at pedestrian crossing
- Filled Pel bags should be placed inside the work area nearest barricades that are most at risk of impact from oncoming traffic.
- Maintain pedestrian safety from upstream traffic at all relocated crossings with placement of Type III barricades or barricades equipped with a bottom rail, no more than 6 inches above street level, and a top rail at least 36 inches high (see Protection of Pedestrians, page 17).

Equipment

- Advance–warning sign
- 2 advance-warning signs ("Digger," "Work Area Ahead," or "Utility Work Ahead")
- 2 flag trees and flags
- 28" or 36" traffic cones
- 1 lane-closure sign (arrow board or flashing-arrow panel)
- Type III barricades or barricades equipped with two rails
- Stanchions telescoping rails
- 2 to 4 Type B flashers (required)
- "Pedestrian Crossing" sign (optional)



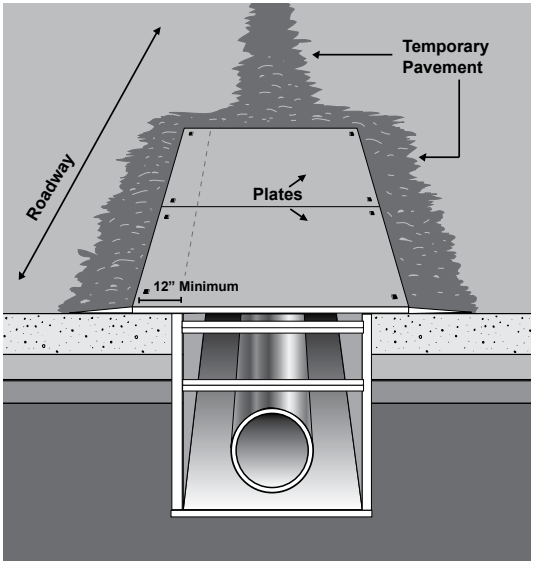


Blueprint of work area

Excavation Operations

Where operations require open trenches, and pedestrian or vehicular traffic requires maintaining passageways or traffic lanes, plates should be used.

- Plates must be large enough to span the opening, must have a minimum bearing area 1 foot wide on each side of the trench, and must be adequate to carry the load.
- Trench walls and adjacent soil must be sufficiently stable for the use of plates.
- Area at the edge of plates must be tapered to provide smooth riding and safer walking conditions. ***It is important to avoid pedestrian tripping hazards or plate movement.***
- Plates must be fastened with spikes in pre-drilled holes or spiked securely from the side so that they will not move off of the openings.
- For wide trenches or where unstable soil conditions exist, consideration should be given to construction of temporary bridges.

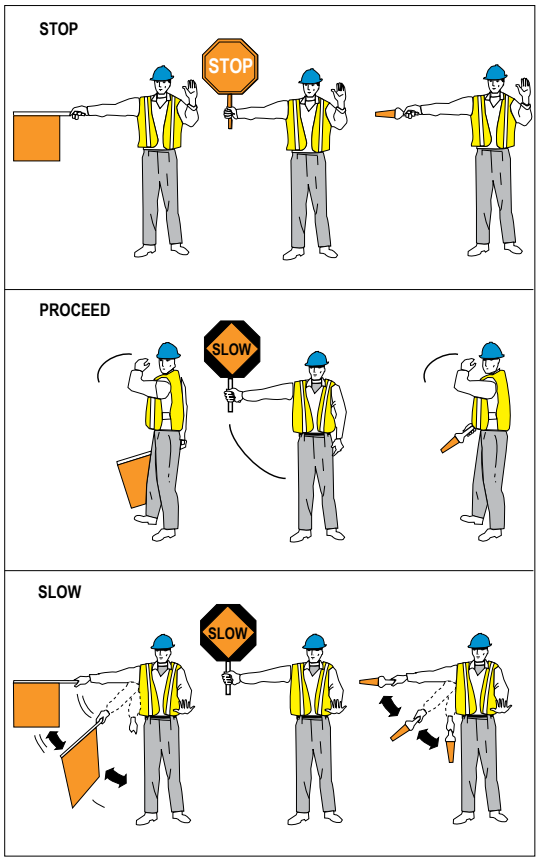


Flagger at Work Sites

A flagger will be required for certain work operations where the traffic must be stopped or controlled. Flagging is a form of communication with the motorist. The language of flagging consists of only three signals: STOP, SLOW, and PROCEED.

When traffic in both directions must use a single lane for a limited distance, movements from each end must be coordinated. Provisions should be made for alternate one-way movement through the constricted section via methods such as flagger control, a flag transfer, a pilot car, traffic-control signals, or stop, or yield control. Control points at each end should be chosen to permit easy passing of opposing lanes of vehicles. If traffic on the affected one-lane roadway is not visible from one end to the other, then flagging procedures, a pilot car with a flagger, or a traffic-control signal should be used to control opposing traffic flows.

- Flaggers must wear approved safety apparel available in Class & Stock that is compliant with American National Standard for High-Visibility Apparel, ANSI/ISEA 107-2004, Class 2 or 3 risk exposure.
- The flagger must be clearly visible at all times to approaching traffic for a distance sufficient to permit proper response by the motorist to the flagger's instructions and to permit traffic to reduce speed before entering the work zone.
- The "Flagger Ahead" sign must go before the flagger station, and the flagging station should be well ahead of the work area.



- The flagger station should be located at the start of the taper.
- The flagger should always face the oncoming traffic and make eye contact with the lead motorist.
- The flagger should stand alone, never permitting a group of workers to congregate around the flagger station.
- Flaggers will focus on the task at hand, directing traffic, and shall not be distracted by other factors, including, but not limited to, personal cell phones, electronic devices, and the like.
- When the situation requires the use of flags, only approved flags shall be used.
- When two flaggers are used, one flagger will be designated as the lead flagger.
- When two flagging stations are not visible to one another, radio communication is required or a third flagger may be stationed at a point visible in between each flagging station.
- If the flagging stations are too far apart for verbal communications, the flag transfer method of one-lane, two-way traffic control may be used. In this method, the driver of the last vehicle proceeding into the one-lane section is given a red flag and instructed to deliver it to the flagger at the other end. The opposite flagger, upon receipt of the flag, then knows that it is reasonably safe to allow traffic to move in the other direction.
- Flaggers must be illuminated at night.
- Floodlights must not produce a disabling glare condition for approaching road users, flaggers, or workers.

THE WAY WE WORK IS SAFELY

February 2011

ATTACHMENT G

Con Edison - Work Area Protection dated November 2009

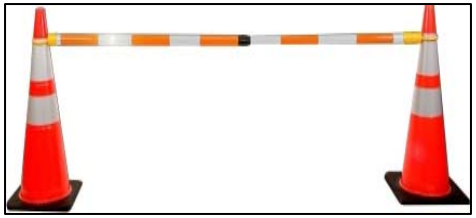
Work Area Protection

11/20/09

Temporary Pedestrian and Traffic Control Device

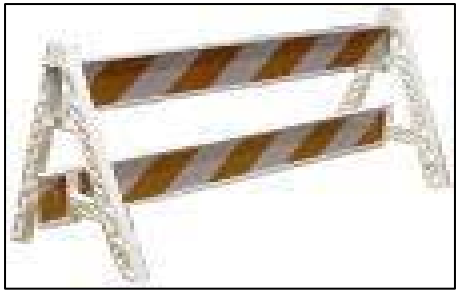
28” Traffic Cone

Used to identify a work zone and to direct
vehicular traffic away from the work zone and
to redirect vehicular back into their normal path of traffic.



28” Cone and Rail System

Cone and Rail system is to be used to delineate
Work zones exposed to vehicular traffic

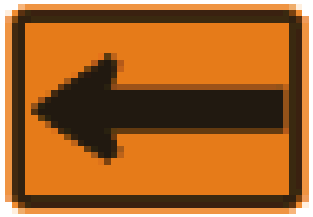


Two Rail Crashworthy TYPE II Barricade

Barricade used to establish a barrier on the pedestrian side
of a work zone, including crosswalks.

Advanced Warning Signs

WORK AHEAD SIGN
Required on every street construction project



ARROW BOARD
Required on every street construction project

FLAGGER AHEAD SIGN
Required at every construction site that is utilizing a Flagger to direct traffic

Lighting must be provide at night for these signs

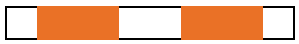
The next five slides will provide you with a minimum work area protection standard for a number of construction sites that could be identified in the field.

Obviously conditions could change and the Foreman should evaluate each area before work area is established. If an unusual condition exists the Foreman should reach out to the contractor safety specialist for guidance.

Each contractor should review the MUTCD and understand the different spacing required for sign placement and traffic control devices. The following slides are not to scale and should only be used as a training aid to assist workers are how a proper set should look

---

Symbols used in the following slides to represent applicable traffic control devices

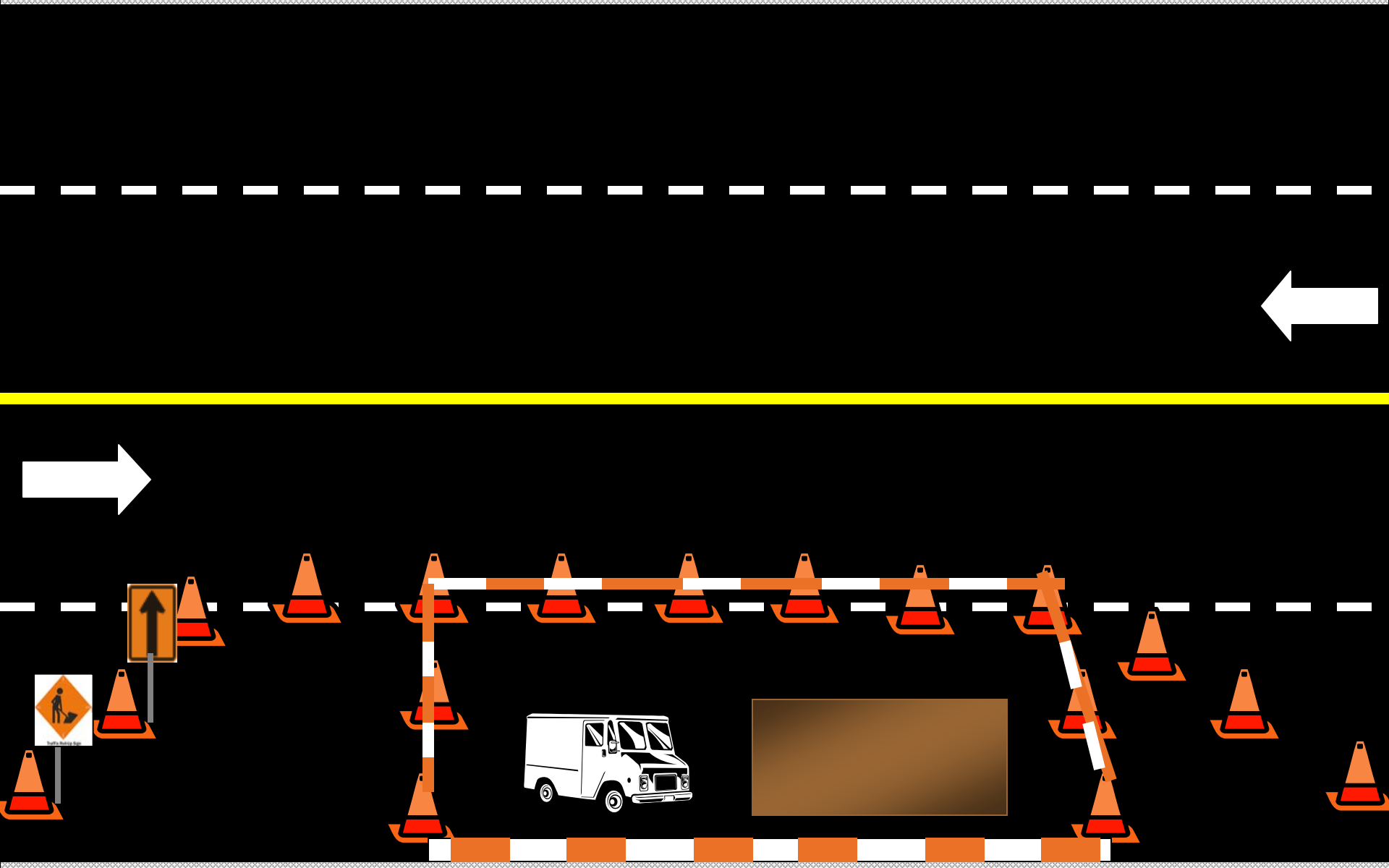


Symbol for a Type II **Crashworthy** barricade

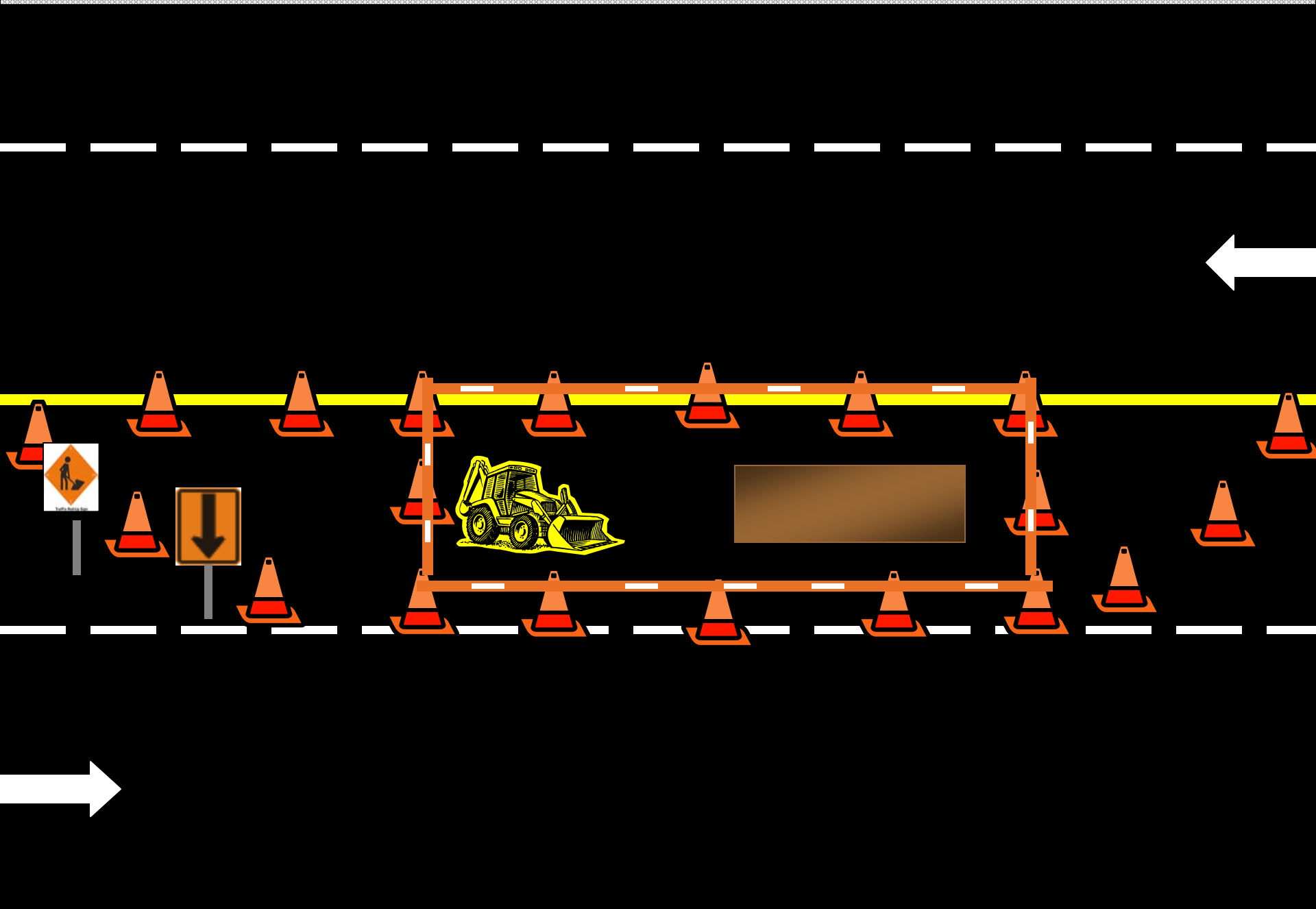
Symbol for a 28” Traffic Cone

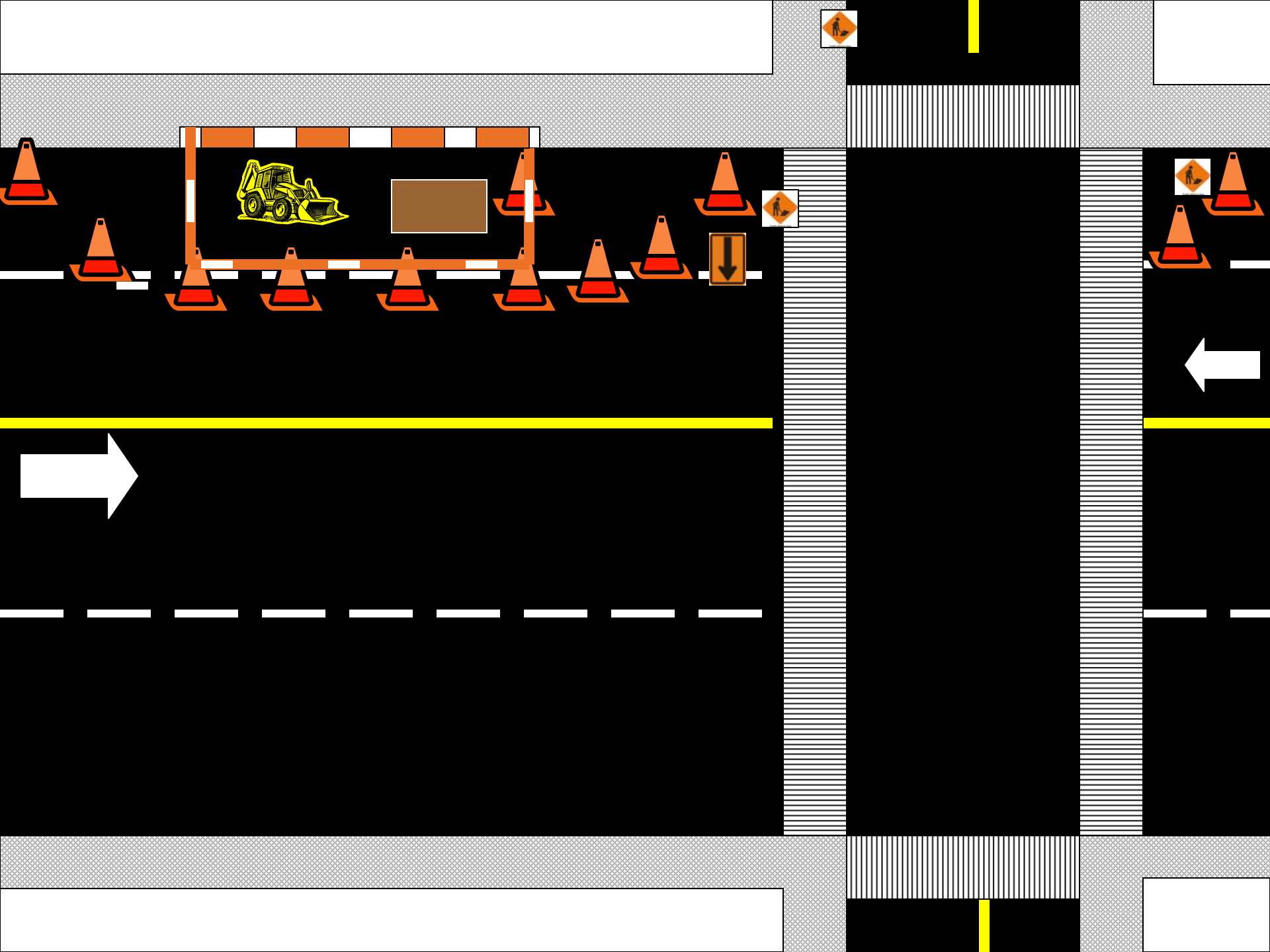
TYPE II Barricade (2 Rails)

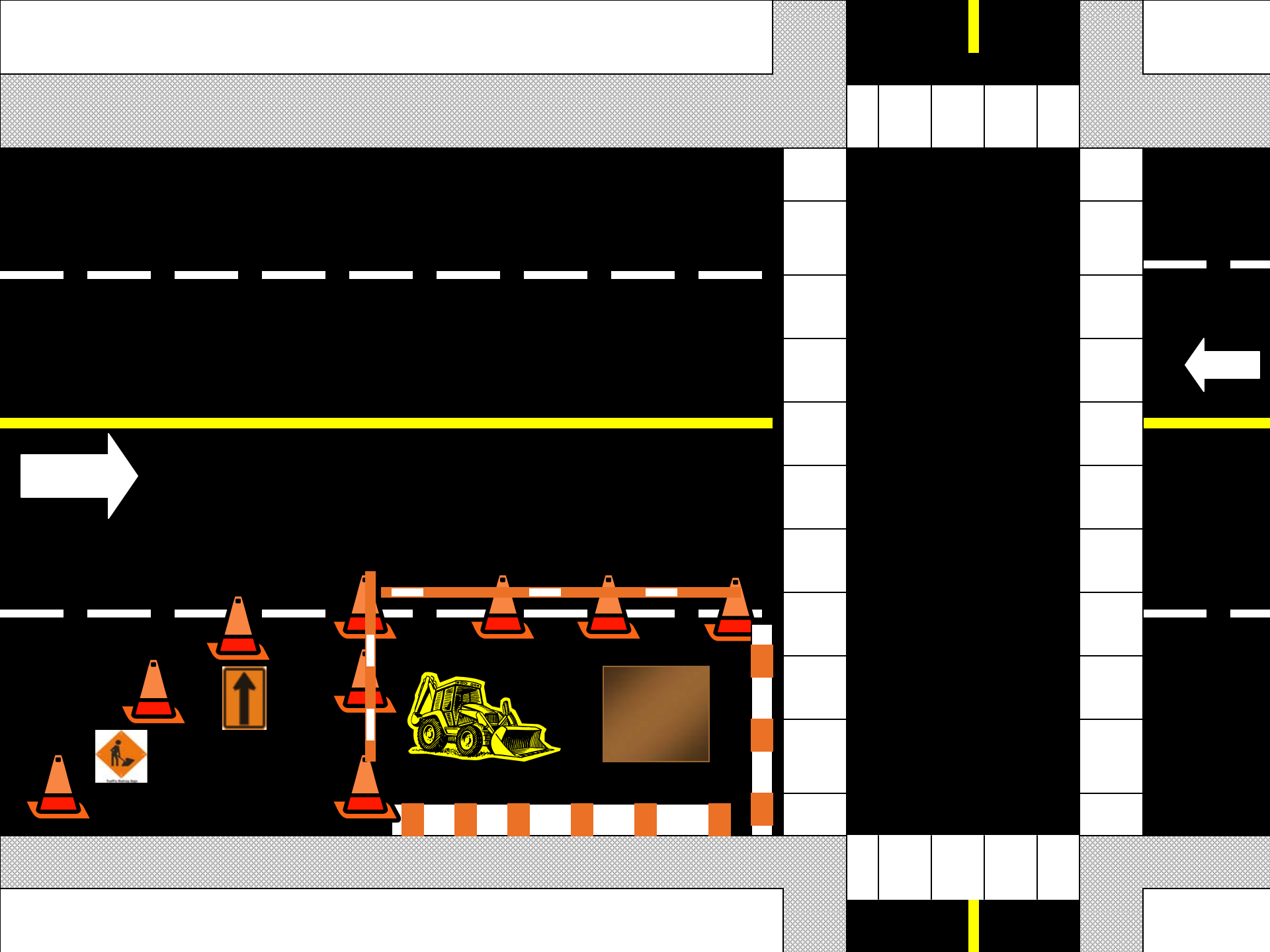
28” Cone and Rail



FLAGGER could be used to assist and if so a sign is required.







ATTACHMENT H

Pre-Entry Briefing Attendance Sheet

AECOM HEALTH AND SAFETY PLAN PRE-ENTRY BRIEFING ATTENDANCE SHEET

RCRA Facility Investigation (RFI) Activities

Consolidated Edison Co. of New York, Inc.

Astoria, New York Facility

Briefing Conducted By: _____

Date Performed: _____

Topics Discussed: _____

_____

_____

_____

Printed Name	Signature	Representing

ATTACHMENT I

Supervisor’s Report of Incident Form

Supervisor's Report of Incident

1. Seek immediate medical attention if necessary.
2. Employee must report **all** incidents to their supervisor **immediately**.
3. Supervisor calls the Incident, Injury and Near Miss Reporting Line at **(800) 348-5046**.

Section 1 - Organization Information

Region: ☐West ☐ Midwest ☐ Southwest/Mountain ☐ Southeast ☐ Mid-Atlantic ☐ Northeast	District:	Section/Dept Number:
Business Line: ☐ Infrastructure-Water ☐ Infrastructure-Transportation ☐ Infrastructure-Energy & Power ☐ PDD-Facilities ☐ PDD-Design ☐ Environmental		Office Name:
Client Name:		Project Number:
Project Name:		

Section 2 - Type of Incident (SRI Sections to be Completed)

☐ Injury/ illness (Sections 3, 4, and 7)	☐ Vehicle Incident (Sections 3, 4, 5, and 7)	☐ Property Damage (Sections 3, 4, 6 and 7)	☐Environmental Spill/Release (Sections 3, 4, and 7)
☐ Regulatory Inspection or Notification: (Sections 3, 4,7)			☐ Other (describe)

Section 3 – Contact/Incident Information

<table>
<tr><td colspan="2">Employee/Claimant Name:</td><td>Employee Job Title:</td><td>☐ Full-Time Employee
☐ Subcontractor/Subconsultant
☐ Temp Agency Employee
☐ Part-Time Employee
☐ Third Party Employee</td></tr>
<tr><td>Work Phone:</td><td>Cell Phone:</td><td>Home Phone:</td><td>Employee Number:</td></tr>
<tr><td colspan="2">Date/Time of Incident:</td><td colspan="2">Date/Time Reported to Supervisor:</td></tr>
<tr><td colspan="2">Street Address of Incident or approximately:</td><td>City:</td><td>State/Zip:</td></tr>
<tr><td colspan="2">Body Part Injured:</td><td colspan="2">Type of Treatment: Medical/hospital or doctor ☐
First Aid Only ☐</td></tr>
<tr><td colspan="4">Medical Facility Contact Info:
(Name, Address, Phone)</td></tr>
</table>

Section 4 - Descriptions of Incident *(employee, supervisor and witness statements)*

Employee Description of Incident:	
(use additional paper if necessary)	
Employee Signature:	**Date and Time:**

Supervisor Description of Incident: (*Supervisor signs in Section 7*)

(*use additional paper if necessary*)

Witness Name :	Witness Address:	Witness Phone No.:
Witness Description of the Incident: (*use additional paper if necessary*)		
Witness Signature:		***Date and time:***

Section 5 - Vehicle Incident Information *(fill out for motor vehicle incidents only)*

5a - AECOM Driver Name:		Driver's License #:	State Issued:	Expiration Date:	
Vehicle Year:	Make:	Model:	Color:	License Plate:	State:
VIN Number:					

AECOM Vehicle was:	☐ AECOM Owned	☐ Rented	**Who was involved?**	☐ AECOM Vehicle*(Section 5a)*	☐ Pedestrian
	☐ Leased	☐ Personal Vehicle		☐ Another Vehicle*(Section 5b)*	☐ Property

Use of Vehicle at Time of Incident:	Vehicle Type:
☐ Office Visit ☐ Site Visit ☐ Client Meetings ☐ Field Work ☐ Personal ☐ Other_____	☐ Commercial Motor Vehicle ☐ Non Commercial Motor Vehicle

5b - Name of Other Driver:	Address:	City:	State/Zip:
Work Phone:	Cell Phone:		
Date of Birth:	Drivers License #:	State Issued:	Expiration Date:

Vehicle Year:	Make:	Model:	Color:	License Plate:	State:
VIN Number, Insurance Company Name, Insurance Policy Number:					

If *Vehicle Owner* is different from driver then complete owner's contact information	**Owner Name:**	
	Address, City, State, Zip:	
	Work Phone:	Cell Phone:
Authorities contacted? ☐ Yes ☐ No	If so, who responded?	
Citations Issued? ☐ Yes ☐ No	Type of Citation:	Person Cited:

Section 6 - General Liability (*Fill out for property damage only*)

Description of damaged property:	
Where can the property be seen?	
Property Owner Name:	
Address, City, State, Zip:	
Work Phone:	Cell Phone:

Section 7- Signatures

Supervisor

Print Name:	Signature:	Date:	Telephone:

Office/Location Manager

Print Name:	Signature:	Date:	Telephone:

Regional SH&E Manager

Print Name:	Signature:	Date:	Telephone:
Comments:			

Attention: This form must be completed and forward to the Regional SH&E Manager within one (1) business day following the occurrence of the incident.

ATTACHMENT J

Con Edison - Corporate Environmental, Health and Safety Procedure dated January 2010

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

MANAGEMENT OF CHANGE

CEHSP A11.03 – Environment, Health And Safety Considerations In Planning and Design of Project Work

(CEP converted to CEHSP on 07/16/2008)
Revision 15: 05/18/2009 Effective Date: 07/01/2009

Contents

1.0 PURPOSE

IT IS THE POLICY OF CON EDISON TO COMPLY WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS AND CORPORATE POLICIES PERTAINING TO ENVIRONMENTAL, HEALTH, AND SAFETY CONSIDERATIONS IN PLANNING AND DESIGN. The purpose of this procedure is to:

- Ensure that environmental, health, and safety (EH&S) considerations are identified and incorporated into the planning and design of projects in order to adhere to regulatory requirements and to achieve environmental, health and safety excellence, and
- Consider alternate design considerations to promote resource conservation, reduce ***risk***, and improve project management.

2.0 APPLICABILITY

This Corporate Environmental, Health and Safety Procedure (CEHSP) applies to all Con Edison employees and third party contractors/developers working on present or future Con Edison property for the planning and design of ***project work*** (unique in nature), which typically includes engineering involvement and design.

A project is defined as a sequence of tasks with a specific beginning and end, including work to be performed either on or off Company property. Work that is solely performed under ***maintenance and service activities*** is not considered a project and is not covered by this

procedure. Maintenance and service activities may include snow removal, janitorial services, equipment calibration, asbestos surveys, non-destructive testing of welds, preventative maintenance, and inspections.

Planning for ***recurring work*** is not covered by this CEHSP but is instead conducted per CEHSP A11.04 *Environment, Health and Safety Considerations in the Planning and Design of Recurring Work*. The ***user organization*** must determine whether CEHSP A11.03 or CEHSP A11.04 applies to a particular activity. However, all work (with the exception of maintenance and service activities described above) must be planned according to either CEHSP A11.03 *or* CEHSP A11.04. (Refer to Section 5.0 Definitions.)

Planning for emergency work must take place during job briefings.

Attachments 1 through 5 are included to facilitate implementation of this CEHSP.

3.0 INTRODUCTION

This CEHSP addresses project-planning activities during the planning and design of a project up to the start date of the project. The planning and design of projects must be conducted with input from all relevant parties as defined by the ***Responsible Person***, including the user organization, engineering, the local ***EH&S representative***, the **facility *custodian***, Construction Services, and Corporate EH&S, as applicable. A checklist of EH&S considerations (***CEHSP A11.03 Checklist***) must be used as a reference tool for use in addressing EH&S issues during project design (see Attachment 5 of this CEHSP).

All applicable sections of the CEHSP A11.03 Checklist must be used as a planning tool for project work. CEHSP A11.03 reviews must be conducted at the project development and funding stage of a project as well as during the engineering design phase of a project. To ensure that all checklist items are addressed appropriately and that EH&S considerations are included in the project scope and budget, the relevant parties (as defined by the responsible person) must review the design specifications before they are finalized.

4.0 COMPLIANCE REQUIREMENTS

4.1 Responsible Person Responsibilities

The ***Responsible Person*** for each project must oversee the CEHSP A11.03 planning process. Specifically, the Responsible Person is required to:

- Conduct EH&S project planning reviews during the project development/funding and engineering/design phases of a project. The CEHSP A11.03 Checklist must be completed during these reviews.
- Determine who the signatories are and obtain approval of the completed CEHSP A11.03 Checklist (see Attachment 3).
- Include the completed CEHSP A11.03 Checklist to Construction, as appropriate.
- To the maximum extent possible, ensure that all EH&S concerns, resource conservation opportunities, and risk reduction activities are incorporated into the project design.

OPTIONAL: Identify the environmental benefits of the project, and if applicable complete the Environmental Benefits Evaluation (see Attachment 4). Keep the completed Environmental Benefits Evaluation with the CEHSP A11.03 Checklist and send a copy to the Corporate EH&S Resource Conservation Coordinator.

- If the project scope ***changes*** significantly after the CEHSP A11.03 Checklist is approved, the CEHSP A11.03 Checklist must be re-evaluated. Any necessary revisions must be included in the final planning and design package.

- For project planning approvals (see Attachment 3) that exceed two years from the date of the final sign-off of the CEHSP A11.03 Checklist, the CEHSP A11.03 Checklist must be evaluated and re-approved, if necessary, to accommodate changes that may have occurred in the year preceding the project start date. If a new Responsible Person is assigned to the project after the checklist has been signed off on and the engineering package has not yet been released, the new Responsible Person is required to review and sign the checklist.

Each user organization or Responsible Person must maintain a copy of the approved CEHSP A11.03 Checklist in the project file.

4.2 CEHSP A11.03 Checklist Completion

The user must complete a review of EH&S Considerations in Design using the CEHSP A11.03 Checklist as described in the flowchart in Attachment 1.

When completing the CEHSP A11.03 Checklist, each Applicability question must be answered after consulting the resources described in the checklist. If the question is applicable, the "Actions Taken" column must be completed explaining how the issue will be addressed.

Note: Sections of the checklist that do not apply to the final design may be eliminated from the final completed CEHSP A11.03 Checklist. In addition, operating groups may add business-specific items to the CEHSP A11.03 Checklist to fit to their needs.

Alternatives in the design of a project must be considered to improve resource conservation, minimize EH&S risk, and ensure compliance with environmental or safety requirements.

See the EH&S Project Flowchart (Attachment 1) for compliance requirements details. A Planning Process Guide has also been included as a reference to assist user organizations with implementation of this procedure (Attachment 2).

5.0 DEFINITIONS

CEHSP A11.03 Checklist: The detailed environmental, health, and safety considerations planning document (see Attachment 5).

Change: Any modification that may affect environment, health, or safety elements.

Custodian: The organization responsible for the facility.

EH&S Representative: An EH&S Manager, Safety Administrator, or other department EH&S staff member.

Facility: Any property or asset owned or leased by Con Edison.

Maintenance and service activities: Maintenance and service activities may include, but are not limited to, snow removal, janitorial services, equipment calibration, asbestos surveys, non-destructive testing of welds, preventative maintenance, and inspections.

Project Work: Unique jobs requiring engineering support that result in a modification to a system, structure or component, that typically requires multiple technical disciplines or work groups to complete:.

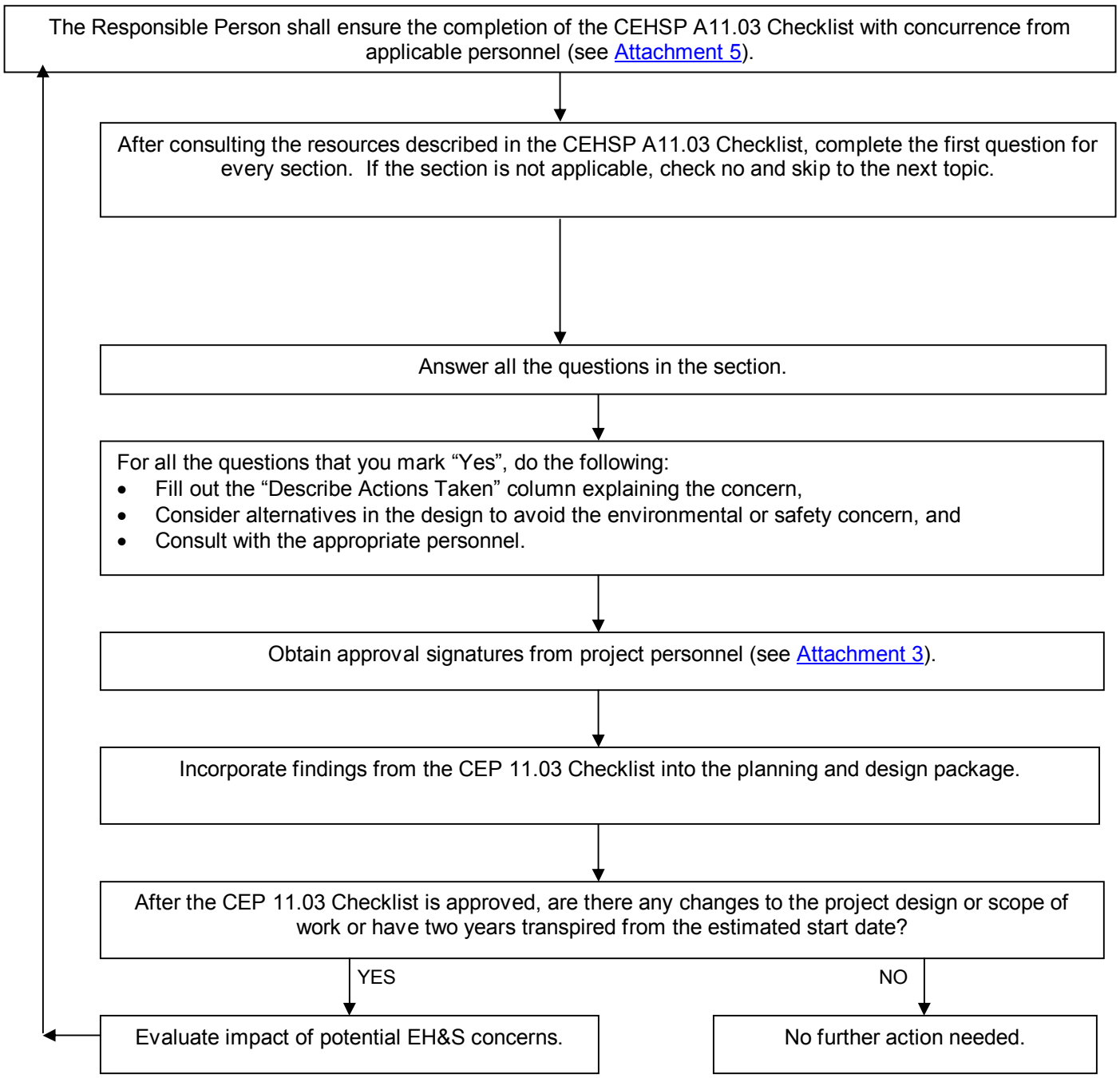
Recurring Work: Installation and repair activities performed on a repetitive basis. Examples include repair of gas mains, installing new cable, installing new services, pump replacement, vault installations, breaker retrofits, bushing cleanings, etc.

Responsible Person: A project manager, engineer/EH&S representative or individual from the project-sponsoring department who is responsible for the project. For Central Operations projects, the Responsible Person for CEHSP A11.03 checklist completion is the Central Engineering Lead Discipline Engineer.

Risk: The potential for an adverse exposure or hazard to occur that could result in an impact to the public, employees or the environment. Prediction and prevention of adverse impacts include taking into consideration the consequence of the impact, the likelihood of its occurrence and the detection methods in place to mitigate the potential impact. Risk must be engineered out of projects whenever possible. Barriers and control mechanisms must be established for risks that cannot be engineered out.

***User Organization*:** The organization or operating group responsible for requesting and funding the project.

Attachment 1
EH&S CEHSP Checklist Flow Chart: Project Work



Attachment 2
EH&S Project Planning Process Guide

Stage 1: Project Development and Funding Meeting: Conduct CEHSP A11.03 review meeting with relevant operating and EH&S personnel. Consider alternatives to design that can ensure EH&S compliance, promote resource conservation and reduce risk. Are there better alternatives to this design? Can the EH&S concerns and/or hazards be engineered out of this project?

Stage 2: Field Walk: Evaluate EH&S considerations in project field walk. Include EH&S representatives as appropriate.

Stage 3: Engineering Review Meeting: Evaluate findings of project development, funding review and field walk. Update the CEHSP A11.03 Checklist based on new information available for this project. If the EH&S concerns and hazards cannot be engineered out of the project, what engineering controls and barriers can be instituted to minimize risk? Consider the hierarchy of Control Measures:

Hierarchy of Controls (Best to Worst):

A. Inherently Safer Designs that Eliminate or Reduce EH&S Risk
B. Engineering Controls:
   Passive Control Measures (Personal Protective Equipment)
   Active Control Measures (i.e. Mechanical devices, etc.)
C. Administrative Controls (i.e. Operating procedures, safe work permits)

Stage 4: Finalize CEHSP A11.03 Checklist: See Attachments 1, 2 and 4.

Stage 5: Project Changes: For significant project changes (e.g., 300 megawatt plant devalued to 200), re-evaluate EH&S considerations identified in CEHSP A11.03 Checklist. Update as necessary.

Attachment 3
EH&S Project Planning Cover Sheet

Estimated Project Start Date:	Department:	Project Number/Work Order:
Project Title:	**Responsible Person:**	
Project Scope of Work (attach details as necessary):		

The signature indicates that the signer has reviewed and concurred with the CEHSP A11.03 Checklist.

				Re-Signl[2]			
Signature[1]	**Title**	**Department**	**Date Signed**	**Signature[1]**	**Title**	**Department**	**Date Signed**
Engineer/Responsible Person							
Responsible Person EH&S (or designee)							
User Group EH&S							
Facility/Custodian EH&S (as applicable)							
Construction (when work is performed by Construction)							
Other:							

[1] Instead of a hardcopy of the form with an actual signature, an electronic record is an acceptable substitute.
[2] For planning approvals exceeding two years past the date of initial approval of CEHSP A11.03 Checklist, the CEHSP A11.03 Checklist must be re-evaluated.

Attachment 4
Environmental Benefits Evaluation (Optional)

Keep the Environmental Benefits Evaluation with the CEHSP A11.03 Checklist and send a copy to the Corporate EH&S Resource Conservation Coordinator.

Project Description:
Business Unit Proposing Project:

Economic Analysis

To be completed in conjunction with Financial Planning representative.

Project Cost (*current $'s*)			Net Present Value (*$'s*)	IRR%	Simple Payback (*yrs*)
Budget Category	O&M	Yes / No			
	Capital	Yes / No			

Environmental Benefits

To be completed in conjunction with local EH&S representative.

		If yes, quantify key Metrics
Improve Air Quality		
Greenhouse Gas Reductions	**Yes ☐ No ☐**	
SO2 Reductions	**Yes ☐ No ☐**	
NOx Reductions	**Yes ☐ No ☐**	
Particulate Matter Reductions	**Yes ☐ No ☐**	
Reduced Energy Use	**Yes ☐ No ☐**	
Reduced Water Use	**Yes ☐ No ☐**	
Prevent Spills to the Environment	**Yes ☐ No ☐**	
Environmentally Preferred Options		
Toxic Material Reduction	**Yes ☐ No ☐**	
Increased Use of Recycled Material	**Yes ☐ No ☐**	
Decreased Material Use	**Yes ☐ No ☐**	
Waste Minimization		
Hazardous Waste Reduction	**Yes ☐ No ☐**	
Non Hazardous / Non Regulated Waste Reduction	**Yes ☐ No ☐**	
Increased Amount of Material Being Recycled	**Yes ☐ No ☐**	
Other:	**Yes ☐ No ☐**	
	Yes ☐ No ☐	
	Yes ☐ No ☐	

Other Operational Benefits

To be completed in conjunction with Project Planning representative.

		If yes, quantify key metrics
Improve Reliability	**Yes ☐ No ☐**	
Impact on Operational Costs	**Yes ☐ No ☐**	
Regulatory Requirement	**Yes ☐ No ☐**	
Evaluate New Technology	**Yes ☐ No ☐**	
Improve Operational Efficiencies	**Yes ☐ No ☐**	
Enhance Relationship with Stakeholders		
Public	**Yes ☐ No ☐**	
Regulators	**Yes ☐ No ☐**	
Elected Officials	**Yes ☐ No ☐**	
Employees	**Yes ☐ No ☐**	
Other	**Yes ☐ No ☐**	
Other:	**Yes ☐ No ☐**	
	Yes ☐ No ☐	

	Yes ☐ No ☐	

Attachment 5
EH&S Project Checklist (CEHSP A11.03 Checklist)

SECTION 1: AIR			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Air Permits		See Attachment 1 in CEHSP E01.02 Air Permits Consult with the EH&S Air Group For diesel generators: CE-ES-2002 Part 7 CE-MS-4215	
• Will the construction activities or resulting facility add a new or modify an existing air emission source at a facility with a Title V permit, state facility permit or registration?	**Yes ☐ No ☐**		
• Will the construction activities or resulting facility involve:			
- New source review requirements?	**Yes ☐ No ☐**		
- Commercial boilers?	**Yes ☐ No ☐**		
- Gas turbines?	**Yes ☐ No ☐**		
- Small (house) boilers less than 10 million Btu/hr?	**Yes ☐ No ☐**		
- Emergency Diesel Generators?	**Yes ☐ No ☐**		
- Portable/Permanent Air Compressors?	**Yes ☐ No ☐**		
- Paint Spray Booths?	**Yes ☐ No ☐**		
- Gasoline Dispensing Sites?	**Yes ☐ No ☐**		
- Soldering Ovens?	**Yes ☐ No ☐**		
- Steam Jenny?	**Yes ☐ No ☐**		
- Exhausting particulates, visible dust or chemicals to the outside?	**Yes ☐ No ☐**		
- Other fuel burning equipment? If yes, specify equipment.	**Yes ☐ No ☐**		
- Will the project impact IR links used by CEMS or SEMARC systems?	**Yes ☐ No ☐**		
List all applicable permits in Section 32 Permits.			

SECTION 1: AIR			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Material/Coatings (Subject to Air Emission Requirements) Will the construction activities or resulting facility involve: • Architectural or surface coatings (such as paints, adhesives, etc.)?	**Yes ☐ No ☐**	See Attachment 1 in CEHSP E01.10 Architectural Coatings Also see CE-SS-3400-9900 CE-ES-2002 Part 43 (Paints)	
• Introduce or remove refrigerants? If yes, specify the type and amount.	**Yes ☐ No ☐**	See CE-MS-2010 **Accepted refrigerants:** • R-123; • R-134A ; • R-410A ; • Lithium Bromide solutions in absorption units. Note: R-410A is the preferred refrigerant because of low ozone depletion and global warming potentials. Note: Use R-22 only if alternate refrigerants are not available, notify your local EH&S if R--22 will be used.	
• Spray insulation/ fire proofing?	**Yes ☐ No ☐**	See Section 19: Non-Thermal Insulation Materials (NATI)	
SF^6 Equipment • Does the design of the SF^6 equipment incorporate leak detection technologies?	**Yes ☐ No ☐**	Note: FLIR camera is a leak detection technology	
• Does the design incorporate leak control and inventory management methods to address loss of gas during filling?	**Yes ☐ No ☐**	See • CE-ES-2002 Part 26 • CE-ES-2002 Part 14 • CE-ES-3156 • EI-4059	
• If the design includes elimination, will the construction activities or resulting facility involve replacement or introduction of SF^6 equipment?	**Yes ☐ No ☐**		
• What is the insulating medium of outgoing equipment?	**Yes ☐ No ☐**		

SECTION 1: AIR

Question		Resource	Describe action taken Are there alternatives to avoid this EH&S concern?
• What is the total SF^6 quantity (in pounds) being eliminated, replaced and or introduced?	**Yes ☐ No ☐**		

SECTION 2: ASBESTOS

Question		Resource	Describe action taken Are there alternatives to avoid this EH&S concern?
Will the construction activities or resulting facility involve one or more of the following activities:			
• Renovation?	**Yes ☐ No ☐**		
• Demolition?	**Yes ☐ No ☐**		
• New installation?	**Yes ☐ No ☐**		
• Equipment repair or retirement?	**Yes ☐ No ☐**		
Presence of Asbestos A determination needs to be made whether suspect asbestos containing materials (ACM) will be encountered or disturbed. Asbestos can be found in thermal insulation, fire proofing and in other building materials. At Con Edison, asbestos can be typically found in the following: • coal tar wrap • transite ducts • arc-proof tape			
• Does historical knowledge indicate asbestos?	**Yes ☐ No ☐**	Look for either a Con Edison or manufacturer's label indicating the presence (or not) of ACM. Or, consult with the Asbestos Project Coordinator (APC)	
• Has a survey been performed? If no, provide an explanation.	**Yes ☐ No ☐**	Work with EH&S representatives and the APC to see if an asbestos survey has been performed, or have one performed.	
• Is asbestos present?	**Yes ☐ No ☐**	Consult with the APC,	

SECTION 2: ASBESTOS			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
• Is there a need for abatement If yes, include time for the abatement. If no, do other precautions need to be taken?	**Yes ☐ No ☐**	Make arrangements for asbestos abatement prior to renovation, demolition, or new installation activities. Schedule adequate time for preparation and submittal of regulatory notifications.	

SECTION 3: BLOODBORNE PATHOGENS			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Does current or prior site use or conditions indicate that bloodborne pathogen material (e.g., syringes, bandages, sewage, etc.) are or could be present? If yes, describe the plans that you have made to have the bloodborne pathogen material removed?	**Yes ☐ No ☐**	CEHSP S07.00 Bloodborne Pathogens Exposure Control Plan GEI 13.02	

SECTION 4: CHEMICAL SAFETY AND HANDLING			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility involve storage or use of chemicals?	**Yes ☐ No ☐**		

SECTION 4: CHEMICAL SAFETY AND HANDLING			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Chemical Product Approval • For construction, can the use of chemicals be avoided? • For a resulting facility or equipment installation, can the facility be re-designed to avoid or minimize chemical use? If not, provide an explanation, and • Check CRS to see if the chemical is approved for use at Con Edison. • If the chemical is not approved, determine if another approved product can be used. • Is there an approved substitute available? If another chemical cannot be used as a substitute, provide an explanation.	**Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP S09.02 Chemical Product Evaluation and Selection CEHSP S09.03 Preliminary Assessment of New EH&S-Related Equipment, Supplies, and R&D Services All chemicals used must be approved by Con Edison prior to use. Allow sufficient time for product approval through CRS	
Temporary Storage for Construction Activities: New York City Fire Department Permits • Will flammable mixtures in quantities greater than 5 gallons and/or combustible mixtures in quantities greater than 10 gallons, or gasoline in quantities greater then 1 gallon, be transported, stored or used for refueling? • Will greater than 1 pound of organic peroxides be stored or used? • Have all chemicals that will be used for construction activities been identified on a listing for the landlord for HazCom purposes and for SARA reporting? • Is there a storage location area for these chemicals that is protected from vehicles, forklifts, and not near drains, trenches or sump pumps? • Will the storage container location be vented so not to impact sensitive receptors? • Is a NYCFD permit needed for the temporary storage of flammable or combustible materials? If yes, list all applicable permits in Section 32	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	Check the MSDSs for the specific chemicals that are or will be on site. If Yes, complete Fire Section	

SECTION 4: CHEMICAL SAFETY AND HANDLING			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Sulfuric Acid Batteries or Battery Room Will the construction activities or resulting facility: • Involve the new installation, removal or replacement of batteries? • Increase the amount of sulfuric acid at the site by 30% or greater? If yes, regulatory notification for SARA purposes is required within 30 days. • Does the amount of sulfuric acid trigger a new or revision of existing Risk Management Plan? (1000 lbs of sulfuric acid in NYC and 10,000 lbs outside of the City)? • Is the battery room designed to properly vent to the atmosphere? • Will batteries be placed in enclosed rooms? If not, explain. • Units equipped with secondary containment and away from drains? • Have air changes been incorporated to design? If no, explain. • Is there an eye wash station within 10 seconds of unobstructed travel? • Are MSDSs of battery acid pre-approved for use by Con Edison and does operations have all the necessary data to commence Risk Management Plan?	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	CE-ES-2002 Part 19 (CENG Battery Room Design Standard) 29 CFR 1910.151 ANSI Standard Z358.1 Engineering Specification Ce-Es-4523 - General Purchase Specification For Spill Containments For Lead-Acid Batteries CE-ES-3118 - Construction Specification For The Installation Of Batteries And Related Equipment CE-ES-4004 General Purchase Specification For Replacement Of Substation Lead Acid Batteries	
Chemical Bulk Storage Regulations Will the construction activities or resulting facility involve: ▪ The installation, modification or closure of an aboveground storage tank (AST) containing a hazardous substance or mixture with a capacity of 185 gallons of greater? ▪ The installation, modification or closure of an underground storage tank (UST) containing a hazardous substance or mixture of any capacity? ▪ The use of a non-stationary tank (i.e., tote, drum) used to store one thousand kilograms (2,200 lbs.) or	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	A "Yes" reply requires adherence to NYSDEC CBS regulations {NYSDEC CBS Permit Required and Spill Prevention Report} CEHSP E07.02 Chemical Bulk Storage CEHSP E07.05 Risk Management Plans	

SECTION 4: CHEMICAL SAFETY AND HANDLING			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
more of a hazardous substance or mixture for a period of ninety (90) consecutive days or more?		6 NYCRR 595 to 599 Note: Important Deadline: CBS Tanks must be registered with DEC 3 business days prior to installation!	
New AST Systems • Will there be sufficient secondary containment for the tank(s) and transfer stations? • Is there a leak monitoring system to monitor for leaks between the tank bottom and secondary containment system (visual, mechanical or electronic). Note: Tanks that are entirely aboveground, on racks, cradles, or stilts may be visually monitored for leakages. • Is there spill/overfill prevention equipment (such as high-level warning alarm), or equipped with a gauge or other monitoring device that accurately determines the level or quantity of substance in tanks? Note: Gauges must be accessible to the operator, carrier and conveniently read. • If tank will rest in soil, has corrosion protection been incorporated for tank's bottom? • Will the tank be installed in a location that is protected from physical damage from forklifts, cars, trucks? • Will there be a separation of Incompatible substances? • Is an initial inspection required prior to placing tank in use?	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**		

SECTION 4: CHEMICAL SAFETY AND HANDLING			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
New UST systems Will the design incorporate the following: • Corrosion protection for tank and piping? • Secondary containment (i.e. double-walled). • Leak detection capable of detecting leaks between the tank and secondary containment system. • On-ground and underground pressurized piping must have an automatic line leak detector. • On-ground and underground piping must be equipped with leak detection equipment (interstitial monitoring). If no, provide an explanation	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**		
Totes (Portable Chemical Storage Containers) • Will the construction or resulting facility include non-stationary tank storage areas? If yes, the design must include - Storage of Incompatibles separately that must not be stored in close proximity to each other - Enclosures for protection from water exposure. - Sufficient secondary containment. - Stable platforms or pallets for stacking	**Yes ☐ No ☐**	Note: For storage, 30 feet separation or a 2-hour fire wall.	
• Will greater than 1 pound of organic peroxides be stored or used? **List all applicable permits in Section 32 Permits.**	**Yes ☐ No ☐**		

SECTION 5: ELECTRICAL PERMITS			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility involve electrical wiring?	**Yes ☐ No ☐**		

SECTION 5: ELECTRICAL PERMITS			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
If yes, • In New York City, have you determined whether the construction activities or resulting facility require a permit from the Department of Buildings electrical unit? • Outside New York City, have you determined whether the construction activities or resulting facility require a permit or other authorization from the local government? **List all applicable permits in Section 32 Permits.**	**Yes ☐ No ☐** **Yes ☐ No ☐**	Consult with an electrical engineer.	

SECTION 6: ENCLOSED SPACES – ELECTRICAL AND GAS			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will construction activities include or the resulting facility house electrical or gas enclosed spaces (i.e., a space that has limited access)?	**Yes ☐ No ☐**		
Existing Structure Survey For existing structures, has the site been surveyed to identify all enclosed spaces? If no, provide an explanation.	**Yes ☐ No ☐**	CEHSP S17.01 Electrical Enclosed Spaces CEHSP S17.02 Gas Enclosed Spaces	
Enclosed Space Safety • Have all measures been taken to eliminate enclosed spaces? • If enclosed spaces cannot be avoided, have all measures been taken to enhance the safety of either the existing or the enclosed spaces of the resulting facility? • Does the structure have a history of SF4, S2F2, SOF2, SO2F2, SO2, HF gases or hydrofluoric gases?	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	Contact ChemLab to sample the structure. Refer to GSI 17.00 series.	

SECTION 6: ENCLOSED SPACES – ELECTRICAL AND GAS			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
• Is there a history of solid decomposition byproduct? If yes, there may be a presence of metallic fluoride which looks like fine talcum powder, white or tan in color Note: This byproduct is toxic and acidic when in contact with moisture such as perspiration.	**Yes ☐ No ☐**	Contact ChemLab to sample the structure. Refer to GSI 17.00 series.	
• Is hydrogen sulfide gas (SF^6) or hydrogen sulfide suspected? Note: These decomposition byproducts are to be anticipated before opening any circuit breaker.	**Yes ☐ No ☐**	Contact ChemLab to sample the structure. Refer to GSI 17.00 series.	

SECTION 7: ENVIRONMENTAL SITE ASSESSMENTS AND LAND USE			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility require one or more of the following:			
• Installation of Con Edison equipment on a new customer's property,	**Yes ☐ No ☐**		
• Site acquisition, or	**Yes ☐ No ☐**		
• Changes in use of real estate?	**Yes ☐ No ☐**		
• Has the zoning for the site been determined?	**Yes ☐ No ☐**	Check with the local Department of Buildings	
• Has a Phase I, II or III Environmental Site Assessment been conducted?	**Yes ☐ No ☐**		
If yes, have you reviewed it and incorporated its findings?	**Yes ☐ No ☐**	CEHSP A11.01 Environmental Assessments	
If no, working with EH&S representatives, have you made arrangements for the appropriate level of site assessment.?	**Yes ☐ No ☐**	Consult with your local EH&S representative	

SECTION 8: ERGONOMICS

Question		Resource	Describe action taken Are there alternatives to avoid this EH&S concern?
Will the construction activities or resulting facility involve musculoskeletal stress? Examples of musculoskeletal stress are: • The frequent repetition of a task, • The use of excessive force • Working in awkward positions, • Contact with surfaces that place unnecessary pressure on body parts, • Extreme temperatures or lighting conditions.	**Yes ☐ No ☐**		
Does the design minimize worker musculoskeletal stress?	**Yes ☐ No ☐**	CEHSP S23.00 Ergonomics Consult with the Ergonomics SME to explore other, more ergonomic alternatives.	

SECTION 9: EXCAVATION AND TRENCHING

Question		Resource	Describe action taken Are there alternatives to avoid this EH&S concern?
Will the construction activities involve excavation or trenching?	**Yes ☐ No ☐**		
Identification of Underground Installations			
• What underground installations exist at or near the site?	**Yes ☐ No ☐**	Check M&S plates in Electric, Gas and Steam. Check as-constructed drawings. Check site survey.	
• Does the design incorporate avoidance of the underground installations?	**Yes ☐ No ☐**	CEHSP S13.00 Excavation and Trenching	
Excavating Near Existing Structures			
• What structures (e.g., buildings, walls, subways, etc.) are located near the site?	**Yes ☐ No ☐**	Knowledge of the site.	
• Does the design avoid activities that could damage or otherwise negatively affect the existing structures?	**Yes ☐ No ☐**	CEHSP S13.00 Excavation and Trenching	
• Will vibration monitoring (e.g., for construction activities near subways) be required?	**Yes ☐ No ☐**		

SECTION 9: EXCAVATION AND TRENCHING

Question		Resource	Describe action taken Are there alternatives to avoid this EH&S concern?
Sheeting/Shoring • Will construction activities require sheeting/shoring? • Are there alternatives to these construction activities (i.e., activities that avoid sheeting/shoring)?	**Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP S13.00 Excavation and Trenching	
Ground Water Accumulation Will ground water accumulate in the excavation? See Section 28: Water	**Yes ☐ No ☐**	GEI 12.08 Wastewater and Stormwater Management	

SECTION 10: FALL PROTECTION

Question		Resource	Describe action taken Are there alternatives to avoid this EH&S concern?
Will the construction activities or resulting facility involve work above floor/ground level? Examples include: • Approved ladders and scaffolds • Ramps, • Runways and other walk ways • Excavations • Hoist areas • Holes • Unprotected sides and edges • Wall openings • Walking/working surfaces • Other If yes, incorporate slip and fall protection measures into the design.	**Yes ☐ No ☐**	CEHSP S18.00 Working at Elevations	

SECTION 11: FIRE PROTECTION AND PREVENTION			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Does the project involve any of the following: • A new facility being constructed? • An existing facility being altered? • New equipment, material, or system being added? • Existing equipment or system being altered?	**Yes ☐ No ☐**		
Consult with the Fire Protection and Prevention SME and see the following documents: • CEHSP S14.01 Fire Protection And Prevention • CEHSP S14.02 NYFD Permits • CEHSP S14.03 Certificates of Fitness • CEHSP S24.01 and/or S24.02 Emergency Response or Emergency Evacuations Plans			
Fire Department Permits A fire department permit is required if "Yes" is checked for any of the following boxes:			
• Will the construction activities or resulting facility involve the use, storage, or transportation of certain hazardous substances (e.g., tires, gasoline, grease, combustible gas cylinders, etc.)?	**Yes ☐ No ☐**		
• Will the resulting facility involve the operation and control of specified equipment (i.e., air compressors and refrigeration equipment) or construction activities (such as operating service stations and repair shops).	**Yes ☐ No ☐**		
Building Permits A building permit is required if "Yes" is checked for any of the following boxes:			
• Will the construction activities result in a change of occupancy or any area, or an additional occupancy, or affect egress at the site?	**Yes ☐ No ☐**		
• Will the construction activities require the cutting away of any wall, floor, or roof construction, or any portion thereof?	**Yes ☐ No ☐**		
• Will the construction activities require the removal, cutting or modification of any beams or structural supports?	**Yes ☐ No ☐**		
• Will the construction activities require the removal, change or closing of any required means of egress, either temporarily or on a permanent basis?	**Yes ☐ No ☐**		

SECTION 11: FIRE PROTECTION AND PREVENTION			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
• Will the construction activities require the rearrangement or relocation of any parts of the building? Will the rearrangement or relocation affect loading or exit requirements, or lighting, heating, ventilation or elevator requirements?	**Yes ☐ No ☐**		
• Will the construction activities require additions to, alterations of, or rearrangement, relocation, replacement, repair or removal of any portion of a standpipe or sprinkler system, water distribution system, house sewer, private sewer, or drainage system, including leaders, or any soil, waste or vent pipe, or any gas distribution system?	**Yes ☐ No ☐**		
• Will the construction activities or resulting facility require a field office and/or a storage facility? ➔ If yes, will the field office and/or storage facility be made of a material other than all metal or a non-combustible material?	**Yes ☐ No ☐**		
• Are there any other factors associated with the construction activities that could affect human health, fire safety or structural safety of the building?	**Yes ☐ No ☐**		
Fire Suppression Systems			
• Will there be any change in water suppression supply, pressure requirements, water quantity, piping size, piping arrangement or pipe hanger location? ➔ Existing hydraulic calculations must be reviewed for demand changes.	**Yes ☐ No ☐**		
• Will there be any addition of beams, ducts, walls, ceilings or floors, such that the flow of heat to the sprinkler or the water spray pattern from any nozzles or sprinkler head would be interrupted or modified? ➔ Determine if new barriers will upset the coverage pattern or area for any nozzle.	**Yes ☐ No ☐**		

SECTION 11: FIRE PROTECTION AND PREVENTION			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
• Will the construction activities affect fire suppression components or features including fire pumps, tanks, piping, valves, hydrants, extinguishers, hose stations, sprinklers heads/nozzles, smoke/heat detectors, fire doors, fire dampers, foam systems, etc.? (Determine if additional equipment or systems are needed, and, if so, where they should be located.) ➔ Equipment or system requirements need to be reviewed and the location of additional equipment, if any, needs to be determined.	**Yes ☐ No ☐**		
• Will any transmitter, control, switch or cable related to the alarm functions be changed as a result of the construction activities?	**Yes ☐ No ☐**		
• Will the construction activities require the addition or elimination of an interlock in the suppression system?	**Yes ☐ No ☐**		
• Will the construction activities eliminate, add or modify existing floor drains and oil curbs? ➔ Existing floor drain arrangements may need to be analyzed to determine if their capacity is sufficient to handle any additional suppression system that may be required.	**Yes ☐ No ☐**		
• Will the construction activities change the initiation threshold or response time of any automatic device that could potentially impact suppression system performance?	**Yes ☐ No ☐**		
• Gaseous suppression systems require the confinement of the gaseous suppression agent within the affected area to facilitate extinguishment and to prevent re-ignition. Will the construction activities change the volume or pressure of the affected area, or create openings or paths through which the suppression agent can flow?	**Yes ☐ No ☐**		
• Will the construction activities change the coordination between the HVAC and suppression systems through the interlocks or a change in capacity?	**Yes ☐ No ☐**		

SECTION 11: FIRE PROTECTION AND PREVENTION			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
• Will there be any change in the circuitry of the gaseous suppression system operation or notification that could affect prompt response?	**Yes ☐ No ☐**		
• For a new building that does not require a sprinkler system in its design, the engineer must generate a cost justification for including the sprinkler or other fire prevention protection, based on code trade-offs, such as the number of exits, types of building materials, compartmentation, fire areas, etc. Does the justification support the installation of a sprinkler system?	**Yes ☐ No ☐**		
Fire Detection Systems			
• Will the primary and/or backup power supplies be affected due to the construction activities?	**Yes ☐ No ☐**		
• Will the construction activities require installing new, or removing existing, or relocating existing smoke/heat detectors, or will it involve a change in the type of detector(s) used or needed in the affected area?	**Yes ☐ No ☐**		
• Will any manual alarm (i.e., pull station) require removal or relocation, or will the alarm be made less accessible as a result of the construction activities ?	**Yes ☐ No ☐**		
• Will the construction activities cause a change in existing ventilation systems that could delay alarm activation?	**Yes ☐ No ☐**		
• Will the construction activities affect the initiation threshold or response time of the detector?	**Yes ☐ No ☐**		
• Will the construction activities introduce any large obstruction between the detectors and a potential fire below?	**Yes ☐ No ☐**		
Fire Barriers			
• Will the construction activities result in structural changes to the supporting elements of a barrier or to the barrier itself?	**Yes ☐ No ☐**		

SECTION 11: FIRE PROTECTION AND PREVENTION			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
• Will the construction activities result in any new penetrations in fire rated walls, floors or ceilings, or changes or repairs to any existing fire rated seals? (New electrical or mechanical penetrations must be sealed utilizing a method that will provide a fire rating equivalent to or higher than the required fire rating of the barrier.)	**Yes ☐ No ☐**		
• Will any barrier or element of a barrier need to be installed or have its fire rating increased based upon changes in the occupancy classification?	**Yes ☐ No ☐**		
Flammable and Combustible Liquids, Gases, Dusts, Vapors, and Ignition Sources and Control			
• Will flammable and combustible liquids, gases, dusts, vapors and ignition sources be used or stored on site?	**Yes ☐ No ☐**		
• Are the necessary safeguards for the use and/or storage of these materials included in the design?	**Yes ☐ No ☐**		
• If chemical products are required in the construction or operation of the construction activities, have you taken all measures to use Con Edison approved chemicals? ➔ If a new chemical is required, see Section 4.0 Chemical Safety and Handling and Section 20 Oil and Dielectric Fluid	**Yes ☐ No ☐**		
Egress			
• Will the construction activities or resulting facility affect the existing exits?	**Yes ☐ No ☐**		
• Will the construction activities or resulting facility affect the path of travel to an existing exit?	**Yes ☐ No ☐**		
• Will the construction activities affect the travel distance to the existing exit?	**Yes ☐ No ☐**		
• Will the construction activities affect the existing emergency lighting?	**Yes ☐ No ☐**		
• In new construction projects, has the number of exits, travel paths and distances, and emergency lighting been evaluated based upon the existing Building and Fire Codes?	**Yes ☐ No ☐**		

SECTION 11: FIRE PROTECTION AND PREVENTION			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
• Will the project result in changes to the dimensions (height and width) of corridors or aisles along the path of travel to an existing exit?	**Yes ☐ No ☐**		
• Will the project increase travel distances to an exit that exceed code requirements?	**Yes ☐ No ☐**		
• Will the project result in changes to the line of sight to emergency exit signs?	**Yes ☐ No ☐**		
• For construction activities in existing buildings, have the codes in existence at the time of original construction been reviewed?	**Yes ☐ No ☐**		
• Will the project result in changes to existing staircases, open stairs, platforms, or catwalks?	**Yes ☐ No ☐**		
• Will the project activities result in the need for an Emergency Action Plan or in changes to an existing Emergency Action Plan?	**Yes ☐ No ☐**		

SECTION 12: AWARENESS AND PROTECTION OF WATERS			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility impact vegetation, wetlands/waters, and/or wildlife?	**Yes ☐ No ☐**		
Land Characterization Has the impact on vegetation been determined?	**Yes ☐ No ☐**	Conduct a walk-through with the Corporate EH&S Wetlands SME.	
Landscaping • Has the design taken into account a plan for the final landscaping of the site? • Note: If plants are involved, is there need for irrigation?	**Yes ☐ No ☐**	Consult with Corporate EH&S Wetlands SME.	
Erosion Control Has the design taken measures to control soil erosion?	**Yes ☐ No ☐**	Consult with Corporate EH&S Wetlands SME.	
Animal Carcasses and Other Organic Debris Are there animal carcasses, fecal matter, abandoned nests, and other decaying organic debris on site?	**Yes ☐ No ☐**	If yes, make arrangements to have them removed. CEHSP E09.01 Protection of Wildlife	

SECTION 12: AWARENESS AND PROTECTION OF WATERS			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Does the design incorporate the avoidance of nuisance species (e.g., netting or other bird/animal deterrent)?	**Yes ☐ No ☐**		
Protected Wildlife • Have you determined the type of habitat(s) on the site? • Have you determined what the habitat(s) indicate about the wildlife present on site? • Might there be endangered species present? • Might construction activities negatively impact wildlife other than endangered species and have alternatives been considered?	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	Habitat is the primary indicator of the existence of wildlife and, especially, of endangered species Consult with the Corporate EH&S Wetlands SME regarding contact with the New York Natural Heritage Program and USFWS about the site?. Refer to CEHSP E09.01 Protection of Wildlife	
Nuisance Wildlife • Have you identified the possible effects of nuisance wildlife at the site (e.g., bird nesting and migration, raccoon scavenging, etc.)? • Have you taken into account methods in the design for reducing the effects of nuisance wildlife during construction and long-term during operation?	**Yes ☐ No ☐** **Yes ☐ No ☐**	Nuisance wildlife may cause damage to Con Edison facilities or otherwise affect Con Edison activities. Consult with the Corporate EH&S and refer to CEHSP E09.01 Protection of Wildlife	
Awareness and Protection of Waters • Based upon a map review, will the activities be located 300 feet or less from waters or waterways, for example: – Fresh and tidal wetlands, – New York City watershed, – Aqueduc ts, – Stream, river, pond, and – Water fronts?	**Yes ☐ No ☐**	Consult with EH&S to determine what federal, state, or local laws may restrict construction activity and what permits may be required. Refer to CEHSP E02.05.	
Dredging Activities Does the design call for dredging activities?	**Yes ☐ No ☐**	Look at alternatives to dredging (dredging activities are costly and time-consuming)? If the determination is made that dredging is necessary, consult with EH&S to determine what federal, state or local permits may be required. Refer to CEHSP E02.05.	

SECTION 12: AWARENESS AND PROTECTION OF WATERS

Question		Resource	Describe action taken Are there alternatives to avoid this EH&S concern?
Dock and Other Marine Construction/Repair Will the project involve dock or marine construction/repair? If yes, contact the ERTs for reporting relief a month before contractors are expected to mobilize to the site for projects that have established start dates and end dates. The local operating group must also be notified.	**Yes ☐ No ☐**		

SECTION 13: HAZARDOUS WASTE

Question		Resource	Describe action taken Are there alternatives to avoid this EH&S concern?
Will the construction activities or resulting facility involve handling, transporting or disposing of any hazardous waste such as the following:			
• Lead-contaminated waste (also see Lead Management)?	**Yes ☐ No ☐**		
• Mercury-contaminated waste (also see Section 17: Mercury Management)?	**Yes ☐ No ☐**		
• Benzene-contaminated waste?	**Yes ☐ No ☐**		
• Ignitable liquids?	**Yes ☐ No ☐**		
• Acids or caustics?	**Yes ☐ No ☐**		
• PCB waste (also see Section 21: PCB)?	**Yes ☐ No ☐**		
Waste Handling, Transportation, and Disposal • Have you determined how the hazardous waste will be handled?	**Yes ☐ No ☐**	CEHSP E04.04 Accumulation CEHSP E04.06 Storage CEHSP E04.12 Hazardous Waste Contingency Plan CEHSP E04.13 Closure Plan	
• Have you identified an appropriate Company-approved waste hauler to transport the hazardous waste?	**Yes ☐ No ☐**	Go to http://manhapps/EHSInfoline/Default.asp, click on Related Sites, then click on Waste Management Contracts to see a list of Company-approved waste haulers and disposal facilities	
• Have you determined an appropriate Company-approved hazardous waste disposal facility?	**Yes ☐ No ☐**		

SECTION 13: HAZARDOUS WASTE			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Hazardous Waste Storage Areas Will hazardous waste be stored at the facility?	**Yes ☐ No ☐**	CEHSP E04.06 Storage Consult with EH&S to incorporate all regulations into the design.	

SECTION 14: LEAD MANAGEMENT			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility involve one or more of the following activities where lead may be present:			
• Renovation, including paint disturbance?	**Yes ☐ No ☐**		
• Demolition?	**Yes ☐ No ☐**		
• Equipment retirement?	**Yes ☐ No ☐**		
Paint Sampling Has the existing paint been sampled for lead and PCBs?	**Yes ☐ No ☐**	CEHSP S10.00 Lead Management Program CEHSP E06.00 PCB Management Contact the ChemLab	
If yes, have you developed a written waste disposal plan to handle the paint debris, as follows: • If positive for lead, treat as hazardous waste; • If positive for PCBs, treat as PCB waste; • If negative for both lead and PCBs, treat as non-hazardous waste?	**Yes ☐ No ☐**		
And, have you have you built time into the schedule to allow for proper removal of the paint?	**Yes ☐ No ☐**		
If no, is the paint surface a large area? • If yes, then sample for lead and PCBs. • If no, then treat paint debris as assumed hazardous for lead and PCBs. And, develop a waste disposal plan accordingly.	**Yes ☐ No ☐**		
Other Lead Debris Are there lead-jacketed cables on site? Note: Lead-jacketed cables are exempt scrap metal. If yes, develop a waste disposal plan.	**Yes ☐ No ☐**	CEHSP S10.00 Lead Management Program	

SECTION 15: MATERIALS HANDLING

Question		Resource	Describe action taken Are there alternatives to avoid this EH&S concern?
Will construction activities or resulting facility involve storing, handling, lifting, rigging and/or moving materials, either manually or using mechanical systems?	**Yes ☐ No ☐**		
Moving Heavy Materials Will the construction activities or resulting facility utilize materials that need to be moved using mechanical equipment (i.e., forklifts, power jacks, stubbin trucks, etc.)? If yes, include items that need to be identified in material handling plan(s).	**Yes ☐ No ☐**	CEHSP S19.00 Materials Handling	
Lifting and Rigging Materials Will the construction activities or resulting facility utilize materials that need to be moved using rigging equipment, cranes, etc? If yes, include a general rigging specification with the design package. In New York City, an individual with a Master Riggers License will need to be involved in the general rigging specification.	**Yes ☐ No ☐**		
Load Measurements If heavy equipment will be utilized, have you taken load measurements (e.g., ensured that the flooring and/or working platforms or elevators are resilient and capable of supporting the load)? If yes, include a loading plan.	**Yes ☐ No ☐**		

SECTION 16: MECHANICAL EQUIPMENT

Question		Resource	Describe action taken Are there alternatives to avoid this EH&S concern?
Will the construction activities or resulting facility involve mechanical equipment?	**Yes ☐ No ☐**		
Safety • Are there any special considerations associated with the mechanical equipment? • Does the design incorporate equipment guarding? • Have you addressed safety issues for personnel working near mechanical equipment?	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP S20.00 Portable Tools, and CEHSP S19.00 Materials Handling	

SECTION 17: MERCURY MANAGEMENT			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility involve the handling, transporting, and/or disposal of mercury-containing equipment? For example: • Gas regulators • Thermostats • Manometers • Bailey meters • Fluorescent lighting	**Yes ☐ No ☐**		
Existing Mercury-Containing Equipment For existing facilities, particularly old ones, have you determined (i.e., prior knowledge, survey results, etc.) if mercury-containing equipment is present? If yes, indicate how the determination was made and develop a disposal plan. If no, have you considered conducting a survey?	**Yes ☐ No ☐**	CEHSP S11.00 Mercury Management Program	
Job Setup • Have you taken measures to avoid or reduce use of mercury-containing equipment? • If the design calls for the possible contact with mercury-containing equipment, have you built time into the schedule to allow for proper removal of the equipment?	**Yes ☐ No ☐** **Yes ☐ No ☐**		

SECTION 18: NOISE			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility use equipment that creates noise?	**Yes ☐ No ☐**		
Noise • Taking particular account of any noise sensitive areas near the site, have you made every attempt to minimize noise during construction? • Have you made every attempt to reduce potential operational noise?	**Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP E08.02 Noise Construction and Utility Activities CEHSP E08.03 Noise Facility Operations Noise sensitive areas include, but are	

SECTION 18: NOISE		
Question	**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
• Will hearing protection be required? **Yes ☐ No ☐** • Will the construction activities or resulting facility require noise permits or variances to complete the work activities (e.g., construction activities needing to be performed after hours)? **Yes ☐ No ☐** **List all applicable permits in Section 32 Permits.**	not limited to, parks, hospitals, schools, etc.	
Hearing Conservation Program Will equipment installed in the facility trigger the hearing conservation program? **Yes ☐ No ☐**	CEHSP S03.00 Hearing Conservation Program	

SECTION 19: NON-ASBESTOS THERMAL INSULATION MATERIALS (NATI)		
Question	**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility involve one or more of the following activities: • Renovation, **Yes ☐ No ☐** • Demolition, **Yes ☐ No ☐** • New installation, and/or **Yes ☐ No ☐** • Equipment retirement? **Yes ☐ No ☐**		
NATI Will the construction activities involve the installation of new, or the removal of existing Non Asbestos Thermal Insulation? **Yes ☐ No ☐**	Asbestos Management Manual, Chapter 6.31 – Non-Asbestos Thermal Insulation	
Replacement Material Have you obtained concurrence from EH&S representatives that the proposed new insulation materials are approved for use at Con Edison? **Yes ☐ No ☐**	Consult with EH&S.	
Other Disturbance of NATI Will NATI potentially be disturbed during the implementation of the construction activities such that safety and health controls should be implemented? **Yes ☐ No ☐**	Consult with EH&S	

SECTION 20: OIL AND DIELECTRIC FLUID			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
• Will the construction activities or resulting facility use or store oil and/or dielectric fluid?	**Yes ☐ No ☐**		
• Are storage tanks currently present on site and/or will storage tanks be installed?	**Yes ☐ No ☐**		
Oil Storage Permits • Will the construction activities or resulting facility involve storage of oil in quantities at or above 1,100 gallons? **List all applicable permits in Section 32 Permits.**	**Yes ☐ No ☐**	CEHSP E03.02 Major Oil Storage Facilities CEHSP E03.03 Petroleum Bulk Storage Consult with EH&S to obtain the necessary registrations and permits.	
Oil Storage • Has the design incorporated all requirements for underground storage and aboveground storage tanks?	**Yes ☐ No ☐**	CEHSP E03.02 Major Oil Storage Facilities CEHSP E03.03 Petroleum Bulk Storage and consult with EH&S	
Used Oil Disposal • Will the construction activities or resulting facility produce used oil? If yes, does the design incorporate proper storage areas and disposal procedures? If yes, is the volume included in the SPCC Plan? If yes, is the Material identified in the Emergency Response or Action Plan	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP E05.04 Used Oil Storage and Disposal CEHSP E04.12 Hazardous Waste Contingency Plan CEHSP E04.13 Closure Plan CEHSP S24.01 and/or S24.02 Emergency Response or Emergency Evacuations Plans Consult with EH&S	

SECTION 20: OIL AND DIELECTRIC FLUID			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Oil Storage Plans • Will the resulting facility house either the following: – 42,000 gallons of oil in a UST; or – 1,320 gallons in aboveground equipment including drums?	**Yes ☐ No ☐**	CEHSP E03.04 Spill Prevention Control and Countermeasures (SPCC Plans) Consult with EH&S to develop and implement a new SPCC that includes secondary containment requirements. or if the facility already has an SPCC Plan, determine whether the plan requires revision. a result of the design? CEHSP E03.05 Facility Response Plans	
• Will the resulting facility house the following: – 42,000 gallons of oil in a UST; or – 1,320 gallons in aboveground equipment including drums? and – Transfer oil over water to or from a vessel or – Store 1,000,000 gallons of oil – Is located where a discharge can cause injury to fish, wildlife or environmentally sensitive areas or impact public drinking water	**Yes ☐ No ☐**		
Tank Closure For a site with existing tank(s), will the tanks be closed and/or removed?	**Yes ☐ No ☐**	CEHSP E03.03 Petroleum Bulk Storage CEHSP E03.04 Major Oil Storage Facilities Consult with EH&S for details about tank closing.	

SECTION 21: PCB			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility involve renovation, demolition, and/or equipment retirement of one or more of the following PCB-containing equipment or coating? Examples of PCB-containing equipment or coating are: • Equipment manufactured before on or before July 2, 1979 (or an unknown date) (e.g., ballasts, oil-filled electrical equipment, potheads, bushings). • Arc proofing. • Coal tar wrap. • Underground primary PILC cable and cable oil. • Rectifiers with small PCB capacitors. • Paint. • Caulks, mastics, and sealants.	**Yes ☐ No ☐**		
Waste Handling, Transportation, and Disposal • Have you determined how the PCB waste will be handled?	**Yes ☐ No ☐**	CEHSP E06.07 Waste Storage	
• Have you determined how the PCB waste will be transported? • Have you determined where the PCB waste will be disposed of?	**Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP E06.11 Transportation CEHSP E06.12 PCB Disposal Go to http://manhapps/EHSInfoline/Default.asp, click on Related Sites, then click on Waste Management Contracts to see a list of Company-approved waste haulers and disposal facilities	

SECTION 21: PCB			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Waste Storage Will the facility temporarily store PCB waste on site? If yes, is the volume included in the SPCC Plan? If yes, is the Material identified in the Emergency Response or Action Plan? If yes, is the Material identified in the Hazardous Waste Contingency Plan?	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP E06.07 Waste Storage CEHSP E04.12 Hazardous Waste Contingency Plan CEHSP E04.13 Closure Plan CEHSP S24.01 and/or S24.02 Emergency Response or Emergency Evacuations Plans CEHSP E03.04 Spill Prevention Control and Countermeasures (SPCC Plans) Consult with EH&S for required design elements.	
Paint Removal		See Section 14: Lead Management	

SECTION 22: PERMIT-REQUIRED CONFINED SPACE			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Has the site been surveyed to identify all confined spaces?	**Yes ☐ No ☐**	CEHSP S16.00 Permit Required Confined Space Program	
Confined Space Safety • Have you taken all measures to eliminate confined spaces? • If confined spaces cannot be avoided, have all measures been taken to enhance the safety of either the existing or the future confined spaces?	**Yes ☐ No ☐** **Yes ☐ No ☐**		

SECTION 23: PERSONAL PROTECTIVE EQUIPMENT		
Question	**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Other than basic PPE, will specialized PPE be required during the construction activities or need to be used at the resulting facility (e.g., fire retardant clothing, self-containing breathing apparatus, diving equipment, etc.)?		

SECTION 23: PERSONAL PROTECTIVE EQUIPMENT		
Question	**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
List any significant details:		

SECTION 24: PESTICIDES		
Question	**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Pesticide Use If the construction activities or resulting facility involves pesticides, has a pesticide applicator vendor been identified? **Yes ☐ No ☐**	Consult with EH&S to identify a pesticide applicator vendor	

SECTION 25: SAMPLING		
Question	**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Site Characterization • Does the site need to be characterized (e.g., soil contamination) prior to start of work activity? **Yes ☐ No ☐** • Have you developed a sampling plan? **Yes ☐ No ☐**	Consult with EH&S and the ChemLab	

SECTION 26: SOLID WASTE			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility involve generating, handling, transporting, or disposing of solid wastes? Examples of solid waste are: • oily/solid debris, • non-empty containers, • certain cleanup materials, • treated wood, • garbage, • certain plastics, • scrap lumber, • sheeting, • non-contaminated construction and demolition waste, • used oil, • metal, • pallets, • scrap metal (including cable), • lead-acid batteries, • asphalt, • electronics, • mercury containing equipment, and • electrical equipment.	**Yes ☐ No ☐**		

SECTION 26: SOLID WASTE			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Waste Handling, Transportation, and Disposal Determine the following: • Quantity and type of waste that will be generated. • Is there an opportunity for recycling any of these wastes? Explain what waste will not be recycled, and if not, why not. • Is there sufficient room for storage of the solid waste (including retired equipment) at the location? If not, what arrangements have been made to accommodate this storage? • Will all drums of recyclable/waste generated be sent to the Astoria waste storage facility? If not, explain.	_____ **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP E05.03 Solid Waste Storage and Disposal CEHSP E05.06 Transportation A registered hauler must be used. Consult with EH&S. CEHSP E05.03 Solid Waste Storage and Disposal **Go to** http://manhapps/EHSInfoline/Default.asp, click on Related Sites, then click on Waste Management Contracts to see a list of Company-approved disposal facilities	
Recycling/Green Initiatives • Does the design of the equipment take recycling of materials into consideration, especially at the end of the useful life? • Does the design incorporate recycled materials, and items such as green roofs, solar panels, recovering storm water, etc.?	**Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP E05.05 Recycling	
Used Oil/Transmission Feeder Dielectric Fluid • Will the project generate used oil/dielectric fluid as a result of site remediation/demolition, construction or operations? (Con Ed will recycle this fluid whenever possible) • Will the oil generated be stored in 55-gal drums? If yes, is there sufficient storage space and secondary containment to accommodate these drums? • Does the facility have the necessary permits to store used oil? Check with Corporate EH&S.	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP E05.04 Used Oil Storage and Disposal	

SECTION 27: VEHICLE MANAGEMENT			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility involve vehicles arriving, being stored, and moving about the site?	**Yes ☐ No ☐**		
Design Considerations • Have you determined how vehicles will access and depart the site?	**Yes ☐ No ☐**		
• If a large number of vehicles will need to be utilized, have you considered the following:	**Yes ☐ No ☐**		
– If traffic congestion impact to local roads will require viable, alternate routes or flexible scheduling?	**Yes ☐ No ☐**		
– The impact to local traffic safety?	**Yes ☐ No ☐**		
- Impact on noise pollution or excessive idling of construction vehicles impacts on local air quality?	**Yes ☐ No ☐**		
• Have you planned where vehicles will be stored when not in use?	**Yes ☐ No ☐**		
• If the design calls for street or traffic lane closure, have you determined what steps need to be taken (e.g., permits)?	**Yes ☐ No ☐**		

SECTION 28, PART II: WATER			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
The following documents can be used as reference materials: CEHSP E02.02 Wastewater Discharge SPDES Permits CEHSP E02.03 Stormwater Discharge SPDES Permits CEHSP E02.04 Wastewater Discharges to Publicly-Owned Sewer System or On-Site Septic Disposal System			
Does the project involve wastewater, stormwater, groundwater, excavation activities, dewatering, sewers, oil-water separators or SPDES?	**Yes ☐ No ☐**		
SPDES Permits: Existing Permit, Major or Minor Modification If the existing facility has a SPDES permit, will the construction activities or resulting facility result in any of the following: Note: If any of the following are marked yes, this has		State notifications and approvals can take six to nine months. Coordinate with Corporate EH&S SME to start regulatory filing/notifications.	

SECTION 28, PART II: WATER			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
the potential to trigger a **major or minor** SPDES permit modification. • Increase or decrease in volume of water discharged? • Change in the allowable limits for contaminants in the wastewater effluent? • Change or addition of a discharge location? • Change from underground to surface discharge? • Change from surface to underground discharge? • Change to the wastewater schematic/diagram? • Add or change wastewater treatment (such as waste neutralization, oil/water separator, etc.)? • Bypass the SPDES treatment system (such as boiler drainage at a steam plant, flood pumps, etc.)? • Addition/removal/modification of boilers? • Change monitoring requirements? • Administrative changes (e.g., change of address, point of contact name/telephone number)? **List all applicable permits and permit modifications in Section 32 Permits.**	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	If yes, take samples and determine whether the effluent of the treatment system is or will be in compliance with water quality limits. If not in compliance with water quality limits, the design must be modified so that the effluent will be in compliance.	
SPDES Permits: New Permit Will the construction activities or resulting facility require any of the following: • Connection or use of an outlet or discharge pipe (point source such as an oil water separator) that will discharge to the waters of the state (surface and ground water)? • Change in the facility's topography, grading and draining pattern (e.g., adding structures and pavement)? If yes, a SPDES permit may be required. **List all applicable permits in Section 32 Permits.**	**Yes ☐ No ☐** **Yes ☐ No ☐**	Follow Oil-Water Separator, CE-ES-2002 Part 35 CE-MS-4224 Consult with Corporate SME. If a permit is necessary, state notifications and approvals can take several months. Coordinate with Corporate EH&S to start regulatory filing/notifications.	

SECTION 28, PART II: WATER			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
General SPDES Permit: Storm Water Will the construction activities involve any of the following: • Disturbance of one (1) acre or more of land and discharge to New York State surface waters or stormwater sewer? • Disturbance of 5,000 square feet or more of area that falls within the New York City Watershed East of Hudson River in Dutchess, Putnam, and Westchester Counties? If yes to any of the above, the project must obtain coverage under NYSDEC's general permit for stormwater discharge for construction activity.	**Yes ☐ No ☐** **Yes ☐ No ☐**	Construction activities may not begin until all agency approvals are received. General Permit approvals can take several months to secure. Consult with Corporate SME to begin regulatory filing and plan preparations • Prepare SWPPP • Review SWPPP with SME • Submit SWPPP to MS4 or NYSDEC (as applicable) for approval See CEHSP E02.03, Attachment 3	
Individual SPDES Permit Will construction activities be located on sloping terrain adjacent to tributaries to waters of the state? If yes, an individual SPDES permit will be required. Note: Individual permits require more time to secure. Review scope to determine if need for individual permit requirements can be removed	**Yes ☐ No ☐**	Construction activities can not commence until all agency approvals are received. Consult with Corporate SME for determination and to commence regulatory filing and plan preparations • SWPPP preparation • Submission to MS4 for review & acceptance • MS4 acceptance & NOI submitted to DEC	
Dry Wells: • Are there dry wells on site? • If yes, do the construction activities or resulting facility have the potential to impact/disturb the dry well(s)? If yes, consult with Corporate EH&S.	**Yes ☐ No ☐** **Yes ☐ No ☐**	Consult with Corporate EH&S.	
Wastewater Discharges to Municipal Sewer System Will the construction activities or resulting facility	**Yes ☐ No ☐**	See the New York City sewer discharge limits table.	

SECTION 28, PART II: WATER			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
result in wastewater discharges to a municipal sewer system? If yes, analytical results will be required. A municipal sewer discharge permit may be required prior to discharge.			
Wastewater Discharges to Septic Systems Will the construction activities or resulting facility result in wastewater discharge of 1,000 gallons/day or more to an on-site septic system? If yes, this requires a SPDES permit.	**Yes ☐ No ☐**	See the New York City sewer discharge limits table.	
Dewatering: Construction and Operational Activities Will the construction activities involve excavation? If yes, answer the following questions: • What is the depth to groundwater (water table)? Note: Dewatering may be required due to a shallow water table, site conditions and/or construction activity season. • In Brooklyn/Queens, will the project involve the installation of a groundwater well to withdraw water in excess of 45 gallons per minute? If yes, a NYSDEC Long Island well permit is necessary. Note: The design must incorporate soil density testing, collection of a groundwater sample (if encountered) and sample analysis for the local sewer discharge quality parameters. • Do analytical results show that the groundwater exceeds local sewer discharge quality requirements? • Can the construction activities be designed to eliminate or minimize the need to dewater? If not, explain. • Has a dewatering strategy been determined (e.g., on-site filtration, seepage, etc.)? Explain. • Have you consulted with Corporate EH&S to see if a permit is needed?	**Yes ☐ No ☐** _____ **Yes ☐ No ☐** N/A ☐ **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	Contact Corporate SME for assistance in determining if a dewatering plan is required. Review the below listed sources to help determine dewatering plan applicability: **Historical site information** MGP Site location? Appendix B? Incident Reports at site? Review Utility Plates Historical and or new ChemLab Analyticals EDR Search performed? **Hydrogeological** Depth of water table Review Tidal Charts Presence of underground streams? Surface streams (Note that some streams appear during the rain events Is site in flood zone? Is site a wetland? Refer to GEIs 12.08 Wastewater	

SECTION 28, PART II: WATER			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
If no, explain. • Is the construction activity located within 35 feet of a waterway? If yes, consult with Corporate EH&S about the feasibility of discharging to the waterway without a SPDES permit. • In New York City, will there be a discharge of more than 10,000 gallons per day to the sewer system? If yes, refer to GEI 12.08 Wastewater and Stormwater Management. • Will water be discharged for more than one day to the sewer? If yes, consult with Corporate EH&S to obtaining necessary permission.	**Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐** **Yes ☐ No ☐**	and Stormwater Management and GEI 13.04 Work Site Restoration Practices	
Post Construction Will the construction activities or resulting facility cause a change in the drainage at the site? Examples are: • Paving portions of site, • Change in topography, • Excavation activities that impact existing subsurface drainage. If yes, how does the design provide for sufficient stormwater drainage and site management? Explain.	**Yes ☐ No ☐**		

SECTION 29: WELDING AND BURNING			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility involve welding or burning (i.e., hot work)?	**Yes ☐ No ☐**		
Permits and Certificates • Have you determined if the hot work requires a permit? • If welding is required, have you determined if the welder requires a certificate?	**Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP S15.00 Welding, Cutting and Other Hot Work Operations A permit is required in New York City	
On-Site Activities • Does the design address flame control and ventilation? • Can on-site welding be minimized?	**Yes ☐ No ☐** **Yes ☐ No ☐**	CEHSP S15.00 Welding, Cutting and Other Hot Work Operations	

SECTION 30: WORK AREA PROTECTION			
Question		**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Job Set-Up Plan Other than usual job-set up, are high-level protective measures required (e.g., closed sidewalk or closed street signage, use of barriers rather than caution tape, etc.)?	**Yes ☐ No ☐**	Refer to Work Area Protection guidance documents	

SECTION 31: OTHER		
Question	**Resource**	**Describe action taken Are there alternatives to avoid this EH&S concern?**
Will the construction activities or resulting facility involve distinctive features that this Checklist has not covered?		
Provide Details		

SECTION 32: PERMITS
List necessary permits.

ATTACHMENT K

Con Edison - Rules We Live By updated January 2012

CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

CEHSP A32.00 – Rules We Live By
Effective Date: 01/04/2010

CONTENTS

1.0 PURPOSE

This procedure establishes a consistent approach to communicating and reinforcing the importance of following critical safety work practices designed to protect employees, contractors, and the public.

2.0 APPLICABILITY

This Corporate Environmental, Health and Safety Procedure (CEHSP) apply to all Con Edison employees (management and union) and contractor employees working for Con Edison.

3.0 INTRODUCTION

There are safety and operational procedures specifically designed to protect against the potential for significant injury due to the energy (electricity, gas, steam, or falling from elevation) that must be controlled. Operating groups that work with these sources of

energy have identified Rules We Live By. This is defined as a work procedure or safety requirement that, if not followed, could result in a severe injury or fatality, or place other individuals (employees or members of the public) at significant risk.

4.0 COMPLIANCE REQUIREMENTS

4.1 RULES WE LIVE BY IDENTIFICATION, TRAINING, AND REPORTING

4.1.1 IDENTIFICATION

Where work tasks require the safe control of electricity, gas, steam, or work at elevation, the operating organization must identify key procedures required to control the energy or mitigate the effect or impact onto the employee, fellow employees, contractor employees or the public. Lessons learned from previous incidents must be included in the identification process. To see the Central List of the Rules, click here.

.
An organization must notify Corporate EH&S of any change to a Rule.

4.1.2 TRAINING AND COMMUNICATION

An organization's Rules We Live By and associated procedures must be reinforced in applicable skills training.

Each employee in the organization must receive OJT training on the Rules We Live By identified by the organization.

Rules We Live By must be reinforced, when applicable, in job briefings.

Rules We Live By must be incorporated into the scope of safety field observations and inspections.

Where contractor work practices involve Rules We Live By, contractor employees will be trained on the applicable Rules We Live By, reporting procedure, and consequences. The operating organization must communicate the applicable Rules to contractor management and ensure the Rules are incorporated in the HASP. The contractor supervision will be required to train their affected employees and subcontractor employees before they begin work.

4.1.3 REPORTING AND INVESTIGATION

If a supervisor observes a Rule We Live By being violated, the work must be stopped immediately.

If an employee, not a supervisor, believes a Rule We Live By may have been violated, he/she must stop the work immediately and report the situation to the supervisor of the employee who committed the alleged violation.

Resolution of the alleged violation must follow the Time Out process as defined in CEHSP 28 – Calling a Time Out.

4.2 VIOLATION OF A RULE WE LIVE BY

A violation of a Rule We Live By will result in significant consequences.

Any employee who witnesses a violation of a Rule We Live By and does not stop the work and report the violation will also be considered to have violated the Rule.

A violation by a contractor company or by a sub-contractor must be reported via an action line by the operating organization with contractor oversight.

The organization must notify Corporate EH&S after action has been taken as a result of the violation.

4.3 DEFINITIONS

Con Edison employee: This includes all management and union employees.

Contractor employee: This includes all per-diem contractor employees and those employees working for a contractor company hired by Con Edison.

RULES WE LIVE BY
2012

Hazard	Electric Operations	Central Operations	Gas Operations	Customer Operations	Business Shared Services (CFS)	Enterprise Shared Services (Facilities)
Verify Dead/Lockout-Tag Out	Properly test or spear to ensure that electric equipment, cable, or wire is "dead" as required regardless of voltage, before beginning dead work activities.	Properly test or verify that equipment is de-energized, isolated and protected prior to initiating dead work activities."				Properly lock out/tag out equipment before beginning work on the equipment
Permits (Operating, D-faults)	Enter D-Fault tagged structures only when authorized by the operating authority to perform feeder processing.	• Operating Orders and Work Permits - Only perform work that is within the authorized scope of work as listed on the work permit. • Do not change the status of a piece of equipment that has a Stop Tag applied to it. • Follow the sequence of an operating order.		Do not enter a structure that has been classified and tagged as a D-fault	Operating Orders and Work Permits - Only perform work that is within the authorized scope of work as listed on the work permit.	
Atmospheric Testing	• Perform atmospheric testing and ventilate as required before entering and while working in an enclosed space or a permit-required confined space. • For excavations greater than 4 feet in depth the atmosphere shall be tested prior to entry or when the excavation is not already occupied	• Perform atmospheric testing and ventilate as required before entering and while working in an enclosed space or a permit-required confined space. • For excavations greater than 4 feet in depth the atmosphere shall be tested prior to entry or when the excavation is not already occupied	• Perform atmospheric testing and ventilate as required before entering and while working in an enclosed space or a permit-required confined space. • For excavations greater than 4 feet in depth the atmosphere shall be tested prior to entry or when the excavation is not already occupied	• Perform atmospheric testing and ventilate as required before entering and while working in an enclosed space or a permit-required confined space.	• Perform atmospheric testing and ventilate as required before entering and while working in an enclosed space or a permit-required confined space.	
Rescue/Retrieval	Entrant and attendant are required to wear rescue harness when working in enclosed spaces	Entrant and attendant are required to wear rescue harness when working in enclosed spaces	Entrant and attendant working in enclosed spaces shall wear rescue harnesses, when required	Entrant and attendant are required to wear rescue harness when working in enclosed spaces	Entrant and attendant are required to wear rescue harness when working in enclosed spaces	
High Hazard Energy PPE	• Use fall protection equipment as required. • Use the appropriate rubber gloves, rubber sleeves, fire retardant clothing, and eye protection/face shield as required for the electrical hazard.	• Use fall protection equipment as required • Use the appropriate rubber gloves, rubber sleeves, fire retardant clothing, and eye protection/face shield as required for the electrical hazard	• Use fall protection equipment as required • Wear fire retardant (FR) coveralls when working on blowing gas. • Wear FR hood and FR glove liners whenever airline respirators are required.	• Use fall protection equipment as required • Use appropriate rubber gloves, rubber sleeves, fire retardant clothing, and eye protection/face shield as required for electrical work. • Do not come into contact or move a downed or low hanging utility wire while performing Site Safety or Damage Assessment work.	• Use fall protection equipment as required. • Use the appropriate rubber gloves, rubber sleeves, fire retardant clothing, and eye protection/face shield as required for the electrical hazard	• Use fall protection equipment as required
Sheeting/Shoring		Ensure that excavations five feet or deeper are properly sheeted and shored before anyone enters.	Ensure that excavations five feet or deeper are properly sheeted and shored before anyone enters.			

RULES WE LIVE BY
2012

Gas Piping Integrity Test			Perform an integrity test before a customer turn on.	Perform an integrity test before a customer turn on.		
Securing Loads					Reels over 5,000 Lbs are secured per DOT requirements	

conEdison, inc.

PURCHASING NEWSLETTER FOR CONTRACTORS

Volume 10, Issue 3 | Purchasing Department | Fall 2009

Standards of Business Conduct

The Standards of Business Conduct (SBC) has been developed for vendors that do work with CECONY and O&R (collectively "Company"). Company is committed to conducting all dealings with contractors, vendors, and other business associates in a fair, ethical, and lawful manner. Company has established a comprehensive ethics program to support ethical business conduct. Without exception, every employee of Company is required to follow the policies and practices set forth in the SBC.

If a policy, procedure or proper course of action is not clear, or if you see a Company employee or another contractor engaged in a potential violation of the SBC, please contact one of the following numbers:

CECONY Ethics Helpline: **1-800-253-8885**

ORU Ethics Helpline: **1-845-577-3551**

ORU Ethics Office: **1-845-577-2943**

Several principles of business conduct discussed in the SBC are: Conflict of Interest, Gifts and Entertainment, Complying with Laws and Regulations, Respecting Our Employees Environment, Safety Safeguarding Our Workplace, Fair Dealing, Accounting and Business Records, Protection and Proper Use of Company Assets, Protection and Use of Confidential Information, Prohibition on Insider Trading, and Use of Former Company Employees.

The SBC document will be part of the Vendor Qualification Application, Disclosure Form and the Company's No-Gift Policy Letter.

Disclosure Forms

Updates have been made to the Contractor Disclosure Form, which is used for bids valued at $350,000 or greater and is to be filled out by a principal or owner of a firm submitting the form. The updated form requires that you provide information relating to affiliates of your company as well as present or former partners, principals, directors, officers, employees, etc. In addition, questions related to OSHA, environmental, legal matters, business ownership and structure, financial structure and SBC are also addressed in the updated form.

Your input is important to us.

If you have comments, questions, or an article to submit, we'd like to hear from you.

E-mail us at **robinsonsa@coned.com**.

Standard Terms and Conditions for Construction Contracts

There have also been several updates to the CECONY Standard Terms and Conditions for Construction Contracts (ST&C's). The updates relate to the use of former Company employees on Company projects and a requirement that while on or about the site of work Contractor's employees are required to have available for review Contractor or government issued name and photo identification. The updated ST&C's are available on our website at **http://apps.coned.com/purchasing/tc.asp**

The Rules We Live By

Effective January 1, 2010, Con Edison is initiating a program of Rules We Live By. The purpose of establishing this new class of Rules is to put a spotlight on those few critical work procedures or safety requirements that, if not followed, could result in a severe injury or fatality, or place other individuals (employees, contractors, or members of the public) at significant risk.

The Rules We Live By encourages and set an expectation for all employees to seek and accept responsibility for safety. The Rules apply to all management and union employees, and to contractors, and all can be tied to current procedures. Examples include: Verifying Dead /Lockout-Tag Out; Working within Permits (Operating, D-faults); Performing Atmospheric Testing; Using Rescue/Retrieval; and High Hazard Energy PPE. The operating organization responsible for contractor oversight will communicate the applicable Rules through the Health and Safety Plan (HASP) process. The Rules are organization-specific; however, if you are engaged in work with or for another organization, its Rules will also apply.

Contractors will be required to train their employees on the applicable Rules and reporting procedure. It is still important to follow all procedures, however, the Rules We Live By leave no room for non-compliance and failure to adhere to them will result in significant mandatory discipline for both the employee and the employee's company. A violation by a contractor will be reported via an Action Line. If you see a violation occurring or that could occur, stop the work, and notify your Contract Administrator. If necessary, use the Time Out process. It's your responsibility not to look the other way.

ATTACHMENT L

CEHSP A28.00 – Calling a Time Out

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

CEHSP A28.00 – Calling A Time Out

(CSP converted to CEHSP on 07/16/2008)

Revision 4: 08/04/09 Effective Date: 10/01/09

CONTENTS

1.0 PURPOSE

IT IS THE POLICY OF CON EDISON TO MINIMIZE ENVIRONMENT AL, HEALTH AND SAFET Y (EH&S) CONCERNS WHENEVER POSSIBLE. This procedure outlines the process for calling a ***Time Out*** or work stoppage due to a safety, health and/or an environmental concern and resolving the Time Out before proceeding with work.

2.0 APPLICABILITY

This Corporate Environmental, Health and Safety Procedure (CEHSP) applies to all Con Edison employees and contractors.

3.0 INTRODUCTION

The company's commitment to EH&S excellence requires that all work proceed only if it is safe and environmentally sound. The responsibility for fulfilling this requirement rests with every employee and contractor. Success depends on open communication between individuals and their supervisors prior to beginning work, and – in certain cases – after EH&S issues are identified.

4.0 COMPLIANCE REQUIREMENTS

4.1 CALLING A TIME OUT

All work shifts must begin with a job briefing in which safety, health, and environmental issues are discussed. If an employee has an EH&S concern, he/she must discuss it with his/her supervisor before proceeding with the job. After discussion, if there is still uncertainty on how to

proceed or the concern is not adequately addressed, the employee has the right to call a Time Out without reprisal.

When a safety, health, and/or environmental concern arises on a job, the concerned employee must stop the work in question and immediately contact his/her supervisor to provide information regarding the nature of the hazard or EH&S-related concern. The supervisor must discuss the concern with the employee, either in person or on the phone, and attempt to resolve it. If the concern is resolved to the satisfaction of the employee and the supervisor and if there is certainty that all safety, health, and environmental procedures are being followed, the work may continue. If the concern is not resolved to the satisfaction of the employee and/or supervisor, work is to remain stopped and the employee must call a Time Out. The Time Out applies only to the location where it has been called; there are no system-wide or company-wide Time Outs.

4.2 RESOLVING A TIME OUT

Once a "Time Out" is called, the following process must be followed to resolve the concerns:

- The local EH&S representative is to be contacted to obtain assistance in resolving the concern. For support groups working in the field, their organization's contact person must also be notified. The local EH&S representative will act as the authority (expert) related to health, safety, and environmental rules, regulations, and procedures and either make a determination on the merits of the concern or contact an appropriate subject matter expert (SME) from other areas of the company, including, but not limited to Engineering, Corporate EH&S, or operations. In general, the number of people involved in the Time Out must be kept to the minimum required to resolve the issue. If the local EH&S representative understands all of the issues involved in the Time Out and all EH&S concerns are addressed, the local EH&S representative's determination is final and the Time Out is concluded.

- When the local EH&S representative determines that support is needed from a company SME, the SME will serve as the final arbiter of the Time Out. In this instance, once all EH&S concerns are addressed, the SME's decision is final and the Time Out is closed.

- In either case, whether the local EH&S representative or the SME is called, once the EH&S concern is evaluated and either it is determined that no safety, health or environmental issue exists or that the EH&S concern has been mitigated, the employees are expected to return to work.

- If the local EH&S representative cannot be reached, the job cannot continue until EH&S intervention is obtained. The Corporate EH&S Response Team (ERT) can be used either to directly resolve the issue or to reach another EH&S representative who can. Furthermore, any person listed on the ***Time Out card*** may be called to resolve the issue.

- Pending resolution of the Time Out, in emergency and other situations where extensive job and procedural reviews are necessary to resolve the concerns, an alternate work plan (where practical) approved by the responsible SME will be implemented to complete the job. Before proceeding with any work prior to the resolution of the "Time Out," the Operating Supervisor and the local EH&S representative must ensure that the work will be performed in full accord with EH&S procedures, that all rules and regulations will be followed, and that safety, health, and environmental risks will be minimized.

At the conclusion of all "Time Out" situations, it must be clearly stated to all those involved that the "Time Out" is over.

When an EH&S concern has been raised, the employee and supervisor have resolved the issue themselves, and work has proceeded, the supervisor must notify the local EH&S representative if the concern was significant or could recur. In all Time Out situations, the EH&S representative will review the incident in a timely manner, determine if the Time Out has implications outside the organization/area where it occurred, and take appropriate steps to prevent its recurrence.

4.3 TIME OUT SAFETY TALK

To ensure that all employees are familiar with and understand the Time Out Program, an annual safety talk (SAF7240) must be provided.

4.4 TIME OUT CARD

Each organization must issue a Time Out card to all of its employees. All cards is must be green and white, approximately 3-1/2 inches by 2 inches, and include the following information, at a minimum:

SIDE 1	SIDE 2
You Can Always Call a Time Out	Operating Area Location/Organization
If you have a safety, health, and/or environmental question and/or concern, we are available 24 hours a day for assistance.	No job proceeds until it is made safe and environmentally sound
Con Edison Picture of "Referee"	List names and telephone numbers of local EH&S staff or Call the Control Center at (xxx) xxx-xxxx, to reach a Safety or Environmental Specialist to assist you

5.0 DEFINITIONS

Time Out: Mechanism for any company employee to stop a job if he or she is unsure of how to proceed because of a safety, health or environmental concern. A Time Out can only be called if the concern cannot be resolved to the satisfaction of the employee and supervisor.

Time Out Card*:* A green and white card, approximately 3-1/2 inches by 2 inches, issued to all company employees for the purpose of calling a Time Out.

6.0 RESPONSIBILITIES

Employees**:** Employees are responsible for discussing EH&S concerns with their operating supervisors and calling a Time Out, when appropriate.

Local EH&S Representative: The local EH&S representative is the operating department's EH&S manager or one of his/her staff members. The local EH&S representative is responsible for:

- Determining the merits of EH&S issues identified by operating supervisors and resolving Time Outs, if possible.

- Contacting the appropriate SME if additional guidance is needed.

Operating Supervisor: The operating supervisor is a supervisor in an operating department with that title or any other supervisor in another department. The operating supervisor is responsible for:

- Attempting to resolve EH&S concerns raised by employees.

- Contacting the local EH&S representative if the employee EH&S concern cannot be resolved.

- Assessing the significance of any EH&S concerns raised and notifying the local EH&S representative of concerns that are significant or are likely to recur.

Subject Matter Expert: The SME is an individual who has detailed, specific knowledge on a particular subject by the nature of his/her education, training and experience. The SME is responsible for:

- Providing assistance to the local EH&S representative in resolving Time Outs.

- Serving as final arbiter of Time Outs.

- Approving alternate work plans, where necessary

Corporate EH&S Response Team (ERT) **:** If the local EH&S representative cannot be reached, the ERT is responsible for directly resolving the Time Out or reaching another EH&S representative who can.

7.0 REFERENCES

This CEHSP was developed by Con Edison as a matter of policy to ensure open communication about, and prompt resolution of, EH&S issues arising on the job.

ATTACHMENT M

CEHSP E08.02 – Noise Construction and Utility Activities

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

LAND USE

CEHSP E08.02 – Noise Construction and Utility Activities

(CEP converted to CEHSP on 07/24/2008)

Revision 5: 12/10/2008 Effective Date: 12/10/2008

CONTENTS

1.0 PURPOSE

IT IS THE POLICY OF CON EDISON TO COMPLY WITH STATE AND LOCAL REGULATIONS PERTAINING TO NOISE. The purpose of this procedure is to ensure that all company personnel perform appropriate actions to prevent ***unreasonable noise*** and comply with permissible noise limits.

2.0 APPLICABILITY

This Corporate Environmental, Health and Safety Procedure (CEHSP) applies to all Con Edison personnel and contractors, both on and off Con Edison facilities and at field locations, who attend to Con Edison equipment, facilities, or operations that create noise that could be considered unreasonable.

3.0 INTRODUCTION

New York City, and many local governments in the Company's service area have restrictions on the level of noise that may be produced. In general, these limits apply to two types of situations: ***facility operations***, and ***field operations***. In New York City, however, three distinct situations apply: ***facility operations***, construction activities and utility activities (street work). In addition, the restrictions vary by time of day. Con Edison has compiled tables summarizing the noise regulations applicable in the Company's service area. These tables can be found in Attachments *1* and *2*.

In addition, New York State regulations address noise from certain heavy duty trucks. These requirements are discussed in Section 4.4, New York State Noise Requirements.

4.0 COMPLIANCE REQUIREMENTS

Equipment and operations associated with Con Edison facilities and services can produce noise. All equipment used by Con Edison should be in good working order, properly maintained, and properly used. Where possible, noisy equipment should not be located near ***noise-sensitive areas and/or sensitive receptors***, e.g., schools, hospitals, and churches.

Where a given operation could be accomplished using a variety of equipment, equipment with operating characteristics that produce less noise should be used. The facility or field manager is responsible for ensuring compliance with all federal, state and local noise regulations.

Qualified personnel should execute the procedures regarding noise measurements described in the following sections. Qualified personnel are defined as personnel from Con Edison Technical Service, who are trained to make noise measurements according to American National Standards Institute ***(ANSI)*** standards, and are operating under the advice from Con Edison's Environment, Health and Safety (EH&S) noise subject matter expert (SME) . The person should be familiar with the make and type of equipment used in these measurements, calibration and should be experienced in general noise data collection procedures. The person should be able to identify ***impulsive*** and ***tonal noise.*** Measurements should be made using a Type 1 ***Sound Level Meter (SLM)*** / preamplifier/microphone combination.

4.1 FIELD OPERATIONS

Field operations include maintenance, installation, upgrade, and repair of Con Edison equipment. These types of operations include repair or installation of aboveground and belowground power transmission conduits (electrical, natural gas, steam), repair or installation of power transmission equipment, tree maintenance, on-site or off-site construction or demolition, and use of any safety equipment associated with these procedures.

Most field operations, other than operations undertaken outside of permissible times, can be thought of as construction activities. Constr uction activities additionally covered under this CEHSP include any activity (except tunneling) necessary or incidental to the erection, demolition, assembling, altering, installing, or equipping of buildings, public or private highways, roads, premises, parks, utility lines including such lines in already-constructed tunnels or other property, land clearing, grading, excavating and filling. Many communities have time restrictions on such activities, which must be adhered to. Additional requirements (discussed below), including the preparation of a Noise Mitigation Plan and additional sound-reducing devices, are required for work performed in New York City.

Unreasonable Noise

In addition to time restrictions, certain noise codes have specific regulations that must be followed regarding field activities. These regulations are summarized below.

- Construction devices – Prohibiting use of construction devices (e.g., air compressor, pile driver, bulldozer, crane, hoist) so as to create unreasonable noise.

- Containers and construction material – Prohibiting handling or transport of any container or any construction material in a public place so as to create unreasonable noise.

- Exhausts - Except as otherwise provided in the New York City code, prohibiting discharge into the open air of the exhaust of any device, including but not limited to any steam engine, diesel engine, internal combustion engine or turbine engine, so as to create unreasonable noise.

- Power tools – Prohibiting use of power tools (e.g., nail guns, saws, vacuums, drills) so as to create unreasonable noise.

- Schools, hospital, courts – Prohibiting unnecessary noise through the use of any device on any street adjacent to any school or court while the same is in session, or adjacent to any hospital.

- Sensitive receptors – Prohibiting unnecessary noise through the use of any device within 50 feet of a school, house of worship, hospital, retirement community, open tract of serene land, park or recreation area, and psychiatric centers.

4.1.1 Utility Activities Within New York City

Negotiations with NYCDEP from 2005 to 2006 resulted in the partial exemption for utility-related construction, such as street activities, cable and pipe replacements, and new infrastructure installation.

Utility-related Construction must meet the following requirements:

- Each site where utility-related construction activities occur, or construction devices/tools are used, must have a filled-out Utility Noise Mitigation Plan on-site and posted. This requirement does not apply to safety devices utilized while performing routine maintenance task, such as ventilation blowers.

- OJT/Tailboard Talk training for all personnel who perform utility-related construction is required. Although our present CEHSP and GEIs satisfy this training requirement, additional training has been developed to assist with full compliance.

- The new code has restrictions on the types of tools that can be used, rather than list noise limits for each type as in the prior code requirements.

- Sensitive Receptors such as hospitals and schools adjacent to work locations should be communicated with prior to work starting when possible.

- For work longer than 3 days continuously in one location, postings and other communication must be sufficient to inform all residents within 200 feet of schedule.

Utility Noise Mitigation Plans

A utility noise mitigation plan template is included as *Attachment 3*. The utility noise mitigation plan should be filled out by the job supervisor or field foreman prior to the start of construction activities – only devices deemed in compliance with NYCDEP regulations shall be utilized. If there are any deviations from the approved items, the ConEd noise SME must be consulted prior to the start of work activities.

Elements of the utility noise mitigation plan include the following requirements:

- Self-certification that tools/equipment maintained so they operate at normal manufacturer's operating specifications.
- Tools/equipment must be equipped with appropriate manufacturer's noise reduction device.
- Specialized vehicles require use of additional noise mitigation measures.
- Use of noise-insulating fabric for portable pumps, compressors, generators, etc.
- Quieter equipment shall be used when available or when required by the NYCDEP. Prohibit unnecessary engine idling.
- Properly install and secure steel traffic plates – must re-set and secure within 24 hours of a call from the DEP to the utility.
- Notify all residents within 200 feet of construction area when work is scheduled to be longer than 3 days.
- Notification shall include information on schedules/work locations.
- Respond to all noise complaints/official DEP notice on same day. If after hours, respond next day.
- Phase in vehicles with quieter backup alarms – already being done at ConEd.
- Establish / implement formal noise mitigation training program.
- Includes field supervisory personnel and subcontract supervisors.
- Supervisors shall field-train all field workers.
- Minimize noise impact of sensitive receptors.
- Schools, hospitals, places of worship, etc.
- Required to work with facility owner/operator.
- Perimeter ***noise barriers*** must be used in accordance with 28-101(g) of NYC Chapter 28.
- If project is non-emergency, long-term (greater than 15 days) where there is a dedicated lane, must comply with 28-100 through 28-104.

Permissible Hours of Utility Activities

Regulations concerning utility activities within New York City are listed below. All utility-related construction activities which fall outside these hours require after-hours authorization from the NYCDEP, the NYCDOB, or the NYCDOT. Additional noise mitigation methods may also be required if the NYCDEP so indicates for after-hours work.

Hours of Work are to be in accordance with NYC DOT permit stipulations and/or NYC DOT Highway Rules, generally 7 AM through 10 PM w eekdays for utility activities. Please note the extension to 10 p.m., also applies to Con Edison's contractors. Additional mitigation techniques for receptors within 200 feet may be required by the DEP for hours between 10 PM and 7 AM during weekdays and 7PM through 7AM during weekends.

4.1.2 Construction Operations Within New York City

Construction Activities

General construction and demolition will have to m eet the Utility requirements in addition to the following:

- More complex Mitigation Plans (must be completed as part of planning the work and prepared with the assistance of the noise SME)
- Specific mitigation requirements for a variety of tool/equipment types
- Certain activities may require enclosures/barriers to reduce noise
- Certain projects with perimeter construction fences shall be required to have noise attenuating material added to the fencing
- Quieter or "smart" back-up alarms are required.

Construction Noise Mitigation Plans

All construction work performed within New York City must be performed in accordance with NYC Administrative Code, Chapter 28. For all construction activities, a Noise Mitigation Plan (*Attachment 3*) must be completed. Only NYCDEP-approved devices or equivalent may be used on-site. NYCDEP must approve the plan, how ever would pre-approve generic plans with checklists for certain repetitive work. Consult with the Corporate Environmental Health and Safety Department for assistance.

The Mitigation Plan must be written and clearly posted at the job site. Elements of the construction and demolition noise mitigation plan include the following requirements:

- More complex Mitigation Plans (must be completed as part of planning the work and prepared with the assistance of the noise SME)
- Residents within 200 feet of a construction site shall be given notice when work is scheduled for longer than 3 days. Conspicuous posting of such information, or where necessary notification of building managers/owners, shall satisfy this requirement.
- The owner/operator of sensitive receptors (e.g. schools, hospitals and places of worship), adjacent to this site, shall be contacted when practicable to coordinate work to minimize impact on the property.
- Self-certification that tools are maintained so that they operate at normal manufacturer's operating specifications. The NYCDEP will refer to an outside source to determine if your equipment "may be the source of a noise complaint".

- Use of mufflers/noise mitigation devices on equipment and construction vehicles to meet requirements. *(Note: If equipment continues to exceed level as specified in the Appendix of Rules, a five day cure periods is allowed to perform maintenance, replace equipment and file an Alternative Noise Mitigation Plan.)*

- Mitigation of noise from internal combustion engines.

- Prevention of vehicle idling and use of quieter backup alarms.

- Use of noise barriers if site is within 75 feet of a residential receptor or 200 feet of ANY receptor.

- By January 1, 2008, quieter or "smart" back-up alarms will be required.

- Construction projects that are not regard as "utility work" (e.g. building construction or demolition, major renovation, or any installations) that are not completed within **15 calendar days**, will not fall under the same exemption as work on the system.

- Construction material shall not be handled in such a way as to create unreasonable noise.

Permissible Hours of Construction

Regulations concerning construction activities within New York City are listed below. All construction activities which fall outside these hours require after-hours authorization from the NYCDEP, the NYCDOB, or the NYCDOT. Additional noise mitigation methods (such as noise barriers) are required if work is performed outside these hours.

Hours of Work are to be in accordance with NYC DOT Permit Stipulations and/or NYC DOT Highway Rules, generally 7 AM through 6 PM week days for construction activities. Additional mitigation techniques for receptors within 200 feet may be required by the DEP for hours between 7 PM and 7 AM during weekdays and dur ing weekends. There is an exception for occupied one or two family dwellings, convents or rectories between 10 a.m. and 4 p.m. on wither Saturday or Sunday (Note: Must be a minimum of 300 feet from house of worship).

4.1.3 Operations Outside New York City

Permissible Hours of Construction

Regulations concerning normal field operations are listed in the table in *Attachment 1*, Normal Field Operation Regulations. Except where indica ted, these are simply day and time restrictions imposed by the various communities. In many case s, providing that field operations do not occur outside these day and time restrictions, the field operations will be in compliance with the local noise codes.

Specific Requirements

Some noise codes require special muffler requirements on devices such as engines, air compressors, and pavement breakers. In addition, certain communities impose noise limits on construction activities. If there are specific noise levels stated in the Special Requirements column of the table in *Attachment 1*, noise monitoring may be required. Careful attention should be given to the equipment and vehicles used in field operations utilizing impact equipment that

emit high impulsive noise levels such as pile drivers, pavement breakers, and steam shovels. [6] P

The following procedures apply only to field operations that require noise monitoring as indicated in *Attachment* 1 and may be skipped if no special requirements are listed in Attachment 1.

4.2 OPERATIONS UNDERTAKEN OUTSIDE OF PERMISSIBLE TIMES

In some jurisdictions, noise from operations undertaken outside of permissible times as a result of dealing with emergency situations is exempt from local noise restrictions. However, some jurisdictions impose time limits on such operations, may require a variance for such operations, and/or may require repair operations to commence within a certain time limit of the ***emergency event***. NYC may issue variance from noise standards for the construction activity. Variance may be granted for the initial period of three days and then renewed. The variance must be clearly posted. If work must begin without variance, an application must be submitted within ***12*** **hours** of commencement.

4.2.1 Utility Activities Within New York City

For utility work conducted outside of 7AM – 10 PM on weekdays, additional authorization must be obtained from NYCDOB, NYCDOT or NYCDEP to work outside those hours. From 6PM – 10PM weekdays, any required daytime noise mitigation controls must be utilized. From 10PM – 7AM weekdays and 7PM – 7AM weekends, additional noise mitigation controls may be required by the DEP if there are any receptors within 200 feet. This will be determined on a case-by-case basis.

4.2.2 Construction Operations Within New York City

In New York City, in the case of urgent necessity in the interest of public safety, the NYCDEP is authorized under the New York City Noise Code to issue a variance from the provisions of the Construction Activity Noise Code provisions for any such construction activity. Such a variance may be granted for an initial period of up to 3 days, and may be renewed for periods of 3 days or less while such urgent necessity continues. The variance must be clearly marked on the license or permit, which must be prominently posted at the job site.

4.2.3 Operations Outside New York City

Refer to the Noise Regulations for Operations Undertaken Outside of Permissible Times (*Attachment 4*), for any required variances, time limitations, and exemptions regarding operations undertaken outside of permissible times. [8] R/P

4.3 NOISE MONITORING METHODOLOGY

The noise measuring device should be set to use the descriptor specified in the local noise code, as indicated in Special Requirements column of the *Attachment* 1. Noise that is considered impulsive must be noted and used in the evaluation of the maximum allowable levels given in *Attachment 3*, the Normal Field Operation Regulations Table. Measurements should be made in such a way as to exclude ***extraneous noises***. Measurements should not be made while ***adverse meteorological conditions*** are occurring in the study area.

Repeat this procedure for each boundary at the property line. Compare the measured property line levels with the maximum allowable levels for the corresponding area in *Attachment* 1. If measured noise levels are below the maximum allowable noise levels for the corresponding types of noise, as indicated in the Special Requirements column of (*Attachment* 1), then noise levels from the Normal Field Operations meet the requirements of the local noise code. If measured levels exceed the maximum allowable levels, the noise from l field operations exceeds the local noise codes. [7]

New York City no longer requires noise measurements for normal field locations. Use ***A-weighted*** measurements. All measurements must be taken by "qualified personnel" only.

5.0 DEFINITIONS

Adverse Meteorological Conditions: Rain, snowfall, snow-covered ground, wet ground, gusty winds, and high winds. Measurements should not be made during these types of conditions.

ANSI: Acronym for "American National Standards Institute".

A-Weighted: Measurement that assigns each frequency a "weight" through the use of a filter network that is related to the sensitivity of the ear at that frequency. The level of the filtered signal is displayed as the A-weighted level. The A-weighted frequency characteristic was originally designed to mirror the 40-phon equal-loudness-level contour of the 1933 Fletcher-Munson data.

Emergency Event: The need for immediate repair of Con Edison equipment associated with Con Edison operations due to situations that are causing or are likely to cause service interruptions, or situations that present an imminent danger to the public. Examples include repair or installation of aboveground and belowground power transmission conduits (e.g., electrical, natural gas, steam), immediate repair or installation of power transmission equipment, and immediate tree maintenance.

Extraneous Noises: Noises that are not associated with Con Edison operations. Extraneous noises include, but are not limited to, passing aut omobiles or trucks, railway activity, nearby aircraft, nearby construction or demolition, natural sounds, and other nearby noises not associated with Con Edison operations.

Facility Operations: Operational procedures of Con Edison facilities which are essential for normal Con Edison operations. Examples include power generation, compressors, turbines, pipes and valves, bulk material transport, deliveries, fans, and any on-site maintenance or modifications.

Field Operations: Maintenance, installation, upgrade, and repair of Con Edison equipment associated with Con Edison operations. Examples include repair or installation of aboveground and belowground power transmission conduits (e.g., electrical, natural gas, steam), repair or installation of power transmission equipment, tree maintenance, and on-site construction or demolition.

Impulsive Noise: A single short burst or a series of short bursts of sound pressure. The pressure-time history of a single burst includes a rise to peak pressure, followed by a decay of the pressure envelope. The pressure-time history of a single burst includes a 6 dB, or greater, rise to peak pressure, followed by a decay of the pressure envelope, when the rise to peak

pressure occurs in 1 second or less. For noise containing a series of short bursts of sound pressure, the noise will be considered impulsive if each impulse in the series is separated in time by less than 1 second. Examples include thunder, noise as a result of pile-driving, steam-shoveling, etc.

Noise Barrier: A structure used for the purpose of placing near a noise source to reduce the noise level measurable at a receptor location.

Noise-Sensitive Area (a.k.a Sensitive Receptor): Tracts of land where serenity and quiet are extraordinarily important and serve an important public need, and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks, or portions of parks or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and old-age homes.

Octave Band: A filter with a single transmission band or passband with relatively low attenuation extending from a lower band-edge frequency greater than zero to a finite upper edge frequency which is twice the lower band-edge frequency. The nominal midband frequency, for a set of contiguous octave bandpass filters, is one of a series that includes 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, and 8000 hertz, extended by successive multiplication or division by 10.

Qualified Personnel: Personnel from Con Edison Technical Service, who are trained in calibrated noise measurements and calibrated ***octave band*** measurements, according to ANSI standards, and are operating under the advice from Con Edison EH&S. Qualified personnel should be familiar with the make and type of equipment used in the measurements, and experienced in general noise data collection procedures. Qualified personnel should be able to identify impulsive and periodic noise.

Receptor: Real property, including but not limited to buildings, grounds offices and dwelling units, from which sound levels from sound sources outside such property may be measured.
Sound Level Meter (SLM): Device used to measure sound pressure level with a standardized frequency weighting and indicated exponential time weighting for measurements of sound level, or without time weighting for measurement of time-average sound pressure level or sound exposure level.

Tonal Noise: For the purposes of this document, noise containing single-frequency tones, when the sound pressure of any single-frequency tone in any octave band exceeds the non-tonal masking noise in the corresponding octave band by 6-dB or more. This corresponds, in general, to a tone being prominent when it is more than 10 dB above the threshold of audibility. Examples of tonal noise would include transformer hum, idling engine noise, and constant-rpm engine noise.

Unreasonable Noise: Any excessive or unusually loud sound that annoys, disturbs, injures, or endangers the comfort, repose, health, peace, or safety of a person or that causes injury to plant or animal life, or damage to property or business.

6.0 REFERENCES

NOTE: Con Edison is subject to numerous local noise regulations. Tables have been developed summarizing the local noise regulations applicable in Con Edison's service area. These tables include:

- Attachment 1, Field Operation Regulations
- Attachment 4, Noise Regulations for Operations Undertaken Outside of Permissible Time

For purposes of the References section, the annotations are limited to citations to New York City and New York State regulations. Readers are referred to the Tables for local requirements.

Note: References are forthcoming.

ATTACHMENT 1
FIELD OPERATION REGULATIONS

CITY, TOWN or VILLAGE	ALLOWABLE NORMAL OPERATION DAYS/HOURS	SPECIAL REQUIREMENTS
Airmont	Mon-Sat 8:00am-10:00pm	L_{10} (1) levels must not exceed 60dB(A) at construction site boundary
Beacon	7:00am-11:00pm	
Briarcliff Manor	Mon-Sat 8:00am-7:00pm	Blasting and Rock Drilling permitted only Mon-Fri 9:00am-5:00pm
Bronxville	Mon-Fri 8:00am-6:00pm	
Buchanan (Village of)	8:00am-7:00pm	
Chestnut Ridge (Village of)	Mon-Sat 8:00am-7:00pm	L_{10} (1) levels must not exceed 60dB(A) at construction site boundary
Clinton	7:00am-8:00pm	
Croton on Hudson	Mon-Sat 8:00am-10:00pm Sundays 10:00am-8:00pm	
Dover	7:00am-9:00pm	
Greenburg	Mon-Fri 7:00am-8:00pm Sat 9:00am-6:00pm; no work on Sunday	
Hyde Park	6:00am-11:00pm	
LaGrange (Town of)	6:30am-9:00pm	
Larchmont	Mon-Fri 8:00am-7:00pm Sat 9:00am-6:00pm Sun 10:00am-5:00pm	L_{10} (1) levels must not exceed 70dB(A) at a distance of 40 feet
Lewisboro	Mon-Sat 8:00am-7:00pm	
Mamaroneck	Mon-Fri 8:00am-8:00pm Sat 9:00am-6:00pm Sun 9:00am-5:00pm	Pile Drivers and Steam Shovels permitted only Mon-Fri 8:00am-6:00pm No noise permitted beyond property border
Millbrook (Village of)	7:00am-10:00pm	Hours of restriction only apply when within 500 feet of residential zone.
Montebello	Mon-Sat 8:00am-10:00pm	L_{10} (1) levels must not exceed 60dB(A) at construction site boundary
Mount Pleasant	8:00am-6:00pm	• L_{10} (1) levels must not exceed 70dB(A) at a distance of 400 feet when bordering residential zone from 8:00am-6:00pm. • L_{10} (1) levels must not exceed 55dB(A) at a distance of 400 feet when bordering residential zone from 6:00pm-8:00am. • L_{10} (1) levels must not exceed 75dB(A) at a distance of 400 feet bordering nonresidential zone during business hours. • L_{10} (1) levels must not exceed 80dB(A) at a distance of 400 feet bordering nonresidential zone during nonbusiness hours.
Mount Vernon	Mon-Fri 7:00am-6:00pm No weekends permitted unless have current permit from the Committee of Buildings	• L_{10} (1) levels must not exceed 70dB(A) at 400 feet when bordering residential zone from 8:00am-8:00pm. • L_{10} (1) levels must not exceed 55dB(A) at 400 feet when bordering residential zone from 8:00pm-8:00am. • L_{10} (1) levels must not exceed 75dB(A) at 400 feet when bordering commercial zone during business hours. • L_{10} (1) levels must not exceed 75dB(A) at 400 feet when bordering commercial zone during non-business hours. • Sound levels must not exceed 80dB(A) at the site boundary when bordering a manufacturing zone. • Sound levels must not exceed 55dB(A) at site boundary when near any noise-sensitive areas.

ATTACHMENT 1 (CONTINUED)
FIELD OPERATION REGULATIONS

CITY, TOWN or VILLAGE	ALLOWABLE NORMAL OPERATION DAYS/HOURS	SPECIAL REQUIREMENTS
New Castle	Mon-Fri 7:30am-8:00pm Sat-Sun 10:00am-5:00pm	No blasting on Saturday, Sunday or holidays
New Rochelle (Residential)	Mon – Fri 8:00am-10:00pm Sat-Sun 10:00am-5:00pm 10:00pm-8:00am	• L_{10} (1) levels must not exceed 70dB(A) at a distance of 400 feet in residential areas. • Sound levels must not exceed 55dB near any sensitive receptor. • Compressors require mufflers with 20dBA or more Insertion Loss. • Pavement Breakers manufactured before 12/31/74 require mufflers with 5dBA or more Insertion Loss. • For residential areas, no noise must be audible beyond property perimeter.
New Rochelle (Commercial)		L_{10} (1) levels must not exceed 75dB(A) at a distance of 400 feet during normal business hours L_{10} (1) levels must not exceed 80dB(A) at a distance of 400 feet at all other times In manufacturing areas, during a 24hour period, L_{10} (1) levels must not exceed 80 dB(A) when measured at construction site boundary
New York City	Mon-Fri 7:00am-6:00pm	
North Castle	8:00am-6:00pm(or sundown) Sundown – 8:00am	• Sound levels must not exceed 70dB(A) at a distance of 400 feet when bordering residential zone. • Sound levels must not exceed 75dB(A) at a distance of 400 feet when bordering commercial zone. • Air Compressors require mufflers with 20 dBA or more Insertion Loss. • Paving Breakers manufactured before 12/31/74 require mufflers with 5 dBA or more Insertion Loss. • Sound levels must not exceed 55dB(A) in residential areas or 65dB(A) in commercial / manufacturing areas
North Hempsted (Village of)	Mon-Fri 8:00am-9:00pm Sat-Sun 10:00am-6:00pm	
Ossining (Town of)	Mon-Fri 8:00am-8:00pm Saturday 9:00am-5:00pm	
Ossining (Village of)	Mon-Fri 7:30am-8:00pm Saturday 9:00am-5:00pm	
Pawling (Village of)	Mon-Sat 7:00am-8:00pm	L_{10} (1) levels must not exceed 80dB(A) at construction site boundary. IMPULSIVE Noise must not exceed 130dB(A) at property line.
Peekskill	Mon-Fri 7:30am-8:00pm Saturday 9:00am-5:00pm	No holiday work permitted
Piermont	7:00am-5:00pm	
Poughkeepsie (City)	6:30am-9:00pm	Other hours for construction (emergency work) only with a permit issued by the Building Inspector
Poughkeepsie (Town)	7:00am-10:00pm	
Ramapo	Mon-Sat 8:00am-10:00pm	L_{10} (1) levels must not exceed 60dB(A) at construction site boundary

CITY, TOWN or VILLAGE	ALLOWABLE NORMAL OPERATION DAYS/HOURS	SPECIAL REQUIREMENTS
Sleepy Hollow (Village of)	Mon-Fri 8:00am-9:00pm Saturday 9:00am-9:00pm	
Sloatsburg	Mon-Fri 7:00am-7:00pm	
Suffern	Mon-Fri 7:00am-8:00pm	
Unionvale	7:00am-8:00pm	
West Haverstraw	Mon-Fri 6:00am-9:00pm Saturday 8:00am-22:00pm	
White Plains	7:00am-7:00pm	
Yonkers	Mon-Fri 7:00am-9:00pm	

$L_{eq}(1)$: Time-average sound energy level during a time period of 1 hour. For the purposes of this document, all $L_{eq}(1)$ levels are expressed in dB(A).

L_{10}: The sound level exceeded for 10% of the specified time period.
L_{90}: The sound level exceeded for 90% of the specified time period.

ATTACHMENT 2
UTILITY NOISE MITIGATION PLAN

This document must be used for Utility Activities taking place from 7AM to 10 PM Monday through Friday and 7AM – 6 PM weekends. If work is performed outside these hours, additional noise mitigation measures may be required. (Must have authorization to work any time between 6PM and 7AM)

I Site-Specific Information

If any receptor(s) within 200 feet (if working outside 7AM – 6PM weekdays only), additional noise mitigation may be required by DEP.

If any sensitive receptor(s) have been identified, the building occupant **has been** be contacted. Noise impact of sensitive receptors has been minimized. Con Ed has contacted the facility owner/operator to minimize impact on their operations.

If work scheduled to take longer than 3 days, all residents within 200 feet of construction area have been notified. If job less than 3 days is about to run over, STOP work and perform necessary notifications.

If non-emergency work scheduled to take longer than 15 days, resident notification has been performed, and additional conditions have been met if a dedicated lane is available (all construction mitigation requirements apply).

If the site is required to utilize DOB-specified perimeter barriers at the site **and** a receptor is within 200 feet, a perimeter noise barrier is also being used at the site.

This Plan certifies that all equipment on site is maintained to operate in accordance with the manufacturer's operating specifications.

All tools/equipment are equipped with appropriate manufacturer's noise reduction device

Noise-insulating fabric is utilized for portable pumps, compressors, generators, etc.

Work which occurs after 6PM and before 7AM has after hours work authorization. Additionally:

a. From 6-10PM weekdays, daytime noise mitigation controls apply
b. Between 10PM and 7AM weekdays, and between 7PM and 7AM on weekends, may be required by NYCDEP to employ additional noise mitigation techniques for receptors within 200 feet

Quieter equipment is used when available or when required by the NYCDEP

Unnecessary engine idling is prohibited

Steel traffic plates are properly seated and secured. All are re-set and secured within 24 hours of a call from the DEP

All noise complaints/official DEP notice are responded to on the same day or, if after hours, the next day.

Vehicles with quieter backup alarms are utilized.

A formal noise mitigation training program has been established and site personnel have been trained.

Perimeter noise barriers are used if required in accordance with 28-101(g)

b) If project is non-emergency, long-term (greater than 15 days) where there is a dedicated lane, sections 28-100 through 28-104 are being follow

ATTACHMENT 3
HOLD SPACE FOR DRAFT CONSTRUCTION MITGATION PLAN

ATTACHMENT 4
NOISE REGULATIONS FOR OPERATIONS UNDERTAKEN OUTSIDE OF PERMISSIBLE TIME

CITY, TOWN, or VILLAGE	Regulations	DETAILS
Bedford	EXEMPT	
Airmont (Village of)	EXEMPT	
Chestnut Ridge (Village of)	EXEMPT	
Clinton (Town of)	EXEMPT WITH APPROVAL	Granted by Zoning Enforcement Officer and the Zoning Board of Appeals
Croton-on-Hudson	EXEMPT	
Dover (Town of)	ONLY FOR TEMPORARY CONDITIONS	
Fishkill (Town of)	BY TEMPORARY PERMIT	Granted by Town Clerk upon recommendation of Zoning Enforcement Officer
Hastings-on-Hudson	EXEMPT	
Hyde Park (Town of)	EXEMPT	
LaGrange (Town of)	EXEMPT	
Mamaroneck (Town of)	ONLY WITH EXCEPTION	Issued by Town of Mamaroneck
Mamaroneck (Village of)	SPECIAL PERMIT REQUIRED	Issued by Building Inspector
Millbrook (Village of)	EXEMPT	
Montebello (Village of)	EXEMPT	
Mount Pleasant	SPECIAL PERMIT REQUIRED	Issued by Building Inspector
Mount Vernon	SPECIAL PERMIT REQUIRED	Issued by Commissioner of Buildings
New Castle	VARIANCE REQUIRED	Issued by Zoning Board of Standards and Appeals
New Hempstead (Village of)	EXEMPT	
New Rochelle	PERMIT FOR RELIEF REQUIRED	Issued by City Clerk
New York City	VARIANCE REQUIRED	Within 12 hours, Variance Required. Variance Valid for 3 days, and must be renewed as required. Mitigation Plan required.
North Castle	SPECIAL PERMIT REQUIRED	Issued by Building Inspector
Nyack (Village of)	EXEMPT	
Pawling (Village of)	EXEMPT	
Piermont (Village of)	VARIANCE REQUIRED	Issued by Village Board
Poughkeepsie (City)	SPECIAL PERMIT REQUIRED	Issued by Building Inspector, valid for up to 3 days. May be renewed for an additional 3 days.
Poughkeepsie (Town of)	EXEMPT	
Ramapo (Town of)	EXEMPT	
Scarsdale	EXEMPT	
Sleepy Hollow	EXEMPT	
Spring Valley (Village of)	SPECIAL	Exempt for 24 hours
Suffern (Village of)	EXEMPT	
Wappingers Falls (Village of)	EXEMPT	
West Haverstraw (Village of)	SPECIAL PERMIT REQUIRED	Issued by Building Inspector for periods of 3 days. May be renewed.
Yonkers	EXEMPT	

ATTACHMENT N

CEHSP S05.03 – Personal Protective Equipment – Protective Clothing

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

CEHSP S05.03 – Personal Protective Equipment: Protective Clothing
(CSP converted to CEHSP on 07/17/2008)
Revision 8: 06/10/2008 Effective Date: 06/30/2008

CONTENTS

1.0 PURPOSE

IT IS THE POLICY OF CON EDISON TO COMPLY WITH FEDERAL, STATE, AND LOCAL REGULATIONS PERTAINING TO THE SELECTION OF PROTECTIVE CLOTHING FOR THE BODY (ARMS, LEGS, AND TORSO). The purpose of this procedure is to ensure that appropriate ***personal protective equipment (PPE)*** is selected and worn to protect Con Edison workers, contractors, and visitors at Con Edison facilities and work sites from chemical and physical hazards to the ***body***.

2.0 APPLICABILITY

This Corporate Environmental, Health and Safety Procedure (CEHSP) applies to any Con Edison activity that presents work hazards to the body that require the use of PPE.

3.0 INTRODUCTION

Many hazards can threaten the body, including heat, splashes from hot metals during welding, splashes from hazardous liquids (acids, bases, solvents), impacts, cuts, electrical hazards (arc, flame), and radiation. Based on the results of ***hazard assessments*** performed in each facility in accordance with CEHSP S 05.01, *Hazard Assessment and Personal Protective Equipment*, protective clothing must be identified that provides the correct protection.

Where hazards are determined to be present that can cause injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact, it is necessary to select PPE to adequately protect affected employees. A variety of protective clothing is available to protect against these hazards, including vests, jackets, aprons, coveralls, and full-body suits. In

addition, the OSHA Electrical Maintenance Standard, 29 Code of Federal Regulations (CFR) 1910.269, prohibits generation, transmission, and distribution employees who may be exposed to flame or electric arc from wearing clothing that may increase the severity of an injury.

This procedure presents requirements for selecting and maintaining protective clothing to control work hazards to the body, specifically the arms, legs, and torso.

4.0 COMPLIANCE REQUIREMENTS

4.1 HAZARD ASSESSMENT AND GENERAL GUIDELINES FOR SELECTION AND USE OF PPE

Con Edison must perform a hazard assessment to determine the ***proper*** personal protective equipment required for each job task performed by employees. The hazards, physical requirements of the operation, resistance of clothing to work-related destructive factors (chemicals, abrasion, etc.), and worker comfort must be considered when selecting required clothing. The PPE hazard assessment is performed to ensure that PPE is correctly identified and that implementation is consistent with workplace conditions. The assessment must be reviewed when new PPE or new chemicals are introduced into the workplace or when operations change. A ***hazard assessment certification*** must be maintained by personnel and the facility to provide a record of workplace reviews. [1] R

The following paragraphs identify guidelines for the selection and use of protective clothing.

4.1.1 Arc or Flame Protection

OSHA standard 29 CFR 1910.269 requires that all electric power generation, transmission, and distribution employees who may be exposed to ar c or flames wear clothing that does not contribute to the severity of an injury that could be sustained by the employee. This requirement is based on the fact that certain fabrics are easily ignited and can cause burns. Employees who are potentially be exposed to electrical arc and/or gas fires must wear flame resistant/flame retardant clothing. Employees who are not exposed to electrical arc and/or gas fires may wear 100% natural fiber clothing (wool or cotton). [2] R

4.1.2 Fit and Appearance

Clothing of all kinds must meet certain safety requirements when there is a potential for it to catch on moving parts of machinery (gears, pulleys, rotating shafts, etc.). Clothing, whenever practical, must not have loose parts, such as sleeve tabs, pant cuffs, pocket flaps, etc. Sleeves or pant legs must fit closely to the wearer.

When appropriate, the color of the garment selected must be chosen to show stains that could indicate contact with a hazardous substance or to make a worker conspicuous. Also, persons working in areas near traffic must wear fluorescent yellow/reflective vests as specified in the Con Edison Work Area Protection and Traffic Control Field Manual. [3] R/P

4.1.3 Laundering

Maintenance and laundering are needed when clothing is soiled due to ***incidental contact*** with substances typically found in the workplace. In the event an employee's uniform or coveralls are contaminated with a hazardous substance (as outlined in this CEHSP) the employee will turn the

clothing over to supervision for proper cleaning or disposal as required. All clothes must be laundered in accordance with manufacturer's instructions. [4] R/P

4.2 CON EDISON PPE REQUIREMENTS

4.2.1 Selection of Protective Clothing

Decisions regarding the appropriate garment to wear must be made on a daily basis according to existing field conditions. The following conditions or materials may be encountered during daily duties:

- Potential for flame or electric arc.
- Presence of oil - non-PCB and PCB-containing.
- Presence of asbestos-containing material (ACM).
- Work with or on lead-containing material.
- Work with hazardous chemicals.

Attachment 1 is a flowchart that provides guidelines for the selection of protective clothing for these hazards. Attachment 2 identifies types of protective clothing.

Based on the potential exposure of the employees, natural fiber clothing may be acceptable. However, in any situation where employees may be exposed to the hazards of electric arc or flame these employees must wear appropriate flame-retardant clothing. These situations will be documented on the appropriate hazard assessment form for the task being conducted.

Requirements for Flame-Retardant Clothing

Employees and contractors must wear flame retardant (FR) clothing when performing tasks that may expose them to the hazards of flame or electric arc. Employees who are potentially exposed to electric arc must wear Nomex, Indura, or other FR materials approved by Corporate EH&S. Employees who are potentially exposed to gas flash fire must wear Nomex.

In situations where employees and contractors are required to wear FR clothing, all layers of clothing underneath the FR clothing must be either FR or 100% natural fiber (wool or cotton), including undergarments. In warmer weather, employees or contractors may choose to wear only 100% natural fiber undergarments under the outermost layer of FR clothing. In all cases, the outermost layer of clothing must be FR. Employees and contractors are prohibited from wearing clothing containing polyester, nylon, rayon, and acetate, alone or in blends, when performing tasks that may expose them to flames or electric arc.

In situations that present the potential for flame or electric arc exposure and the possibility that the garments may become soiled with oil, PCB-containing oil, or other liquid, limited-use FR/ **Chemical Resistant (CR)** disposable outerwear must be worn over the FR coveralls. **These disposable FR/CR garments must not be worn without the FR coveralls.**

Clothing Requirements for Oil and PCB-Containing Oil

If oil is present and there is reason to expect that a flame or electrical arc will not occur, employees must use garments that protect against the oil hazard. Depending on the amount of oil present and the potential for contact with oil, either disposable polycoated or Saranex coveralls must be worn. The selection of garment is independent of the PCB content of oil.

- Saranex coveralls provide greater protection against oil breakthrough and ***penetration*** than do polycoated coveralls. For this reason Saranex coveralls must be worn when the amount of oil present may result in substantial contact.

- In situations where potential contact with oil is minimal, polycoated coveralls can be used.

If a situation has the potential for flame or electric arc exposure and possible soiling of garments with oil, limited-use FR disposable outerwear must be worn over the FR coveralls. **These disposable FR garments must not be worn without the FR coveralls**.

After work involving potential contact with oil is completed, the disposable coveralls must be removed. If the garments have been in direct contact with oil containing 50 parts per million (ppm) or greater PCBs, the coveralls must be disposed of in accordance with Corporate Environmental Procedure (CEP) 06.12 , *Disposal*. If the garments have been in direct contact with oil containing less than 50 ppm PCBs, the coveralls must be disposed of as general waste.

Clothing Requirements for Asbestos-Containing Materials

If asbestos-containing material (ACM) is present and there is reason to expect that a flame or electrical arc will not occur, employees must use garments that protect against the asbestos hazard. In this situation, a Con Edison-approved disposable coverall (Tyvek) must be worn during asbestos removal. This coverall may be worn alone or over FR coveralls.

If there is reason to expect that a flame or electrical arc may occur during asbestos work and there is a potential chemical or oil exposure, such as during the removal of arc-proofing tape in a manhole, the limited-use, chemically resistant FR disposable garments (polycoated Sontara) must be worn in place of the asbestos coverall. If there is reason to expect that a flame or electrical arc may occur during asbestos work and there is no potential chemical or oil exposure, the limited-use FR disposable garments (uncoated Sontara) must be worn in place of the asbestos coverall. In these situations, the limited-use FR disposable outerwear must be worn over the FR coveralls. **These disposable FR garments must not be worn without the FR coveralls**.

Upon completion of asbestos work, the asbestos coverall or limited-use FR garment must be removed and disposed of in accordance with the Asbestos Management Manual, Chapter 11 - Storage, Transfer, Transportation and Disposal.

Clothing Requirements for Work with Hazardous Liquid Chemicals

The proper selection of protective clothing depends on the nature of potential hazard (routes of entry, physical characteristics, toxicological properties, etc.), the type of work to be done, ergonomic constraints, and the chemical and physical performance or resistance characteristics required by the protective clothing. Both polycoated and Saranex Tyvek coveralls are chemical resistant to a wide range of chemicals. If a hazardous chemical splashes onto the coveralls, remove the chemical first by washing it off and then remove the coveralls. Saranex coveralls must be worn when the amount of acid, bases, solvents or other hazardous liquids present may result in substantial contact.

- In situations where potential contact with acids, bases, solvents and other hazardous liquid material is minimal, polycoated Tyvek must be worn.
- The PPE for battery maintenance activities includes a rubber apron and vinyl sleeves.

Clothing Requirements for Welding and Burning

Employees exposed to the hazards created by welding, cutting or brazing operations, including assistants and fireguards, must wear flame-retardant coveralls. Employees performing welding or cutting activities must also don the following equipment:

- Flame-resistant gauntlet gloves.
- Flame-retardant coveralls.
- Flame-resistant aprons or leather vests, jackets, leggings, sleeves and spats worn over the flame-retardant coveralls when additional protection against sparks and radiant energy is needed.
- 100% natural fiber undergarments
- A flame-retardant skullcap with ear covers for overhead work.

Clothing Requirements for Lead Splicing Work

Persons performing lead splicing work must wear FR coveralls. If the job will result in soiling of the FR coveralls, limited-use FR garments must be worn over the FR coveralls. This should protect and extend the life of the FR coveralls. **The limited-use FR garment must not be used without the FR coveralls.**

Clothing Requirements for Working with Hazardous Materials

Clothing for all tasks where there is a potential for exposure to hazardous materials must be approved by EH&S. [5] R/P

Clothing Requirements for Working Near or Over Water

U.S. Coast Guard approved personal flotation dev ices must be worn by an employee whenever the danger of drowning exists. This condition may exist whenever an employee is working near or over water and could be pulled or pushed or fall into the water.

Each personal flotation device must be maintained in a safe condition and inspected frequently enough to ensure that it does not have rot, mildew, water saturation, or any other condition that could render the device unsuitable for use. An employee may cross streams or other bodies of water only if a safe means of passage, such as a bridge, is provided. [6] R/P

4.2.2 Reusable Clothing Maintenance and Laundering

Most reusable work garments require periodic laundering to clean them of general debris and material that accumulates on them at the work location due to incidental contact. The vendor will maintain those clothes that are part of the rental contract. All other clothes must be laundered according to manufacturer's specifications.

When ***accidental contact*** occurs and reusable clothing becomes soiled or contaminated with materials such as ACM or PCBs, appropriate precautions must be taken.

PCB-Contaminated Reusable Clothing

Reusable clothing that has been in direct contact with oil containing 50 ppm or greater PCBs must be disposed of in accordance with CEP 06.12, *Disposal*.

Reusable clothing that has been in direct contact with oil containing 1 ppm or more PCBs, but less than or equal to 49 ppm PCBs, must be collected and bagged at the work location for vendor pickup.

Friable ACM-Contaminated Reusable Clothing

Reusable clothing that has been in direct contact with friable ACM must be wet down to minimize fiber release, placed in a sealed container, and collected from the employee. The contaminated garment must be removed and disposed of in accordance with the Asbestos Management Manual, Chapter 11 - Storage, Transfer, Transportation and Disposal.

Laundering of 100% Cotton Clothing

The laundering instructions for 100% cotton garments are as follows:

- Machine wash in warm water with similar colors.
- Use only non-chlorine bleach, when needed.
- Tumble dry at low to medium temperature.
- Iron on a low to medium temperature, if required.

Laundering Indura and Proban Coveralls

Both Indura and Proban coveralls are made of cotton that has been treated to make them fire retardant. When washed properly, the fire-retardant treatment should last the life of the garment. The manufacturer's instructions for laundering Indura and Proban treated fabrics must be adhered to, including the following washing instructions:

- Wash clothing inside out to minimize edge and surface abrasion.
- Use a water level sufficient for the quantity of clothing to be washed, preferably the high tide level on the washer.
- Use a quality detergent, such as Tide, All, Era, Yes, or Wisk. Follow the detergent manufacturer's instructions.
- Use a temperature that is as low as possible but that still cleans the garment. When using a quality detergent, the warm or cold setting may be sufficient.
- Do not use chlorine (sodium hypochlorite) bleach such as Clorox as this can affect the fire-retardant properties of these garments.
- When drying garments, use the minimum setting required to dry the clothing in a practical time
- Dry garments inside out.
- To minimize shrinkage, immediately remove garments from the clothes dryer when they are dry or slightly damp.

Laundering Nomex Garments

Nomex garments are made of flame-retardant aram id fibers. The flame-retardant property is "built into" the fiber; it is not applied to a fabric as a treatment or additive, as in the case of the Indura and Proban coveralls. The manufacturer's instructions for laundering Nomex garments must be adhered to, including the following washing instructions:

- Nomex garments must be sorted and washed separately from other garments to prevent flammable fibers/lint from being transferred to the Nomex garment.
- Heavily soiled or stained garments must be pre-treated as soon as possible with a full-strength heavy-duty liquid detergent.
- The wash load size must allow the garment to move freely throughout the wash and rinse cycles.
- Normal wash water setting (approximately 140 ^{o} Fahrenheit) is adequate for moderately soiled garments. Higher temperatures may be required for heavily soiled or stained garments.
- A synthetic heavy-duty liquid laundry detergent, such as liquid Tide, All, Era, Yes, and Wisk, is recommended for cleaning Nomex garments.
- Chlorine bleach must not be used. Bleach will not degrade the flame-retardant properties of the garment, but it may cause strength and color loss over time.
- Nomex garments must be tumble-dried on medium or high temperature settings.
- Iron on medium setting, if necessary. [7] R/P

4.3 PPE INSPECTION AND MAINTENANCE

This information will help to ensure that equipment is maintained in a satisfactory condition and provides the required protection when used. The following minimum requirements for inspection and maintenance will be followed.

- PPE must be properly inspected prior to use. Damaged or missing items like holes in gloves or protective clothing, missing side shields on glasses, and broken laces or cracked soles on shoes can significantly impact the effectiveness of the PPE. Signs of wear, such as smooth soles on shoes that can cause slipping or scratches on goggles that limit vision, can present new hazards. PPE that is damaged, missing items, or shows signs of wear, jeopardizing the protection afforded by the equipment, will be removed from service and repaired or replaced.
- PPE must be cleaned and properly decontaminated in accordance with manufacturer recommendations.
- PPE must be properly stored to protect it from exposure to conditions that can damage or compromise its effectiveness. Specific locations acceptable for the storage of PPE will be identified.
- Employees must be familiar with methods for obtaining new PPE in the event that testing and inspection identify unacceptable equipment.

Con Edison maintains a supply of PPE that can be used by facility personnel when needed. The equipment is specific to the tasks performed by Con Edison personnel. [8] R/P

4.4 TRAINING AND TESTING

Refer to CEHSP S05.01, *Hazard Assessment and Personal Protective Equipment*, Section 4.4 for detailed training and testing requirements. [9] R/P

4.5 RECORDKEEPING

In accordance with CEHSP S05.01, *Hazard Assessment and Personal Protective Equipment,* the Training Coordinator for each operating organization must retain training records for three years. Additionally, OSHA 1910.269(a)(2)(vii) requires that training records associated with FR clothing be maintained for the duration of the employee's employment. The Safety Administrator must maintain hazard assessment documentation for all job types currently performed within the organization. [10] R/P

5.0 DEFINITIONS

***Accidental Contact*:** An unexpected event where a substantial amount of a substance spills, splashes, sprays, or otherwise comes into contact with a worker. It is not a typical occurrence for the duties/job being performed.

Body: Arms, legs, and torso.

Hazard Assessment: A systematic review performed to identify exposure hazards and appropriate PPE for specific work operations. This assessment includes a review of the work activities, equipment, and materials used, and end products and by-products to evaluate the potential for physical contact, noise hazards and/or respiratory hazards.

Hazard Assessment Certifications: Written verification that identifies a completed exposure assessment, including the evaluated tasks/processes and areas, the person who performed the assessment, and the date(s) of the assessment.

Incidental Contact: Materials that an employee may contact during the performance of his daily duties. For example, an auto mechanic contact with lube oil while replacing a part or a troubleshooter brushing up against equipment in a vault during an inspection that results in a smudge on their clothing.

Penetration: Flow of chemicals through clothing discontinuities, such as zippers, seams, and pinholes.

***Personal Protective Equipment (PPE)*:** Clothing and equipment worn by personnel to prevent contact with hazards present in the work area. PPE includes safety glasses, face shields, gloves, safety shoes, hearing protection, hard hats, etc.

Proper: Approved, certified, or suitable, within acceptable guidelines set forth by governing codes and standards, as well as recognized safe work practices.

6.0 RESPONSIBILITIES

Employees: The PPE user is responsible for following the requirements of the PPE procedure, including: wearing required PPE; attending required training; caring for, cleaning, and maintaining PPE; and submitting equipment for repair or replacement.

Environment, Health, and Safety (EH&S): EH&S performs the following functions:

- Reviews applicable regulations and ensures that procedures meet all regulatory requirements.
- Revises procedures as applicable.

- Reviews/approves controlled documents prior to release.
- Distributes updates and changes.
- Reviews training prepared by the Learning Center.
- Provides technical assistance to Safety Administrators.

Facility or Site Manager Responsible for Compliance: The Con Edison designated individual within each operating organization who is responsible for ensuring compliance with federal, state, and local regulations and this procedure.

Law Department: The Law Department assists and provides guidance to EH&S by reviewing changes to these procedures in light of all applicable statutes and regulations to ensure that the procedures meet all legal requirements.

Operating Organizations: Unless otherwise indicated, operating organizations are responsible for compliance with federal, state, and local regulations and this procedure.

Safety Administrator: Responsible for performing hazard assessments, selecting PPE, and maintaining hazard assessment certifications.

Supervisors: Responsible for ensuring that personnel wear proper PPE and for performing necessary training.

Training Coordinators: Enters PPE training records into the Training Registration System.

7.0 REFERENCES

4.1 HAZARD ASSESSMENT AND GENERAL GUIDELINES FOR SELECTION AND USE OF PPE

[1] 29 CFR 1910.132(d) (hazard assessment, including written certification requirement); 29 CFR 1910.132, Appendix B (non-mandatory compliance guidelines for hazard assessment, including Section 7, reassessment of hazards). NOTE: The OSHA regulations do not specifically require reassessment of hazards, although the issue is addressed in the Appendix B non-mandatory guidelines).

[2] 29 CFR 1910.137 (electrical protective equipment); 29 CFR 1910.269(l)(6) (apparel for electrical power generation, transmission, and distribution).

[3] USDOT Federal Highway Administration, *Manual on Uniform Traffic Control Devices,* Section 6D.03, Worker Safety Considerations (2003 Edition) (clothing requirements when working near traffic). The manual can be found at: http://mutcd.fhwa.dot.gov/HTM/2003/html-index.htm. The remaining requirements in this section relating to fit and appearance are required by Con Edison as a matter of policy.

[4] See Note 6 below regarding laundering.

4.2 CON EDISON REQUIREMENTS

[5] 29 CFR 1910.132 (general PPE requirements); 29 CFR 1910.137 (electrical protective equipment); 29 CFR 1910.252(b)(3) (protective clothing for welding, cutting and

brazing); 29 CFR 1910.269(l)(6) (apparel for electric power generation, transmission and distribution). NOTE: The OSHA regulations do not contain specific requirements for protective apparel comparable to those discussed in CEHSP S 05.01, *Hazard Assessment and Personal Protective Equipment* relating to head, eye and/or face, hand and foot protection. The specific clothing identified in this section has been determined to meet OSHA requirements relating to proper PPE. NOTE: 29 CFR 1910.269(l)(6) allows clothing made of acetate, nylon, polyester or rayon provided it has been treated to eliminate hazards; Con Edison bars all clothing containing such fibers as a matter of policy.

[6] 29 CFR 1910.269(w)(5)(i)-(iii) (requiring personal flotation device when danger of drowning exists). NOTE The cited provision applies only to the operation and maintenance of electric power generation, control, transformation, transmission and distribution lines and equipment. Con Edison applies this requirement to all activities that involve the potential for drowning as a matter of policy.

[7] 29 CFR 1910.132(a) (general PPE maintenance requirement); 29 CFR 1910.132(e) (prohibiting use of damaged/defective PPE); 29 CFR 1910.132, Appendix B, Sec. 12 (non-mandatory: cleaning and maintenance); 29 CFR 1910.137(b) (in service use and care of electrical protective equipment). NOTE: Con Edison has developed the specific procedures in this section relating to maintenance and laundering of particular types of clothing to ensure that the clothing continues to provide proper protection to Con Edison employees.

4.3 PPE INSPECTION AND MAINTENANCE

[8] 29 CFR 1910.132(a) (general PPE maintenance requirement); 29 CFR 1910.132(e) (prohibiting use of damaged/defective PPE); 29 CFR 1910.132, Appendix B, Sec. 12 (non-mandatory: cleaning and maintenance); 29 CFR 1910.137(b) (in service use and care of electrical protective equipment). NOTE: Con Edison has developed the specific procedures in this section relating to inspection and maintenance to ensure that protective clothing is maintained in a satisfactory condition.

4.4 TRAINING AND TESTING

[9] See CEP 05.01, *Hazard Assessment and Personal Protective Equipment*, for training and testing requirements.

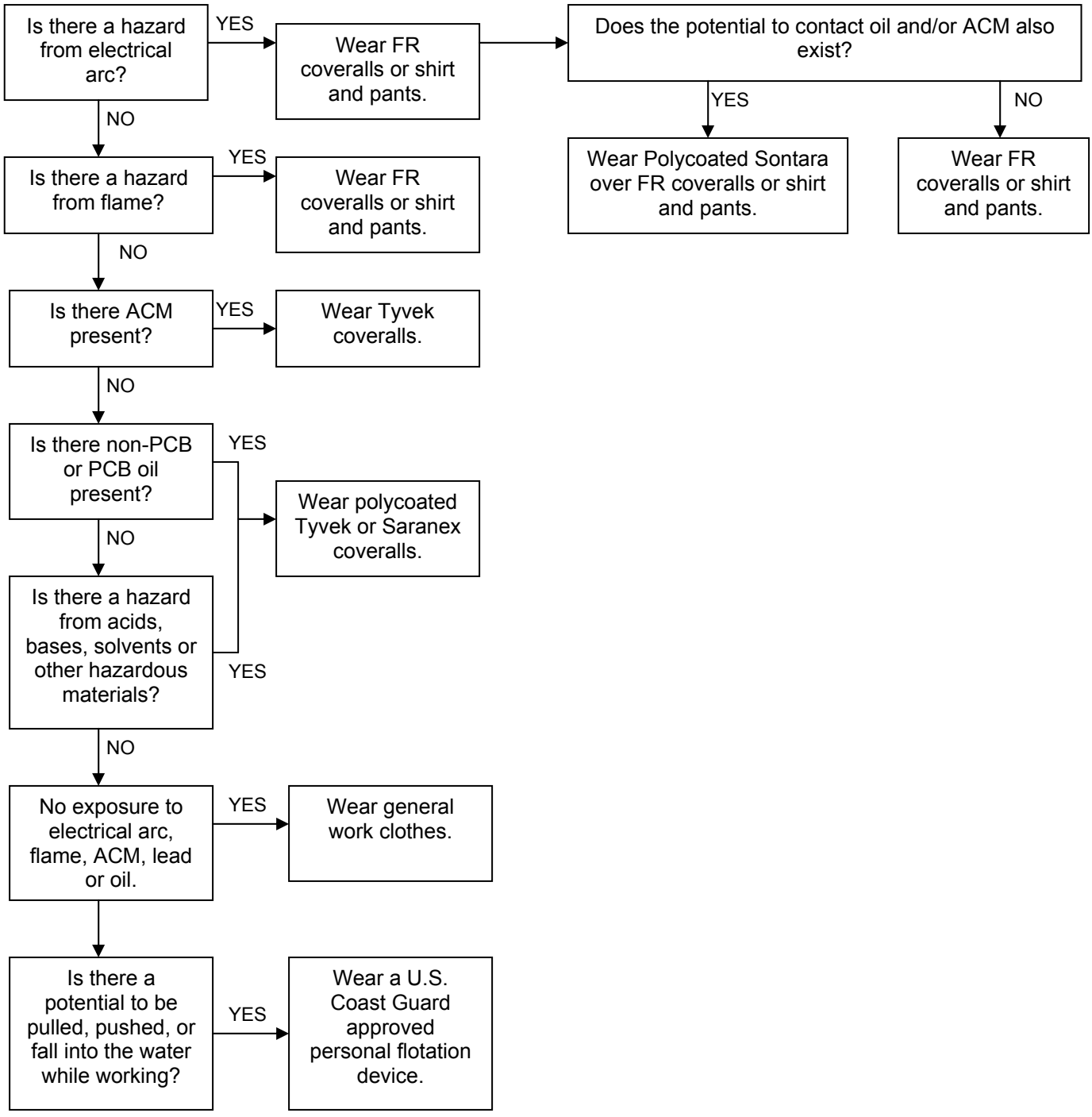
4.5 RECORDKEEPING

[10] 29 CFR 1910.132(d)(2) (written hazard assessment certification); 29 CFR 1910.132(f)(4) (training records); 29 CFR 1910.269(a)(2) (electric power generation, transmission and distribution training recordkeeping). NOTE: the OSHA regulations do not specify a retention period for training records under 29 CFR 1910.132(f)(4). Con Edison has adopted a three-year record retention period as a matter of policy. 29 CFR 1910.269(a)(2) requires training records to be retained for the duration of the employee's employment**.** This training covers PPE, including FR clothing.

National Safety Council - Accident Prevention Manual for Business and Industry, 10th edition.

ATTACHMENT 1

GUIDELINES FOR SELECTION OF PROTECTIVE CLOTHING



ATTACHMENT 2
PERSONAL PROTECTIVE CLOTHING

PROTECTIVE CLOTHING	USE	GROUP/OPERATION
Flame Retardant (FR)	• Worn when there is potential exposure to flame or electric arc. • Worn when performing lead splicing.	Steam, Powerhouse, Electrical Welding, Hotwork Gas Operations Welding, Hotwork
U.S. Coast Guard Approved Personal Flotation Device	Worn when the potential of drowning exists.	Steam, Powerhouse, Electrical, Spill Response Team Members
Tyvek	Worn when potential for contact with asbestos-containing materials (ACM).	Maintenance, Spill Response Team Members
Kleenguard Ultra (Tyvek equivalent)	Worn for general utility, asbestos, bloodborne pathogens, lead dust, bulk chemical delivery, and short-term, incidental contact with oil, including polychlorinated biphenyls (PCB).	Maintenance, Spill Response Team Members
Disposable Polycoated / Saranex	• Polycoated is worn when there is minimal potential for contact with PCBs. • Saranex is worn where there is greater potential for contact with PCBs.	Maintenance, Spill Response Team Members
Disposable Polycoated/ Saranex	• Polycoated is worn when there is a minimal potential for contact with acid, bases, solvents and other hazardous liquid materials. • Saranex is worn where there is a greater potential for contact with acids, bases, solvents and other hazardous liquid materials	Acid Deliveries, Maintenance of Acid Systems, solvents
Polycoated Sontara	Polycoated Sontara is worn when there is both a potential for arc or flame and a potential for exposure to an oil contaminant or asbestos. This garment protects normal FR clothing.	Operations where there is an exposure to arc or flame and where there is an exposure to oil and/or asbestos
Uncoated Sontara	Uncoated Sontara is worn when there is a potential for arc or flame and no potential for exposure to an oil contaminant. This garment protects normal FR clothing.	Operations where there is an exposure to arc or flame and where there is an exposure to asbestos (no oil)
Rubber Apron Vinyl Sleeves	Rubber apron bib style and vinyl sleeves are worn over work clothes to protect against acids.	Battery Maintenance and acid handling

ATTACHMENT O

CEHSP S12.00 – Lock Out / Tag Out Procedures

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

CEHSP S12.00 – Lockout/Tagout Procedures

(CSP converted to CEHSP on 07/17/2008)

Revision 3: 12/17/2007 Effective Date: 12/31/2007

CONTENTS

1.0 PURPOSE

IT IS THE POLICY OF CON EDISON TO COMPLY WITH A LL FEDERAL REGULATIONS RELATING TO *LOCKOUT/TAGOUT*. The purpose of this procedure is to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, startup or release of stored energy could occur and cause injury, the machine or equipment is isolated from the ***energy source*** and rendered inoperative.

This document does not supersede Con Edison's General Instructions Governing Work on System Electrical Equipment (i.e., Bluebook) or any other existing corporate documents (i.e., COP 5-1-2, Processing & Controlling Operating Orders and Work Permits).

2.0 APPLICABILITY

This Corporate, Environmental and Safety Procedure (CEHSP) applies to all Con Edison facilities, each of which is responsible for establishing and documenting site-specific lockout/tagout procedures for each piece of equipment, machinery or system under that site's supervision. Procedures may be established for classes of equipment or machinery if their function and operation are similar and the procedure can collectively account for the control of all hazardous energy sources.

This CEHSP also applies to all outside contractors performing work on Con Edison equipment within the facility. It is the responsibility of the Facility's Manager to ensure compliance. Failure to comply may result in immediate termination of such outside contractor's services.

Procedures must be developed, documented and utilized by each Con Edison site for the control of potentially hazardous energy when employees are engaged in the activities covered by this section.

Exception: The site does not need to document the required procedure for a particular machine or equipment, when **all** of the following elements exist:

(1) The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees;

(2) The machine or equipment has a single energy source which can be readily identified and isolated;

(3) The isolation and locking out of that energy source will completely de- ***energize*** and deactivate the machine or equipment;

(4) The machine or equipment is isolated from that energy source and locked out during ***servicing and/or maintenance***;

(5) A single ***lockout device*** will achieve a locked-out condition;

(6) The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance;

(7) The servicing and/or maintenance does not create hazards for other employees; and

(8) The employer, in utilizing this excepti on, has had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing and/or maintenance.

3.0 INTRODUCTION

3.1 PROCEDURE

This procedure applies to any job task that may expose workers to potentially hazardous energy. There are several qualified exceptions:

- Anytime a guard is removed. Minor tool changes and adjustments and/or other minor servicing activities that are routine, repetitive, and integral to the use of the equipment and that occur during ***normal production operations***, are not covered by the lockout/tagout standard, provided the work is performed using alternative measures that provide effective protection.

- The standard does not apply while servicing or maintaining cord and plug connected electrical equipment, provided that the equi pment is unplugged from the energy source; and the plug remains under the exclusive control of the employee performing the servicing and/or maintenance.

- ***Hot tap*** operations that involve transmission and distribution systems for gas, steam, water, or petroleum products when they are perform ed on pressurized pipelines provided that continuity of service is essential, shutdown of the system is impractical, and employees are provided with alternative protection that is equally effective. [1] R

3.2 PERSONNEL

Authorized Employees

An authorized employee is one who is able to init iate these procedures, and to employ all parts of the procedures to ensure the safe completion of work. Authorized employees are selected on the basis of either their formal training, on the job experience, licenses held or familiarity with mechanical and electrical work and associated hazards related to this work.

Affected Employees

Individuals whose jobs requires them to operate a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires them to work in an area in which such servicing or maintenance is being performed.

All other company and outside contract employees whose work operations are or may be in an area where lockout/tagout procedures may be utilized are also deemed affected employees. [2] R

4.0 COMPLIANCE REQUIREMENTS

4.1 LOCKOUT PROCEDURE

Except under conditions noted in Section 4.4, the only authorized employee that can remove a lock and tag is the authorized employee who installed the lock and tag.

- The authorized employee who performed all the steps in Section 4.2, A-B-C-D-E, may apply a sequentially numbered padlock to equipment capable of accommodating a padlock for the purpose of preventing the normal operation of an ***energy isolating device*** such as a switch, valve, etc.

- The authorized employee will continue the procedure in Section 4.2 steps F and G to completion, and return the padlock along with all Stop Tags.

- The authorized employee will update log entries as stated in 4.2 E. [3] R/P

4.2 LOCKOUT/TAGOUT PROCEDURE SEQUENCE

A. Notification

The authorized employee will notify the supervisor of the facility and any affected employee in the facility that a lockout/tagout procedure will be put into effect, the location of the equipment to be taken off-line, and the reason for the procedure.

The authorized employee will issue the appropriate amount of Stop Tags, and enter data into a logbook consisting of:

- Date and time

- ID number of tag(s) issued
- Equipment removed from service
- Authorized employee name(s)
- Date and time tags were returned (equipment returned to service).

The authorized employee is to acknowledge understanding the procedure, and the importance of adhering to the procedure.

B. Identification and Location of Devices

After receiving a job briefing on the hazards associated with the work assignment and required personal protective equipment, the authorized em ployee will make a survey to locate and identify all energy isolating devices (i.e., which switch(s) valve(s) or other isolating devices apply to the equipment) to be locked out.

Note: More than one energy source may be involved.

C. Shut Down of Equipment

The authorized employee must shut the machinery or equipment down in the operational method described by departmental procedure, or stop and obtain an operating procedure from his/her supervisor before shutting down the equipment.

D. Isolation - Dissipation

The authorized employee will operate the switch, va lve, or other energy-isolating device, or multiple combinations thereof, so that the equipment is isolated from all of its energy sources. Stored energy between the isolating device and the equipment must be dissipated. Energy such as spring-loaded components, rotating components, pressurized hydraulic, water, steam, gas, air pressure, or potential stored energy (i.e., capacitors) must be relieved of potential hazard by blocking, restraining, re-positioning or bleeding down as required.

E. Tagout Procedure Sequence

Lockout is the preferred method of isolating machines or equipment from energy sources, and must be used when the energy isolating device is ***capable of being locked out***.

A tagout procedure may be used on those energy isolating devices that are incapable of being locked out after all available methods and means have been exhausted and no satisfactory alternative is available.

The authorized employee will apply Stop Tags to eac h energy isolating device, in accordance with an associated procedure.

The authorized employee will record the following information on each tag affixed:
1. Name of employee invoking the procedure
2. Date procedure initiated
3. Reason for procedure
4. Warning legend

When the equipment is returned to operation, the authorized employee will remove all Stop Tags and log each stop tag removed, completing the procedure.

F. Verification

The authorized employee will verify that all energy has been isolated by going back to the original device and verifying by testing that an unexpected release of stored energy will not occur (i.e., electrical, hydraulic, pneumatic, pressurized liquids and gases etc.). After ensuring that personnel are not exposed to any hazards from the release of stored energy, the authorized employee will follow written procedures for performing the assigned task.

G. Restoring Machine or Equipment to Normal Operation

After the assigned task is completed and the equipment is ready for return to normal operation, the authorized employee will perform the following sequence:

1. Check area around the equipment to be sure no other personnel are exposed to danger. Notify all affected employees of the intent to restore energy.
2. Remove all tools and supplies from immediate vicinity.
3. Check to make certain all protective guards, covers, casings, etc. are in place, and that all moving parts are unrestricted.
4. Check position of local starting mechanism, valves, controls, etc. to ensure against premature or unwanted action leading to a hazardous condition.
5. Remove, in reverse sequence of application, all Stop Tags.
6. Re-position valves, switches, etc. in compliance with operating procedures.
7. Operate the energy isolating devices to restore energy to the equipment.
8. Notify the supervisor of the facility and affected employees of the restoration of energy to the equipment.
9. Operate the equipment in the normal manner to detect any discrepancies. Repeat procedures as found necessary.
10. Return Stop Tags and update the log in accordance with step 4.1 E. [4] R/P

4.3 GROUP LOCKOUT OR TAGOUT

When work is performed on machinery or equipment involving more than one person, each employee in the group is responsible for adhering to all provisions of the procedures for lockout or tagout.

In the event a group of employees require the procedure to be used, the following actions must be followed:

1. A single authorized employee will be designated by the supervisor of the facility as having primary responsibility for a set number of persons working under the protection of a group procedure.

2. This authorized employee will be the individual designated to coordinate with the affected employees and ensure continuity of protection.

3. Each employee working on the unit must review with the authorized employee designated by the supervisor of the facility, placement of Stop Tag or padlock device on each energy isolating device de-energized under the procedure.

4. All affected employees must receive a job briefing by an authorized employee. [5] R

4.4 SHIFT OR PERSONNEL CHANGES

Shift Changes

When work on a machine or piece of equipment will continue into the next work shift, protection must be continued. The oncoming authorized employee must be satisfied that the procedure is properly in effect and it is safe to transfer lockout or ***tagout devices***.

- The oncoming authorized employee will be given a job briefing, and will accompany the off-going authorized employee to the location of each Stop Tag or padlock device.

- The off-going authorized employee will point out the location of all Stop Tags and padlocks tags applied during his/her shift.

- The oncoming authorized employee will record the number of Stop Tags and padlocks applied.

- The oncoming authorized employees must ensure t hat they are familiar with the existence and reason for the lockout or tagout procedure, and the number of Stop Tags and padlock devices recorded.

- The authorized employees will review the number of Stop Tags and padlock devices for discrepancies, and then record the transfer of responsibility from the off-going to the oncoming employee in the log.

Personnel Changes

Each Stop Tag or padlock device must be remov ed from each energy isolating device by the authorized employee who applied them.

If the employee who initiated the procedure is not available to remove the Stop Tag or padlock device, they may be removed by a ***qualified employee*** provided the following conditions are completely satisfied:

1. The qualified employee must be trained in all aspects of this procedure.

2. The qualified employee has complied with all parts of this procedure prior to removing the device.

3. The qualified employee verifies that the employee who initiated the procedure is unavailable. All reasonable attempts must be made to contact the employee and inform the employee of the intended action.

The employee will be informed that the above action was taken before the employee begins work again at the location.

Special Circumstances

In situations where a lockout device must be removed by someone other than the person who installed it, the following steps must be taken:

- A qualified employee on site must personally verify that no affected employees are exposed to danger from re-energizing or reactivating equipment.

- The lockout device(s) may be removed by cutting or similar method only after the qualified employee has verified that no affected employee exposure exists. [6] R

4.5 ANNUAL INSPECTION

The operating organization must conduct, on at least an annual basis, an inspection of the requirements and compliance with this procedure. This inspection must:

- Be performed by an authorized employee other than those using the procedure.

- Correct any inadequacies or deficiencies found.

- Include a review of the employee's res ponsibilities between each authorized employee and the inspector.

- Be certified to include the machine or equipment, the date of the inspection, the employees included, and the person performing the inspection.

Attachment 2 must be used for these inspections.

These annual inspections are intended to assure that the energy control procedure continues to be implemented properly and that the employees in volved are familiar with their responsibilities under that procedure. The inspection must be able to determine whether the:

- Steps in the energy control procedure are being followed;

- Employees involved know their responsibilities under the procedure;

- Procedure is adequate to provide the necessary protection, and what changes, if any, are needed.

When lockout is used, the inspection must include:

- A review with all authorized employees for the procedure being inspected,

- Their responsibilities under that procedure.

- Group meetings between the authorized employee and affected employees.

When tagout is used, this review must be performed with all affected employees, as defined in the standard, as well as with all authorized employees, for the procedure being inspected.

The site's senior manager must certify that the annual inspections have been performed. The certification must identify:

- The machine or equipment on which the energy control procedure was being utilized,

- The date of the inspection,
- The employees included in the inspection,
- And the person performing the inspection.

The results of the audit will be forwarded to the manager of maintenance, for recordkeeping. [7] R

4.6 PROTECTIVE HARDWARE AND MATERIAL

Lockout and tagout equipment must be provided in sufficient quantity to satisfy the requirements of this procedure. Such hardware and material must be capable of safely tagging, isolating, securing or blocking machines and equipment from energy sources.

Lockout and tagout devices must be singularly identified, must be the only devices used for controlling energy, and must not be used for other purposes.

Whenever replacement or major repair, renovation or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machine or equipment must be designed to accept a lockout device

Durable

Lockout and tagout devices must be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

Tagout devices must be constructed and printed so that exposure to weather condition or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.

Tags must not deteriorate when used in corrosive environments such as areas where acid and alkaline chemicals are handled and stored.

Standardized

Lockout and tagout devices must be standardized within the facility where used in at least one of the following criteria - color, shape, or size. Additionally, on tagout devices, print and format must be standardized.

Substantial

Lockout devices must be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.

Tagout devices, including their means of attachment, must be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means must be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than fifty (50) pounds and having the basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.

Identifiable

Lockout and tagout devices must indicate the identity of the employee applying the devices.

Tagout devices must warn against hazardous condition if the energy isolating device is not operated, and must include a legend such as the following - Do Not Open, Do Not Close, Do Not Start, Do Not Energize, Do Not Operate. [8] R

4.7 TRAINING

The company will provide training to ensure that employees understand the purpose and function of the lockout/tagout procedure and that the knowledge and skills required for the safe application, usage and removal of lockout/tagout controls are acquired by authorized employees.

The company must certify that employee training has been accomplished and is up to date. The certification must contain each employee's name and dates of training.

Equipment-Specific Training

Each authorized employee must receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

Each affected employee must be instructed in the purpose and use of the lockout/tagout procedure.

All other employees whose work operations are or may be in an area where lockout/tagout procedures may be utilized must be instructed about the procedure and about the prohibition relating to attempts to restart or reenergize machines or equipment that are locked out or tagged out.

Specific instructions will include the proper procedure for locking out and tagging out of devices. Specific training will be given regarding the limitations of tags. Attachment 1 must be utilized for this purpose.

Training will be done through The Learning Center, or by the safety administrator or by the responsible shop operating supervisor. The tracking and recording of this training will be the responsibility of the department training Coordinator. [9] R/P

Retraining

Retraining must be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedure.

Additional retraining must be conducted whenever a periodic inspection reveals, or local EH&S has reason to believe, that there are deviations from, or inadequacies in the employee's knowledge, or use of the energy control procedures.

The training must reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary. [10] R

5.0 DEFINITIONS

Affected Employee: An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized Employee: A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employ ee's duties include performing servicing or maintenance covered under this section.

Capable of Being Locked Out: An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

Energized: Connected to an energy source or containing residual or stored energy.

Energy Isolating Device*:* A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy Source: Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Hot Tap: A procedure used in the repair, maintenance and services activities which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Lockout: The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device: A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Normal Production Operations: The utilization of a machine or equipment to perform its intended production function.

Qualified Employee: A qualified person is a person who has been trained and has demonstrated proficiency, in compliance with 29 CFR 1910.147(c)(7), to perform servicing and maintenance on the machine or equipment to be inspected.

Servicing and/or Maintenance: Workplace activities such as constructing, installing, ***setting up***, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming of machines or equipment and making adjustments or tool changes, where t he employee may be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

Setting Up: Any work performed to prepare a machine or equipment to perform its normal production operation.

Tagout: The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout Device: A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

6.0 REFERENCES

3.0 INTRODUCTION

3.1 PROCEDURE

[1] 29 CFR 1910.147(a)(2)(ii)-(iii) (applicability and exceptions).

3.2 PERSONNEL

[2] 29 CFR 1910.147(b) (definitions).

4.0 COMPLIANCE REQUIREMENTS

4.1 LOCKOUT PROCEDURE

[3] 29 CFR 1910.147(c)(1) (energy control program generally). See 29 CFR 1910.147, Appendix A (non-mandatory guidelines: typical minimal lockout procedure).

4.2 LOCKOUT/TAGOUT PROCEDURE SEQUENCE

[4] 29 CFR 1910.147(c)(2) (preference for lockout); 29 CFR 1910.147(c)(3) (full employee protection); 29 CFR 1910.147(c)(4) (energy control procedure); 29 CFR 1910.147(c)(9) (notification of employees); 29 CFR 1910.147(d)(1)-(6) (preparation for shutdown, machine or equipment shutdown; machine or equipment isolation; lockout or tagout device application; stored energy; verification of isolation); 29 CFR 1910.147(e)(1)-(3) release from lockout or tagout). See 29 CFR 1910.147, Appendix A (non-mandatory guidelines: typical minimal lockout procedure).

4.3 GROUP LOCKOUT OR TAGOUT

[5] 29 CFR 1910.147(f)(3) (group lockout/tagout).

4.4 SHIFT OR PERSONNEL CHANGES

[6] 29 CFR 1910.147(c)(8) (requiring lockout/tagout to be performed only by authorized employee performing servicing and/or maintenance); 29 CFR 1910.147(f)(4) (shift changes).

4.5 ANNUAL INSPECTION

[7] 29 CFR 1910.147(c)(6).

4.6 PROTECTIVE HARDWARE AND MATERIAL

[8] 29 CFR 1910.147(c)(5) (protective materials and hardware).

4.7 TRAINING

[9] 29 CFR 1910.147(c)(7)(i), (iv) (training and recordkeeping). NOTE: This section includes Con Edison-specific procedures relating to training and recordkeeping.

[10] 29 CFR 1910.147(c)(7)(iii) (retraining).

ATTACHMENT 1
EXAMPLE SITE PROCEDURE

GENERAL

The following simple lockout procedure is provided to assist employers in developing their procedures so they meet the requirements of this standard. When the energy-isolating devices are not lockable, tagout may be used, provided the employer complies with the provisions of the standard that require additional training and more rigorous periodic inspections. When tagout is used and the energy-isolating devices are lockable, the employer must provide full employee protection (see 29 CFR 1910.147 (c)(3)) and additional training and more rigorous periodic inspections are required. For more complex systems, more comprehensive procedures may need to be developed, documented, and utilized.

Lockout Procedure for

_____

(Name of Company for single procedure or identification of equipment if multiple procedures are used).

Purpose

This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It must be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

Compliance With This Program

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance, must not attempt to start, energize, or use that machine or equipment.

_____

Type of compliance enforcement to be taken for violation of the above.

Sequence of Lockout

(1) Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.

_____

Name(s)/job title(s) of affected employees and how to notify.

(2) The authorized employee must refer to the company procedure **for the particular machine or equipment** to identify the type and magnitude of the energy that the machine or equipment

utilizes, must understand the hazards of the energy, and must know the methods to control the energy.

Type(s) and magnitude(s) of energy, its hazards and the methods to control the energy.

(3) If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).

Type(s) and location(s) of machine or equipment operating controls.

(4) De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).

Type(s) and location(s) of energy isolating devices.

(5) Lock out the energy isolating device(s) with assigned individual lock(s).

(6) Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.

Type(s) of stored energy - methods to dissipate or restrain.

(7) Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.

Caution: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.

Method of verifying the isolation of the equipment.

(8) The machine or equipment is now locked out.

Restoring Equipment to Service

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps must be taken.

(1) Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.

(2) Check the work area to ensure that all employees have been safely positioned or removed from the area.

(3) Verify that the controls are in neutral.

(4) Remove the lockout devices and reenergize the machine or equipment. Note: The removal of some forms of blocking may require re-energization of the machine before safe removal.

(5) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

ATTACHMENT 2
LOCKOUT/TAGOUT PERIODIC INSPECTION

Facility Name _____ Date _____
Address _____
Equipment Name _____ I.D. No. _____
Authorized Inspector (Print) _____ I.D. No. _____

The identified equipment requires a periodic inspection of the energy control procedures according to §1910.147(6) The Control of Hazardous Energy (Lockout/Tagout). Check (✓) or complete all elements of this form that apply to the Periodic Inspection. Note deficiencies in comments section.

ENERGY SOURCES

☐ Electrical ☐ Hydraulic ☐ Chemical ☐ Other _____
☐ Mechanical ☐ Pneumatic ☐ Thermal _____

ENERGY ISOLATING DEVICES

☐ A manually operating electrical circuit breaker.
☐ A disconnect switch
☐ A manually operated switch by which the circuit's conductors can be disconnected from all underground supply conductors (no pole can be operated individually).
☐ A line valve
☐ A block
☐ A similar device used to block or isolate energy.
☐ Other _____

Note: Push buttons, selector switches, and other circuit type devices are not energy-isolating devices.

	YES	NO	COMMENTS
Do authorized employees understand the energy control procedures for this equipment?			
Do the authorized employees understand the requirements of the standard for this equipment?			
Do the authorized employees understand which locks/tags are to be used on this equipment?			
Are the lockout/tagout procedures being followed?			
Do employees understand their responsibilities in the energy control procedure?			
Have any deviations or inadequacies been identified during this inspection that require attention? If so, list.			
Have tagout procedures been reviewed when tagout alone is the only means of energy isolation?			
Have you reviewed the removal of an isolating circuit breaker?			
Have you reviewed blocking of a controlling switch?			
Have valve handle removal procedures been reviewed?			
Have you reviewed the opening of an extra disconnect switch?			

The items checked above have been reviewed with/explained to the authorized employees at the time of the periodic inspection.

Authorized Employee (Signature)	Date	Authorized Employee (Signature)	Date

I hereby certify that the periodic inspection for compliance with lockout/tagout standards on the equipment as specified by OSHA 29 CFR §1910.147 has been satisfactorily completed with the authorized employees identified above.

Inspector _____ _____ _____

Signature	Title	Date

ATTACHMENT P

CEHSP S17.01 – Electrical Enclosed Spaces

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

CORPORATE ENVIRONMENTAL, HEALTH AND SAFETY PROCEDURE

CEHSP S17.01 – Electrical Enclosed Spaces

(CSP converted to CEHSP on 07/17/2008)
Revision 16 – 7/01/10 Effective Date: 10/01/10

CONTENTS

1.0 PURPOSE

IT IS THE POLICY OF CON EDISON TO ENSURE THE HEALTH AND SAFETY OF EMPLOYEES AND CONTRACTORS WORKING IN ELECTRICAL ENCLOSED SPACES. This procedure discusses entry into ***electrical enclosed spaces***, including requirements for testing the atmosphere, training, ventilation, and monitoring.

2.0 APPLICABILITY

This Corporate Environmental, Health and Safety Procedure (CEHSP) applies to all Con Edison employees and contractors working under Con Edison oversight (defined as "contractors" for this CEHSP), who work in electrical enclosed spaces used for the operation and maintenance of electric power generation, transmission, and distribution lines and equipment, including fiber-optic equipment associated with these electrical systems.

For outside agencies such as public improvement, that are not under contract with Con Edison, the Con Edison organization serving as the primary contact must inform the agency's project supervision of the relevant safety precautions to be taken when working in Con Edison facilities that meet the definition of an electrical enclosed space under Occupational Safety and Health Act (OSHA) regulations. The communication of the potential hazards and relevant safety precautions to the agency must be documented.

3.0 INTRODUCTION

This CEHSP identifies the procedures for inspection, entry and work in electrical enclosed spaces. Spaces that are not designed for entry under normal operating conditions are not considered to be electrical enclosed spaces for the purposes of this procedure. In addition, spaces that are expected to contain a ***hazardous atmosphere*** are not considered to be electrical enclosed spaces. These spaces are instead addressed as ***permit-required confined spaces***.

This procedure does not address practices in permit-required confined spaces, ***gas enclosed spaces*** (working spaces such as gas manholes) and similar structures not associated with electric power generation, transmission, and distribution. Entry into these spaces must be performed in accordance with applicable CEHSPs. Permit-required confined spaces are addressed in CEHSP S16.00, *Permit-Required Confined Space Program,* and gas enclosed spaces are addressed in CEHSP S17.02, *Gas Enclosed Spaces.*

4.0 COMPLIANCE REQUIREMENTS

4.1 JOB BRIEFINGS

The lead or more knowledgeable employee must conduct a job briefing with the employees involved before they start the job. The briefing must cover: the hazards associated with the job; work procedures involved; special precautions; energy source controls; and personal protective equipment (PPE) requirements. The procedures covered will include personal escape and rescue plans based on the configuration of the enclosed space and address proper emergency contacts Additional briefings must be held if significant changes that might affect the safety of the employees occur during the course of the work. Job briefings must be documented [1] R

4.2 VEHICULAR OR PEDESTRIAN TRAFFIC

Prior to the performance of work, protection of enclosed space entry work areas must be planned, using the current Con Edison *Work Area Protection and Traffic Control Field Manual,* to avoid vehicular and pedestrian traffic hazards. [2] R

4.3 PRE-ENTRY INSPECTION

4.3.1 Evaluation of Potential Hazards

Before an entrance cover to an enclosed space is removed, it must be determined that removal can be done safely and that the condition of the electrical facilities contained therein is sufficient to allow unrestricted access and emergency rescue. The initial inspection must be conducted by a ***qualified*** Con Edison employee or equivalently trained individual and must include:

1) Testing for stray voltage on the frame, cover, or grating, in accordance with OJT ELE0020.

2) Checking whether the cover is above “normal”, expected temperature.

3) Gradually loosening the cover if it is fastened in place, to release any residual pressure.

4) Determining whether there might be a hazardous atmosphere in the space, or whether conditions at the site could cause a hazardous atmosphere, such as an oxygen deficient or flammable atmosphere to develop within the space. This includes the oxygen level, presence of a flammable atmosphere, carbon monoxide levels, and if applicable, other toxic contaminants. Where vented manholes are present, the vent holes must be used to test the atmosphere. If an atmosphere is potentially in the flammable range or above the upper explosive limit and if it is determined that the cover must be removed, it must be done without creating a spark .

Any conditions making it unsafe to remove the cover must be eliminated before the cover is removed (that is, reduced to the extent that it is no longer unsafe). [3] R/P

4.3.2 Removal/Opening of the Cover

Appropriate tools (manhole hooks, bars, etc.) must be used to remove covers from subsurface structures. Removed covers must be place in locations that will not hinder traffic or pose a tripping hazard. When covers are removed from electrical enclosed spaces, a manhole guard consisting of a railing with appropriate toe guards, temporary cover or other barrier must be installed promptly to prevent an accidental fall through the opening and protect employees working in the space. [4] R

4.3.3 Defective Primary Cable

Where a cable in a manhole has one or more abnormalities that could lead to or that could be an indication of an impending fault, the defective cable must be de-energized before an employee may enter the manhole. This is indicated by a D-Fault tag hung in the chimney of the structure. The latest version of EO-1184, *Identifying Cable And Splice Abnormalities On Distribution Feeders* or CE-TI-6832, *Procedure For A Quick Visual Inspection (QVI) on the 69 KV and 138 KV Low and Medium Pressure Insulating Fluid Filled Cable Systems*, must be followed in all cases involving D-Faults. Abnormalities, such as oil or compound leaking from cables or joints, broken cable sheaths or joint sleeves, hot localized surface temperatures of cables or joints, or joints that are swollen beyond normal tolerance are presumed to lead to or be an indication of an impending fault. [5] R

4.4 ATMOSPHERIC TESTING

Atmospheric testing is required prior to space entry for the following reasons:

- To evaluate the hazards and verify that acceptable conditions for entry exist.
- To ensure that acceptable conditions are maintained during the entry work.

4.4.1 Order of Testing

All structures must be tested according to Attachment 1 prior to entry.

The internal atmosphere must be tested using an approved, properly calibrated Atmospheric Testing Device, in the following sequence:

- Oxygen (acceptable criteria between 19.5 and 23.0%). Oxygen monitoring equipment must be set to alarm if the oxygen content falls below 19.5 percent, or increases above 23.0 percent.
- Flammable gases and vapors (acceptable criteria less than 10% of the lower explosive limit (LEL), i.e., a reading of less than 0.5% as calibrated against methane.
- Carbon monoxide (CO) (acceptable criteria less than 35 parts per million [ppm]).
- Tests for toxic vapors and gases, if necessary. Entry level for toxic substances must not exceed the associated OSHA Permissible Exposure Limit (PEL), regardless of the anticipated length of entry. If hydrogen sulfide (H2S) is present, follow GSI 17.01.02.

The readings will be documented including the time and results.

For entry into pipe type feeder manholes that are connected to sulfur hexafluoride (SF_6) equipment or manholes containing sulfur hexafluoride (SF_6) switches, the ChemLab must be contacted to perform the monitoring if there has been a fault on the feeder or equipment (as per GEHSI S17.01.03, *Entry Into Subsurface Structures Containing SF6 Potheads*, 17.01.04, *Entry into SF6 Switch Structures, and* 17.01.05*, Testing, Ventilation, and Monitoring Subsurface Structures*).

Where hazardous atmospheres are suspected, it is permissible to "pre-test" the space with an instrument not approved per section 4.4.3 for one or more concerns. Pre-testing is desirable to minimize the potential for damaging a space entry gas detector through overexposure. Regardless of the results and actions of any such pretest, proper testing for all concerns using an approved instrument must be performed prior to actual space entry. [6] R/P

4.4.2 Stratified Atmospheres

Following initial testing from outside the space, the atmosphere must be tested a distance of approximately four feet in the direction of travel and to each side during descent. If a sampling probe is used, the entrant's rate of progress must be slowed to accommodate the sampling speed and detector response. [7] R

4.4.3 Space Entry Gas Detector Requirements

Pre-entry atmospheric testing, and any required during-entry atmospheric testing, must only be performed using a gas detector approved by Corporate EH&S for space entry testing in accordance with CEHSP S09.03, *Preliminary Assessment and Approval of New EH&S-Related Equipment, Supplies and R&D Services*. Approved instruments must be initially calibrated by Technical Services, and must be recalibrated at least once every 90 days. Instruments with remote calibration procedures accepted by Safety & Industrial Hygiene and Technical Services can be calibrated locally; Technical Services must calibrate all other instruments. All gas detectors must have the calibration due date clearly indicated and must not be used if this date is not clearly visible. Calibration due date may be indicated by a sticker attached by Technical Services or displayed on the instrument's screen where possible.

Only personnel who have current training on the use of space entry gas detectors may use them in the field or be assigned duties that may require their use in emergency situations. Contractors must use instrumentation that meets the OSHA requirements they must also calibrate the equipment in accordance with the manufacturers instructions. [8] R/P

4.4.4 Approved Equipment

The Draeger Miniwarn units are the only approved space entry gas detectors for compliance with the testing requirements of this CEHSP. Contractors may use equipment not specifically listed provided it is appropriate for meeting the testing requirements and is in working order and properly calibrated. [9] P

4.4.5 Hazardous Atmosphere

Employees must not enter any enclosed space that contains a hazardous atmosphere, unless the entry is performed in accordance with CEHSP S16.00, *Permit-Required Confined Space Program.* [10] R

4.4.6 Con Edison Initial Entry and Visual Inspection

Once the structure is initially entered, a visual inspection must be conducted for exposed live conductors, improperly sealed cable ends, visual burnouts, structural damage, D-Fault tags, environmental tags, and excessively long cable ends that could contact the structure cover/grating or metal frame. The visual inspection must be documented. In addition, abnormalities, such as oil or compound leaking from cable or joints, broken cable sheaths or joint sleeves, hot localized surface temperatures of cables or joints, or joints that are swollen beyond normal tolerance are presumed to lead to or to be an indication of an impending fault. EO-1184, *Identifying Cable And Splice Abnormalities On Distribution Feeders* or CE-TI-6832, *Procedure For A Quick Visual Inspection (QVI) on the 69 KV and 138 KV Low and Medium Pressure Insulating Fluid Filled Cable Systems,* must be followed to determine when a cable must be de-energized for work in a manhole. If personnel note a "D" Fault, they must exit the structure immediately and report their findings in accordance with EO-1184 or CE-TI-6832. If a D-Fault tag, environmental tag, or any unsafe condition is found, further steps may only be taken with consent and advice of the control center and/or field supervisor. Cable inspections are not required for enclosed spaces where electrical equipment has not been previously tied into the system or for service boxes with no primary cable. [11] P

4.4.7 Entry by Con Edison Personnel Not Qualified for Electrical Work, Contractors, or Public Improvement Personnel

If entry takes place immediately after the initial inspection (see Section 4.4.6) a follow-up inspection is not required provided that the Con Edison Inspector or the contractor supervisor were on location during the initial inspection by the qualified electrical worker. If entry by non-qualified personnel (i.e., Con Edison employees not qualified for electrical work, contractors, and public improvement personnel) is not immediate but takes place within 72 hours of the initial inspection, a "follow-up inspection" must be conducted prior to each entry. The follow-up inspection must be conducted by a qualified person (Con Edison or contractor trained by Con Edison) involved in the work and include:

1) Verification that the initial inspection was performed in the specified time frame.

2) Testing for stray voltage by a qualified Con Edison employee or qualified contractor.

3) Completion of atmospheric testing as outlined in this section

4) Determination that it is safe to enter the space.

5) A visual inspection for any abnormalities previously defined.

6) Communication of inspection results and hazards to the Con Edison inspectors and the contractor supervisor.

If entry is delayed past the 72 hours, the initial inspection must be repeated per Section 4.4.6. Qualified telecommunication employees and their contractors accompanied by qualified Con Edison personnel do not need to repeat the initial inspection until 30 days has expired. Con Edison personnel not qualified for electrical work may only enter after the "follow-up" inspection is conducted by qualified personnel. Follow-up inspections must be documented. Service boxes without primary service are exempt from the initial inspection (Section 4.4.6), however, they must have the equivalent of the "follow-up inspection". This section does not apply to enclosed spaces or trenches where electrical equipment has not been previously tied into the system. [12] P

4.4.8 Burnouts or Electrical Failure

Only Con Edison qualified employees are authorized to complete the work identified in this paragraph. If evidence is present of cable or component failure, fire, smoke, explosion, or other abnormalities, additional PPE in the form of protective hood (C/S 684-0755) and goggles (C/S 689-3952) must be worn prior to approaching the cover and subsequent work until the burnout has been cleared. Employees responding to burnouts may remove the cover if it can be done safely. After removal of the cover, the employees must remain a safe distance away for a period of 10 minutes in the absence of a flare-up. If a flare-up occurs, the employee must remain a safe distance away until the burning stops. The hose of a power ventilator may be directed into the opening if the hose can be placed safely. After a burnout has been cleared (burnt apart or cut), the structure must be ventilated to remove gases and odors created by the burnout. [13] P

4.4.9 Attendants

While work is performed in an electrical enclosed space, an attendant must always be available within oral and/or visual contact of personnel in the structure in order to render emergency assistance. The attendant is not precluded from performing other duties outside the electrical enclosed space if these duties do not distract the attendant from monitoring employees within the space. The duties of the attendant are outlined in the applicable OJT. The attendant must not be distracted from his/her duties by engaging in such activities as speaking on a cell phone, text messaging or use of other handheld devices. Other than for performing a rescue, one person must be present outside the structure to perform the attendant duties. This does not preclude more than one person entering the structure. An attendant is not precluded from reaching into an underground structure to hand an entrant tools or other job materials so long as only the hands/arms break the entry plane.

Prior to an attendant entering the space to perform rescue, he/she must notify emergency rescue support. Attendants must be trained in first aid, cardiopulmonary resuscitation (CPR), and rescue. [14] R

4.4.10 Personal Protective Equipment

The minimum personal protective equipment for Con Edison employees, contractors, and visitors for work covered in the scope of this procedure are safety shoes, hardhat, eye protection, and FR clothing (where electrical flash hazards exist, or hot work operations are

conducted). If working to clear a burnout or electrical failure, see the personal protective equipment requirement in Section 4.4.8. The FR clothing requirements are outlined in CEHSP S05.03, *Personal Protective Equipment: Protective Clothing*. Entrants and attendants are required to wear a retrieval harness at all times during entry activities in underground electric distribution structures. For work in excavations that exceed 48 inches in depth and contain energized conductors (either direct buried or in ducts), entrants and attendants must wear harnesses if the work task has the potential to contact energized conductors (i.e. breaking out a manhole/service box or breaking out a concrete encased duct bank containing live electrical facilities). Harnesses are not required in underground electric distribution structures when the cables are not connected to the system (i.e., newly installed and not having been connected to the system yet). [15] R

4.5 MONITORING AND VENTILATION

4.5.1 Monitoring

If flammable gases or vapors or CO are detected at the alarm level or if oxygen increases/decreases beyond alarm levels, forced-air ventilation must be used during the entire period of entry to maintain oxygen at a safe level (between 19.5% and 23.0% oxygen), ensure that the concentration of combustible gases and vapors at less than 10% of the LEL (0.5% as calibrated against methane) and concentrations of CO at less than 35 ppm. If combustible gases are vapors are detected, the local control center must be notified immediately.

Continuous monitoring must be conducted to ensure that any increase in the concentration of flammable gases or vapors and/or CO that occurs is detected. This monitoring shall be conducted at a height of approximately 4 feet above the entrant(s) respective walking/working surface (s). If the structure (such as a service box) is less than 4 feet deep monitoring shall be conducted at approximately one foot below street level.

Monitoring results at the time of initial entry into the structure must be documented. Under no circumstances will a monitor be left in the structure when employees exit. Should the enclosed space be exited during the shift there is no need to repeat the initial entry monitoring and document the results provided continuous atmospheric monitoring is performed the entire shift, and the entrant and/or attendant do not leave the work zone. If continuous monitoring inside the structure is stopped for any reason during the shift (e.g. to replace battery, device removed from structure when employee exits), initial entry monitoring must be repeated and documented.

Structures must be re-tested for safe atmosphere after de-watering.

Continuous forced-air ventilation is required during hot work while making/breaking lead cable splices. For additional information on Con Edison procedures for addressing these hazards, refer to CEHSP S10.00, *Lead Management Program,* and CEHSP S15.00, *Welding, Cutting And Other Hot Work Operations.* [16] R/P

4.5.2 Ventilation

Ventilation with forced air may be necessary to eliminate or control hazardous gases or fumes that may be present in electrical enclosed spaces and to maintain an adequate supply of oxygen. The use of power ventilation, however, does not eliminate the need to perform continuous atmospheric monitoring. Personnel who enter electrical enclosed spaces for cable identification,

inspection, or other minimal time periods must first perform initial atmospheric monitoring and maintain continuous monitoring throughout the entry to ensure that an enclosed atmosphere is safe.

If at any time a test indicates an unsatisfactory atmosphere, leave the manhole or vault at once. Operate the power ventilator for 10 minutes and then take a second test. (For more guidance on proper ventilation techniques refer to ELE1010). Take this test away from the output of the power ventilator. If this test indicates a satisfactory condition, the subsurface enclosure may be entered. If the unsatisfactory condition persists, report the matter to the supervisor or local control center. Only Con Edison-approved power ventilation equipment may be used. [17] R/P

Specific Ventilation Requirements

If continuous forced-air ventilation is used, operation of the system must begin before entry is made, and operation must be maintained to ensure that a safe atmosphere exists before employees are allowed to enter the work area. The forced-air ventilation must be directed to deliver air into the immediate area where employees are present within the electrical enclosed space and must continue until all employees leave the enclosed space. [18] R

Air Supply

The air for the continuous forced-air ventilation must be supplied from a clean source and must not increase the hazards in the electrical enclosed space. [19] R

4.6 OPEN FLAMES

If open flames are used in electrical enclosed spaces, a test for flammable gases and vapors must be made immediately before the open flame device is used (Continuous monitoring satisfies this requirement). In New York City, a certificate of fitness is required as outlined in CEHSP S14.03, *FDNY Certificates of Fitness*. [20] R

4.7 ACCESS

Employees must not climb into or out of manholes or vaults by stepping on cable or hangers. Only approved ladders that extend three feet above the surface may be used. [21] R A ladder must be placed in the electrical enclosed space at all times during work in the space, unless it is impractical due to the position of the ladder in relation to the work tasks in the structure. If impractical, then the ladder must be positioned within reaching distance of the attendant at the entrance into the space.

Note: Rack arms, stanchions, and cable hangers are designed to support the weight of cable and joints only. These items must not be used for any other load-bearing purposes.

4.8 COMMUNICATIONS

Reliable communications (visual, voice, signal line, or two-way radio) must be maintained among all employees involved in the job. If reliable communications cannot be maintained, the entry must be discontinued. The entry may continue when a reliable communication mechanism is established. [22] R

4.9 LOWERING/LIFTING EQUIPMENT

Equipment used to lower/lift materials and tools into manholes or vaults must be capable of supporting the weight to be lowered and must be checked for defects before use. Before tools or materials are lowered into a manhole or vault, employees working in the space must be clear of the area directly under the opening. [23] R

4.10 DUCT RODS

If duct rods are used, they must be installed in the direction presenting the least hazard to employees. An employee must be stationed at the far end of the duct line being rodded to ensure that the required minimal approach distances are maintained from exposed energized parts. [24] R

4.11 CABLES

Energized cables must be carefully inspected for defects before they are moved. Energized primary cable must only be inspected/handled/moved by qualified Con Edison employees or qualified contractors. Energized joints must only be handled by Con Edison personnel or contractors fully qualified by 29 CFR 1910.269. Energized secondary cable must only be inspected/handled/moved by or under the direction of qualified Con Edison employees, or qualified contractors. Refer to EO-10130 (distribution cable) for cable moving procedures.

When multiple cables are present in a work area, the cable to be worked must be identified by electrical means, unless its identity is obvious by reasons of distinctive appearance or location or by other readily apparent means of identification. Cables other than the one being worked must be protected from damage.

When work is performed on buried cable or on cable in manholes metallic sheath bonding must be maintained or the cable sheath must be treated as energized. [25] R/P

4.12 USE OF EQUIPMENT BY CON EDISON EMPLOYEES AND/OR CONTRACTORS

Con Edison employees may use the contractor's ladders or rescue device, if visually inspected before use, and found to be in proper working order. Only Con Edison atmospheric monitoring equipment may be used by or for Con Edison employees. Contractors may use Con Edison equipment with prior approval from Con Edison personnel supervising the work. [26] P

4.13 TRAINING

Con Edison employees and contractors who enter electrical enclosed spaces for the purpose of conducting physical work, or who serve as attendants, must be trained as required for the reason for entry, including the following:

- Applicable work procedures
- First aid/CPR (SAF 0021)
- Electrical enclosed space entry procedure
- Electrical enclosed space rescue
- The hazards of electrical enclosed space entry
- The proper use of forced-air ventilation for manholes, vaults, or similar structures
- Procedures for clearing underground structures of flammable gas and vapors

All of the above topics (except first aid/CPR) are covered in OJT ELE1010, Enclosed Space Entry and Rescue and in various skill courses.

Employees subject to entering manholes where SF_6 may be present must receive the following additional training:

- Properties of SF_6
- Nature and composition of the solid and gaseous decomposition products
- Appropriate precautions to be taken. [27] R/P

4.14 ELECTRICAL ENCLOSED SPACE RESCUE

Examples of situations that may require rescue or resuscitation include but are not limited to:

- Illness (of a degree to preclude self-rescue).
- Injury (burns or fractures).
- Unconsciousness (physical blow, electric shock, or heart attack).

Retrieval equipment must be inspected to ensure proper function, and be available outside of the truck at the job site prior to the start of work. Before the actual work tasks begin, the retrieval device must be set up at the space entrance, or nearby so that employees can be promptly and safely extracted from the space. The placement of the retrieval device will be determined during the job briefing, based on potential hazards in the space and around the work area. For structures less than 48" in depth, the retrieval device does not have to be set up. When placing grounds on a transformer where the top of the transformer is within 48" of the grating, the retrieval device does not have to be set up.

The preferred placement of the self-supporting extraction device is always at the structure opening, in position to facilitate immediate use for rescue. If the work area cannot be configured to support this placement, the device may be positioned elsewhere inside the work area, but personnel must ensure that they have identified the location where the device would be set up to facilitate rescue, and maintain that area free of material/equipment.

A ladder must be placed in the electrical enclosed space at all times during work in the space, unless it is impractical due to the position of the ladder in relation to the work tasks in the structure. If impractical, then the ladder must be positioned within reaching distance of the attendant at the entrance into the space.

For multiple entrants in an enclosed space, the same rescue method shall be employed for each person. If both entrants are simultaneously injured, the rescue priority will be based upon first aid training.
[28] R

5.0 DEFINITIONS

Attendant: An individual authorized by the management of his/her department who is stationed outside an enclosed or other space to monitor the authorized entrants and perform all duties assigned in this program, including providing assistance to employees inside the space.

Confined Space: A space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work, and
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry), and
- Is not designed for continuous employee occupancy.

Confined spaces include, but are not limited to pits, sumps, sewers, manholes, wells, tanks/tankers, boilers and pressure vessels, other vessels, and equipment.

Electrical Enclosed Space: A working space, such as a manhole, vault, tunnel, service box, or shaft, used for the operation and maintenance of electric power generation, transmission, and distribution lines and equipment. An electrical enclosed space has a limited means of egress or entry, and is designed for periodic employee entry under normal operating conditions. Under normal conditions, an electrical enclosed space does not contain a hazardous atmosphere, but may contain a hazardous atmosphere under abnormal conditions.

Gas Enclosed Space: A working space used solely for the maintenance and distribution of natural gas lines and equipment, such as a manhole, vault, tunnel, or shaft. A gas-enclosed space has a limited means of egress or entry, and is designed for periodic employee entry under normal operating conditions. Under normal conditions, a gas-enclosed space does not contain a hazardous atmosphere, but may contain a hazardous atmosphere under abnormal conditions.

Hazardous Atmosphere: An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, unaided from an enclosed space), injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10% of its ***lower explosive limit [LEL]*** (0.5% as calibrated against methane).
- Atmospheric oxygen concentration below 19.5% or above 23.0%.
- Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in The Occupational Safety and Health Administration General Industry Standard (29 CFR 1910.1000) and which could result in employee exposure in excess of its dose or permissible exposure limit.
- Any other atmospheric condition that is ***immediately dangerous to life or health (IDLH).***

Immediately Dangerous to Life or Health (IDLH): Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a dangerous atmosphere.

Lower Explosive Limit (LEL): The lower limit of flammability of a gas or vapor at ordinary ambient temperatures expressed by a percentage of the gas or vapor in air by volume.

Permit-Required Confined Space: A confined space that has one or more of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere.

- Contains a material that has the potential for engulfing an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross section.
- Contains any other recognized serious safety or health hazard.

Qualified: Qualified is defined in this CEHSP with respect to employees, workers, or contractors as being trained and knowledgeable in the procedures, potential hazards, and appropriate safety measures relevant to the work the person is required to perform.

6.0 RESPONSIBILITIES

Chem Lab: The Chem Lab is responsible for providing clearances for entering an enclosed space that may contain SF_6 gas or SF_6 by-products.

Electric Construction Group: The Electric Construction Group is responsible for installing and maintaining caution signs for SF_6 enclosed spaces.

Employees: Con Edison employees working in subsurface structures are responsible for following the requirements of this CEHSP and for attending required training.

Environment, Health, and Safety (EH&S): EH&S performs the following functions:

- Reviews applicable regulations and ensures that procedures meet all regulatory requirements.
- Revises procedures as applicable.
- Distributes updates and changes.
- Reviews training prepared by The Learning Center.
- Provides technical assistance to line management and the field.

In addition, the Director of EH&S Safety and Industrial Hygiene provides advice and counsel on this procedure.

Facility, Site, EHS; or Field Manager Responsible for Compliance: The Con Edison designated individual within each operating department who is responsible for ensuring compliance with federal, state, and local regulations, and this procedure.

Law Department: The Law Department assists and provides guidance to EH&S by reviewing changes to these procedures in light of all applicable statutes and regulations to ensure that the procedures meet all legal requirements.

Operating Departments: Unless otherwise indicated, operating departments (Customer Operations, Electric, Gas, Purchasing and CFS, Steam, and Systems & Transmission Operation [S&TO]) are responsible for compliance with federal, state, and local regulations, and this procedure.

Supervisors: Supervisors are responsible for ensuring that personnel follow proper procedures and for performing necessary training.

7.0 REFERENCES

4.1 JOB BRIEFINGS

[1] 29 CFR 1910.269(c) (job briefing). NOTE: The cited regulation does not require that completion of job briefings be documented. Con Edison requires such documentation as a matter of policy.

4.2 VEHICULAR OR PEDESTRIAN TRAFFIC

[2] 29 CFR 1926.200 (accident prevention signs and tags).

4.3 PRE-ENTRY INSPECTION

[3] 29 CFR 1910.269(e)(4) (evaluation of potential hazards). NOTE: The cited regulation discusses potential hazards relating to atmospheric pressure, temperature differences, and hazardous atmosphere generally. Con Edison included additional evaluation measures as a matter of policy to enhance employee safety.

[4] 29 CFR 1910.269(e)(5) (removal of covers). NOTE: The cited regulation addresses the removal of covers generally; Con Edison requires the use of appropriate tools as a matter of policy.

[5] 29 CFR 1910.269(t)(7) (defective cables). NOTE: The cited regulation includes exceptions to the requirement that defective cable be de-energized before employees enter a manhole. Con Edison does not allow these exceptions as a matter of policy. Also, the CEHSP identifies Con Edison-specific procedures addressing D-Faults.

4.4 ATMOSPHERIC TESTING

[6] 29 CFR 1910.269(e)(8) (calibration of test instruments); 1910.269(e)(9) (testing for oxygen deficiency); 29 CFR 1910.269(e)(10) (testing for flammable gases); 29 CFR 1910.269(x) (definition of hazardous atmosphere). NOTE: The cited regulations address atmospheric testing generally. Con Edison has adopted additional testing requirements, including a requirement that test results be documented, as a matter of policy.

[7] 29 CFR 1910.146, Appendix B, Sec. 4 (testing stratified atmospheres).

[8] NOTE: The electrical enclosed space regulations do not address use of space entry gas detectors except as identified in Note 6 above. Con Edison has developed these procedures for calibration and use of gas detectors as a matter of policy.

[9] NOTE: The electrical enclosed space regulations do not address approval of space entry gas detectors and use of detectors for survey purposes. Con Edison has developed these procedures as a matter of policy.

[10] 29 CFR 1910.269(e)(6) (hazardous atmosphere).

[11] NOTE: The electrical enclosed space regulations do not require documented visual inspections once personnel enter an electrical enclosed space. Con Edison has developed these procedures to ensure the safety of its employees.

[12] NOTE: The electrical enclosed space regulations do not contain specific procedures addressing entry of nonqualified personnel. Con Edison has developed these procedures to ensure the safety of Con Edison personnel not qualified for electrical work, contractors and public improvement personnel entering such spaces.

[13] NOTE: The electrical enclosed space regulations do not contain special procedures to address burnouts or electrical failures. Con Edison has developed these procedures to ensure the safety of employees responding to such incidents.

[14] 29 CFR 1910.269(e)(2) (attendant training); 1910.269(e)(7) (attendants generally); 1910.269(t)(3) (attendants for manholes).

[15] 29 CFR 1910.269(g) (requires PPE to meet requirements of 40 CFR Part 1910, subpart I).

4.5 MONITORING AND VENTILATION

[16] 29 CFR 1910.269(e)(11) (ventilation and monitoring); 1910.269(e)(12) (specific ventilation requirements). NOTE: The cited regulations address ventilation and monitoring generally. Con Edison has adopted additional requirements, including a requirement that monitoring be documented, as a matter of policy.

[17] See Note 16 above.

[18] 29 CFR 1910.269(e)(12) (specific ventilation requirements).

[19] 29 CFR 1910.269(e)(13) (air supply).

4.6 Open Flame

[20] 29 CFR 1910.269(e)(14) (open flames). See CEHSP S14.03, *FDNY Certificates of Fitness* for additional requirements.

4.7 ACCESS

[21] 29 CFR 1910.269(h)(1) (ladders, platforms, step bolts, and manhole steps); 1910.269(t)(1) (access).

4.8 COMMUNICATIONS

[22] 29 CFR 1910.269(t)(3)(iv) (reliable communication).

4.9 LOWERING EQUIPMENT

[23] 29 CFR 1910.269(t)(2) (lowering equipment into manhole).

4.10 DUCT RODS

[24] 29 CFR 1910.269(t)(4) (duct rods).

4.11 CABLES

[25] 29 CFR 1910.269(t)(5) (multiple cables); 1910.269(t)(6) (moving cables); 1910.269(t)(8) (sheath continuity). NOTE: The CEHSP includes Con Edison-specific details regarding cable moving.

4.12 USE OF EQUIPMENT BY CON EDISON EMPLOYEES AND/OR CONTRACTORS

[26] NOTE: These procedures clarify when Con Edison employees and contractors can use each other's equipment.

4.13 TRAINING

[27] 29 CFR 1910.269(a)(2) (training generally); 1910.269(e)(2) (enclosed space training, including attendants). NOTE: The training outlined in the CEHSP was developed to satisfy the requirements of 29 CFR 1910.269 and other regulations applicable to employees entering electrical enclosed spaces.

4.14 ELECTRICAL ENCLOSED SPACE RESCUE

[28] 29 CFR 1910.269(e)(3) (rescue equipment).

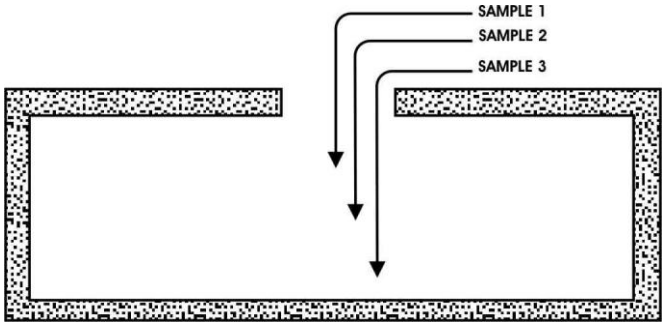
ATTACHMENT 1

SAMPLING PROCEDURE FOR MANHOLE ATMOSPHERES

Detector must first be operated in fresh air. Initial test is for oxygen deficiency followed by a gas detection test.

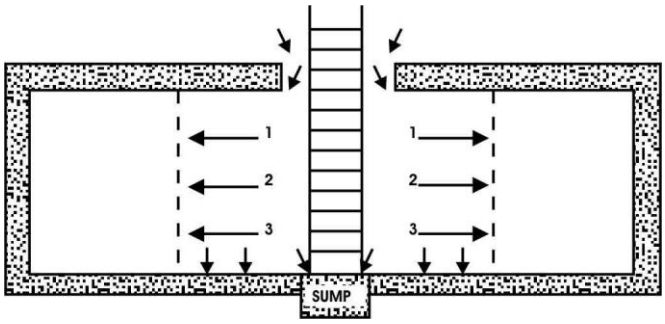
STEP 1

Observations of the atmosphere in the manhole shall be made at a level approximately two feet from the top, near the middle of the manhole, and at a level near the bottom. If water is present in the manhole, the latter observation must be made at a level just above the surface of the water. Care must be taken not to immerse the end of the sampling hose in water. When exposed to water, the filter at the end of the sampling hose will automatically close to prevent any material or gas from entering the instrument. This action will also render the instrument inoperable until the filter is replaced. To prevent erroneous readings, operating difficulties and maintenance problems, always use the probe and filter supplied with each gas detector.



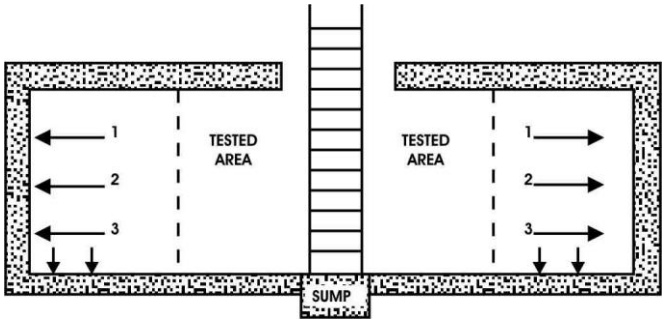
STEP 2

Insert ladder into structure and take sample around casting and chimney. While descending the ladder, take samples to the right and left for three levels



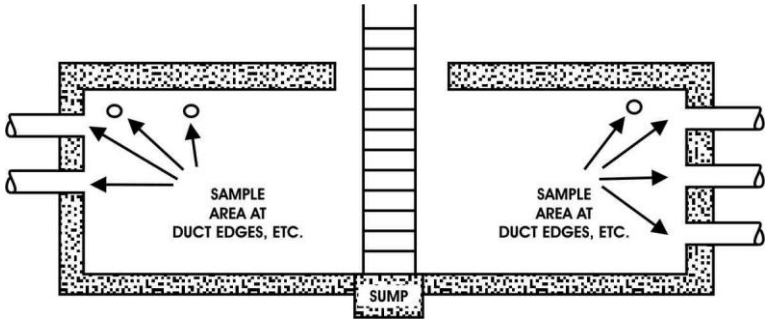
STEP 3

Check the remainder of the manhole from the tested area



STEP 4

Check the remaining interior of the structure at corners, cracks, and other irregularities. Duct edges shall also be checked without removing duct seal, foam, cement, or other packing materials. If possible, readings shall also, be performed up the ducts a distance of approximately 2 inches past the plane of the manhole wall.



ATTACHMENT Q

Contractor Injury Form

CONSOLIDATED EDISON COMPANY OF NEW YORK
CONSTRUCTION EH&S
CONTRACTOR INJURY REPORT

Injury Date: _____ *Time of Injury:* _____ *Work Location:* _____

Date Reported: _____ *Time Reported:* _____

Name of Injured: _____ *Contractor Co:* _____

Home Address: _____

Date of Birth: _____ *SS# (Last 4 digits):* _____ *Length of Svce:* _____

Supervisor: _____ *Phone:* _____ *Shift:* _____

PART OF BODY
Be as specific as possible (e.g. right index finger, left foot, etc.)

____	1. Head	____	15. Chest
____	2. Nose	____	16. Abdomen
____	3. Ears	____	17. Back
____	4. Eyes	____	18. Hip
____	5. Mouth	____	19. Knee
____	6. Face	____	20. Ankle
____	7. Jaw	____	21. Leg
____	8. Neck	____	22. Foot
____	9. Shoulder	____	23. Toe
____	10. Elbow	____	24. Body
____	11. Wrist	____	25. Heart
____	12. Arm	____	26. Lungs
____	13. Hand	____	27. Skin
____	14. Finger	____	28. Throat

NATURE OF INJURY / ILLNESS

____	1. Laceration	____	9. Burns
____	2. Puncture	____	10. Shock
____	3. Contusion / Bruise	____	11. Inhalation
____	4. Sprain / Strain	____	12. Infection
____	5. Fracture / Dislocation	____	13. Hernia
____	6. Concussion	____	14. Skin Disorder
____	7. Amputation	____	15. Irritation
____	8. Foreign Matter	____	16. Unconsciousness

INJURY CLASSIFICATION

Medical Treatment ____
Restrictions (if yes, please describe): _____
Lost Time ____
First Aid ____
Non-recordable (FYI) ____

TYPE OF INCIDENT

____	1. Animal	____	10. Falling Objects	____	19. Stepped In	____	28. Steam
____	2. Insect	____	11. Gas / Fumes	____	20. Caught Between	____	29. Heat
____	3. Electric flash	____	12. Handling Objects	____	21. Altercation	____	30. Sun
____	4. Electric contact	____	13. Pushing Objects	____	22. Improper Body Pos	____	31. Chemicals
____	5. Burns (Other)	____	14. Pulling Objects	____	23. Vehicle Accident	____	32. Plants
____	6. Slip	____	15. Lifting Objects	____	24. Improper Tool Use	____	33. Carrying Obj
____	7. Trip	____	16. Striking Objects	____	25. Flames	____	34. Hearing Loss
____	8. Fall	____	17. Struck By Objects	____	26. Smoke	____	35. Repetitive Motion
____	9. Flying Objects	____	18. Stepped On	____	27. Vapors	____	36. Other

Describe nature, extent and type of injury (if not listed above):

_____

Describe fully how injury was sustained:

_____

Witnesses (Name & Address): 1) _____
2) _____

Hospital: _____ Address: _____

Physician: _____ Admitted to Hospital: ____YES ____NO

Treatment Received: _____

Report Prepared By: _____ Emp #: ____ Phone: _____ Date: _____

CCI / Supervisor: _____ Emp #: ____ Phone: _____

EH&S Rep: Thomas F. O'Connell Emp #: 85425 Phone: (718) 204-4282

PO # _____

If you cannot e-mail the form, then you may fax it to: Construction EHS&T at

Amendment 002

Community Air Monitoring Plan

1.0 Community Air Monitoring Plan

Real-time air monitoring for volatile compounds and particulates at the perimeter of the hot zone will be performed.

- VOCs will be monitored at the downwind perimeter of the hot zone if total organic vapors in the worker breathing zone exceed 5 ppm above background, or at least twice every hour. Monitoring will be conducted with a PID equipped with a 10.2 or 10.6 eV lamp. If total organic vapor levels exceed 1 ppm above background at the perimeter, excavation activities must be halted and monitoring continued. All readings must be recorded and be available for State (NYSDEC & NYSDOH) personnel to review.
- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration. All readings must be recorded and be available for review by the NYSDEC and/or NYSDOH. These action levels will be modified if particulates are better characterized and identified. Dust monitoring equipment shall be calibrated as per manufactures instruction
- Dust suppression methods may consist of water misting with a hudson spray or spray bottle provided this does not cause a slipping hazard. Run off will be contained with water absorbent pads. A shop vac may also be employed as a dust suppression method.

1.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 1 ppm above background at the perimeter of the hot zone, excavation activities will be halted or odor controls will be employed, and monitoring continued. If the organic vapor level decreases below 1 ppm above background, excavation activities can resume provided:

- The organic vapor level 200 feet downwind of the hot zone or half the distance to the nearest residential or commercial structure, whichever is less, is below 1 ppm over background; and
- More frequent intervals of monitoring, as directed by the SSO, are conducted.
- If the organic vapor level is greater than 1 ppm above background at the perimeter of the hot zone, work activities must be shut down or odor controls must be employed. When work shut-down occurs, downwind air monitoring, as directed by the SSO, 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.

1.2 Major Vapor Emission

If any organic levels greater than 1 ppm over background are identified 200 feet downwind from the work site, or half the distance to the nearest residential or commercial property, whichever is less, 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 1 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the hot zone, 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 1 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.

1.3 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

- The local police authorities will immediately be contacted by the SSO and advised of the situation;
- 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 SSO; and
- All Emergency contacts will go into effect as appropriate.

PLEASE USE THIS DOCUMENT TO MAKE ANY CHANGES TO THE HEALTH AND SAFETY PLAN

Site Safety Plan Amendments

Amendment No.: 002

Client: Consolidated Edison Co. of New York	**Project Number: 60146427.100**
Location: New York, NY	**Date: October 1, 2012**
Project Manger: Jennifer Pfeiffer	**Site Engineer: Eleanor Vivaudou**
Site EHS Officer: Stephen White	
Amendment: Community Air Monitoring Program	
Reason for Amendment: The dust/particulate monitoring in the CAMP has been modified to reflect NYSDOH guidance. A CAMP will be implemented at each subsurface intrusive investigation location performed during the Remedial Investigation of the former manufactured gas plant site. AECOM will implement the CAMP.	
Alternative Safeguard Procedures: See attached CAMP.	
Required Changes in PPE: See attached CAMP.	

Site EHS Officer **Date**

Corp. EHS Manager **Effective Date**

Appendix C

Con Edison Utility Clearance Procedures

UTILITY CLEARANCE PROCESS FOR INTRUSIVE ACTIVITIES
E H&S REMEDIATION PROGRAM

1.0 INTRODUCTION

This document outlines the process that should be used to identify, locate and clear subsurface utilities as part of all Environmental Health and Safety Department's Remediation Section intrusive site investigations. The various activities that comprise this process are specified in efforts to eliminate or substantially reduce the risk of encountering a subsurface utility while performing intrusive activities. Where appropriate, reference is made to other existing safety procedures, which should also be considered.

Due to the potential presence of subsurface utilities and the inherent variable of their size, depth and layout, it is not possible to address all situations and circumstances that may be encountered during intrusive activities. However, adherence to the steps outlined here will effectively minimize physical impacts to subsurface utilities and prevent associated health and safety risks that might otherwise result from field investigation activities. The activities prescribed below should not be blindly followed. Rather, it is the intent of this document that **ALL FIELD PERSONNEL**:

1) Understand the terms of this process;

2) Develop an awareness and be mindful of, the potential and actual risks associated with utilities and other related hazards at a site;

3) Become familiar with the location(s) and configuration(s) of all subsurface utilities at the site, as marked out and as delineated on available drawings;

4) Develop an awareness and understanding of the potential uncertainties associated with utility locations as marked out;

5) Maintain a high level of vigilance while implementing all components of intrusive fieldwork.

ALL FIELD PERSONNEL, including the Con Edison Project Manager (PM), Construction Management (CM), consultants and contractors should be familiar with the fundamental provisions of this utility clearance process PRIOR to engaging in any field activities.

The process described in the remainder of this document consists of the three (3) primary components summarized below. These components are designed for use in an integrated manner.

Process Narrative – The narrative provides detailed descriptions of the specific steps that should be taken prior to and during intrusive activities to minimize the potential of encountering subsurface utilities.

Utility Clearance Flow Chart: The key steps of the utility clearance process, as outlined in the narrative, are shown graphically on the flow chart provided in **Attachment A**. The flow chart serves as a guide and should not replace the narrative for developing an understanding of and/or implementing the process.

Utility Clearance Checklist - A key component of this process is the completion of the checklist provided in **Attachment B**. The checklist shall, be completed by the Con Edison PM. The intent of the checklist is to ensure that all appropriate steps of the process described herein have been completed. Secondly, it will be used to document that all reasonable steps were taken to prevent conditions that may be potentially harmful to the on-site workers and the surrounding community at large, and that might otherwise adversely impact the physical integrity of, or cause damage to, the utility. The completed checklist will be incorporated in the project files maintained by the Con Edison PM.

2.0 APPLICABILITY

The utility clearance process shall be performed prior to and/or during the intrusive site investigation activities listed below.

- Excavation of Soil Borings
- Installation of Monitoring Wells
- Installation of Soil Gas Sampling Probe Points
- Excavation of Exploratory Test Pits/Trenches

3.0 SUBSURFACE UTILITY CLEARANCE PROCESS

The key activities that comprise the process are listed below and a detailed description of each is provided in the remainder of this document in the order in which they should be completed (as shown in the Utility Clearance Flow Chart in **Attachment A**).

- Obtain Plates, Drawings and Maps
- Notification to Con Edison Operating Groups and Submission of Site-Specific HASP for Review
- Code 753 Utility Mark-Out

- Site Walk
- Utility Clearance - Sample Location Confirmation
- Checklist Completion

It is noted that completion of some steps may not be warranted for all intrusive activities at all sites. The process is designed to be flexible and, thus, allows the Con Edison PM to incorporate those utility clearance activities that are appropriate for a set of site-specific conditions, knowledge of the site, previous work completed at a site, etc. Exceptions are summarized in Section 5.0 of this document. The key premise is that any deviations and the rationale for each are well documented and reflect sound judgment on the part of the Con Edison PM and other project personnel.

3.1 Obtain Plates, Drawings and Maps

Hard copies of available utility plates, drawings and/or maps should be obtained by the Con Edison PM. Drawings, plates, etc. should be reviewed as a preliminary step to determine the type, size and location of utilities in the vicinity of the work site. The drawing title, most recent revision date shown on the drawings, approximate scale and source shall be documented in the appropriate space(s) on the Utility Clearance Checklist (**Attachment B**).

The source of the drawings may vary depending on whether the site is a Con Edison owned/operated facility, private/public property, or extends into a public street/sidewalk. The various sources for substation utility drawings are discussed below and listed in **Table 1**. Drawings for private properties and facilities, such as apartments, schools, churches, residences, etc., can typically be reviewed at, and/or obtained from, the property/facility manager and Department of Public Works and/or Department of Buildings in the municipality where the property is located.

NOTE: Copies of all drawings obtained during this step should be available at the site during all site walks/inspections and at all times during subsequent intrusive activities. The drawings should be reviewed immediately prior to implementing intrusive activities at each new site location where intrusive activities are to be performed.

Steam, Gas and Electric
All electric and gas plates are available on Con Edison's intranet by searching for 'maps' or accessing the Advanced Mapping System website listed below.

http://maps/AdvancedMappingHomePage.htm

Similarly, steam plates can be obtained by selecting "Active" and "Archived" Steam Plates from the website:

http://maps/steam.htm

Based on agreement between Transmission Operations and EH&S, Remediation personnel may access these intranet sites and print the plates using the facilities in the conference room in Building 97 in Astoria. In addition, a large format photocopier, which is also located in Building 97, is available for use by EH&S remediation. A log book, which is stored at the facility, should be completed each time the facilities (i.e., plotter, computer, and or photocopier) are used.

Conduit and Duct Occupancy (C&DO) utility plates should be obtained from the appropriate Con Edison engineering group(s) including, electric (e.g., distribution lines, transmission feeders, etc.) steam and gas by the Con Edison PM.

AFTER accessing the website and obtaining the required drawings, the appropriate party listed in **Table 1** may be contacted with inquiries regarding electric and steam plates or for questions regarding use of the Advanced Mapping System.

Sewer and Water

Drawings showing water and sewer utilities should be obtained from the New York City Department of Environmental Protection (NYCDEP). Drawings can be requested from the NYCDEP by completing the form provided in **Attachment C** and faxing or mailing it using the appropriate contact information listed on the request form. If you have questions you should contact the NYCDEP personnel at the telephone number listed in **Table 1.**

Subterranean Tunnels

Drawings showing locations and depths of tunnels including subways and automobile tunnels and related subsurface infrastructure should be obtained as appropriate by contacting the Metropolitan Transportation Authority as listed in **Table 1.** It is noted that if intrusive activities will be performed in the immediate vicinity of subsurface MTA structures, such as subway or automobile tunnels, a letter submitted to the MTA may be required to request a work permit from MTA. The letter should include a brief summary of the work and a map(s)/drawing(s) of the proposed work and will be submitted to:

Mr. Rajen Ydeshi
Outside Projects
New York City Trasit
2 Broadway, 7th Floor
New York, New York 10004

Miscellaneous

Con Edison generally does not maintain plates and drawings showing detailed information of utility distribution on private property. However, as discussed above, facility managers, property owners, Department of Public Works and/or Department of Buildings of the municipality where the site is located, should be contacted in efforts to obtain available utility drawings for the facility. Contact information (e.g., telephone numbers, e-mail addresses, etc.) for municipalities can typically be obtained by accessing the municipality's website. The name, address and telephone numbers for the Department of Buildings in New York City are listed in **Table 1.**

3.2 Complete Utility Markouts

Due to the diversity and nature of sites investigated by the EH&S Remediation Group and the potential utilities at these sites, an effective mark out may require an M-scope survey by Con Edison, request a Code 753 utility survey, and/or a subsurface utility survey by a private utility-locating contractor. The applicability of each of these is discussed below.

3.2.1 Overview of Utility Markout Methods

Code 753

The Con Edison PM should instruct their consultant and/or contractor to request a Code 753 utility mark out as per the 16 New York City Rules and Regulations (NYCRR) Part 753. Consistent with the One-Call (also called Dig Safe New York) criteria, the request should be made at least 72 hours prior to initiating fieldwork. The telephone numbers of the various one-call systems are listed by region below.

New York City / Long Island:	(800) 272-4480
Westchester	(800) 962-7962

Confirmation that mark outs completed under Code 753, and as received by facsimile or telephone from the participating utility companies, should be documented on spaces provided on the Utility Clearance Checklist (**Attachment B**). The markouts should be maintained by the Con Edison PM or designated representative. If the physical markings on the street/sidewalk become faint or obscure they should be refreshed by over-painting with new pain as needed. When the utility markouts are being refreshed, typically by consultant, contractor, or other project personnel, a Con Edison representative or their designee **MUST** be present and observe this activity.

Con Edison M-Scope Survey

Con Edison engineering groups (see below for contacts) can conduct utility surveys using a 'M-Scope'. This tool uses the magnetic susceptibility of subsurface features such as electrical conduits, electric cables, pipes, etc. This method of survey can be subject to interference by other conductive bodies at grade or in the subsurface, such as buried pieces of metal, rebar in concrete, iron-rich soil, etc., and can be ineffective or produce misleading results in these types of conditions. A utility survey using an M-Scope can be requested by contacting the appropriate party listed below. Note for markouts inside substations contact Mark Rimler at (212) 460-3921.

County	Contact Name	Telephone Number
Manhattan	Jane Shin	(212) 894-9345
Brooklyn & Queens	John Haas	(718) 348-6725
Bronx	Greg Kasbarian	(718) 904-4659
Westchester	Faney Bantin	(914) 789-6715
Staten Island	Joseph Nappi	(718) 890-6231

Private Utility Contractor

Private utility contractors employ a variety of utility detection and location techniques, which may include:

- Ground Penetrating Radar (GPR)
- Magnetometer
- M-Scope
- Electrical Conductivity
- Electrical Resistance
- Accoustics

Use of multiple methods may permit the detection and surveying of conductive and non-conductive buried utilities.

3.2.2 Applicability of Utility Clearance Resources

The use of the various utility markout resources that may be employed at various sites is summarized in the table below and discussed in the remainder of this section.

Site Setting	Utility Survey by Con Edison	Utility Survey by Private Contractor	Code 753 (1)
Con Edison Facility	X	X (optional)	X[1]
Street / Sidewalk			X
Private Property	X (optional)	X	X[1]

(1) At larger Con Edison Properties (e.g., Astoria) or large private or publicly owned properties, a Code 753 survey may not be warranted.

Con Edison Facility

Utility markouts at Con Edison facilities should be coordinated by the Con Edison PM with support from the Construction Management (CM) inspector assigned to the project (if any) and/or facility personnel, as appropriate. At a minimum, an M-Scope survey should be completed. In some circumstances, an independent utility locating contractor should also be used. The decision to use a utility contractor will be made by the Con Edison PM. The use of an independent utility mark-out contractor is strongly recommended at sites where a variety of utilities are known or suspected to be present and which may not be readily identified or mapped

using M-Scope alone. A benefit of using a utility locator contractor is that, as described above, they can provide a greater array of tools to locate a variety of subsurface utilities that are non-conductive, such as concrete sewer lines, PVC pipes, etc. in addition to identifying/confirming the presence and location of conductive utilities.

Private Property (including Soil Gas Sampling Probes)

An independent utility locator should be used for utility markouts on private properties. It is noted that utility markouts in basements or slab-on-grade constructed buildings may be inconclusive due to the presence of rebar or welders-mesh commonly used as reinforcement in concrete. Accordingly, a thorough inspection of the basement floor and walls should be performed to identify where utilities enter and leave the building. Sub- or in-floor utilities often enter along the perimeter of the floor, at support columns, and/or along dividing walls. The observation of utilities entering the floor may indicate utilities that lie within or immediately beneath the concrete basement slab. If the location of the utility layout of any such sub- or in-floor utility cannot be effectively determined, then any intrusive work must be discussed with the Con Edison PM and may require that no intrusive activities be performed at that location.

Public Street / Sidewalk

A combination of Con Edison utility survey staff and independent utility locator contractors may be used for work areas located in and along roadways. Since Con Edison maintains utilities in streets and along sidewalks, in addition to the mark outs performed through the Code 753 survey, an M-scope survey may also be requested within a 10 foot radius of each proposed sample location. It is noted that due to often heavy work loads of the M-Scope survey staff, this option may not always be available of practicable and should be considered optional.

3.3 Site Walk

After completion of the activities outlined above, a site walk shall be conducted by the Con Edison PM with participation from Construction Management, contractors (drillers, soil gas, excavators, etc.), Con Edison facility managers, NYSDEC (as deemed appropriate by the Con Edison PM), and private facility managers/property owners. A list of the names and phone numbers of each participant at the site walk will be maintained by the Con Edison PM. The key objectives of the site walk are to:

- Review the all planned locations where invasive activities will be performed,
- Adjust the positions of the locations away from utilities as marked out (as necessary)
- Collectively determine the appropriate utility clearance activities (e.g., test pits, etc.) that will be performed at each location (as described in Section 3.4) and document all decisions and /or concerns using the Utility Clearance Checklist (as described in Section 4.0) and in **Table 2**.

Other site conditions and project issues assessed during the site walk should include:

- Presence and location of overhead utilities and/or obstructions that might prevent the safe operation of drilling /excavating equipment;
- Presence of, or need for, appropriate grounding for electrical equipment at the site;
- Site access to equipment;
- Storage of equipment/supplies overnight (e.g., establish a staging area);
- Storage and management of investigative derived waste (IDW);
- Hours of on-site work;
- Permits needed, if any;
- Review roles and responsibilities of all project personnel who will be onsite;
- Review site and emergency contacts; and
- Review anticipated schedule of work.

3.4 Utility Clearance - Sample Location Confirmation

The appropriate actions necessary to confirm the location and/or absence of utilities, which are agreed on during the site walk and as documented in the Utility Clearance Checklist and in **Table 2**, will be implemented at each sample location during the investigation. As discussed above, and consistent with th Utility Clearance Process Flow Chart, the actions will generally include one or more of the following:

- Moving the location outside the *tolerance zone*, if possible. If no *tolerance zone* is marked out during the utility survey (i.e., only a utility center line is marked), the *tolerance zone* will be defined in the field as: *the distance of one-half of the known diameter of the utility plus two feet on either side of the centerline as marked out.*
- Performing a utility clearance test pit at each location where intrusive work will be performed; and/or
- Performing a utility clearance test pit using non-mechanical means to expose and physically verify the exact location and configuration of all nearby utilities.

Brief descriptions of the activities that will be completed during the various investigation activities are discussed below.

NOTE: When working within 12 feet of high pressure gas lines (i.e., 125 psig or greater), Gas operations shall be contacted and the gas line will be carefully excavated by hand in accordance with the Gas Operations Standard G-11863, titled "Inspection and Maintenance Requirements Associated with the Excavation Activities Near Gas Pipelines Operating at 125 psig and Above".

Soil Borings / Monitoring Wells

All locations within the tolerance zone should be moved outside the zone, if possible. After moving the location, a utility clearance test pit should be excavated to a minimum of 5-feet below ground surface using non-mechanical methods, such as hand auger, post-hole digger and/or vacuum truck. The diameter of the test pit should be at least two inches wider than the outer diameter (OD) of the mechanized drilling equipment. The 5-foot depth is consistent with the concept that most utilities are typically installed within the top five feet of the subsurface.

NOTE: Utilities may be deeper than five feet due to buildup of surface grade on properties and or streets or right-of-ways. Although the original depth of utilities is anticipated to be within the upper five feet, utilities that are buried in areas that have been built up will presently be deeper by the thickness of the built-up material.

Intrusive investigation locations where physical space prohibits the relocation of proposed sample locations outside the tolerance zone, the adjacent utility(ies) will be exposed by excavating using non-mechanical methods to visually confirm its physical location and configuration. This confirmatory excavation will be completed in addition, a 5-foot excavation at the specific location being investigated (e.g., soil boring, monitoring well boring, etc.), as described above.

Soil Gas Sampling

At soil gas sample locations, test pits will also be excavated to one foot below grade or below the bottom of a concrete floor, if present, prior to installation of soil gas sample probes points. The one-foot depth specified is consistent with the concept that most utilities that could be impacted by the advancement and emplacement of the probe points, such as telephone lines, local electric (e.g., for outdoor lighting), cable television, in-ground sprinkler lines, etc., are typically installed from grade to a depth of one foot.

Basements / Indoor Soil Borings and Monitoring Wells

Prior to installing a soil boring, monitoring well or soil gas sample probe point in a basement and after identifying that no utilities are present in the floor of the basement or foundation slab (as per Section 3.2.2), an electric powered diamond core drill, concrete saw or jack hammer will be used to advance through the concrete and expose the underlying soil. At each location where soil borings and/or monitoring wells will be installed, a hand excavated test pit will then be advanced to a depth of five feet below the bottom of concrete slab. This test pit should be excavated using hand auger, post-hole digger and/or vacuum truck in tandem with a non-conductive probe rod, which can be used to confirm the absence of utilities to a depth of five feet below the bottom of the concrete slab.

NOTE: The use of a jack-hammer to loosen compact soil while hand excavating a utility clearance test pit is strictly prohibited, except as noted above.

Exploratory Test Pit/Trench

Exploratory test pits/trenches will be performed to identify the presence or absence of subsurface structures related to former operating facilities at the site, such as gas holder foundations at former manufactured gas plant (MGP) sites, and should not be confused with *utility clearance test pits* discussed above. The *exploratory test pits* or *trenches* will typical have dimensions of approximately five feet wide by 10 feet deep by 10 to 20 long, accordingly, excavating them by hand is impracticable. The excavation of *exploratory test pits/trenches* must be approached with heightened awareness as the potential for damaging subsurface utilities, if present, is great.

In efforts to develop a reasonable degree of confidence that utilities will not be encountered during excavation of *exploratory test pits/trenches*, a focused utility survey will be conducted in the area immediately surrounding the test pit or the area defined by a boundary established by measuring two feet perpendicular from all sides of the proposed exploratory test pit boundaries. For example, if the surface dimensions of the exploratory test pit are 10 feet long by 5 feet wide, the surrounding area of the focused utility survey will have dimensions 14 feet long by nine (9) feet wide. It is suggested that the focused utility survey should be completed after all other on-site surveys have been completed. This will allow the surveyor(s) to develop a better understanding of the site-wide subsurface utility configuration.

Following completion of the focused utility survey, *utility clearance test pits* will be excavated by hand to confirm the presence of any and all utilities identified within five feet from the exploratory test pit/trench. After exposing the utilities, the excavator can proceed to excavate the *exploratory test pit/trench*, however, the operator should be experienced with digging in areas where underground utilities may be present and should use the utmost care when performing the excavation. Excavation should proceed slowly enough so that any obstruction/structure encountered can be evaluated and to confirm that the structure is not a utility.

4.0 Checklist Completion

The Utility Clearance Checklist (**Attachment B**), as well as the overall Utility Clearance Process to locate and clear utilities was designed to be dynamic. Accordingly the Utility Clearance Checklist should be updated throughout the process as each utility clearance activity is completed. During the site walk and after all utility-related issues at each location have been identified and addressed to the satisfaction of all project personnel, the relevant portions of the Utility Clearance Checklist will be completed by the Con Edison PM. It is noted that the Utility Clearance Checklist will be considered complete only after all proposed utility clearance actions identified during the site walk have been successfully implemented and all pertinent information and activities have been documented.

5.0 Exceptions to Requirements of the Utility Clearance Process

Due to the inherent diversity and conditions present at project sites, some general exceptions to the utility clearance process are identified below.

- Sites where extensive utility mapping has been completed and/or where extensive intrusive activities have already been performed.

- Locations where facility layout is well documented and understood.

- Sites or portions of large sites (e.g., Astoria facility) where utilities are known not to exist currently or to not have ever existed throughout the life of the facility, property or site.

All circumstances where one or more steps of this process are not being implemented must be discussed with the Con Edison PM and must be duly documented. Regardless of whether or not exceptions are made during the utility clearance process, a Utility Clearance Checklist should always be completed for each site, in accordance with the terms outlined in Section 4.0 of this document.

ATTACHMENT A

Utility Clearance Process Flow Chart

Utility Clearance Process During Intrusive Activities
E H & S – Remediation Group

03/06/03

Rev. 0

CON EDISON FACILITY

PM to Obtain & Review
Facility Excavating Procedure

As stringent as Remediation's process?

No

PM to Obtain Plates for all CE Utilities
Steam, Electric, Gas, etc.

Yes

Use Facility Clearance Protocol

Perform Utility Markout:
- Con Edison Mark-out Staff and/or
- Private Utility Locating Contractor

PRIVATE PROPERTY

PM to Review Drawings
- Department of Buildings
- Department of Public Works
- Building Plans at Facility

Perform Utility Markout:
- Private Utility Locating Contractor
- Con Edison Mark-out Staff

Contractor to Request Code 753 Mark-out:
- Provide maps of locations
- Request sn-site work
- Obtain mark-out confirmations

STREET / SIDEWALK

PM to Obtain Plates for all CE Utilities
Steam, Electric, Gas, etc.

Review Drawings
- Department of Buildings
- Department of Public Works
- Others (NYCTA, DEP, etc.)

Contractor to Request Code 753 Mark-out:
- Provide maps of locations
- Request on-site work
- Obtain mark-out confirmations

No

Indoors / Basement

Yes

Inspect Basement
Attempt to visually locate all utility service lines into and out of the walls and floors of building.

Drill Through Concrete
(Use Core Drill)

Soil gas sample below slab?

Yes

Box A
Hand auger one foot prior to driving soil gas sample probe to required depth

No

Site Walk for Location Confirmation
Prior to Intrusive Activities
- Con Edison PM
- Construction Management
- Project Consultant
- Contractor (Driller, excavator, etc.)
- Complete Utility Clearance Checklist

Yes

Utilities identified within 2 feet from proposed sample location

NOTE: If location is near a high pressure Gas main (>125 psig then) MUST contact Gas Ops and hand expose.

No

Yes

Can location be moved at least 2 feet from all utilities?

Move it

No

Hand Excavate
To locate nearby utility

Excavate Test Pit by Hand or Vacuum Truck

- Soil Boring / Monitoring Wells

Excavate test pit using hand auger , post-hole digger and/or vacuum truck: minimum hole diameter 2-inches greater than diameter of Auger and minimum of 5 ft deep. Use non-conducting probe rod during excavation.

(NOTE: for soil gas only go to Box A)

ATTACHMENT B

Utility Clearance Process Checklist

CHECKLIST FOR INTRUSIVE FIELDWORK

PROJECT BACKGROUND INFORMATION

Site Name: _____ Job No. _____

Site Address: _____

Con Edison Project Manager: _____ Phone: _____

Con Edison Site Manager: _____ _____

Consultant Project Manager: _____ Phone: _____

Consultant Site Manager: _____ Phone: _____

Subcontractor (driller, excavation, etc): _____

Subcontractor's Contact Person: _____ Phone _____

Meeting / Start Date _____ Time _____

HEALTH AND SAFETY PLAN REVIEW

Name: _____ Organization: _____ Date: _____

Name: _____ Organization: _____ Date: _____

Name: _____ Organization: _____ Date: _____

Health and Safety Form Completed: _____ Date _____

Site Drawings (yes/no/NA): _____ (Attach site figure with proposed boring locations)

CODE 753 UTILITY MARK-OUT REQUESTED? Y / N

Called by: _____ Organization: _____

Date: _____ Time _____ Initials _____

Reference # _____

Utility Drawings Received: _____ (Attach copy of utility maps)

UTILITY INVENTORY

Above Ground Services:

Utility	Utility Company Name	Depth (ft)	Phone	Date Notified	Notification Method	Marked
Electric		NA				Y / N
Telephone		NA				Y / N
Cable		NA				Y / N
Overhead Supports		NA				Y / N
Traffic light cables		NA				Y / N

Drawings/Plates Obtained (List) _____

Notes: _____

UTILITY INVENTORY (continued)

Below Ground Services:

Drawings/Plates Obtained (List) _____

Utility	Utility Company Name	Depth (ft)	Phone	Date Notified	Notification Method	Marked
Electric						Y / N
Telephone						Y / N
Cable						Y / N
Gas						Y / N
Water						Y / N
UST System						Y / N
Storm						Y / N
Sanitary						Y / N
Steam						Y / N
Pipeline Companies						Y / N
Other (Tunnels, etc.)						Y / N

PRIVATE UTILITY LOCATING SERVICE RETAINED? Y / N

Called: Date _____ **Time** _____ **Initials** _____

Name of Locating Service: _____

Telephone #/ contact: _____

Type of sensing equipment used: _____

METAL DETECTOR SURVEY

Drilling location cleared by Parsons with a metal detector: **By (initials):** _____ **Date:** _____

INTRUSIVE SAMPLING LOCATIONS MARKED, M-SCOPED AND CLEARED

Locations Marked by: _____ Date: _____

M-Scope performed by: _____ Date: _____

Conduct Site Walk and Complete Site Walk Table

ACKNOWLEDGEMENT

The parties listed on the attached Site Walk Sign-In Sheet have participated in a site walk at _____ to review proposed intrusive sampling locations and to evaluate the presence, configuration and identification of utilities at this site, as marked out. The parties have agreed with the proposed activities that will be completed prior to conducting intrusive work. The utility clearance activities will be completed as summarized in Table A (attached).

ADDITIONAL COMMENTS / NOTES: _____

Site Walk Sign-In Sheet

Project Name: _____

Date of Site Walk: _____

Name:	Organization:	Phone No.

ATTACHMENT C

Instructions for Obtaining Drawings for Sewer and Water Utilities

From the NYC DEP

Table 1 - Summary Table of Resources for Obtaining Subsurface Utility Plates and Drawings

Utility Type	County	Company	Organization	Name	Telephone Number
Electric	All	Con Edison	Electric Engineering	http://maps/AdvancedMappingSystem.htm[1]	
			For Questions contact:	John Ensemplare (Mgr. – B&Q)	(718) 802-5540
				Mike Mitchell (Mgr. – Manhattan)	(212) 460-1119
				Richard Mariani (Mgr. – Westchester)	(914) 925-6026
Gas	All	Con Edison	Gas Engineering	http://maps/steam.htm[1]	--
			For Questions contact:	Mike Verlizzo (Mgr.)	(718) 319-2357
Steam	All	Con Edison	Steam Engineering	http://maps/steam.htm[1]	--
			For Questions contact:	Tony Barbera	(212) 460-4843
Sewer /Water	NYC	NYC DEP /	Bureau of Water and Sewer Operations	Vincent Soriano/ Doug Greely	(718) 595-5330
Tunnels	Subway Crossing the East River	MTA	Outside Projects – Adjacent Work	Vasanth Battu/ Rajen Ydeshi / [If drilling in immediate vicinity of MTA structure, e.g., subway tunnel, car tunnel, etc., you will need submit a letter and plan drawing(s) to Mr. Ydeshi]	(646) 252-4473 (646) 252-3641
	Crossing the Hudson River	Port Authority of NY/NJ	Surveying	Richard Danko (rdanko@panynj.gov) Bill Kane (wkane@panynj.gov)	(201) 595-4841 (201) 595-4842

(1) "Maps" website listed is accessible on the Con Edison Intranet.

Appendix D

AECOM Field Methods and Procedures

AECOM Field Methods and Procedures

1.0 Field Log Books

All field activities will be carefully documented in field log books. Entries will be of sufficient detail that a complete daily record of significant events, observations, and measurements is obtained. The field log book will provide a legal record of the activities conducted at the site. Accordingly:

- Field books will be assigned a unique identification number.
- Field books will be bound with consecutively numbered pages.
- Field books will be controlled by the Field Team Leader while field work is in progress.
- Entries will be written with waterproof ink.
- Entries will be signed and dated at the conclusion of each day of field work.
- Erroneous entries made while field work is in progress will be corrected by the person that made the entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing the correction.
- Corrections made after departing the field will be made by the person who made the original entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing and dating the time of the correction.
- At a minimum, daily field book entries will include the following information:
    - Location of field activity;
    - Date and time of entry;
    - Names and titles of field team members;
    - Names and titles of any site visitors and site contacts;
    - Weather information, for example: temperature, cloud coverage, wind speed and direction;
    - Purpose of field activity;
    - A detailed description of field work conducted;
    - Sample media (soil, sediment, groundwater, *etc.*);
    - Sample collection method;
    - Number and volume of sample(s) taken;

- Description of sampling point(s);
- Volume of groundwater removed before sampling;
- Preservatives used;
- Analytical parameters;
- Date and time of collection;
- Sample identification number(s);
- Sample distribution (*e.g.* laboratory);
- Field observations;
- Any field measurements made, such as pH, temperature, conductivity, water level, *etc.*;
- References for all maps and photographs of the sampling site(s); and
- Information pertaining to sample documentation such as:
    - Bottle lot numbers
    - Dates and method of sample shipment
    - Chain-of-Custody (COC) Record numbers
    - Federal Express Air Bill Number

2.0 Field Equipment Decontamination and Management of Investigation Derived Wastes

2.1 Decontamination Area

A temporary decontamination area lined with polyethylene sheeting will be constructed on-site for decontaminating the drilling equipment. Water collected from the decontamination cleaning activities will be collected in 55-gallon drums and managed as IDW.

2.2 Equipment Decontamination

The following procedures will be used to decontaminate equipment used during the RI activities:

- All drilling equipment including the drilling rig, core barrels, bits, rods, tools, samplers, and tremie pipe will be cleaned with a high-pressure steam cleaning or hot water pressure washing unit, as appropriate, before beginning work.
- Tools, drill rods, and core barrel will be placed on sawhorses or polyethylene plastic sheets following steam cleaning or pressure washing. Direct contact with the ground will be avoided.
- All core barrels, rods, and tools will be decontaminated between each drilling location according to the above procedures.
- The back of the drill rig and all tools, core barrels, and rods will be decontaminated at the completion of the work and prior to leaving the site.

2.2.1 Sampling Equipment Decontamination

Suggested Materials:

- Potable water
- Phosphate-free detergent (*e.g.* Alconox™)
- Distilled water
- Aluminum foil
- Plastic/polyethylene sheeting
- Plastic buckets and brushes
- Personal protective equipment in accordance with the HASP

Procedures:

- Prior to sampling, all non-dedicated sampling equipment (bowls, spoons, interface probes, *etc.*) will be either steam cleaned or washed with potable water and a phosphate-free detergent (such as Alconox™). Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, *etc.*

- The sampling equipment will then be rinsed with potable water followed by a deionized water rinse.

- Between rinses, equipment will be placed on polyethylene sheets or aluminum foil if necessary. At no time will washed equipment be placed directly on the ground.

- Equipment will be wrapped in polyethylene plastic or aluminum foil for storage or transportation from the designated decontamination area to the sampling location.

2.3 Management of Investigation Derived Wastes

2.3.1 Decontamination Fluids

Steam-cleaning and decontamination fluids will be collected in 55-gallon drums. The drums will be labeled as investigation derived wastewater subsequently characterized and disposed.

2.3.2 Drill Cuttings

Visibly impacted drill cuttings will be contained in 55-gallon drums. The drums will be labeled as investigation derived soils and subsequently characterized and properly disposed.

2.3.3 Development and Purge Water

All development and purge water will be contained in 55-gallon drums. The drums will be labeled as investigation derived wastewater and subsequently characterized and properly disposed.

2.3.4 Personal Protective Equipment

All personal protective equipment (PPE) will be placed in 55-gallon drums for proper disposal.

2.3.5 Dedicated Sampling Equipment

All dedicated groundwater sampling equipment, if used, will be placed in 55-gallon drums for proper disposal.

3.0 Drilling and Soil Sampling Procedures

3.1 Introduction

Drilling activities to be conducted during the Remedial Investigation consist of:

- Soil borings
- Monitoring well installations

These procedures are described in the following section.

3.2 Soil Borings and Subsurface Soil Sampling

The following methods will be used for conducting soil borings.

3.2.1 Suggested Equipment

- Field book
- Project plans
- Personal protective equipment in accordance with the HASP
- Metal detector
- Stakes and flagging
- One pint containers for lithology samples
- Tape measure
- Decontamination supplies
- Water level indicator
- Photoionization detector (PID) with a 10.2 or 10.6 eV lamp
- Camera
- Clear tape, duct tape
- Aluminum foil
- Laboratory sample bottles
- Coolers and ice

- Shipping supplies

3.3 Drilling and Geologic Logging Method

- Soil borings will be advanced using rotosonic or geoprobe-direct push drilling methods. The sonic drilling method is preferred.

- Soil samples will be collected continuously to the bottom of the borings using 5 to 10-foot long 4-inch diameter sonic sample bags or 4-foot long, 2-inch diameter macro core samplers.

- Soil samples retrieved from the borehole will be visually described for:

    - Percent recovery

    - Representativeness – specify if there is a possibility that the soil sample being described is not representative of the interval sampled

    - Soil type

    - Color – use color charts and describe 'natural color' of sample as opposed to staining cause by contamination.

    - Moisture content – terms are dry, moist, and wet

    - Texture

    - Grain size and shape

    - Consistency

    - Visible evidence of staining

    - Any other observations

The descriptions will be in accordance with the Unified Soil Classification System (USCS), American Society for Testing and Materials (ASTM) guidelines, or the modified Burmeister system.

- Soil samples will be immediately screened for the evolution of organic vapors with a PID.

- A representative portion of the sample will be placed in a plastic "zip lock" bag or an eight-ounce sample jar filled approximately half full. The container will be labeled with the boring number and interval sampled. Aluminum foil will be placed on the top of the jar and the cap will be screwed on tightly.

- After a minimum of 10 minutes, the lid will be unscrewed and the tip of the PID will be inserted through the aluminum foil across the cap or into the bag to measure the headspace for organic vapors.

- Remaining soil will be disposed of in accordance with methods specified in the procedure for the management of IDW.

- All borings will be completed as monitoring wells or sealed with bentonite or cement/bentonite grout following completion.

- All drilling equipment will be decontaminated between each boring in accordance with methods specified in the procedure for field equipment decontamination.

- The designated field geologist will log borehole geology and headspace measurements in the field book and the drilling record along with any other observations (for example, odors, NAPL, soil staining,*etc*. as described below).

3.3.1 Description of Contaminants

Visible Contamination Descriptors

- **Sheen** - iridescent petroleum-like sheen. Not to be used to describe a "bacterial sheen" which can be distinguished by its tendency to break up on the water surface at angles, whereas petroleum sheen will be continuous and will not break up. A field test for sheen is to put a soil sample in a jar of water and shake the sample (jar shake test), then observe the presence/absence of sheen on the surface of the water in the jar.

- **Stained** - used w/ color (i.e. black or brown stained) to indicate that the soil matrix is stained a color other than the natural (unimpacted) color of the soil.

- **Coated** - soil grains are coated with tar/free product – there is not sufficient free-phase material present to saturate the pore spaces.

- **Blebs** - observed discrete spherical shapes of tar/free product - but for the most part the soil matrix was not visibly contaminated or saturated. Typically this is residual product.

- **Saturated** - the entirety of the pore space for a sample is saturated with the tar/free product. Care should be taken to ensure that you're not observing water saturating the pore spaces if you use this term. Depending on viscosity, tar/free-phase saturated materials may freely drain from a soil sample.

- **Oil**. Used to characterize free and/or residual product that exhibits a distinct fuel oil or diesel fuel like odor; distinctly different from MGP-related odors/impacts.

- **Tar**. Used to describe free and/or residual product that exhibits a distinct "coal tar" type odor (e.g. naphthalene-like odor). Colors of product can be brown, black, reddish-brown, or gold.

- **Solid Tar**. Used to describe product that is solid or semi-solid phase. The magnitude of the observed solid tar should be described (e.g. discrete granules or a solid layer).

- **Purifier Material**. Purifier material is commonly brown/rust or blue/green wood chips or granular material. It is typically associated with a distinctive sulfur-like odor. Other colors may be present.

Olfactory Descriptors

- Use terms such as " tar-like odor" or "naphthalene-like odor" or "fuel oil-like odor" that provide a qualitative description (opinion) as to the possible source of the odor.

- Use modifiers such as strong, moderate, faint to indicate intensity of the observed odor.

DNAPL/LNAPL

- A jar shake test should be performed to identify and determine whether observed tar/free-phase product is either denser or lighter than water. In addition, MGP residues can include both light and dense phases - this test can help determine if both light and dense phase materials are present at a particular location.

Viscosity of Free-Phase Product – If free-phase product/tar is present a qualitative description of viscosity should be made. Descriptors such as:

- Highly viscous (e.g. taffy-like)
- Viscous (e.g. No. 6 fuel oil or bunker crude like)
- Low viscosity (e.g. No. 2 fuel oil like)

3.3.2 Soil Sampling

- The number and frequency of samples to be collected from each boring and the associated analytical parameters are summarized in Section 4 of the Remedial Investigation Work Plan.

- Samples for VOC analysis will be collected directly from the sonic liners or macrocores, placed into appropriate containers, and compacted to minimize headspace and pore space. The remaining sample volume will be placed into a stainless steel bowl or plastic bag, homogenized, and placed in appropriate containers for the other analyses.

- The sample containers will be labeled, placed in a laboratory-supplied cooler, and packed on ice (to maintain a temperature of 4ºC). The coolers will be shipped overnight to the laboratory for analysis.

- Chain-of-custody procedures will be followed as outlined in the QAPP.

- The sampling equipment will be decontaminated between samples in accordance with procedures described in the procedure for field equipment decontamination.

- Excess soil remaining after sampling will be contained in accordance with methods specified in the procedure for the management of IDW.

- The sample locations, descriptions, and depths will be recorded in the field book.

4.0 Monitoring Well Installation and Development

The following methods will be used for drilling, installing, and developing the monitoring wells.

4.1 Suggested Equipment

Soil borings will be advanced using rotosonic drilling methods.

- Field book
- Project plans
- Personal protective equipment in accordance with the HASP
- Metal detector
- Stakes and flagging
- One pint containers for lithology samples
- Tape measure
- Decontamination supplies
- Water level indicator
- Photoionization detector (PID) with a 10.2 or 10.6 eV lamp
- Camera
- Clear tape, duct tape
- Aluminum foil
- Laboratory sample bottles
- Coolers and ice
- Shipping supplies
- Polyethylene disposable bailers (development)
- Polypropylene rope (development)
- Waterra pump or other purge pump (development)

- Stainless steel or glass beakers (development)
- Turbidity meter (development)
- Temperature, conductivity, pH meter (development)

4.2 Monitoring Well Installation

The monitoring wells will be installed in accordance with the following specifications:

- The monitoring well borings will be advanced with 6-inch diameter sonic casing pipe.
- Wells will be constructed with 2-inch ID, threaded, flush-joint PVC casings and screens.
- Screens will be 10 feet long with 0.01-inch or 0.02-inch slot openings with a 2-foot sump at the base. Alternatives may be used at the discretion of the field geologist and approval of Con Edison, based on field conditions.
- The annulus around the screens will be backfilled with silica sand having appropriate size (*e.g.* Morie No. 1) to a minimum height of two feet above the top of the screen. Outer sonic casing or auger flights will be withdrawn as sand is poured in a manner that will minimize hole collapse and bridging.
- A bentonite pellet seal or slurry seal with a minimum thickness of one foot will be placed above the sand pack. The bentonite seal (pellets) will be allowed to hydrate before placement of grout above the seal.
- The remainder of the annular space will be filled with a cement-bentonite grout to the ground surface. The grout will be pumped through a tremie pipe from the bottom up. The grout will be allowed to set for a minimum of 24 hours before wells are developed.
- Each monitoring well will have a locking expandable gas-tight cap and will be contained in a flush-mount vault.
- The concrete seal or pad will be sloped to channel water away from the well, and be deep enough to remain stable during freezing and thawing of the ground.
- The top of the PVC well casing will be marked and surveyed to 0.01 foot, and the elevation will be determined relative to a fixed benchmark or datum.
- The measuring point on all wells will be on the innermost PVC casing.
- Monitoring well construction details will be recorded in the field book and on a construction log.

4.3 Monitoring Well Development

- After a minimum of 48 hours after completion, the monitoring wells will be developed by surging and pumping. Pumping methods may include using a centrifugal or peristaltic pump and dedicated polyethylene tubing, using a Waterra positive displacement pump and dedicated polyethylene tubing, or other methods at the discretion of the field geologist.

- Water levels will be measured in each well to the nearest 0.01 foot prior to development.

- The wells will be developed until the water in the well is reasonably free of visible sediment (50 NTU if possible or until pH, temperature, and specific conductivity stabilize). A portable nephelometer will be used to take this measurement. A minimum of three well volumes will be removed from each well. If turbidity does not reach 50 NTU or pH, temperature, and specific conductivity do not stabilize, a minimum of 10 well volumes will be removed.

- Development water will be contained in accordance with methods specified in the procedure for the management of IDW.

Following development, wells will be allowed to recover for at least 14 days before groundwater is purged and sampled. All monitoring well development will be overseen by a field geologist and recorded in the field book

5.0 Groundwater Sampling Procedures

5.1 Introduction

Groundwater sampling will be conducted at this site. Procedures for obtaining samples of groundwater are described in this section.

5.2 Groundwater Sampling

5.2.1 Suggested Equipment

- Field book and appropriate forms, including but not limited to the following:
    - o Groundwater gauging form
    - o Low-Flow groundwater sampling forms
    - o Equipment calibration forms
- Project plans and scope of work
- Personal protective equipment, in accordance with the site specific HASP
- Water level indicator and/or oil/water interface probe
- Disposable polyethylene bailers or low-flow sampling pump with dedicated/disposable ¼-inch or ⅜-inch inner diameter polyethylene or Teflon tubing to prevent cross contamination between wells
- Additional polyethylene or Teflon tubing and silastic tubing (when using a peristaltic pump) with the same inner diameter as the tubing installed in the well
- Polypropylene rope
- Steel measuring tape
- Plastic sheeting
- Photoionization detector (PID)
- Appropriate groundwater quality meters:
    - o Multi-parameter instrument with a flow-through cell capable of measuring the following: temperature, conductivity, pH, dissolved oxygen, oxidation/reduction potential (ORP), specific conductance
    - o Turbidity meter

  - Applicable standards for equipment calibration in accordance with the manufactures' specifications

- Decontamination supplies, including but not limited to the following:
  - Non-phosphate detergent (ex. Alconox©)
  - Distilled/deionized water
  - Isopropyl alcohol
- Clear tape; duct tape
- Ziploc (or similar) bags
- Coolers and ice for sample storage and shipment
- Laboratory-cleaned and supplied sample bottles
- Laboratory-supplied chains-of-custody and custody seals
- Shipping labels, as required

5.2.2 Groundwater Sampling Method

5.2.2.1 Pre-Purging/Sampling Activities

- The number and frequency of groundwater samples to be collected at the site, and the associated analytical parameters, are summarized in Section 4.6 of the Remedial Investigation Work Plan.
- Prior to sampling, the static water level, thickness of any free product, and total depth of the well will be measured to the nearest 0.01 foot below the surveyed well elevation mark on the top of the PVC casing with a decontaminated water level indicator or oil/water interface probe. NAPL thickness will be determined using a clear bailer, a weighted string, a steel measuring tape, or an oil/water interface probe. The measurement will be recorded in the field book or on the appropriate field form.
- The probe/bailer/steel measuring tape will be decontaminated according to the procedures outlined in the procedures for field equipment decontamination.
- Prior to beginning purging and sampling, the multi-parameter instrument with flow-through cell and turbidity meter must be calibrated according to manufacturer's specifications. Calibration activities will be recorded in the field book or on the appropriate form.
- After taking the static water level and total depth measurements, the tubing or submersible pump will be installed to the appropriate depth. The pump intake should be located within the screened interval and at a depth that will remain under water at all times. It is recommended that the intake depth and pumping rate remain the same for all sampling events. Intake depth and pumping rate will be recorded in the field book or on the appropriate field form.

5.2.2.2 Purging

- Purging will be conducted using a low-stress sampling technique outlined in the USEPA Region 1 Low-Stress (Low-Flow) SOP, Revision Number 3, dated January 19, 2010. Stabilization of indicator field parameters is used to indicate that conditions are suitable for sampling to begin.

    - o The temperature, pH, conductivity, ORP, dissolved oxygen, and turbidity will be measured with a pre-calibrated probe and recorded in the field book or on the appropriate field form.

    - o Temperature, pH, conductivity, ORP, and dissolved oxygen will be measured using a meter equipped with a flow-through cell (ex. Horiba U-22, Horiba U-52, or similar).

    - o Turbidity will be measured using a separate instrument. It must not be measured in a flow-through cell as the flow-through cell acts as a sediment trap and does not provide an accurate measurement of turbidity (ex. LaMotte 2020 or similar).

- Stabilization is considered to be achieved when three (3) consecutive readings (five [5] minutes apart) are within the following limits:

    - o Turbidity – 10% for values greater than 5 NTU; if three (3) turbidity values are less than 5 NTU, consider the values as stabilized

    - o Dissolved Oxygen – 10% for values greater than 0.5 mg/L; if three (3) dissolved oxygen values are less than 0.5 mg/L, consider the values as stabilized

    - o Specific Conductance – 3%

    - o Temperature – 3%

    - o pH - $\pm$ 0.1 unit

    - o ORP - $\pm$ 10 millivolts

- The well will be purged by removing groundwater until field parameters stabilize to within the abovementioned requirements of previous reading, up to three (3) well volumes are removed, or one (1) hour of purging is performed.

- If continuing to purge following the first hour, and if after two (2) hours of purging indicator field parameters have not stabilized, one of three optional courses of action may be taken:

    - o Continue purging until stabilization is achieved

    - o Discontinue purging, do not collect any samples, and record in log book that stabilization could not be achieved (documentation must describe attempts to achieve stabilization)

    - o Discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization.

- If a well goes dry before the required volumes are removed, it will be allowed to recover, purged a second time until dry or the required parameters are met, and sampled when it recovers sufficiently, in accordance with the USEPA Region 1 Low-Stress (Low-Flow) SOP, Revision Number 3, dated January 19, 2010.

- Purge water and decontamination fluids will be managed and disposed of in accordance with the procedures outlined in the section describing the management of Investigation-Derived Waste (IDW).

5.2.2.3 Sampling

- The intake tubing to the flow-through cell will be disconnected from the flow-through cell prior to sampling. The samples are collected directly from the pump's tubing and VOC samples should be collected first.

- Samples will be collected using dedicated ¼-inch or ⅜-inch polyethylene or Teflon tubing and micro-purging techniques consistent with the USEPA Region 1 Low-Stress (Low-Flow) SOP, Revision Number 3, dated January 19, 2010, directly into laboratory-supplied glassware.

- Well sampling data will be recorded on groundwater sampling record forms or in the field book.

5.2.2.4 Post-Sampling Activities

- Following sampling, all equipment will be decontaminated in accordance with manufacturer's instructions and with the procedures outlined in the appropriate AECOM SOP.

- The sample containers will be labeled, placed in a laboratory-supplied cooler and packed on ice to maintain a temperature of 4°C. Samples will be recorded on the chain-of-custody, which will be included with the samples when they are sent to the laboratory. The cooler will be shipped overnight or delivered to the laboratory for analysis under chain-of-custody protocol in accordance with procedures outlined in the site specific QAPP and the AECOM SOPs.

- The pump tubing may be dedicated to the well for re-sampling (by hanging the tubing inside the well) or properly discarded.

- A post-sampling equipment calibration check will be done at the end of each sampling day, the results of which will be recorded in the field book or on the appropriate field form.

5.2.2.5 Groundwater Sampling Observations

Any observations of sheen, blebs, free-phase product.tar, staining or coating of sampling equipment, odor, etc. that are made during purging and sampling of groundwater are to be included in the groundwater sample collection log.

GW Monitoring Instrument Calibration Log

Project Name: _____ Date: _____

Project Number: _____ Project Manager: _____

Weather: _____

Calibrated by: _____ Instrument: _____

Serial Number: _____

Parameters	Morning Calibration	Morning Temperature	End of Day Calibration Check	End of the Day Temperature
Specific Conductance				
pH				
ORP				
Dissolved Oxygen				
Turbidity				

Notes:

6.0 Air Monitoring

6.1 Introduction

Two types of air monitoring will be performed during the site characterization study: 1) work zone monitoring for protection of the workers performing the site investigation, and 2) community air monitoring at the perimeter of the work site for protection of the community.

6.2 Breathing Zone Air Monitoring During Excavation, Drilling, and Sampling

Air monitoring of the breathing zone within the work site will be conducted periodically during all drilling and sampling activities to ensure proper health and safety protection for the field team.

- An organic vapor meter equipped with a photoionization detector (PID) will be used to monitor for volatile organic compounds or other organic vapors in the breathing zone and borehole, and to screen the samples.

- Additional air monitoring may be required as specified in the site-specific HASP.

The PID readings will be recorded in the field book and on the boring log during drilling activities. The procedure for the PID operation and calibration is included in the field instrument calibration procedures and the Site Health and Safety Plan. Note that equipment calibration will be performed as often as needed to account for changing conditions or instrument readings. The minimum frequency of calibration is specified in the field instrument calibration procedures; more frequent calibration will be performed if spurious readings are observed or there are other problems with the instruments.

6.3 Community Air Monitoring

Community air monitoring requires real-time monitoring for volatile organic compounds (VOCs), particulates (*i.e.* dust), and MGP related odors at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The community air monitoring is not intended for use in establishing action levels for worker respirator protection. Rather, its intent is to provide a measure of protection for the downwind community (*i.e*. off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels for community air monitoring require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, community air monitoring helps to confirm that work activities do not spread contamination off-site through the air.

6.3.1 Community Air Monitoring Plan

Real-time air monitoring for volatile compounds and particulates at the perimeter of the hot zone will be performed.

- VOCs will be monitored at the downwind perimeter of the hot zone if total organic vapors in the worker breathing zone exceed 5 ppm above background, or at least twice every hour. Monitoring will be conducted with a PID equipped with a 10.2 or 10.6 eV lamp. If total organic vapor levels exceed 1 ppm above background at the perimeter, intrusive activities must be halted and monitoring continued. All readings must be recorded and be available for State (NYSDEC & NYSDOH) personnel to review.

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

6.3.1.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 1 ppm above background at the perimeter of the hot zone, intrusive activities will be halted or odor controls will be employed, and monitoring continued. If the organic vapor level decreases below 1 ppm above background, intrusive activities can resume, provided:

- The organic vapor level 200 feet downwind of the hot zone or half the distance to the nearest residential or commercial structure, whichever is less, is below 1 ppm over background; and

- More frequent intervals of monitoring, as directed by the SSO, are conducted.

If the organic vapor level is greater than 1 ppm above background at the perimeter of the hot zone, work activities must be shut down or odor controls must be employed. When work shut down occurs, downwind air monitoring, as directed by the SSO, 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.

6.3.1.2 Major Vapor Emission

If any organic levels greater than 1 ppm over background are identified 200 feet downwind from the work site, or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted or odor controls must be implemented.

If, following the cessation of the work activities, or as a result of an emergency, organic levels persist above 1ppm above background 200 feet down wind or half the distance to the nearest residential or commercial property from the hot zone, 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 exceed in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented:

- Sustained organic vapor levels approaching 1 pm above background for a period of more than 30 minutes; or
- Organic vapor levels greater than 5 ppm above background for any time period.

6.3.1.3 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. The local police authorities will immediately be contacted by the SSO 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 the action levels are measured, air monitoring may be halted or modified by the SSO; and
3. All Emergency contacts will go into effect as appropriate.

7.0 Field Instruments and Calibration

All field analytical equipment will be calibrated immediately prior to each day's use and more frequently if required. 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. All instrument calibrations will be documented in the project field book and in an instrument calibration log. Records of all instrument calibration will be maintained by the Field Team Leader and will be subject to audit by the Quality Assurance Officer (QAO). Copies of all of the instrument manuals will be maintained on-site by the Field Team Leader. All changes to instrumentation will be noted in the field log book.

The following field instruments will be used during the investigation:

- PID
- pH probe
- Mini-RAM dust meter
- Dissolved oxygen probe
- Specific Conductivity probe
- Temperature probe
- Turbidity meter

Probes used to measure pH, dissolved oxygen, specific conductivity, and temperature are all housed in a single instrument and parameters are measured in a sealed flow through cell.

7.1 Portable Photoionization Analyzer

- The photoionization analyzer will be a Thermo 580B (or equivalent), equipped with a minimum 10.2 or 10.6 eV lamp. The PID is capable of ionizing and detecting compounds with an ionization potential of less than 10.6 eV. This accounts for up to 73% of the volatile organic compounds on the Target Compound List.
- Calibration must be performed at the beginning and end of each day of use with a standard calibration gas having an approximate concentration of 100 parts per million of isobutylene. If the unit experiences abnormal perturbation or erratic readings, additional calibration will be required.
- All calibration data must be recorded in field notebooks and on calibration log sheets to be maintained on-site.
- A battery check must be completed at the beginning and end of each working day.

- All changes to the PID will be noted in the field notes (such as bulb or filter cleaning or replacement).

7.2 pH

- Calibration of the pH meter must be performed at the start of each day of use, and after very high or low readings as required by this plan, according to manufacturer's instructions.
- National Institute of Standards and Technology (NIST) – traceable standard buffer solutions which bracket the expected pH range will be used. The standards will be pH of 4.0, 7.0, and 10.0 standard units.
- The use of the pH calibration must be used to set the meter to display the value of the standard being checked.
- The calibration data must be recorded on calibration sheets and maintained on-site.

7.3 Dissolved Oxygen

Calibration of the dissolved oxygen meter must be performed at the start of each day of use, after very high or low readings (approaching or outside of the theoretical dissolved oxygen range at a given temperature), and after bubbles or spurious readings are observed.

Calibrate the meter to a prepared standard or other method in accordance with manufacturer's instructions and note the scale and units on the meter.

7.4 Specific Conductivity and Temperature

- Calibration checks using the conductivity standard must be performed at the start of each day of use, after five to ten readings or after very high or low readings as required by this plan, according to manufacturer's instructions.
- The portable conductivity meter must be calibrated using a reference solution of 200 □ohms/cm on a daily basis. Readings must be within five percent to be acceptable.
- The thermometer of the meter must be calibrated against the field thermometer on a weekly basis.

7.5 Turbidity Meter

- The turbidity meter must be checked at the start of each day of use and at the end of the day according to manufacturer's instructions.

8.0 Field Sample Custody

8.1 Chain of Custody

- A Chain-of-Custody (COC) record will accompany the sample containers during selection and preparation at the laboratory, during shipment to the field, and during return shipment to the laboratory.
- The COC will identify each sample container and the analytical parameters for each, and will list the field personnel that collected the samples, the project name and number, the name of the analytical laboratory that will receive the samples, and the method of sample shipment.
- If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample shipment.
- The COC will be completed by field personnel as samples are collected and packed for shipment.
- Erroneous markings will be crossed-out with a single line and initialed by the author.
- The REMARKS space will be used to indicate if the sample is a matrix spike, matrix spike duplicate, or matrix duplicate.
- Trip and field blanks will be listed on separate rows.
- After the samples have been collected and sample information has been listed on the COC form, the method of shipment, the shipping cooler identification number(s), and the shipper air bill number will be entered on the COC.
- Finally, a member of the sampling team will write his/her signature, the date, and time on the first RELINQUISHED BY space. Duplicate copies of each COC must be completed.
- One copy of the COC will be retained by sampling personnel. The other copy and the original will be sealed in a plastic bag and taped inside the lid of the shipping cooler.
- Sample shipments will be refrigerated at 4ºC, typically by packing with ice, to preserve the samples during shipment.
- After the shipping cooler is closed, custody seals provided by the laboratory will be affixed to the latch and across the front and back of the cooler lid, and signed by the person relinquishing the samples to the shipper.
- The seal will be covered with clear tape, and the cooler lid will be secured by wrapping with packing tape.
- The cooler will be relinquished by the shipper, 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 samples will not be analyzed.

- The samples must be delivered to the laboratory within 48 hours of collection.

8.2 Sample Documentation

The field team leader will retain a copy of the COC, and, in addition, the field team leader will ensure that the following information about each sample is recorded in the field book:

- Sample identifier
- Identification of sampled media (*e.g.* soil, sediment, groundwater)
- Sample location with respect to a known reference point
- Physical description of sample location
- Field measurements (*e.g.* pH, temperature, conductivity, and water levels)
- Date and time of collection
- Sample collection method
- Volume of groundwater purged before sampling
- Number of sample containers
- Analytical parameters
- Preservatives used
- Shipping information:
    - Dates and method of sample shipment
    - Chain-of-Custody Record numbers
    - Federal Express Air Bill numbers
    - Sample recipient (*e.g.* laboratory name)

9.0 NAPL FLUTe™ System

The following provides a description of the NAPL FLUTe™ system and information regarding the FLUTe™ Blank liner, as provided by the manufacturer, Flexible Liner Underground Technologies, Ltd. L.C., of Santa Fe, New Mexico. The FLUTe™ system will be used, as per manufacturer instructions, to aid in determination of contaminant migration pathways at the Rye Service Center.