PRE-CONSTRUCTION
REMEDIAL ACTION WORK PLAN

CAPTAIN'S COVE CONDOMINIUM SITE
NYSDEC SITE NO. 130032

SUBMITTED TO:

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remediation Bureau E, Section A
625 Broadway, 12th Floor
Albany, New York 12233-7017

United States Environmental Protection Agency
Region 2
290 Broadway, 20th Floor
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PREPARED FOR:

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PWGC Project Number: RGI1504

AUGUST 2016

451828

P.W. GROSSER CONSULTING INC.
PROJECT No. RGI1504

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GARVIES POINT WATERFRONT REVITALIZATION PROJECT
GELN COVE, NEW YORK

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ACRONYMS

ACRONYM	DEFINITION
ASP	Analytical Services Protocol
CAMP	Community Air Monitoring Plan
CCR	Construction Completion Report
CFR	Code of Federal Regulations
City	City of Glen Cove
DER	Division of Environmental Remediation
DER-10	Technical Guidance for Site Investigation & Remediation
EDD	Electronic Data Deliverable
ELAP	Environmental Laboratory Accreditation Program
GCIDA	Glen Cove Industrial Development Agency
GPWRP	Garvies Point Waterfront Revitalization Project
HASP	Health and Safety Plan
HSM	Health & Safety Manager
MARSSIM	Multi-Agency Radiation Survey & Site Investigation Manual
NAD 83	North American Datum of 1983
NAPL	Non-Aqueous Phase Liquid
NGVD 88	North American Vertical Datum of 1988
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OSHA	Occupational Safety & Health Administration
PCI	Pre-Construction Investigation
PE	Professional Engineer
PID	Photo-ionization Detector
PM	Project Manager
PWGC	P.W. Grosser Consulting, Inc.
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance / Quality Control

RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
ROD	Record of Decision
RMP	Radiation Monitoring Plan
RXRGIP	RXR Glen-Isle Partners, LLC
SCO	Soil Cleanup Objective
SEC	Safety and Ecology Corporation
SMP	Site Management Plan
SPDES	State Pollution Discharge Elimination System
SSRC	Site-Specific Removal Criteria
SVOC	Semi-Volatile Organic Compound
SWPPP	Stormwater Pollution Prevention Plan
TAGM	Technical and Administrative Guidance Memorandum
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
XRF	X-Ray Fluorescence

CERTIFICATION

I, Paul K. Boyce, certify that I am currently a New York State registered professional engineer (PE), as defined in Title 6 New York Codes, Rules, & Regulations (NYCRR) Part 375, and that this Remedial Action Work Plan (RAWP) was prepared in accordance with applicable statutes and regulations and in substantial conformance with the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that the information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

PAUL K. BOYCE	08.30.16	
PE Name	Date	Signature

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

STATE OF NEW YORK
PAUL KENNETH BOYCE
074604
LICENSED PROFESSIONAL ENGINEER

1.0 INTRODUCTION

P.W. Grosser Consulting, Inc. (PWGC) has prepared the following RAWP for the Captain's Cove Condominium Site (the Site) in support of the Garvies Point Waterfront Revitalization Project (GPWRP). The Site is currently owned by the Glen Cove Industrial Development Agency (GCIDA) and the City of Glen Cove (City). The purpose of this RAWP is to detail the procedures for remedial actions to be completed by RXR Glen-Isle Partners, LLC (RXRGIP), in partnership with GCIDA and the City. This RAWP will implement the remedial excavation element for the Site as outlined in the May 2016 Record of Decision (ROD) Amendment for OU-1 and the May 2016 ROD for OU-2. The remaining remedial elements required by the remedy will be complete during the redevelopment of the Site and will be documented under separate cover.

This RAWP has been prepared in accordance with DER-10 and the Draft Site Management Plan (SMP) for Captains Cove Site, Glen Cove, NY (Dvirka and Bartilucci, June 2010). The Draft SMP provides additional background information, a Site description and soil management specifications for the Site.

1.1 Project Background

The Site is located along Garvies Point Road in Glen Cove, New York. Redevelopment associated with the GPWRP will include restricted-residential, commercial and retail space, as well as open space and public amenities. A Vicinity Map is included as **Figure 1**; a Site Plan is included as **Figure 2**. Please note that the Site, as defined in this work plan, does not include the eastern extent of the property. This portion of the Site has been remediated, is currently being utilized by the City for Ferry Terminal operations and is defined as OU-3 for the Site.

1.2 Excavation Remedial Element & Site Specific Removal Criteria

The Amended ROD for OU-1 and the ROD for OU-2 issued by the NYSDEC in May 2016 included requirements for the excavation and off-Site disposal of soil delineated by the Pre-Construction Investigation (PCI) Report, dated March 2016 with concentrations of the following contaminants, above the following site specific removal criteria (SSRC):

1.	Arsenic	175 mg/kg
2.	Lead	660 mg/kg
3.	Radium-226	> 5 pCi/g*
4.	Thorium-232	> 5 pCi/g*
5.	Grossly Contaminated Media	As defined in 6 NYCRR Part 375-1.2(u)**

6. Non-Aqueous Phase Liquid (NAPL) As defined in 6 NYCRR Part 375-1.2(ac)***

   * Not including the natural background radiation of nuclide of approximately 1 pCi/g

   ** Grossly Contaminated media means soil, sediment, surface water or groundwater which contains sources or substantial quantities of mobile contamination in the form of NAPL, as defined in subdivision 375-1.2 (ac), that is identifiable either visually, through strong odor, by elevated contaminant vapor levels or is otherwise readily detectable without laboratory analysis.

   *** NAPL means a contaminant that is a liquid which may be denser or lighter than water and does not mix easily or dissolve in water, but remains as a separate phase.

Soil from the Site which does not exceed the SSRC may be used to backfill excavations provided that it is overlain by two feet of clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d). Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to complete backfilling of the excavations, as needed.

1.3 Evaluation of Current Site Conditions

As delineated by the PCI Report, the following sample locations have been identified to contain contaminants above the SSRCs referenced above:

- CC-C-004 (Lead)
- CC-C-008 (Lead)
- CC-C-017 (Arsenic)
- CC-C-019 (Arsenic & Lead)
- CC-C-022 (Arsenic)
- CC-C-023 (Lead)
- CC-C-028 (Arsenic & Lead)
- CC-C-029 (Lead)
- CC-C-030 (Lead)
- CC-C-048 (Lead)
- CC-C-051 (Grossly Contaminated Media)
- CC-GI-006 (Lead)
- CC-GI-007 (Lead)
- D2 (Grossly Contaminated Media)

The findings of the PCI have shown concentrations of arsenic, lead, and grossly contaminated media in excess of respective SSRC at varying locations and depths throughout the Site (**Figure 3**).

2.0 DESCRIPTION OF REMEDIAL ACTION

The goal of this remedial program is to remove contaminated materials identified at the Site in excess of SSRC to facilitate the redevelopment of the Site for restricted-residential purposes. Remedial measures described herein will be performed in accordance with DER-10, applicable laws and regulations, the Draft SMP and this RAWP. This remedy is protective of public health and/or the environment for the intended use.

2.1 Summary of Remedial Action

PWGC has prepared this RAWP to remediate areas that have been identified to contain contamination at levels in excess of SSRC based on the findings of the PCI completed at the Site. The remedial action is effective in both the short-term and long-term, reduces mobility, toxicity and volume of contaminants and uses standard methods that are well established in the industry. Refer to **Figure 4** for a remedial excavation plan depicting remedial excavation areas. Refer to **Table 1** for excavation sizes and depths. Refer to **Table 2** for analytical summaries depicting results of prior investigations performed within the excavation areas exhibiting constituents in exceedance of SSRC**.**

The remedial action will be performed in accordance with DER-10 guidance, as well as the Draft SMP and this RAWP, and at a minimum shall include the following major project components:

- Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking and staking of excavations;
- Excavation of materials exceeding SSRC. Screening of excavated materials shall be performed during intrusive work for indications of contamination by visual means, odor, and monitoring with a photo-ionization detector (PID) and radiological count-rate meter and scaler;
- A community air monitoring program will also be implemented during intrusive work;
- Collection and analysis of confirmatory samples to confirm that material exceeding SSRC has been removed;
- Placement of backfill materials in compliance with this RAWP, Draft SMP requirements and in accordance with applicable laws and regulations;
- Characterization, transport and off-Site disposal of excavated materials at permitted disposal facilities in accordance with this RAWP, Draft SMP requirements and applicable laws and regulations for handling, transport, and disposal of contaminated materials; and,
- Submission of a Construction Completion Report (CCR) that describes remedial activities performed, certifying that remedial requirements have been achieved and documenting any changes from this

RAWP.

3.0 REMEDIAL ACTION ACTIVITIES

As described in aforementioned sections, the purpose of this RAWP is to detail the procedures for remedial excavations to be completed in accordance with the remedial excavation element for the Site as outlined in the May 2016 ROD Amendment for OU-1 and the May 2016 ROD for OU-2. The following is intended to describe the overall remedial excavation activities to be performed, as well as respective monitoring to be implemented during the performance of the work. The remedial action activities to be performed are detailed in the following sections and are in conformance with the Draft SMP, unless otherwise stated.

3.1 Governing Documents

3.1.1 Site-Specific Health and Safety Plan

The site-specific Health and Safety Plan (HASP) takes into account the specific hazards inherent to the Site and presents the minimum requirements which are to be met by the remediation contractor and its subcontractors, PWGC and its subcontractors, and other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. The site-specific HASP is included as **Appendix A**.

Contractors and subcontractors will have the option of adopting this HASP or developing their own site-specific document. If a contractor or subcontractor chooses to prepare their own HASP, it must meet the minimum requirements as detailed in the site-specific HASP prepared by PWGC and must be made available to PWGC, NYSDEC, United States Environmental Protection Agency (USEPA), and New York State Department of Health (NYSDOH), for review and approval prior to mobilization to the Site.

Activities performed under the HASP will comply with applicable parts of the Occupation Safety and Health Administration (OSHA) Regulations, primarily 29 Code of Federal Regulations (CFR) Parts 1910 and 1926, and the PWGC Corporate Environmental Health and Safety policy. Modifications to the HASP may be made with the approval of the PWGC Health and Safety Manager (HSM) and/or Project Manager (PM) and will require subsequent approval by the agencies prior to implementation.

3.1.2 Quality Assurance Project Plan

The quality assurance project plan (QAPP), included as **Appendix B**, presents the objectives, functional activities, methods, and quality assurance/quality control (QA/QC) requirements associated with sample collection and laboratory analysis for remedial activities. The QAPP follows requirements detailed in the Uniform Federal Policy for Quality Assurance Project Plans.

3.1.3 Community Air Monitoring Plan

A site-specific Community Air Monitoring Plan (CAMP) has been prepared and is included as **Appendix C** to provide measures for protection of on-Site workers and the downwind community (i.e., off-Site receptors including residences, businesses, and on-Site workers not directly involved in the remedial work) from potential airborne contaminants as a direct result of the remedial activities. The primary concerns for this remedial work are volatile organic compounds (VOCs) and dust particulates.

The CAMP was prepared and will be implemented and executed in accordance with 29 CFR 1910.120(h), the NYSDOH Generic CAMP, and NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4031.

3.1.4 Radiation Monitoring Plan

A site-specific Radiation Monitoring Plan (RMP) has been prepared in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual, Revision 1 (USEPA, August 2000 and June 2001 updates) (MARSSIM) and is included as **Appendix D** to provide measures for radiation monitoring activities to be performed during remedial activities.

3.1.5 Decontamination Plan

A site-specific Decontamination Plan has been prepared and is included as **Appendix E** to detail general and specific procedures, methods, and considerations to be utilized and observed with regard to decontamination procedures during the course of the remedial action.

3.1.6 Stormwater Pollution Prevention Plan

A site-specific Stormwater Pollution Prevention Plan (SWPPP) has been prepared and is included as **Appendix F** to detail general and specific procedures, methods, and considerations to be utilized and observed with regard to sediment and erosion control procedures during the course of the remedial action.

3.2 Notifications

At least 10 days prior to the start of any activity contemplated as part of this RAWP, the Site owner or their representative will notify the Agencies. Currently, this notification will be made to:

Heidi-Marie Dudek, P.E.
Project Manager
NYSDEC
DER
625 Broadway
Albany, NY 12233-7015

and

Lorenzo Thantu
USEPA
Region 2
290 Broadway, 20th Floor
New York, New York 10007

3.3 Mobilization

Mobilization will include the delivery of construction equipment and materials to the Site. Site workers will receive Site orientation and training in accordance with the Draft SMP, RMP, HASP, SWPPP and CAMP and established policies and procedures to be followed during the implementation of the remedial action. The remediation contractor and associated subcontractors will each receive a copy of the Draft SMP, RAWP, RMP, HASP and CAMP and will be briefed on their contents.

3.4 Site Security

Site security will be maintained by utilizing temporary construction fences to be set up as needed. The temporary construction fencing will be maintained throughout the project and access gates will be kept closed during daily operations and closed and locked at all other times.

3.5 Pre-Excavation Utility Location Survey

A pre-excavation utility location survey will be performed prior to the start of work. The contractor will review available utility maps and locate utilities in the area of excavations. In addition, the One Call Center (1-800-272-4480) will be contacted prior to initiating excavation activities.

3.6 Survey Requirements

Prior to the performance of construction activities, an initial site survey will be performed for the Site to verify the existing site conditions and establish the exact limits of the work. At a minimum, the initial site survey will include the following information:

- Established reference points;
- Ground surface elevations measured across a 50’-0” by 50’-0” area centered on each area slated for remediation at the intersection points of a 10’-0” by 10’-0” grid; and
- Existing site features located within and immediately surrounding the above referenced areas (e.g., site structures, limits of paved areas, fence, gates, etc.).

As described in Section 2.0, several excavations are expected to occur in support of the remedial action. Following the completion of such activities, an intermediate survey will be performed to document the extent of excavation and the locations of excavation endpoint soil samples collected. Additionally, following the completion of backfilling and grading activities to construct the subgrade, an intermediate survey will be performed to memorialize the subgrade elevations prior to the installation of a demarcation layer.

Upon installation of the demarcation layer and cover system at each excavation area, an as-built survey will be performed depicting final site features, including demarcation limits and final surface elevations documenting successful installation of required engineering controls (i.e., 2-foot soil cover). Surveys will be completed by a Land Surveyor licensed to practice in New York State and will utilize the same grid developed during the initial site survey. Horizontal locations surveyed shall be in U.S. feet relative to the New York State Plane Coordinate System, Long Island Zone, North American Datum of 1983 (NAD 83). Elevations surveyed shall be in U.S. feet relative to the North American Vertical Datum of 1988 (NGVD 88).

3.7 Soil Screening Methods

Monitoring during soil excavation activities will be performed to protect the health of Site workers and the surrounding community. A RMP, HASP and CAMP have been developed for this project and are included as appendices to this RAWP. These plans specify the monitoring procedures, action levels, and contingency measures that are required to protect public health and on-site workers. Generally, air monitoring will include real-time measurement of fugitive dust levels and VOC concentrations. The project HASP is included as **Appendix A**, the CAMP is included as **Appendix C**, and the RMP is included as **Appendix D**.

Visual, olfactory and instrument-based (e.g. PID) soil screening will be performed during excavation activities.

Radiation screening of excavated material shall be performed in accordance with the RMP provided as **Appendix D**. Screening results shall be made available to the on-Site Engineer as the results are obtained. Excavated material that exceeds screening criteria shall be stockpiled separately in accordance with Section 3.8 of this RAWP. Excavated soil that exceeds screening criteria shall be sampled in accordance with the RMP.

Soils will be segregated based on previous environmental data and screening results into material that requires off-Site disposal and material that requires testing to determine if the material can be reused on-Site. Further discussion of off-Site disposal of materials and on-Site reuse is provided in Sections 3.12 and 3.13 of this RAWP.

3.8 Soil Staging Methods

Prior to performing excavations, soil staging areas will be setup on-Site. Each staging area will be setup as detailed below.

- Individual stockpiles shall not exceed a volume of 500 cubic yards;
- Excavated materials must be staged on top of and covered with polyethylene sheeting. Ten (10) mil thick sheeting shall be used to cover the top of the stockpiles. Two layers of ten (10) mil thick sheeting shall be placed beneath the potentially or known contaminated material to prevent contact with undisturbed soils;
- Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points; and,
- Stockpiles will be kept covered with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by the NYSDEC.

3.9 Soil Excavation and Removal

RXRGIP and its contractors shall be responsible for safe execution of work performed under this RAWP. The presence of utilities and easements on the Site will be investigated by the contractor in accordance with Section 3.5.

Each excavation area will be surveyed prior to any excavation work. Each excavation will start with an area five feet wide by five feet long centered on the historical sampling location, with the exception of sample locations CC-C-030 and CC-C-051 which will start as areas fifteen feet wide by fifteen feet long centered on the historical sampling location.

Soil will be excavated from the excavation area utilizing an excavator/backhoe or equivalent. Excavations shall be performed in a manner that will prevent spills/spread of contamination. Excavation shall also be accomplished by methods which preserve the undisturbed state of subsurface soil whenever possible.

Excavated soil will be stockpiled on polyethylene sheeting and subsequently characterized for off-Site disposal in accordance with the requirements of DER-10, as well as Draft SMP requirements. It should be noted that, to the extent practical, overlying soils (above the depth interval requiring remedial excavation consistent with SSRC) will be segregated and stockpiled separately for potential re-use on-Site. Sampling of overlying soils will

be performed consistent with the sampling procedures as outlined in Section 3.12 of this RAWP for Agency review and approval prior to on-Site reuse.

Upon successful completion of excavation activities, confirmatory samples will be collected from the sides and bottom of each excavation area in accordance with DER-10 requirements (i.e. at a minimum one bottom sample from each excavation for every 900 square feet of bottom, and one sidewall sample for every 30 linear feet of sidewall), as well as Draft SMP requirements. Note that sidewall samples will be collected from each zone of contamination in the event that multiple contamination zones exist for the respective excavation. In the event that a collected confirmatory sample is found to exceed applicable SSRCs, the excavation will be expanded an additional five feet for the full excavation depth to remove the exceedance. This procedure will continue until the final confirmatory samples show that each area was remediated to SSRC. Additionally, no soil exceeding protection of groundwater concentrations as defined in 6 NYCRR Part 375-6.8(b) will remain below stormwater retention basins or infiltration structures, if such structures are encountered during the excavation activities or are proposed as improvements for future redevelopment activities. Once the final extent of each excavation is demonstrated, as determined by the results of confirmatory samples collected and subsequently approved by the Agencies, a final survey will be performed to denote the limits of the excavation, as well as, the locations of final confirmation samples in accordance with Section 3.6 above, a demarcation layer will be installed and the excavations will be backfilled in accordance with the requirements of this RAWP.

During the performance of excavation activities, each two-foot lift will be characterized and screened for the following:

- Visual signs of staining or discoloration;
- Volatile organic vapors utilizing a PID; and,
- Radiation screening utilizing a radiation rate meter/scale in accordance the RMP (**Appendix D**)
    - Soils with readings above two times established background will be segregated separately from other soils and tested prior to off-site disposal.

Handheld X-ray fluorescence (XRF) spectrometer monitoring of soil for heavy metals will not be performed.

Loaded vehicles leaving the Site will be lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and New York State Department of Transportation (NYSDOT) requirements (and other applicable transportation requirements). Additionally, material slated for transport will be properly dewatered to ensure the material is ready for transport. In the event that the material slated for transport is not able to be properly dewatered, water tight trucks will be utilized to transport the material

to the approved disposal facilities.

A truck wash will be operated on-Site, as appropriate. RXRGIP and its contractors will be responsible for ensuring that outbound trucks will be washed, by the contractor, at the truck wash before leaving the Site. Truck wash waters will be collected and disposed of off-Site in an appropriate manner.

Locations where vehicles enter or exit the Site will be inspected daily for evidence of off-Site soil tracking. RXRGIP and its contractors will be responsible for ensuring that egress points from the Site are free of dirt and other materials derived from the Site. Cleaning of the adjacent streets will be performed as needed by the contractor to maintain a clean condition with respect to Site-derived materials.

3.10 Confirmatory Soil Sampling

Following removal of impacted soils, confirmatory soil samples will be collected from each excavation area to confirm the effectiveness of remedial activities. Confirmatory soil samples will be collected in accordance with DER-10. As specified in DER-10, verification sampling will consist of collecting confirmatory soil samples from within each excavation area. DER-10 specifies a sampling frequency of one bottom sample from each excavation for every 900 square feet of bottom, and one sidewall sample for every 30 linear feet of sidewall. A minimum of four sidewall samples and one bottom sample will be collected from each excavation area. Should the excavation expand, additional sidewall and bottom samples will be collected at the frequency specified above. Note that sidewall samples will be collected from each zone of contamination in the event that multiple contamination zones exist for the respective excavation.

Confirmatory soil samples will be analyzed for the suite of constituents identified at each excavation as specified below:

- Metals remediation areas will be analyzed for arsenic and lead by USEPA Method 6010;
- Grossly contaminated media areas and any areas exceeding PID action levels will be analyzed for VOCs by USEPA Method 8260 and Semi-Volatile Organic Compounds (SVOCs) by USEPA Method 8270, in addition to arsenic and lead by USEPA Method 6010; and,
- If any areas exceed radiological action levels they will also be analyzed by gamma spectroscopy using USEPA Method 901.1, as applicable.

Samples collected for volatile organic analysis will be collected utilizing tera-core sampling devices. The remaining sample volume will be transferred to a stainless steel bowl and homogenized. Once homogenized, samples will be transferred to laboratory supplied glassware, packed in a cooler with ice and shipped under

proper chain-of-custody procedures to a NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory for analysis in accordance with NYSDEC Analytical Services Protocol (ASP) Category B Data Deliverable packages and Electronic Data Deliverables (EDDs, in EQuIS format) will be furnished by the laboratory. Sampling equipment decontamination will be performed in accordance with the project QAPP included as **Appendix B**.

3.11 Materials Transport Off-Site

Transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded. Transporting of material will be performed in accordance with applicable Federal, State, and local laws and regulations.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used. Additionally, material slated for transport will be properly dewatered to ensure the material is ready for transport. In the event that the material slated for transport is not able to be properly dewatered, water tight trucks will be utilized to transport the material to the approved disposal facilities. Materials removed from the Site must be transported directly to the disposal facility and a truck wash station will be used for trucks that have entered into the zone of contamination.

The truck transport route is as follows:

- Take Garvies Point Road to Herb Hill Road;
- Take Herb Hill Road to Charles Street;
- Turn right on Charles Street;
- Continue to Glen Cove Avenue;
- Turn left onto Glen Cove Avenue;
- Take the first right onto Pratt Blvd./NY-107;
- Continue south on Route 107 to Glen Cove Road;
- Continue south on Glen Cove Road and merge onto Route 495.

Trucks loaded with Site materials will exit the vicinity of the Site using only this approved truck route. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall

safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site activities. Queuing of trucks will be performed on-Site in order to minimize off-Site disturbance. Off-Site queuing will be prohibited.

3.11.1 Soil Tracking

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

3.11.2 Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Brooms, shovels and potable water will be utilized for the removal of soil and debris from vehicles and equipment, as necessary. Waste materials generated during the decontamination procedures must be containerized, characterized and disposed of properly.

3.11.3 Traffic Control

Drivers of trucks leaving the Site will be instructed to proceed without stopping (except as required by law or traffic patterns) in the vicinity of the Site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the Site is described above.

3.12 Waste Characterization & Materials Disposal Off-Site

Waste characterization will be performed by collecting representative soil samples from excavated soil stockpiles. Sample analysis will be as specified by the requirements of the prospective disposal facility's waste acceptance criteria. After the results of the analysis are complete, the remediation contractor will prepare the necessary forms for submittal to the waste disposal/treatment facility. The forms will then be submitted to the waste disposal facility for evaluation and final approval. Sampling equipment decontamination will be performed in accordance with the project QAPP included as **Appendix B**.

Material excavated and removed from the Site will be treated as contaminated and regulated material and will

be transported and disposed in accordance with local, State (including 6 NYCRR Part 360) and Federal regulations. No material from this Site is proposed for unregulated off-Site disposal (i.e. clean soil removed for development purposes). Unregulated off-Site management of materials from this Site will not occur without formal NYSDEC approval.

Off-Site disposal locations for excavated soils will be identified after waste characterization is performed and will be proposed to the Agencies in a notification. This notification will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the CCR. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6 NYCRR Part 360-1.2. Material that does not meet Unrestricted Use Soil Cleanup Objectives (SCOs) is prohibited from being taken to a New York State recycling facility (6 NYCRR Part 360-16 Registration Facility).

The following requirements apply to the disposal of material excavated from the Site:

- Sampling, classification, manifesting, labeling, transporting and disposing of material must be performed in accordance with applicable Federal, State, and local laws and regulations;
- Materials removed from the Site must be transported directly to the disposal facility;
- Sampling frequency, analysis methods, and the analytical laboratory must meet the disposal facility requirements and be approved by the NYSDEC prior to removal of any material from the Site;
- Letters of commitment must be obtained from disposal facilities to be used during the project. The letters should state that the disposal facility is permitted to accept and has the available capacity to receive the waste that will be shipped from the Site;
- The disposal facility letter of commitment and permit, transporter permits and waste characterization results will be submitted to the Agencies for final approval prior to any off-Site disposal; and,
- Vehicles must be properly decontaminated on an appropriate and approved decontamination pad before leaving the Site. Waste materials generated during the decontamination procedures must be containerized, characterized and disposed of properly.

3.13 Materials Reuse On-Site

The procedures defined for materials reuse in this RAWP will be followed and unacceptable material will not

remain on-Site. Contaminated on-Site material, including historic fill and contaminated soil, that is acceptable for reuse on-Site, in accordance with the requirements of the Record of Decision (ROD) will be placed below a cover system that will be installed at each respective excavation location upon successful completion of remedial excavation activities. Please note that during Site redevelopment a site wide cover system meeting the requirements of the ROD will also be installed.

Any demolition material proposed for reuse on-Site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-Site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused on-Site.

Soil and fill that is derived from the property and is sampled in accordance with DER-10 Section 5.4(e)4 and meets the following SSRC may be reused on-Site:

- Arsenic – 175 mg/kg
- Lead – 660 mg/kg

Grossly Contaminated Media (as defined in 6 NYCRR Part 375-1.2(u)) and NAPL (as defined in 6 NYCRR Part 375-1.2(ac.) will not be allowed to be reused on-Site. "Reuse on-Site" means material that is excavated, does not leave the property, is relocated within the same property on comparable soil/fill material, and addressed pursuant to Engineering Controls. No soil exceeding protection of groundwater concentrations as defined in 6 NYCRR Part 375-6.8(b) will remain below stormwater retention basins or infiltration structures. Materials slated for reuse on-Site will be segregated from other materials to be exported from the Site and the procedures defined for material reuse in this RAWP will be followed. Excavated soil not suitable for backfill will be disposed appropriately offsite in accordance with applicable local, State and Federal regulations.

3.14 Fluids Management

Liquids to be removed from the Site, including but not limited to, excavation dewatering (if necessary) and decontamination waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. During remedial excavation activities it is anticipated that groundwater will be encountered at some of the excavation locations. As necessary to meet applicable SSRCs the excavation(s) will be performed below the water table without dewatering to limit the quantity of waste generated during the implementation of the remedial action. Dewatering will be performed only if necessary to maintain a safe and stable excavation. Dewatering fluids will not be recharged back to the land surface or subsurface of the Site,

and will be managed off-Site, unless prior approval is obtained from NYSDEC.

Any discharge of water generated to surface waters (i.e. a local pond, stream or river) will be performed under a State Pollution Discharge Elimination System (SPDES) permit.

3.15 Site Backfill/Restoration

Each excavation area will be backfilled after agency approval of the confirmatory sample results. Note that sidewall samples will be collected from each zone of contamination in the event that multiple contamination zones exist for the respective excavation. A demarcation layer will be installed at the remediated depth prior to the addition of any backfill material. Materials proposed for import onto the Site will be in compliance with provisions in this RAWP, shall meet the requirements of the ROD and will be tested in accordance to DER-10 Table 5.4(e)10 prior to receipt at the Site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review. Imported soils will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d). The use of Recycled Concrete Aggregate (RCA) for backfill will be subject to NYSDEC approval of source.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases. A process will be established to evaluate sources of backfill soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

Materials received for import to the Site will be in compliance with provisions in this RAWP. The CCR will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill was placed.

3.15.1 Source Screening and Testing

Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- Every truck load of imported material will be inspected for evidence of contamination; and,

- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Samples of imported material will be taken at a frequency specified in Table 5.4(e)10 of DER-10 or at an alternate frequency approved by the NYSDEC PM. Once it is determined that the fill material meets imported backfill chemical requirements, is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

RCA will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the CCR. Facilities will be compliant with 6 NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported to the Site must be derived from recognizable and uncontaminated concrete.

3.15.2 Import of Backfill

Imported soil will be uncontaminated, clean soil that meets the requirements of 6 NYCRR Part 375-6.7(d). The imported uncontaminated, clean soil will be from an approved source/facility and will be evaluated to ensure:

1. That a segregated stockpile is properly maintained at the source and will not be comingled with any other material prior to importing and installing the clean soil material at the Site;
2. That the material does not include any solid waste, as it's prohibited;
3. That screening for evidence of contamination by visual, olfactory and PID soil screening practices prior to testing at the source as well as upon importing to the Site is completed; and,
4. That soil samples will be collected from the segregated stockpile at the source at a frequency specified in Table 5.4(e)10 of DER-10 or at an alternate frequency approved by the NYSDEC Project Manager and analyzed for the following Full List parameters:
    - VOCs by USEPA Method 8260
    - SVOCs by USEPA Method 8270
    - Pesticides by USEPA Method 8081
    - PCBs by USEPA Method 8082
    - Metals by USEPA Method 6010
    - Mercury by USEPA Method 7470
    - Cyanide by USEPA Method 9010

Upon receipt of the segregated stockpile analytical results collected at the source, a Request to Import/Reuse Fill or Soil form will be submitted to the NYSDEC PM for review/approval prior to importing. The report will

include the following:

1. Summary of number of samples collected and analyzed, tabulated data and comparison to Restricted Residential Use and Protection of Groundwater SCOs;
2. Analytical data sheets and chain of custody documentation;
3. Summary of number tons (number cubic yards);
4. An affidavit from the source/facility on company letterhead stating that the segregated stockpile for number tons (number cubic yards) has been properly maintained at the source and complies with the requirements listed above; and,
5. A copy of source/facility NYSDEC permit, if applicable.

Upon importing and installing the approved backfill material on top of a highly visible demarcation barrier, the following documentation will be presented in the CCR:

1. Truck transportation slips from the source to the Site;
2. Confirmation of number tons (number cubic yards) of approved clean backfill material imported and graded at the Site on top of highly visible demarcation barrier;
3. Site plan depicting areas where the approved clean backfill has been placed; and,
4. Photographs documenting the importing and installation of the approved clean backfill at the Site with the underlying highly visible demarcation barrier (i.e. orange geo-synthetic material or equivalent).

3.16 Excavation Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during implementation of this RAWP, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes identified in 6 NYCRR Part 375-6.8(a), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the CCR.

3.17 Dust Suppression

If dust generation approaches action levels, suppression will be accomplished by:

- Covering/capping exposed soil area with mulch, rubber mats, etc.;
- Wetting equipment and excavation faces;
- Water spray dust suppression;
- Hauling materials in properly covered containers; and,
- Restricting vehicle speeds to 10 mph.

When possible, impacted soils will be loaded directly into trucks for immediate off-Site disposal.

3.18 Odor Control

In the event that odor suppression becomes necessary, techniques to be implemented for control of odors from stockpiled soil or from the open excavation will include one or more of the following:

- Cover with plastic;
- Cover with “clean soil”;
- Application of vapor suppressant foam; and,
- Limit working hours to favorable wind and temperature conditions.

3.19 Sediment and Erosion Control

A SWPPP that conforms to the requirements of the NYSDEC Division of Water guidelines and New York State regulations for the remedial work has been prepared and is included as **Appendix F**. Additionally, at a minimum the following control measures will be followed:

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by the NYSDEC. Necessary repairs will be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering. Erosion and sediment control measures identified in the SWPPP will be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they will be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

3.20 Demobilization

Following the completion of pre-construction remedial activities at the Site, equipment will be dismantled and removed from the Site. Prior to leaving the Site, personnel, equipment and vehicles will be decontaminated following the procedures established in PWGC's Decontamination Plan (**Appendix E**). Solid wastes generated during remedial activities (i.e., polyethylene sheeting) will be properly disposed of as investigative derived waste.

4.0 REMEDIAL ACTION MANAGEMENT

4.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Paul K. Boyce, P.E. and James P. Rhodes, C.P.G. The PE for this project is Paul K. Boyce, P.E. Derek Ersbak will be the remedial action PM and Amanda Racaniello will be the remedial action Field Team Leader.

Safety and Ecology Corporation (SEC) has been providing radiological expertise/monitoring for the GPWRP and will be responsible for implementation of the RMP. SEC is licensed by the NYSDOH (NYSDOH License C5666) to provide radiological survey services.

4.2 Reporting and Record Keeping

4.2.1 Daily Reports

Daily reports providing a general summary of activities for each day of active remedial work will be uploaded to an online database by the end of the following day. Those reports will include:

- Project number, statement of the activities, an update of progress made and locations of work performed;
- Quantities of material imported and exported from the Site;
- Status of on-site soil/fill stockpiles;
- A summary of citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP exceedances, if any; and,
- Photograph of notable Site conditions and activities.

Daily reports are not intended to be the primary mode of communication for notification of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be communicated directly to the Agencies by personal communication. Daily reports will be included as an Appendix in the CCR.

4.2.2 Record Keeping and Photo Documentation

Job-site record keeping for remedial work will be performed. These records will be maintained on-Site during the project and will be available for inspection by the Agencies. Representative photographs will be taken of the Site prior to any remedial activities and during major remedial activities to illustrate remedial program elements and contaminant source areas. Photographs will be submitted at the completion of the project in

the CCR in digital format (i.e. jpeg files).

4.3 Deviations from the Remedial Action Work Plan

Changes to the RAWP will be reported to the Agencies, will be documented in daily reports and reported in the CCR. The process to be followed if there are any deviations from the RAWP will include a request for approval for the change from the Agencies noting the following:

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

5.0 CONSTRUCTION COMPLETION REPORT

A CCR will be submitted to the Agencies following implementation of the remedial action defined in this RAWP. The CCR will document that the remedial work required under this RAWP has been completed and has been performed in compliance with this RAWP. The CCR will include:

- Information required by this RAWP;
- As-built drawings for constructed remedial elements, required certifications, manifests and other written and photographic documentation of remedial work performed under this remedy;
- Description of changes in the remedial action from the elements provided in this RAWP;
- Tabular summaries of confirmatory sampling results and material characterization results, QA/QC results for confirmatory sampling, and other sampling and chemical analysis performed as part of the remedial action;
- Account of the locations and characteristics of contaminated material removed from the Site including a figure showing removal areas; and,
- Account of the disposal destination of contaminated material removed from the Site. Documentation associated with disposal of material will include transportation and disposal records, and letters approving receipt of the material.

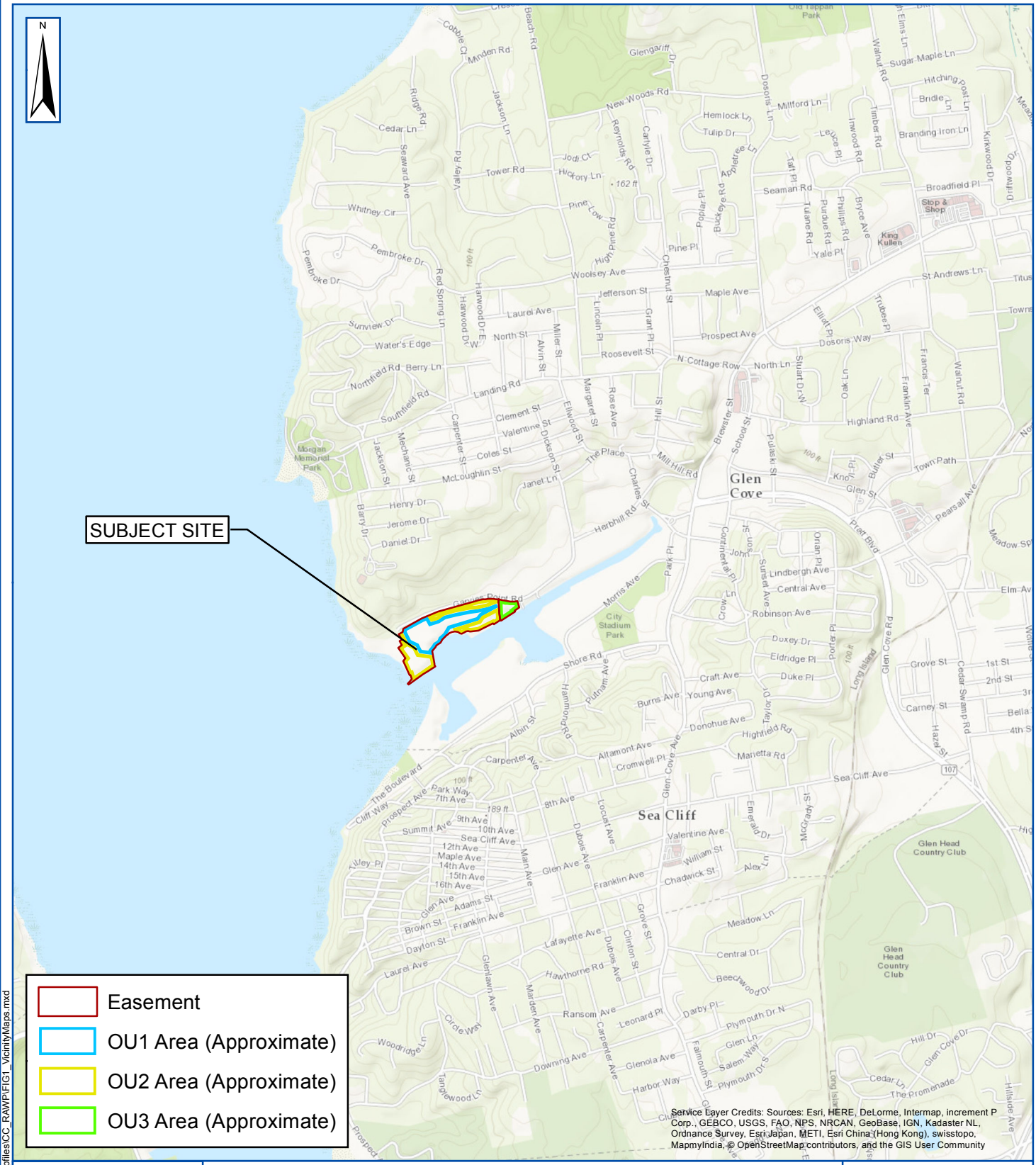
Reports and supporting material will be submitted in digital form.

6.0 SCHEDULE

The table below presents a schedule for the remedial action and reporting. If the schedule for remediation activities changes, it will be updated and submitted to the Agencies. Currently, a seven-week remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
Approval of RAWP	0	1
Mobilization	1	0
Remedial Implementation	2	4
Demobilization	6	0
Submit CCR	7	1

FIGURES



Document Path: G:\Projects\M-R\RGI\1504\mapfiles\CC_RAWP\FIG1_VicinityMaps.mxd

PWGC
Strategic Environmental and Engineering Solutions
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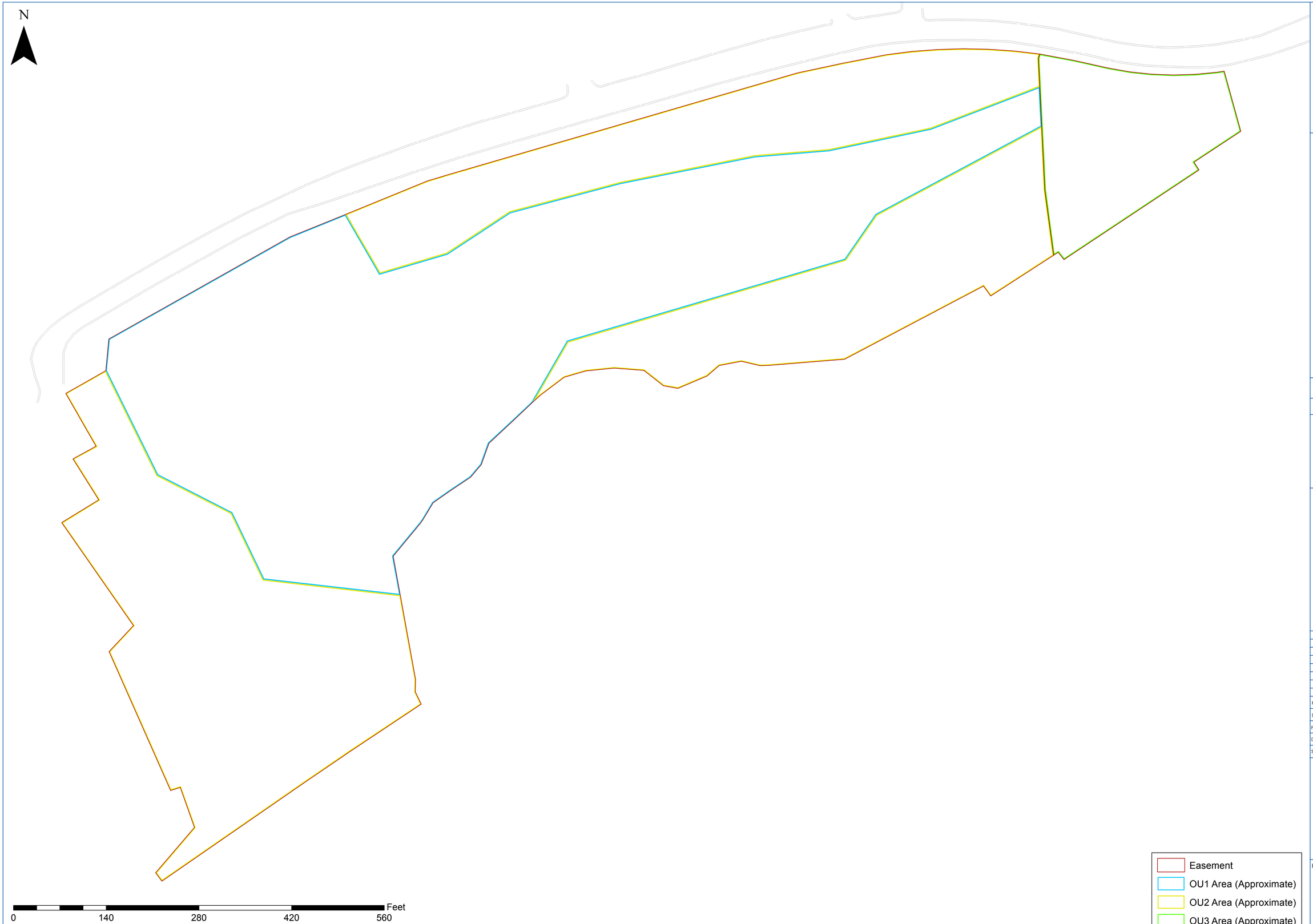
SUBJECT SITE VICINITY

GARVIES POINT ROAD
GLEN COVE, NY

0 ¼ ½ ¾ 1 Miles

Project:	RGI1504
Date:	8/31/2016
Designed by:	DE
Drawn by:	JCG
Approved by:	DE
Figure No:	1



Document Path: G:\Projects\M-R\RGI\1504\mapfiles\CC_RAWP\FIG2_SitePlan.mxd

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STATE OF NEW YORK
PAUL KENNETH BOYCE
074604
LICENSED PROFESSIONAL ENGINEER

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DRAWING PREPARED FOR:

RXR-Glen Isle Partners, LLC
625 RXR Plaza
Uniondale, New York

REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	BSD1504	Designed by:	BB
Date:	8/31/2016	Drawn by:	JCG
Scale:	AS SHOWN	Approved by:	BB

SITE PLAN

CAPTAIN'S COVE

FIGURE NO:

2

N

Client Sample ID:	CC-C-051					
Sample Depth:	0-2'		2-4'		8-10*	
Sampling Date:	2/21/2014		2/21/2014		2/21/2014	
Arsenic, Total	6.3	J	9.2	J	7.7	J
Lead, Total	82.2	J	165	J	84.3	J
Toluene	-		-		150	U
Xylenes	-		-		310	J
Benzo(a)anthracene	640	J	420	J	620	J
Benzo(a)pyrene	590	J	350	J	290	J
Benzo(b)fluoranthene	800	J	420	J	600	J
Chrysene	810	J	440	J	900	J
Indeno(1,2,3-cd)Pyrene	540	J	53	U	54	U

Client Sample ID:	CC-C-022					
Sample Depth:	0-2'		2-4'		6-8'	
Sampling Date:	2/12/2014		2/12/2014		2/12/2014	
Arsenic, Total	379	J	500	J	11.1	J
Lead, Total	212	J	398	J	194	J

Client Sample ID:	CC-C-022
Sample Depth:	0-2'
Sampling Date:	1/9/2015
Arsenic, Total	187
Lead, Total	371

Client Sample ID:	CC-C-017								
Sample Depth:	0-2'	2-4'	4-6'	6-8'	8-10'	10-12'	12-14'	14-16'	16-18'
Sampling Date:	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015
Arsenic, Total	1,050	3.5	12	10.2	6.3	33.2	2.5	4	0.8 U
Lead, Total	537	4.8	349	296	428	18.1	32	3.7	3.2

Client Sample ID:	CC-C-017					
Sample Depth:	0-2'		4-6'		6-8'	
Sampling Date:	2/12/2014		2/12/2014		2/12/2014	
Arsenic, Total	241		15.9		11.6	
Lead, Total	194	J	320	J	187	J

Notes:
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U - Indicates the analyte was analyzed for but not detected.
U/ND - Indicates the analyte was analyzed for but not detected.

	SSRC
Arsenic, Total	175
Lead, Total	660

* - Grossly Contaminated Media Identified

Client Sample ID:	CC-GI-006			
Sample Depth:	0-2'	2-4'	4-6'	6-8'
Sampling Date:	4/21/2015	4/21/2015	4/21/2015	4/21/2015
Arsenic, Total	14.4	14.7	7.8	7.6
Lead, Total	114	738	224	164

Client Sample ID:	CC-C-028
Sample Depth:	0-2'
Sampling Date:	1/9/2015
Arsenic, Total	13

Client Sample ID:	CC-C-028					
Sample Depth:	0-2'		4-6'		6-8'	
Sampling Date:	2/14/2014		2/14/2014		2/14/2014	
Arsenic, Total	253		19.2		7.2	J
Lead, Total	696	J	389	J	285	J

Client Sample ID:	CC-C-048					
Sample Depth:	0-2'		4-6'		8-10'	
Sampling Date:	2/21/2014		2/21/2014		2/21/2014	
Arsenic, Total	3.9	J	4.1	J	9.8	J
Lead, Total	17.3	J	90.9	J	699	J

Client Sample ID:	CC-GI-007		
Sample Depth:	0-2'	2-4'	4-6'
Sampling Date:	4/22/2015	4/22/2015	4/22/2015
Arsenic, Total	15.1	14.8	15.3
Lead, Total	159	741	717

Client Sample ID:	CC-C-029					
Sample Depth:	0-2'		2-4'		8-10'	
Sampling Date:	2/19/2014		2/19/2014		2/19/2014	
Arsenic, Total	5.8	J	8.6	J	8.4	J
Lead, Total	102	J	169	J	1,180	J

Client Sample ID:	CC-C-029
Sample Depth:	8-10'
Sampling Date:	1/9/2015
Lead, Total	141

Client Sample ID:	CC-C-029
Sample Depth:	8-10'
Sampling Date:	1/15/2015
Lead, Total	416

Client Sample ID:	D-2			
Sample Depth:	0.5-1'	2-3'*	6-7'	11-12'
Sampling Date:	11/10/2003	11/10/2003	11/10/2003	11/3/2003
Arsenic, Total	6.72	ND	3.2	3.65
Lead, Total	37.5	60.3	55.7	97.9
Toluene	-	60,600,000	8.59	1.83
Xylenes	-	3,570,000	ND	ND
Benzo(a)anthracene	4,170	ND	ND	39.2
Benzo(a)pyrene	4,350	ND	ND	28.9
Benzo(b)fluoranthene	3,180	ND	ND	27.8
Chrysene	4,520	ND	ND	33
Indeno(1,2,3-cd)Pyrene	1,620	ND	ND	ND

Client Sample ID:	CC-C-030
Sample Depth:	8-10'
Sampling Date:	1/9/2015
Lead, Total	175

Client Sample ID:	CC-C-030	
Sample Depth:	8'	10'
Sampling Date:	1/15/2015	1/15/2015
Arsenic, Total	-	67.8
Lead, Total	8,620	19,900

Client Sample ID:	CC-C-030	
Sample Depth:	8'	10'
Sampling Date:	1/15/2015	1/15/2015
Arsenic, Total	-	51.9
Lead, Total	1,760	13,900

Client Sample ID:	CC-C-030						
Sample Depth:	0-2'	2-4'	4-6'	6-8'	8-10'	10-12'	12-14'
Sampling Date:	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015
Arsenic, Total	4.4	4.4	6.7	4	9.2	4.2	4.7
Lead, Total	38.5	75.2	229	79.2	1,210	239	12.4

Client Sample ID:	CC-C-030						
Sample Depth:	0-2'		2-4'		8-10'		
Sampling Date:	2/14/2014		2/14/2014		2/14/2014		
Arsenic, Total	4.6	J	7.3	J	15.8		
Lead, Total	43.9	J	68.7	J	983	J	

Client Sample ID:	CC-C-019
Sample Depth:	0-2'
Sampling Date:	1/9/2015
Arsenic, Total	993
Lead, Total	473

Client Sample ID:	CC-C-019					
Sample Depth:	0-2'		4-6'		6-8'	
Sampling Date:	2/12/2014		2/12/2014		2/12/2014	
Arsenic, Total	1,850		13.5	J	12.7	J
Lead, Total	772	J	274	J	300	J

Client Sample ID:	CC-C-023
Sample Depth:	6-8'
Sampling Date:	1/15/2015
Lead, Total	267

Client Sample ID:	CC-C-023
Sample Depth:	6-8'
Sampling Date:	1/9/2015
Lead, Total	215

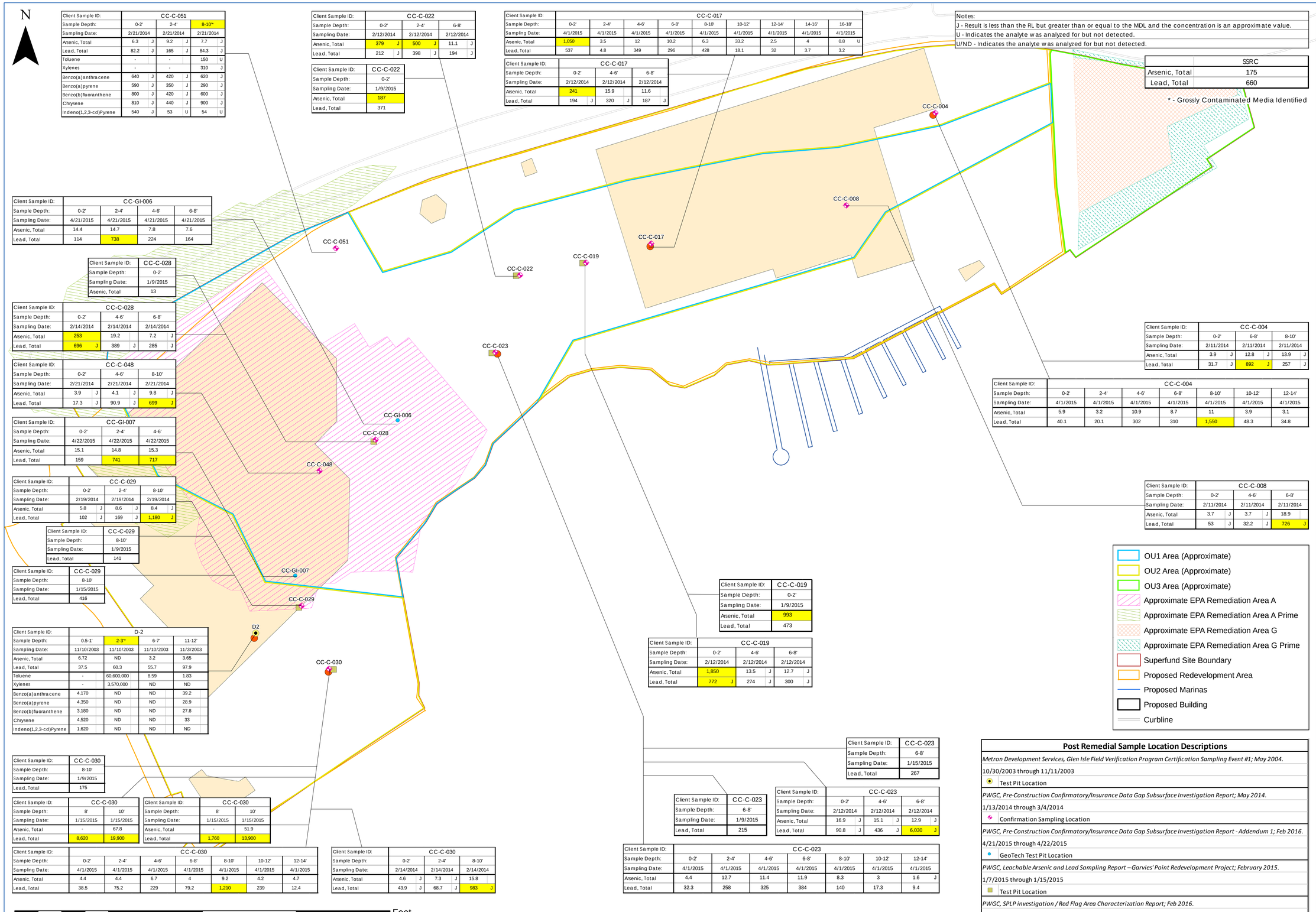
Client Sample ID:	CC-C-023						
Sample Depth:	0-2'		4-6'		6-8'		
Sampling Date:	2/12/2014		2/12/2014		2/12/2014		
Arsenic, Total	16.9	J	15.1	J	12.9	J	
Lead, Total	90.8	J	436	J	6,030	J	

Client Sample ID:	CC-C-023						
Sample Depth:	0-2'	2-4'	4-6'	6-8'	8-10'	10-12'	12-14'
Sampling Date:	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015
Arsenic, Total	4.4	12.7	11.4	11.9	8.3	3	1.6 J
Lead, Total	32.3	258	325	384	140	17.3	9.4

Client Sample ID:	CC-C-004						
Sample Depth:	0-2'		6-8'		8-10'		
Sampling Date:	2/11/2014		2/11/2014		2/11/2014		
Arsenic, Total	3.9	J	12.8	J	13.9	J	
Lead, Total	31.7	J	892	J	257	J	

Client Sample ID:	CC-C-004						
Sample Depth:	0-2'	2-4'	4-6'	6-8'	8-10'	10-12'	12-14'
Sampling Date:	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015	4/1/2015
Arsenic, Total	5.9	3.2	10.9	8.7	11	3.9	3.1
Lead, Total	40.1	20.1	302	310	1,550	48.3	34.8

Client Sample ID:	CC-C-008					
Sample Depth:	0-2'		4-6'		6-8'	
Sampling Date:	2/11/2014		2/11/2014		2/11/2014	
Arsenic, Total	3.7	J	3.7	J	18.9	
Lead, Total	53	J	32.2	J	726	J



- OU1 Area (Approximate)
- OU2 Area (Approximate)
- OU3 Area (Approximate)
- Approximate EPA Remediation Area A
- Approximate EPA Remediation Area A Prime
- Approximate EPA Remediation Area G
- Approximate EPA Remediation Area G Prime
- Superfund Site Boundary
- Proposed Redevelopment Area
- Proposed Marinas
- Proposed Building
- Curbline

Post Remedial Sample Location Descriptions

Metron Development Services, Glen Isle Field Verification Program Certification Sampling Event #1; May 2004.
10/30/2003 through 11/11/2003
- Test Pit Location

PWGC, Pre-Construction Confirmatory/Insurance Data Gap Subsurface Investigation Report; May 2014.
1/13/2014 through 3/4/2014
- Confirmation Sampling Location

PWGC, Pre-Construction Confirmatory/Insurance Data Gap Subsurface Investigation Report - Addendum 1; Feb 2016.
4/21/2015 through 4/22/2015
- GeoTech Test Pit Location

PWGC, Leachable Arsenic and Lead Sampling Report – Garvies' Point Redevelopment Project; February 2015.
1/7/2015 through 1/15/2015
- Test Pit Location

PWGC, SPLP investigation / Red Flag Area Characterization Report; Feb 2016.
4/1/2015 through 4/7/2015
- SPLP / Red Flag Soil Boring

0 140 280 420 560 Feet

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REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

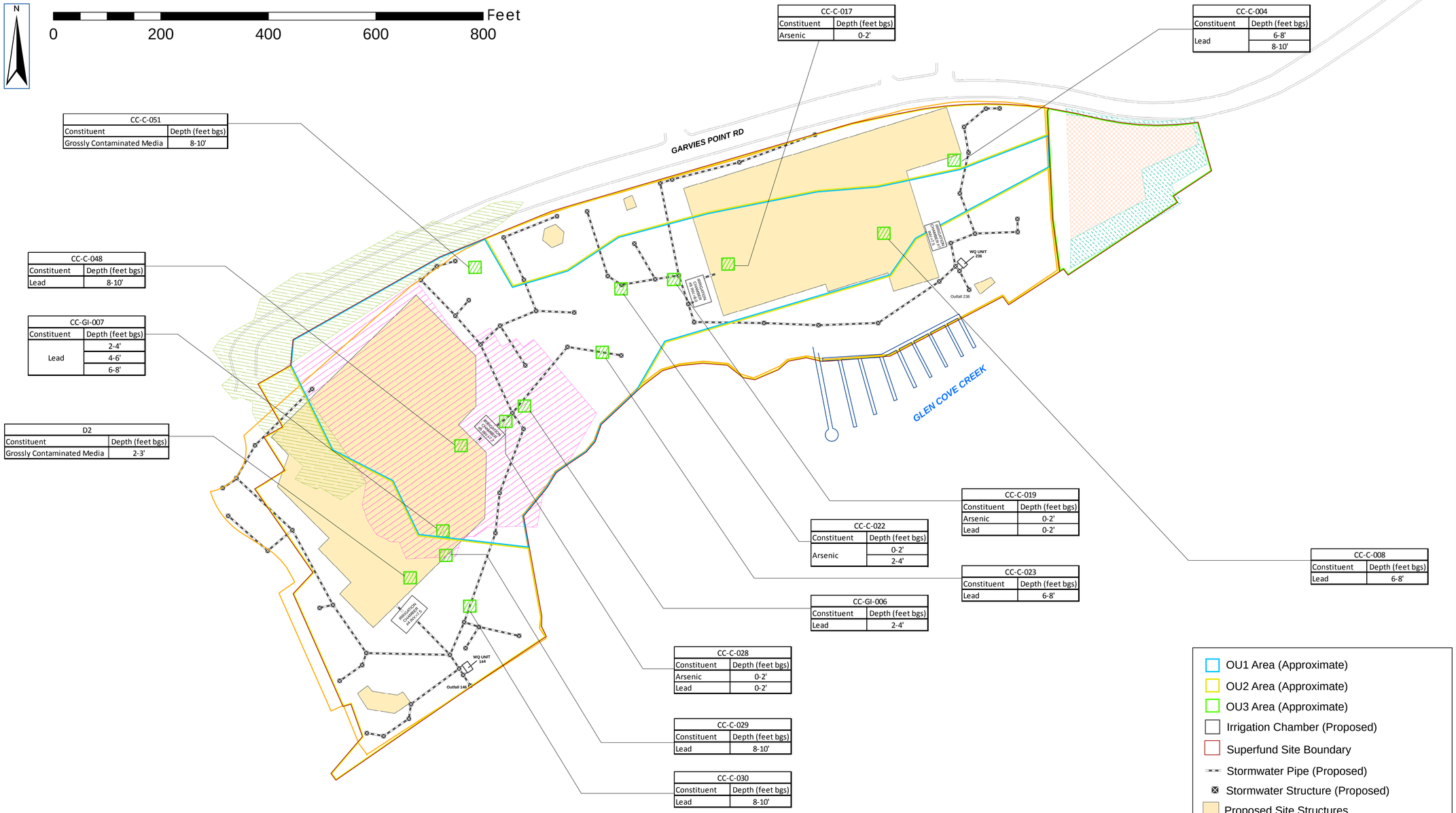
Project:	8SD1504	Designed by:	BB
Date:	8/31/2016	Drawn by:	JCG
Scale:	AS SHOWN	Approved by:	BB

SAMPLE RESULTS

CAPAIN'S COVE

FIGURE NO:

3



CC-C-017	
Constituent	Depth (feet bgs)
Arsenic	0-2'

CC-C-004	
Constituent	Depth (feet bgs)
Lead	6-8'
	8-10'

CC-C-051	
Constituent	Depth (feet bgs)
Grossly Contaminated Media	8-10'

CC-C-048	
Constituent	Depth (feet bgs)
Lead	8-10'

CC-GI-007	
Constituent	Depth (feet bgs)
Lead	2-4'
	4-6'
	6-8'

D2	
Constituent	Depth (feet bgs)
Grossly Contaminated Media	2-3'

CC-C-019	
Constituent	Depth (feet bgs)
Arsenic	0-2'
Lead	0-2'

CC-C-022	
Constituent	Depth (feet bgs)
Arsenic	0-2'
	2-4'

CC-C-008	
Constituent	Depth (feet bgs)
Lead	6-8'

CC-C-023	
Constituent	Depth (feet bgs)
Lead	6-8'

CC-GI-006	
Constituent	Depth (feet bgs)
Lead	2-4'

CC-C-028	
Constituent	Depth (feet bgs)
Arsenic	0-2'
Lead	0-2'

CC-C-029	
Constituent	Depth (feet bgs)
Lead	8-10'

CC-C-030	
Constituent	Depth (feet bgs)
Lead	8-10'

REMEDIAL ACTION REMOVAL CRITERIA (RARC)

1. Arsenic	175 mg/kg
2. Lead	660 mg/kg
3. Radium-226	5pCi/g (not including the natural background radiation of nuclide of approximately 1pCI/g)
4. Thorium-232	5pCi/g (not including the natural background radiation of nuclide of approximately 1pCI/g)
5. Grossly Contaminated Media	As defined in Title 6 NYCRR Part 375-1.2(u) *
6. NAPL	As defined in Title 6 NYCRR Part 375-1.2(ac) **

* Grossly contaminated media means soil, sediment, surface water or groundwater which contains sources or substantial quantities of mobile contamination in the form of NAPL, as defined in subdivision 375-1.2(ac), that is identifiable either visually, through strong odor, by elevated contaminant vapor levels or is otherwise readily detectable without laboratory analysis.

** NAPL means a contaminant that is a liquid which may be denser or lighter than water and does not mix easily or dissolve in water, but remains as a separate phase.

GENERAL NOTES

1. ALL EXCAVATION AREAS ARE PROPOSED AT 5 FT BY 5 FT IN SIZE WITH THE EXCEPTION OF CC-C-051 AND CC-C-030 WHICH ARE PROPOSED AT 15 FT BY 15 FT IN SIZE, DEPTHS AS NOTED. TO BE EXPANDED UNTIL RARC ACHIEVED OR UNTIL THE WATER TABLE IS REACHED.
2. DURING THE 2014 DATA GAP INVESTIGATION & SUBSEQUENT TEST PITS CONDUCTED AT THE CC-C-051 LOCATION, GROSSLY CONTAMINATED MEDIA WAS FOUND TO EXIST AT 8-10 FT BELOW LAND SURFACE.
3. SOILS OVERLYING THE INTERVAL TARGETED FOR REMEDIATION WILL BE STOCKPILED & TESTED FOR REUSE OR DISPOSED OF OFFSITE.
4. CONFIRMATORY ENDPOINT SAMPLES WILL BE COLLECTED IN ACCORDANCE WITH DER-10. ONE CONFIRMATORY ENDPOINT SAMPLE PER EVERY 30 LINEAR FT OF SIDEWALL & ONE CONFIRMATORY ENDPOINT SAMPLE PER EVERY 900 FT2 OF EXCAVATION BOTTOM. CONFIRMATORY ENDPOINT SAMPLES WILL BE ANALYZED IN ACCORDANCE WITH THE APPROVED RAWP.
5. THE NEW YORK BUILDING CODE SHALL GOVERN THE CONDUCT OF ALL CONSTRUCTION EXCAVATION WITH REGARD TO THE SAFETY OF THE PUBLIC AND PROPERTY. ALL WORKERS SHALL BE OSHA TRAINED AS PER THE APPROVED RAWP.
6. SURVEYS AND INSPECTIONS AT PROJECT MILESTONES SHALL BE PERFORMED AS PER THE APPROVED RAWP.
7. NOTIFICATIONS WILL BE SUBMITTED AS PER THE APPROVED RAWP.
8. THE VOLUME OF SOIL TO BE REMOVED AND REPLACED WILL BE DETERMINED BY CONFIRMATORY ENDPOINT SAMPLING.
9. EXCAVATED SOILS EXCEEDING RARC WILL BE STOCKPILED ON POLYETHYLENE SHEETING, CHARACTERIZED, AND DISPOSED OF OFFSITE IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
10. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE AND CONTROLS AS REQUIRED IN THE APPROVED RAWP.
11. THE CONTRACTOR SHALL FOLLOW THE EXCAVATION WORK PLAN REQUIREMENTS OF THE APPROVED RAWP.
12. SITE RESTORATION SHALL CONSIST OF INSTALLATION OF A DEMARCATION LAYER, BACKFILL WITH SOILS APPROVED FOR REUSE OR IMPORTED CLEAN FILL MATERIAL, COMPACTION, & GRADING OF ANY AREA DISTURBED BY EXCAVATION OR SOIL STOCKPILING ACTIVITIES.
13. COMMUNITY AIR MONITORING AND WORKER PROTECTION MONITORING SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPROVED RAWP.
14. GROSSLY CONTAMINATED MEDIA & NAPL IF ENCOUNTERED, WILL BE REMOVED, CHARACTERIZED, AND DISPOSED OF OFFSITE IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
15. EXCAVATIONS EXCEEDING OSHA SLOPING AND BENCHING REQUIREMENTS AS SPECIFIED IN 1926 SUBPART P, APPENDIX B SHALL BE EXCAVATED USING SHIELDING AS SPECIFIED IN OSHA TECHNICAL MANUAL SECTION V, CHAPTER 2.
16. THE DEPICTED EXCAVATION LIMITS ARE NOT TO SCALE
17. THE LOCATION OF THE STORMWATER SYSTEM ANTICIPATES RELOCATION OF THE BULKHEAD FOR THE PROPOSED MARINA

- OU1 Area (Approximate)
- OU2 Area (Approximate)
- OU3 Area (Approximate)
- Irrigation Chamber (Proposed)
- Superfund Site Boundary
- Stormwater Pipe (Proposed)
- Stormwater Structure (Proposed)
- Proposed Site Structures
- Proposed Redevelopment Area
- Approximate EPA Remediation Area A
- Approximate EPA Remediation Area A Prime
- Approximate EPA Remediation Area G
- Approximate EPA Remediation Area G Prime
- Location of proposed removal. Not depicted to scale. See Plan Notes for additional information.

CC-C-001	
Constituent	Depth (feet bgs)

LOCATION NUMBER

CONSTITUENT EXCEEDING RAO AND INTERVAL WHERE EXCEEDANCE WAS FOUND

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DRAWING PREPARED FOR:

REMEDIAL EXCAVATION PLAN

CAPTAIN'S COVE GLEN ISLE

REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project: RGI1504	Designed by: DE
Date: 8/31/2016	Drawn by: JCG
Scale: AS SHOWN	Approved by: DE

FIGURE NO:

4

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TABLES

Table 1

Location	Sample ID	Primary Contaminants	Proposed Excavation Size	Proposed Excavation Depth Interval	Notes
Captain's Cove	CC-C-004	Lead	5'-0" X 5'-0"	6'-0" to 10'-0" BGS	Soil excavated from ground surface to 6'-0" will be segregated and stockpiled separately for potential re-use on-site. Sampling of overlying soils will be performed consistent with the SMP requirements for Agency review and approval prior to on-site reuse.
	CC-C-008	Lead	5'-0" X 5'-0"	6'-0" to 8'-0" BGS	Soil excavated from ground surface to 6'-0" will be segregated and stockpiled separately for potential re-use on-site. Sampling of overlying soils will be performed consistent with the SMP requirements for Agency review and approval prior to on-site reuse.
	CC-C-017	Arsenic	5'-0" X 5'-0"	0'-0" to 2'-0" BGS	
	CC-C-019	Arsenic Lead	5'-0" X 5'-0"	0'-0" to 2'-0" BGS	
	CC-C-022	Arsenic	5'-0" X 5'-0"	0'-0" to 4'-0" BGS	
	CC-C-023	Lead	5'-0" X 5'-0"	6'-0" to 8'-0" BGS	Soil excavated from ground surface to 6'-0" will be segregated and stockpiled separately for potential re-use on-site. Sampling of overlying soils will be performed consistent with the SMP requirements for Agency review and approval prior to on-site reuse.
	CC-C-028	Arsenic Lead	5'-0" X 5'-0"	0'-0" to 2'-0" BGS	
	CC-C-029	Lead	5'-0" X 5'-0"	4'-0" to 10'-0" BGS	Soil excavated from ground surface to 4'-0" will be segregated and stockpiled separately for potential re-use on-site. Sampling of overlying soils will be performed consistent with the SMP requirements for Agency review and approval prior to on-site reuse.
	CC-C-030	Lead	15'-0" X 15'-0"	8'-0" to 10'-0" BGS	Soil excavated from ground surface to 8'-0" will be segregated and stockpiled separately for potential re-use on-site. Sampling of overlying soils will be performed consistent with the SMP requirements for Agency review and approval prior to on-site reuse.
	CC-C-048	Lead	5'-0" X 5'-0"	6'-0" to 10'-0" BGS	Soil excavated from ground surface to 6'-0" will be segregated and stockpiled separately for potential re-use on-site. Sampling of overlying soils will be performed consistent with the SMP requirements for Agency review and approval prior to on-site reuse.
	CC-C-051	Grossly Contaminated Media	15'-0" X 15'-0"	0'-0" to 10'-0" BGS	
	CC-GI-006	Lead	5'-0" X 5'-0"	2'-0" to 4'-0" BGS	Soil excavated from ground surface to 2'-0" will be segregated and stockpiled separately for potential re-use on-site. Sampling of overlying soils will be performed consistent with the SMP requirements for Agency review and approval prior to on-site reuse.
	CC-GI-007	Lead	5'-0" X 5'-0"	2'-0" to 8'-0" BGS	Soil excavated from ground surface to 2'-0" will be segregated and stockpiled separately for potential re-use on-site. Sampling of overlying soils will be performed consistent with the SMP requirements for Agency review and approval prior to on-site reuse.
	D2	Grossly Contaminated Media	5'-0" X 5'-0"	0'-0" to 3'-0" BGS	

Note: Refer to Pre-Construction Remedial Action Work Plan for additional information regarding proposed backfill and sampling protocols.

Table 2
Soil Analytical Results for Metals

Client Sample ID:	Site Specific	CC-C-004			CC-C-008			CC-C-017			CC-C-019			CC-C-022			CC-C-023			CC-C-028			CC-C-029		
Sample Depth:	Removal Criteria	0-2'	6-8'	8-10'	0-2'	4-6'	6-8'	0-2'	4-6'	6-8'	0-2'	4-6'	6-8'	0-2'	2-4'	6-8'	0-2'	4-6'	6-8'	0-2'	4-6'	6-8'	0-2'	2-4'	8-10'
Laboratory ID:		480-54686-10	480-54686-11	480-54686-12	480-54686-22	480-54686-23	480-54686-24	480-54779-13	480-54779-14	480-54779-15	480-54779-19	480-54779-20	480-54779-21	480-54779-28	480-54779-29	480-54779-30	480-54779-31	480-54779-32	480-54779-33	480-54836-30	480-54836-31	480-54836-32	480-55092-1	480-55092-9	480-55092-2
Sampling Date:		2/11/2014	2/11/2014	2/11/2014	2/11/2014	2/11/2014	2/11/2014	2/12/2014	2/12/2014	2/12/2014	2/12/2014	2/12/2014	2/12/2014	2/12/2014	2/12/2014	2/12/2014	2/12/2014	2/12/2014	2/12/2014	2/14/2014	2/14/2014	2/14/2014	2/19/2014	2/19/2014	2/19/2014
Total Metals (mg/kg)																									
Arsenic, Total	175	3.9 J	12.8 J	13.9 J	3.7 J	3.7 J	18.9	241	15.9	11.6	1,850	13.5 J	12.7 J	379 J	500 J	11.1 J	16.9 J	15.1 J	12.9 J	253	19.2	7.2 J	5.8 J	8.6 J	8.4 J
Lead, Total	660	31.7 J	892 J	257 J	53	32.2	726	194 J	320 J	187 J	772 J	274 J	300 J	212 J	398 J	194 J	90.8 J	436 J	6,030 J	696 J	389 J	285 J	102 J	169 J	1,180 J

Client Sample ID:	Site Specific	CC-C-030			CC-C-048			CC-C-051			CC-GI-006					CC-GI-007				D-2				
Sample Depth:	Removal Criteria	0-2'	2-4'	8-10'	0-2'	4-6'	8-10'	0-2'	2-4'	8-10'	0-2'	2-4'	4-6'	6-8'	8-10'	0-2'	2-4'	4-6'	6-8'	8-10'	0.5-1'	2-3'	6-7'	11-12'	
Laboratory ID:		480-54836-10	480-54836-11	480-54836-13	480-55157-1	480-55157-3	480-55157-4	480-55157-12	480-55157-13	480-55157-14	460-93794-18	460-93794-19	460-93794-20	460-93794-21	460-93794-22	460-93794-32	460-93794-33	460-93794-34	460-93794-35	460-93794-36					
Sampling Date:		2/14/2014	2/14/2014	2/14/2014	2/21/2014	2/21/2014	2/21/2014	2/21/2014	2/21/2014	2/21/2014	4/21/2015	4/21/2015	4/21/2015	4/21/2015	4/21/2015	4/22/2015	4/22/2015	4/22/2015	4/22/2015	4/22/2015	11/10/2003	11/10/2003	11/10/2003	11/3/2003	
Total Metals (mg/kg)																									
Arsenic, Total	175	4.6 J	7.3 J	15.8	3.9 J	4.1 J	9.8 J	6.3 J	9.2 J	7.7 J	14.4	14.7	7.8	7.6	11.3	15.1	14.8	15.3	5.2	4.7	6.72	ND	3.2	3.65	
Lead, Total	660	43.9 J	68.7 J	983 J	17.3	90.9	699	82.2 J	165 J	84.3 J	114	738	224	164	234	159	741	717	1,800	17.4	37.5	60.3	55.7	97.9	

Notes:

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The "J" data may be biased high or low or the direction of the bias may be indeterminable.

Highlighted text denotes concentrations exceeding Site Specific Removal Criteria

APPENDIX A
HEALTH AND SAFETY PLAN

P.W. GROSSER CONSULTING, INC.
PROJECT No. RGI1504

HEALTH AND SAFETY PLAN

GARVIES POINT WATERFRONT REVITALIZATION PROJECT
GELN COVE, NEW YORK

SUBMITTED:
AUGUST 2016

PREPARED FOR:
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Appendix E	General Health and Safety Work Practices
Appendix F	Hospital Route Map and Directions
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1.0 STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to chemical, biological and physical hazards during the planned remedial action (RA) to be performed at the Captain's Cove Site (the Site), Glen Cove, New York. P.W. Grosser Consulting Inc.'s (PWGC's) policy is to minimize the possibility of work-related exposure through awareness and qualified supervision, health and safety training, medical monitoring, use of appropriate personal protective equipment, and the following activity specific safety protocols contained in this HASP. PWGC has established a guidance program to implement this policy in a manner that protects personnel to the maximum reasonable extent.

This HASP, which applies to persons present at the Site actually or potentially exposed to safety or health hazards, describes emergency response procedures for actual and potential physical, biological and chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy.

2.0 INTRODUCTION

2.1 Purpose

This HASP addresses the minimum health and safety practices that will be employed by Site workers participating in RA activities at the Site.

The HASP takes into account the specific hazards inherent to the site and presents the minimum requirements which are to be met by PWGC, its' subcontractors, and other on-Site personnel in order to avoid and, if necessary, protect against health and/or safety hazards. PWGC sub-contractors will have the option of adopting this HASP or developing their own Site-specific document. If a subcontractor chooses to prepare their own HASP, it must meet the minimum requirements as detailed in this HASP and must be made available to PWGC.

Activities performed under this HASP will comply with applicable parts of Occupational Safety and Health Administration (OSHA) Regulations, primarily 29 Code of Federal Regulations (CFR) Parts 1910 and 1926 and all other applicable federal, state, and local regulations. Modifications to the HASP may be made with the approval of the PWGC Health and Safety Manager (HSM) and/or Project Manager (PM). A copy of this HASP will be maintained on-Site during all work activities.

Refusal to comply with the HASP or violation of any safety procedures by field personnel may result in their immediate removal from the Site following consultation with the HSM and the Field Team Leader (FTL).

2.2 Scope

This HASP addresses the potential hazards related to the RA activities. The primary RA activities include the following:

- Site Mobilization/Demobilization;
- Excavation; and;
- Soil Sampling

The potential hazards associated with this scope are listed below and are discussed in more detail in this HASP after the project organization and responsibilities section.

- Chemical Hazards
- Biological Hazards
- Physical Hazards

2.3 Application

The HASP applies to all personnel involved in the above tasks who wish to gain access to active work areas, including but not limited to:

- PWGC employees and subcontractors;
- Client representatives; and
- Federal, state or local representatives.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section specifies the project organization and responsibilities.

3.1 Project Manager

- Participates in major incident investigations;
- Ensures that the HASP has all of the required approvals before Site work is conducted; and
- Has the overall project responsibility for project health and safety.

3.2 Field Team Leader (FTL)/ Site Health and Safety Officer (SHSO)

- Ensures that the HASP is implemented in conjunction with the HSM;
- Ensures that field work is scheduled with adequate equipment to complete the job safely;
- Enforces Site health and safety rules;
- Ensures that proper personal protective equipment is utilized;
- Ensures that the HSM is informed of project changes that require modifications to the HASP;
- Ensures that the procedure modifications are implemented;
- Investigates incidents;
- Conducts the Site safety briefing;
- Reports to HSM to provide summaries of field operations and progress; and
- Acts as Emergency Coordinator.

3.3 Health and Safety Manager

- Provides for the development of the HASP;
- Serves as the primary contact to review health and safety matters that may arise;
- Approves individuals who are assigned SHSO responsibilities;
- Coordinates revisions of this HASP with field personnel; and
- Assists in the investigation of major accidents.

3.4 Site Personnel

- Report any unsafe or potentially hazardous conditions to the FTL/SHSO;
- Maintain knowledge of the information, instructions and emergency response actions contained in this HASP; and
- Comply with rules, regulations and procedures as set forth in this HASP and any revisions.

4.0 SITE HISTORY AND PROJECT DESCRIPTION

4.1 Project Background

This HASP has been prepared by PWGC, on behalf of RXR–Glen Isle Partners, LLC (RXRGI) for the removal of hot spots identified on the Site. Metals have been identified above Site Specific Removal Criteria (SSRC) and grossly contaminated media was identified in soil at the Site.

4.2 Site Location and Description

The Site is located along Garvies Point Roads in Glen Cove, New York. Redevelopment associated with the Garvies Point Waterfront Revitalization Project (GPWRP) will include restricted-residential, commercial and retail space, as well as open space and public amenities.

5.0 POTENTIAL HAZARDS OF THE SITE

This section presents an assessment of the chemical, radioactivity, biological, and physical hazards that may be encountered during the tasks specified under Section 1.0. Additional information can be found in **Appendix A** - Material Safety Data Sheets or in **Appendix B** - Activity Hazard Analyses.

5.1 Chemical Hazards

Review of historical information and investigations from the Site indicates that the soil at the Site are contaminated with volatile organic compounds, semi-volatile organic compounds, and metals which are present at ppm levels in soil. These compounds may present an occupational exposure hazard during Site operations.

The chemicals identified above may have an effect on the central nervous system, respiratory system and may cause chronic liver and kidney damage. Acute exposure symptoms may include headache, dizziness, nausea, diarrhea and skin and eye irritation. Specific information on the chemicals identified at the Site can be found in Table 5-1 as well as on the Material Safety Data Sheets found in **Appendix A**.

Radiation may be also present on the Site. Radiation may have an adverse effect on tissue cells and is considered a carcinogen. The primary routes of exposure are absorption, inhalation and ingestion. Acute exposure may include skin irritation, vomiting, nausea, headache, diarrhea and fevers.

Table 5-1

Chemical Hazards

COMPOUND	CAS#	OSHA PEL	ROUTES OF EXPOSURE	SYMPTOMS OF EXPOSURE	TARGET ORGANS	PHYSICAL DATA
Arsenic	7440-38-2	TWA 0.5 mg/m^3	Inhalation Ingestion Skin/Eye	Irritation skin, possible dermatitis, respiratory distress, diarrhea, kidney damage, muscle tremor, convulsions, possible gastrointestinal tract, reproductive effects, possible liver damage.	Skin, respiratory system, kidneys, central nervous system, liver, gastrointestinal tract, reproductive system	VP= unavailable Appearance and odor vary depending upon the specific organic arsenic
Barium	7440-39-3	TWA 0.5 mg/m^3	Ingestion	Cough, sore throat, kin redness, eye redness, eye pain.	Skin, eyes, respiratory tract	Yellowish to white lustrous solid in various forms
Benzo(a) anthracene	56-55-3	None	Inhalation Ingestion Skin/Eye	None	None	Flakes or Powder
Benzo(a) Pyrene	50-32-8	None	Inhalation Ingestion Skin/Eye	None	None	Crystals
Benzo(b) Fluoranthene	205-99-2	None	Inhalation Ingestion Skin/Eye	None	None	Crystals
Benzo(k)fluoranthene	207-08-9	None	Inhalation Skin	None	None	Yellow Crystals
Cadmium	7440-43-9	TWA 0.002 mg/m^3	Inhalation Ingestion	Cough, sore throat, redness, pain, abdominal pain, diarrhea, headache, nausea, vomiting	Kidneys	Soft Blue-White Metal Lumps or Grey powder
Chrysene	218-01-9	None	Inhalation Ingestion Skin/Eye	None	None	Crystals

COMPOUND	CAS#	OSHA PEL	ROUTES OF EXPOSURE	SYMPTOMS OF EXPOSURE	TARGET ORGANS	PHYSICAL DATA
Copper	7440-50-8	TWA 0.2 mg/m^3	Inhalation Ingestion	Cough, headache, shortness of breath, sore throat, redness, pain, abdominal pain, nausea, vomiting	None	Red powder
Dibenzo(a,h)anthracene	53-70-3	None	Inhalation Ingestion Skin	Redness, swelling, itching	None	Colorless crystalline powder
Dieldrin	60-57-1	TWA 0.25 mg/m^3	Inhalation Ingestion Skin/Eye	Convulsions, dizziness, headache, nausea, vomiting, muscle twitching may result from ingestion.	CNS, liver, kidneys, skin	VP= 0.0004 mm Hg Colorless to tan crystal; mild odor
Ideno(1,2,3-cd)pyrene	193-39-5	None	Inhalation Ingestion Skin/Eye	None	None	Yellow Crystals
Lead	7439-92-1	TWA 0.5 mg/m^3	Inhalation Ingestion Skin/Eye	Lassitude, insomnia, facial pallor, anorexia, weight loss, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, paralysis wrist, ankles, encephalopathy, kidney disease, irritation eyes, hypertension	Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue	VP= 0.00000 mmHg Heavy, ductile, soft, gray solid
Mercury	7439-97-6	TWA 0.025 mg/m^3	Inhalation Ingestion Skin/Eye	Abdominal pain, cough, diarrhea, shortness of breath, vomiting, fever	Central nervous system, kidneys	Silvery liquid metal
Nickel	7440-02-0		Inhalation	May cause mechanical irritation, Inhalation of fumes may cause pneumonitis.	Skin, Lungs.	Silvery metallic solid in various forms.
Toluene	108-88-3	TWA 100 ppm	Inhalation, skin absorption, ingestion, skin/eye	Irritation eyes, nose, lassitude, confusion, euphoria, dizziness, headache, dilated pupils, lacrimation, anxiety, muscle fatigue, insomnia, paresthesia, dermatitis, liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	VP= 21 mmHg Colorless liquid with a sweet, pungent, benzene-like odor

COMPOUND	CAS#	OSHA PEL	ROUTES OF EXPOSURE	SYMPTOMS OF EXPOSURE	TARGET ORGANS	PHYSICAL DATA
Xylenes	95-47-6	TWA 100 ppm	Inhalation, skin absorption, ingestion, skin/eye	Irritation eyes, skin, nose, throat, dizziness, excitement, drowsiness, incoordination, staggering gait, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain, dermatitis	Eyes, skin, respiratory system, central nervous system, liver, kidneys, blood, gastrointestinal	VP= 7mmHg Colorless liquid with an aromatic odor

Abbreviations

C = Ceiling limit, not to be exceeded
CNS = Central Nervous System
PEL=Permissible Exposure Limit

OSHA = Occupational Safety and Health Administration
ppm = parts per million
VP = vapor pressure at approximately 68 F in mm Hg (mercury)

TWA = Time-weighted average (8 hours)

5.2 Biological Hazards

Work will be performed in a developed area of Glen Cove, during the course of the project, there is potential for workers to come into contact with biological hazards such as animals, insects and plants. The Activity Hazard Analyses found in **Appendix B** includes specific hazards and control measures for each task, if applicable.

5.2.1 *Animals*

The Site is located in a predominantly developed with commercial businesses and residential housing. It is possible that birds, raccoon, foxes, possum, dogs, cats, rats and mice may be present. Workers shall use discretion and avoid all contact with animals.

5.2.2 *Insects*

Insects, such as mosquitoes, ticks, bees and wasps may be present during certain times of the year. Workers will be encouraged to wear repellents and PPE, if deemed necessary, when working in areas where insects are expected to be present.

During the months of April through October, particular caution must be exercised to minimize exposure to deer ticks and the potential for contracting Lyme disease. Specific precautionary work practices that are recommended include the following:

- Cover your body as much as possible. Wear long pants and long sleeved shirts. Light color clothing makes spotting of ticks easier.
- Try to eliminate possible paths by which the Deer Tick may reach unprotected skin. For example, tuck bottoms of pants into socks or boots and sleeves into gloves. (Duct tape may be utilized to help seal cuffs and ankles). If heavy concentrations of ticks or insects are anticipated or encountered, Tyvek coveralls may be utilized for added protection when the potential for heat stress is not a concern.
- Conduct periodic and frequent, (e.g., hourly), surveys of your clothing for the presence of ticks. Remove any tick, save it and report to the clinic with the tick.
- Use insect /tick repellents that contain the chemical DEET (n,n-Diethyltoluamide). Apply repellents in accordance with manufacturers' recommendations. These repellents are readily available and include such brands as Deep Woods OFF and Maximum Strength OFF.

5.2.3 *Plants*

Poison ivy, sumac and oak may be present on Site. The FTL/SHSO should identify the susceptible individuals. Worker shall avoid all contact with these plants.

5.3 Physical Hazards

Most safety hazards are discussed in the Activity Hazard Analyses (AHA) in **Appendix B** for the different phases of the project. In addition to the AHAs, general work rules and other safety procedures are described in Section 10 of this HASP.

5.3.1 *Temperature Extremes*

Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke.

Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, and poor judgment.

PWGC's Heat/Cold Stress Protocols are specified in **Appendix C**.

5.3.2 *Steam, Heat and Splashing*

Exposure to steam/heat/splashing hazards can occur during steam cleaning activities. Splashing can also occur during well development and sampling activities. Exposure to steam/heat/splashing can result in scalding/burns, eye injury, and puncture wounds.

5.3.3 *Noise*

Noise is a potential hazard associated with the operation of heavy equipment, drill rigs, pumps and engines. Workers will wear hearing protection while in the work zone when these types of machinery are operating.

5.3.4 *Fire and Explosion*

When conducting excavation or drilling activities, the opportunity of encountering fire and explosion hazards may exist from encountering underground utilities, from the use of diesel engine equipment, and other potential ignition sources. During dry periods there is an increased chance of forest and brush fires starting at the job Site. If these conditions occur no smoking will be permitted at the site and all operations involving potential ignition sources will be monitored continuously (fire watch).

5.3.5 *Manual Lifting/Material Handling*

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

5.3.6 *Slips, Trips and Falls*

Working in and around the Site will pose slip, trip and fall hazards due to slippery surfaces that may be oil covered, or from rough terrain, surfaces that are steep inclines, surfaced debris, or surfaces which are wet from rain or ice. Falls may result in twisted ankles, broken bones, head trauma or back injuries.

5.3.7 *Heavy Equipment Operation*

An excavator/backhoe will be used to excavate where required. Working with or near heavy equipment poses many potential hazards, including electrocution, fire/explosion, being struck by or against, or pinched/caught/crushed by, and can result in serious physical harm.

5.3.8 *Electrocution*

Encountering underground utilities may pose electrical hazards to workers. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death.

6.0 ACTIVITY HAZARD ANALYSES

The Activity Hazard Analysis (AHA) is a systematic way of identifying the potential health and safety hazards associated with major phases of work on the project and the methods to avoid, control and mitigate those hazards. The AHAs will be used to train work crews in proper safety procedures during phase preparatory meetings.

AHAs have been developed by PWGC for the following phases of work:

1. Site Mobilization/Demobilization;
2. Excavation; and
3. Decontamination

Copies of these AHAs are included in **Appendix B** of this HASP.

7.0 PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment (PPE) specified in **Table 7-1** represents the hazard analysis and PPE selection required by 29 CFR 1910.132. Specific information on known potential hazards can be found under Section 4.0 and **Appendix B** - Activity Hazard Analyses. For the purposes of PPE selection, the HSM and FTL/SHSO are considered competent persons. The signatures on the approval page of the HASP constitute certification of the hazard assessment. For activities not covered by **Table 7-1**, the FTL/SHSO will conduct the hazard assessment, select the PPE, and document changes in the appropriate field logs. PPE selection will be made in consultation with the HSM.

Modifications for initial PPE selection may also be made by the FTL/SHSO in consultation with the HSM and changes documented accordingly. If major modifications occur, the HSM will notify the PM.

7.1 PPE Abbreviations

HEAD PROTECTION

HH = Hard Hat

HEARING PROTECTION

EP = ear plugs

EM = ear muffs

HAND PROTECTION

Cot = cotton

But = Butyl

LWG = Leather Work Gloves

Neo = Neoprene

Nit = Nitrile

Sur = Surgical

EYE/FACE PROTECTION

APR = Full Face Air Purifying Respirator

MFS = Mesh Face shield

PFS =Plastic Face shield

SG = ANSI approved safety glasses with side shields

BODY PROTECTION

WC = work clothes

Cot Cov = Cotton Coveralls

Poly = Polyethylene coated Tyvek® coveralls

Saran = Saranex coated coveralls

Tyvek® = Uncoated Tyvek® coveralls

FOOT PROTECTION

Neo = Neoprene

OB = Overboot

Poly = polyethylene coated boot

Rub = rubber slush boots

STB = Leather work boots with steel toe

RESPIRATORY PROTECTION

APR = Full-face air purifying respirator with organic vapor cartridges

ASR = Full face air supplied respirator with escape bottle

SCBA = Self-contained breathing apparatus

7.2 Hazard Assessment for Selection of Personal Protective Equipment

The initial selection of personal protective equipment for each task was done by performing a hazard assessment taking into consideration the following:

- Potential chemical and physical present;
- Work operations to be performed;
- Potential routes of exposure;
- Concentrations of contaminants present; and
- Characteristics, capabilities and limitations of PPE and any hazard that the PPE presents or magnifies.

A review of the analytical data from previous sampling events indicates that metals identified in **Table 5-1** are the primary contaminants of concern. The maximum concentration detected for contaminates of concern in soil are as follows:

- Arsenic 1,850 ppm
- Lead 6,030 ppm
- Mercury 6.2 ppm

The exposure routes for these chemicals are inhalation, skin absorption, skin/eye contact and ingestion. Chemical protective gloves will be required for all activities that involve sample handling and the likelihood for skin contact. The proper use of PPE and strict adherence to decontamination and personal hygiene procedures will effectively minimize skin contact and ingestion as potential routes of exposure.

Table 7-1

Personal Protective Equipment Selection

TASK	HEAD	EYE/FACE	FEET	HANDS	BODY	HEARING	RESPIRATOR
Mobilization/ Demobilization	HH	SG	STB	WG	WC	None	None
Excavation, loading and backfilling	HH	SG	STB	WG	WC	EM or EP	None initially APR if action levels exceeded
Decontamination	HH	SG	STB	Nit + Sur	WC, Tyvek® as needed	None	None initially APR if action levels exceeded

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7.3 Respirator Cartridge Change-Out Schedule

A respirator cartridge change-out schedule has been developed in order to comply with 29 CFR 1910.134. If the use of respirators is necessary, the respirator cartridge change-out schedule for this project will be as follows:

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

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

The schedule was developed based on the following scientific information and assumptions:

- Analytical data that is available regarding site contaminants;
- Using the Rule of Thumb provided by the AIHA;
- All of the chemicals have boiling points greater than 70°C;
- Total airborne concentration of contaminants is anticipated to be less than 200 ppm;
- The humidity is expected to be less than 85%; and
- Desorption of the contaminants (including those with poor warning properties) after partial use of the chemical cartridge can occur after a short period (hours) without use (eg, overnight) and result in a non-use exposure.

The following is a partial list of factors that may affect the usable cartridge service life and/or the degree of respiratory protection attainable under actual workplace conditions. These factors have been considered when developing the cartridge change-out schedule.

Type of contaminant(s);

- Contaminant concentration;
- Relative humidity;
- Breathing rate; Temperature; Changes in contaminant concentration, humidity, breathing rate and temperature;
- Mixtures of contaminants;
- Accuracy in the determination of the conditions;

- The contaminant concentration in the workplace can vary greatly. Consideration must be given to the quality of the estimate of the workplace concentration;
- Storage conditions between multiple uses of the same respirator cartridges. It is recommended that the chemical cartridges be replaced after each work shift. Contaminants adsorbed on a cartridge can migrate through the carbon bed without airflow;
- Age of the cartridge;
- Condition of the cartridge and respirator;
- Respirator and cartridge selection respirator fit;
- Respirator assembly, operation, and maintenance;
- User training, experience and medical fitness;
- Warning properties of the contaminant; and
- The quality of the warning properties should be considered when establishing the chemical cartridge change schedule. Good warning properties may provide a secondary or back-up indication for cartridge change-out.

8.0 AIR MONITORING

Air monitoring will be performed for protection for on-Site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-Site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities at the Site. Air monitoring will be used to help to confirm that the remedial work will not spread contamination off-site through the air. The primary concerns for this Site are dust particulates and VOCs. Monitoring with a photo-ionization detector (PID) will be performed during any invasive activities to help confirm that VOCs are not spread off-site.

Real-time monitoring for dust and VOCs will be conducted both within the work area, and along the Site perimeter, during intrusive activities such as excavation and sampling activities.

9.0 ZONES, PROTECTION AND COMMUNICATION

9.1 Site Control

Site zones are intended to control the potential spread of contamination throughout the Site and to assure that only authorized individuals are permitted into potentially hazardous areas. A three-zone approach will be utilized. It shall include an Exclusion Zone (EZ), Contamination Reduction Zone (CRZ) and a Support Zone (SZ). Specific zones shall be established on the work Site when operations begin.

This project is a hazardous waste remediation project, and any person working in an area where the potential for exposure to Site contaminants exists, will only be allowed access after providing the FTL/SHSO with proper training and medical documentation.

The zones are based upon current knowledge of proposed Site activities. It is possible that the zone configurations may be altered due to work plan revisions. Should this occur, the work zone will be adjusted accordingly, and documented through use of a field-change request form.

The following shall be used for guidance in revising these preliminary zone designations, if necessary.

Support Zone - The SZ is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Appropriate safety equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.

Contamination Reduction Zone - The CRZ is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides for an area for decontamination of personnel and portable hand-held equipment, tools and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for EZ entry and egress in addition to access for heavy equipment and emergency support services.

Exclusion Zone - All activities, which may involve exposure to site contaminants, hazardous materials and/or conditions, should be considered an EZ. The FTL/SHSO may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be determined by the Site HSO allowing adequate space for the activity to be completed, field members and emergency equipment.

9.2 Contamination Control

Decontamination areas will be established for the following activities.

- Sampling Activities
- Excavation

9.2.1 *Personnel Decontamination Station*

All personnel and portable equipment used in the EZ shall be subject to a thorough decontamination process, as deemed necessary by the FTL/SHSO. Sampling equipment shall be decontaminated. As necessary, all boots and gloves will be decontaminated using soap and water solution and scrub brushes or simple removal and disposal. All used respiratory protective equipment will be decontaminated daily and sanitized with appropriate sanitizer solution.

All drums generated as a result of sampling and decontamination activities will be marked and stored at a designated area at the site until the materials can be property disposed of off-site.

All non-expendable sampling equipment will be decontaminated. This usually entails the use of Alconox, solvent and distilled/deionized water rinses to eliminate contaminants.

9.3 Communication

- Each team member will have a Nextel cell phone/radio for communication with the PM, HSO and other team members during field activities.
- Hand Signals - Hand signals shall be used by field teams, along with the buddy system. The entire field team shall know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

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

10.0 MEDICAL SURVEILLANCE PROCEDURES

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

10.1 Medical Surveillance Requirements

A physician's medical release for work will be confirmed by the HSM before an employee can work in the exclusion zone. The examination will be taken annually at a minimum and upon termination of hazardous waste Site work if the last examination was not taken within the previous six months. Additional medical testing may be required by the HSM in consultation with the Corporate Medical Consultant and the FTL/SHSO if an over-exposure or accident occurs, if an employee exhibits symptoms of exposure, or if other Site conditions warrant further medical surveillance.

10.2 Medical Data Sheet

A medical data sheet is provided in **Appendix D**. This medical data sheet is voluntary and should be completed by all on-Site personnel and will be maintained at the Site. Where possible, this medical data sheet will accompany the personnel needing medical assistance. The medical data sheet will be maintained in a secure location, treated as confidential, and used only on a need-to-know basis.

11.0 SAFETY CONSIDERATIONS

11.1 General Health and Safety Work Practices

A list of general health and safety work practices is included as an included in **Appendix E**. The work rules will be posted in a conspicuous location at the site.

11.2 The Buddy System

At a minimum, employees shall work in groups of two in such a manner that they can observe each other and maintain line-of-sight for each employee within the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

11.3 Sample Handling

Personnel responsible for the handling of samples should wear the prescribed level of protection. Samples should be identified as to their hazard and packaged as to prevent spillage or breakage. Sample containers shall be decontaminated in the CRZ or EZ before entering a clean Support Zone area. Any unusual sample conditions, odors, or real-time readings should be noted. Laboratory personnel should be advised of sample hazard level and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling, in order to assure that the practices are appropriate for the suspected contaminants in the sample.

11.4 Excavation

Although extensive excavation is not anticipated for the scope of this project, excavations will be conducted in accordance with the requirements contained in 29 CFR 1926, Subpart P-Excavations. It provides for the designation of a "Competent Person" and general requirements for safe excavating practices. The program also incorporates company standards for the monitoring of potentially hazardous atmospheres; protection from water hazards; analyzing and maintaining the stability of adjacent structures; daily competent person inspections; soil classification; sloping and benching; protective systems; and training.

The Competent Person will be the FTL or other designee with appropriate training and experience. The Competent Person will be assisted in his/her duties by other technical personnel such as the HSM, geologists, structural engineers and soils engineers.

No entry into excavations will be allowed for this phase of the project.

12.0 DISPOSAL PROCEDURES

All discarded materials, waste materials or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard or causing litter to be left on site.

All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials will be collected and bagged for appropriate disposal as non-hazardous solid waste. Additional waste disposal procedures may be developed as applicable.

13.0 EMERGENCY RESPONSE PLAN

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

13.1 Responsibilities

13.1.1 *Health and Safety Manager (HSM)*

The HSM oversees and approves the Emergency Response/Contingency Plan and performs audits to determine that the plan is in effect and that all pre-emergency requirements are met. The HSM acts as a liaison to applicable regulatory agencies and notifies OSHA of reportable accidents.

13.1.2 *Field Team Leader/Site Health and Safety Officer (FOL/HSO)*

The FTL/SHSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The FTL/SHSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can ensure that OSHA is notified within the required time frame. The HSM will be notified of all OSHA recordable injuries, fires, spills, releases or equipment damage in excess of $500 within 24 hours.

13.1.3 *Emergency Coordinator*

The Emergency Coordinator for the project is the FTL/SHSO.

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

The Emergency Coordinator will implement the Emergency Response/Contingency Plan whenever conditions at the site warrant such action.

13.1.4 *Site Personnel*

Site personnel are responsible for knowing the Emergency Response/Contingency Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a Site emergency.

13.2 Communication

A variety of communication systems may be utilized during emergency situations. These are discussed in the following sections.

13.2.1 *Hand Signals*

Downrange field teams will employ hand signals where necessary for communication during emergency situations. Hand signals are found in Section 8.3.

13.2.2 *Field Radios and Cell Phones*

PWGC field personnel are provided cellular phones with telephone and two-way radio capabilities for Site communication and emergency use.

13.3 Local Emergency Support Units

A route map from the Site to the nearest hospital can be found in **Appendix F**. This map will be placed with the above emergency telephone numbers in all on-Site vehicles.

13.4 Pre-Emergency Planning

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

Before the field activities begin, the local emergency response personnel will be notified of the schedule for field activities and about the materials that are thought to exist on the Site so that they will be able to respond quickly and effectively in the event of a fire, explosion, or other emergency. Before fieldwork on the Site commences, each person who will be working there or observing the operations will complete a medical data sheet (**Appendix D**). These data sheets will be filled out during Site-specific training and will be kept on the Site.

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

Table 13-1

Emergency Telephone Numbers

Nearest Hospital:

North Shore University Hospital at Glen Cove
101 St. Andrews Lane
Glen Cove, NY 11542
(516) 674-7300

Contact	Firm or Agency	Telephone Number
Police		911
Fire		911
Ambulance		911
Project Manager/Health and Safety Manager	Derek Ersbak PWGC	(631) 589-6353
Health & Safety Officer	Amanda Racaniello PWGC	(631) 589-6353
NYSDEC Site Contact	Heidi-Marie Dudek	(518) 402-9813
USEPA Site Contact	Lorenzo Thantu	(212)-637-3966
New York Poison Control		(800)222-1222
Center for Disease Control		(800)311-3435

13.5 Emergency Medical Treatment

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

- First Aid Kit: Support Zone (or designated by FTL/SHSO upon arrival)
- Emergency Eye Wash: Support Zone (or designated by FTL/SHSO upon arrival)

During Site-specific training, project personnel will be informed of the location of the first aid station(s) that has been set up. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate

treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

There will be at least two people with current First Aid and CPR certification on each active work shift. When personnel are transported to the hospital, the FTL/SHSO will provide a copy of the Medical Data Sheet to the paramedics and treating physician.

Only in non-emergency situations will an injured person be transported to the hospital by means other than an ambulance. **A map and directions to the hospital can be found in Appendix F.**

13.6 Emergency Site Evacuation Routes and Procedures

In order to mobilize the manpower resources and equipment necessary to cope with a fire or other emergency, a clear chain of authority will be established. The EC will take charge of all emergency response activities and dictate the procedures that will be followed for the duration of the emergency. The EC will report immediately to the scene of the emergency, assess the seriousness of the situation, and direct whatever efforts are necessary until the emergency response units arrive. At his/her discretion, the EC also may order the closure of the site for an indefinite period.

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, an air horn will be sounded on the site. The horn will sound continuously for one blast, signaling that immediate evacuation of all personnel is necessary due to an immediate or impending danger. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the evacuation meeting point, which will be determined upon arrival at the site by the FTL/SHSO, prior to work beginning. This will then be conveyed to all crew members during the site-specific briefing.

The EC will give directions for implementing whatever actions are necessary. Any project team member may be assigned to be in charge of emergency communications during an emergency. He/she will attend the Site telephone specified by the EC from the time the alarm sounds until the emergency has ended.

After sounding the alarm and initiating emergency response procedures, the EC will check and verify that access roads are not obstructed. If traffic control is necessary, as in the event of a fire or explosion, a project team

member, who has been trained in these procedures and designated at the site safety meeting, will take over these duties until local police and fire fighters arrive.

The EC will remain at the site to provide any assistance requested by emergency-response squads as they arrive to deal with the situation. A map showing evacuation routes, meeting places and the location of emergency equipment will be posted in all trailers and used during site-specific training.

13.7 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site (air horn will sound for a single continuous blast), and notification of local fire and police departments. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

13.7.1 *Fire Prevention*

Adhering to the following precautions will prevent fires:

- Good housekeeping and storage of materials;
- Storage of flammable liquids and gases away from oxidizers;
- No smoking in the exclusion zone or any work area;
- No hot work without a properly executed hot work permit;
- Shutting off engines to refuel;
- Grounding and bonding metal containers during transfer of flammable liquids;
- Use of UL approved flammable storage cans;
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities; and
- Monthly inspections of all fire extinguishers.

13.8 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet or recommended by the Corporate Medical Consultant will be followed, when necessary.

SKIN AND EYE CONTACT: Use copious amounts of soap and water. Wash/rinse affected areas thoroughly, and then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination. Skin should also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs.

INHALATION: Move to fresh air. Decontaminate and transport to hospital or local medical provider.

INGESTION: Decontaminate and transport to emergency medical facility.

PUNCTURE WOUND OR LACERATION: Decontaminate and transport to emergency medical facility.

13.9 Decontamination during Medical Emergencies

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

13.10 Accident/Incident Reporting

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone:

- Health and Safety Manager;
- Project Manager; and
- The employer of any injured worker who is <u>not</u> a PWGC employee.

Written confirmation of verbal reports are to be completed by the FTL/SHSO using the Incident Report Form and submitted within 24 hours. The incident report and investigation form is found in **Appendix G**. If the employee involved is not a PWGC employee, his employer will receive a copy of the report.

13.11 Adverse Weather Conditions

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

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

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

13.12 Spill Control and Response

All small hazardous spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. Drains or drainage areas should be blocked. All spill containment materials will be properly disposed. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill. The following seven steps should be taken by the Emergency Coordinator:

- Determine the nature, identity and amounts of major spill components;
- Make sure all unnecessary persons are removed from the spill area;
- Notify appropriate response teams and authorities;
- Use proper PPE in consultation with the FTL/SHSO;
- If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosive proof equipment to contain or clean up the spill (diesel only vehicles, air operated pumps, etc.);
- If possible, try to stop the leak with appropriate material; and,
- Remove all surrounding materials that can react or compound with the spill.

13.13 Emergency Equipment

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

- Industrial first aid kit;
- Burn kit and portable eye washes (one per field team);
- Fire extinguishers (one per work area); and
- Absorbent material /spill kit.

14.0 TRAINING

14.1 General Health and Safety Training

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

14.1.1 *Three Day Supervised On the Job Training*

In addition to the required initial hazardous waste operations training, each employee shall have received three days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

14.2 Annual Eight-Hour Refresher Training

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

14.3 Site-Specific Training

Prior to commencement of field activities, all field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the site operations. It will include site and facility layout, hazards and emergency services at the site, and will highlight all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

14.4 On-Site Safety Briefings

Project personnel and visitors will be given on-site health and safety briefings daily by the FTL/SHSO to assist site personnel in safely conducting their work activities. A copy of the Daily Briefing Sign-In Sheet is contained in **Appendix H**. The briefings will include information on new operations to be conducted, changes in work practices or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. The meetings will also be an opportunity to periodically update the crews on monitoring results. Prior to starting any new

activity, a training session using the Activity Hazard Analysis will be held for crew members involved in the activity.

14.5 First Aid and CPR

The HSM will identify those individuals requiring first aid and CPR training to ensure that emergency medical treatment is available during field activities. It is anticipated that a minimum of one field person on-site at any one time will have first aid and CPR training. The training will be consistent with the requirements of the American Red Cross Association or American Heart Association. If none are available on-site, then the HSM shall be notified.

14.6 Supervisory Training

Supervisors and health and safety personnel shall have completed an additional eight hours of specialized training in accordance with 29 CFR 1910.120.

15.0 LOGS, REPORTS AND RECORDKEEPING

Changes to the HASP will be documented in the Health and Safety log book and as appropriate, the HSM and/or PM will be notified. Daily tailgate meetings will be documented in the H&S log book as well as personnel on-site.

15.1 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training and documentation of three day OJT) and medical clearance for hazardous waste site work and respirator use will be maintained on-site. Records for all subcontractor employees will also be kept on-site.

15.2 Incident Report and Investigation Form

The incident report and investigation form is to be completed for all accidents and incidents, including near misses. The form can be found in **Appendix G**.

15.3 Health and Safety Logbooks

The FTL/SHSO will maintain a logbook during site work. The daily site conditions, personnel, monitoring results and significant events will be recorded. The original logbooks will become part of the exposure records file.

16.0 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of the HASP. It is maintained on site by the FTL/SHSO as a project record. Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I will comply with the provisions contained therein.

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

Appendix A
Material Safety Data Sheets

BENZ(a)ANTHRACENE

0385
October 1995

CAS No: 56-55-3
RTECS No: CV9275000
EC No: 601-033-00-9

1,2-Benzoanthracene
Benzo(a)anthracene
2,3-Benzphenanthrene
Naphthanthracene
$C_{18}H_{12}$
Molecular mass: 228.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible.		Water spray, powder. In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		**AVOID ALL CONTACT!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety goggles, face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: complete protective clothing including self-contained breathing apparatus.	T Symbol N Symbol R: 45-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Well closed.

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SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
COLOURLESS TO YELLOW - BROWN FLUORESCENT FLAKES OR POWDER.

Physical dangers
Dust explosion possible if in powder or granular form, mixed with air.

Occupational exposure limits
TLV: A2 (suspected human carcinogen); (ACGIH 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of long-term or repeated exposure
This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Sublimation point: 435/C
Melting point: 162/C
Relative density (water = 1): 1.274

Solubility in water: none
Vapour pressure, Pa at 20/C: 292
Octanol/water partition coefficient as log Pow: 5.61

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur in seafood.

NOTES

This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Do NOT take working clothes home.
Tetraphene is a common name.
Card has been partly updated in October 2005. See sections Occupational Exposure Limits, EU classification.

ADDITIONAL INFORMATION

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BENZO(a)PYRENE

0104
October 2005

CAS No: 50-32-8
RTECS No: DJ3675000
EC No: 601-032-00-3

Benz(a)pyrene
3,4-Benzopyrene
Benzo(d,e,f)chrysene
$C_{20}H_{12}$
Molecular mass: 252.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	**See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.**	**AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	T Symbol N Symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Separated from strong oxidants.

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IMPORTANT DATA

Physical State; Appearance
PALE-YELLOW CRYSTALS

Chemical dangers
Reacts with strong oxidants causing fire and explosion hazard.

Occupational exposure limits
TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005).
MAK: Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

Effects of long-term or repeated exposure
This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 496/C
Melting point: 178.1/C
Density: 1.4 g/cm^3

Solubility in water: none (<0.1 g/100 ml)
Vapour pressure : negligible
Octanol/water partition coefficient as log Pow: 6.04

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment.

NOTES

Do NOT take working clothes home.
Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.

ADDITIONAL INFORMATION

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BENZO(b)FLUORANTHENE

0720
March 1999

CAS No: 205-99-2
RTECS No: CU1400000
EC No: 601-034-00-4

Benz(e)acephenanthrylene
2,3-Benzofluoroanthene
Benzo(e)fluoranthene
3,4-Benzofluoranthene
$C_{20}H_{12}$
Molecular mass: 252.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		**AVOID ALL CONTACT!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	T Symbol N Symbol R: 45-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Provision to contain effluent from fire extinguishing. Well closed.

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SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
COLOURLESS CRYSTALS

Chemical dangers
Upon heating, toxic fumes are formed.

Occupational exposure limits
TLV: A2 (suspected human carcinogen); (ACGIH 2004).
MAK: Carcinogen category: 2; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of long-term or repeated exposure
This substance is possibly carcinogenic to humans. May cause genetic damage in humans.

PHYSICAL PROPERTIES

Boiling point: 481/C
Melting point: 168/C

Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.12

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to air quality and water quality.

NOTES

Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

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BENZO(k)FLUORANTHENE

0721
March 1999

CAS No: 207-08-9
RTECS No: DF6350000
EC No: 601-036-00-5

Dibenzo(b,jk)fluorene
8,9-Benzofluoranthene
11,12-Benzofluoranthene
$C_{20}H_{12}$
Molecular mass: 252.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		**AVOID ALL CONTACT!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety spectacles or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	T Symbol N Symbol R: 45-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Provision to contain effluent from fire extinguishing. Well closed.

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SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
YELLOW CRYSTALS

Chemical dangers
Upon heating, toxic fumes are formed.

Occupational exposure limits
TLV not established.
MAK: Carcinogen category: 2; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of long-term or repeated exposure
This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 480/C
Melting point: 217/C

Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.84

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in crustacea and in fish.

NOTES

Benzo(k)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing benzo(k)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

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Safety (MSDS) data for chrysene

General

Synonyms: 1,2-benzophenanthrene, benzo(a)phenanthrene, 1,2-benzphenanthrene, coal tar pitch, benz(a)phenanthrene, 1,2,5,6-dibenzonaphthalene
Molecular formula: $C_{18}H_{12}$
CAS No: 218-01-9
EC No: 205-923-4

Physical data

Appearance: crystalline powder
Melting point: 253 C
Boiling point: 448 C
Vapour density:
Vapour pressure:
Density (g cm^{-3}): 1.27
Flash point:
Explosion limits:
Autoignition temperature:
Water solubility: insoluble

Stability

Stable. Combustible. Incompatible with strong oxidizing agents.

Toxicology

Toxic. Confirmed animal carcinogen, possible human carcinogen. Harmful if

swallowed, inhaled or absorbed through the skin.

Toxicity data
(The meaning of any abbreviations which appear in this section is given here.)
IPR-MUS LD50 >320 mg kg^{-1}

Risk phrases
(The meaning of any risk phrases which appear in this section is given here.)
R20 R21 R22 R45 R46.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)
UN No 2811. Packing group I. Hazard class 6.1. CDG UK Transport category 1. EMS No 6.1-04.

Personal protection

Safety glasses, good ventilation, gloves. Handle as a carcinogen. A COSHH assessment is required.

Safety phrases
(The meaning of any safety phrases which appear in this section is given here.)
S3 S7 S9 S36 S37 S39 S45.

[Return to Physical & Theoretical Chemistry Lab. Safety home page.]

This information was last updated on April 1, 2005. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

DIBENZO(a,h)ANTHRACENE

0431
October 1995

CAS No: 53-70-3
RTECS No: HN2625000
EC No: 601-041-00-2

1,2:5,6-Dibenzanthracene
$C_{22}H_{14}$
Molecular mass: 278.4

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		**AVOID ALL CONTACT!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin	Redness. Swelling. Itching.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.	T Symbol N Symbol R: 45-50/53 S: 53-45-60-61

EMERGENCY RESPONSE	SAFE STORAGE
	Well closed.

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IMPORTANT DATA

Physical State; Appearance
COLOURLESS CRYSTALLINE POWDER.

Occupational exposure limits
TLV not established.

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of long-term or repeated exposure
The substance may have effects on the skin, resulting in photosensitization. This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 524/C
Melting point: 267/C
Relative density (water = 1): 1.28

Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.5

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur in seafood.

NOTES

This is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Do NOT take working clothes home.
DBA is a commonly used name.
This substance is one of many polycyclic aromatic hydrocarbons (PAH).
Card has been partly updated in October 2005. See section EU classification.

ADDITIONAL INFORMATION

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INDENO(1,2,3-cd)PYRENE

0730
March 1999

CAS No: 193-39-5
RTECS No: NK9300000

o-Phenylenepyrene
2,3-Phenylenepyrene
$C_{22}H_{12}$
Molecular mass: 276.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		**AVOID ALL CONTACT!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	

EMERGENCY RESPONSE	SAFE STORAGE
	Provision to contain effluent from fire extinguishing. Well closed.

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IMPORTANT DATA

Physical State; Appearance
YELLOW CRYSTALS

Chemical dangers
Upon heating, toxic fumes are formed.

Occupational exposure limits
TLV not established.
MAK: Carcinogen category: 2; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of long-term or repeated exposure
This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 536/C
Melting point: 164/C

Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.58

ENVIRONMENTAL DATA

This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in fish.

NOTES

Indeno(1,2,3-cd)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing Indeno(1,2,3-c,d)pyrene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

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ARSENIC

0013
October 1999

CAS No: 7440-38-2
RTECS No: CG0525000
UN No: 1558
EC No: 033-001-00-X

Grey arsenic
As
Atomic mass: 74.9

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames. NO contact with strong oxidizers. NO contact with hot surfaces.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Risk of fire and explosion is slight when exposed to hot surfaces or flames in the form of fine powder or dust.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		**PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!**	**IN ALL CASES CONSULT A DOCTOR!**
Inhalation	Cough. Sore throat. Shortness of breath. Weakness. See Ingestion.	Closed system and ventilation.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
Skin	Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
Eyes	Redness.	Face shield or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Abdominal pain. Diarrhoea. Nausea. Vomiting. Burning sensation in the throat and chest. Shock or collapse. Unconsciousness.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING	
Evacuate danger area! Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment.	T Symbol N Symbol R: 23/25-50/53 S: (1/2-)20/21-28-45-60-61 UN Hazard Class: 6.1 UN Pack Group: II	Do not transport with food and feedstuffs. Marine pollutant.

EMERGENCY RESPONSE	SAFE STORAGE
Transport Emergency Card: TEC (R)-61GT5-II	Separated from strong oxidants, acids, halogens, food and feedstuffs. Well closed.

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SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
ODOURLESS, BRITTLE, GREY, METALLIC-LOOKING CRYSTALS.

Chemical dangers
Upon heating, toxic fumes are formed. Reacts violently with strong oxidants and halogens, causing fire and explosion hazard. Reacts with acids to produce toxic arsine gas (see: ICSC 0222).

Occupational exposure limits
TLV: 0.01 mg/m^3 as TWA; A1 (confirmed human carcinogen); BEI issued; (ACGIH 2004).
MAK: Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly, when dispersed.

Effects of short-term exposure
The substance is irritating to the eyes, the skin and the respiratory tract. The substance may cause effects on the gastrointestinal tract, cardiovascular system, central nervous system and kidneys, resulting in severe gastroenteritis, loss of fluid, and electrolytes, cardiac disorders, shock, convulsions and kidney impairment. Exposure above the OEL may result in death. The effects may be delayed. Medical observation is indicated.

Effects of long-term or repeated exposure
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the mucous membranes, skin, peripheral nervous system, liver and bone marrow, resulting in pigmentation disorders, hyperkeratosis, perforation of nasal septum, neuropathy, liver impairment, anaemia. This substance is carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Sublimation point: 613/C
Density: 5.7 g/cm^3

Solubility in water: none

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms. It is strongly advised that this substance does not enter the environment.

NOTES

The substance is combustible but no flash point is available in literature.
Depending on the degree of exposure, periodic medical examination is suggested.
Do NOT take working clothes home.
Refer also to cards for specific arsenic compounds, e.g., Arsenic pentoxide (ICSC 0377), Arsenic trichloride (ICSC 0221), Arsenic trioxide (ICSC 0378), Arsine (ICSC 0222).
Card has been partly updated in October 2004. See sections Occupational Exposure Limits, EU classification, Emergency Response.
Card has been partly updated in October 2005 in section Effects of long-term or repeated exposure.

ADDITIONAL INFORMATION

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BARIUM

1052
October 1999

CAS No: 7440-39-3
RTECS No: CQ8370000
UN No: 1400

Ba
Atomic mass: 137.3

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Flammable. Many reactions may cause fire or explosion.	NO open flames, NO sparks, and NO smoking. NO contact with water.	Special powder, dry sand, NO hydrous agents, NO water.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	

EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
Inhalation	Cough. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
Eyes	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus. Do NOT wash away into sewer.	UN Hazard Class: 4.3 UN Pack Group: II

EMERGENCY RESPONSE	STORAGE
Transport Emergency Card: TEC (R)-43G12	Separated from halogenated solvents, strong oxidants, acids. Dry. Keep under inert gas, oil or oxygen-free liquid.

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IMPORTANT DATA

Physical State; Appearance
YELLOWISH TO WHITE LUSTROUS SOLID IN VARIOUS FORMS.

Physical dangers
Dust explosion possible if in powder or granular form, mixed with air.

Chemical dangers
The substance may spontaneously ignite on contact with air (if in powder form). The substance is a strong reducing agent and reacts violently with oxidants and acids. Reacts violently with halogenated solvents. Reacts with water, forming flammable/explosive gas (hydrogen - see ICSC 0001), causing fire and explosion hazard.

Occupational exposure limits
TLV: 0.5 mg/m^3 (as TWA) (ACGIH 1999).

Routes of exposure
The substance can be absorbed into the body by ingestion.

Effects of short-term exposure
The substance irritates the eyes, the skin and the respiratory tract.

PHYSICAL PROPERTIES

Boiling point: 1640°C
Melting point: 725°C
Density: 3.6 g/cm^3
Solubility in water: reaction

ENVIRONMENTAL DATA

NOTES

Reacts violently with fire extinguishing agents such as water, bicarbonate, powder, foam, and carbon dioxide.
Rinse contaminated clothes (fire hazard) with plenty of water.

ADDITIONAL INFORMATION

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CADMIUM

0020
April 2005

CAS No: 7440-43-9
RTECS No: EU9800000
UN No: 2570
EC No: 048-002-00-0

Cd
Atomic mass: 112.4

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Flammable in powder form and spontaneously combustible in pyrophoric form. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with heat or acid(s).	Dry sand. Special powder. NO other agents.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	

EXPOSURE		**PREVENT DISPERSION OF DUST! AVOID ALL CONTACT!**	**IN ALL CASES CONSULT A DOCTOR!**
Inhalation	Cough. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Abdominal pain. Diarrhoea. Headache. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	**PACKAGING & LABELLING**	
Evacuate danger area! Personal protection: chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place.	T+ Symbol N Symbol R: 45-26-48/23/25-62-63-68-50/53 S: 53-45-60-61 Note: E UN Hazard Class: 6.1	Airtight. Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs.

EMERGENCY RESPONSE	**SAFE STORAGE**
	Fireproof. Dry. Keep under inert gas. Separated from igntion sources, oxidants acids, food and feedstuffs.

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IMPORTANT DATA

Physical State; Appearance
SOFT BLUE-WHITE METAL LUMPS OR GREY POWDER. MALLEABLE. TURNS BRITTLE ON EXPOSURE TO 80/C AND TARNISHES ON EXPOSURE TO MOIST AIR.

Physical dangers
Dust explosion possible if in powder or granular form, mixed with air.

Chemical dangers
Reacts with acids forming flammable/explosive gas (hydrogen - see ICSC0001). Dust reacts with oxidants, hydrogen azide, zinc, selenium or tellurium, causing fire and explosion hazard.

Occupational exposure limits
TLV: (Total dust) 0.01 mg/m^3; (Respirable fraction) 0.002 mg/m^3; as TWA; A2 (suspected human carcinogen); BEI issued; (ACGIH 2005).
MAK: skin absorption (H); Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

Inhalation risk
A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

Effects of short-term exposure
The fume is irritating to the respiratory tract. Inhalation of fume may cause lung oedema (see Notes). Inhalation of fumes may cause metal fume fever. The effects may be delayed. Medical observation is indicated.

Effects of long-term or repeated exposure
Lungs may be affected by repeated or prolonged exposure to dust particles. The substance may have effects on the kidneys, resulting in kidney impairment. This substance is carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 765/C
Melting point: 321/C
Density: 8.6 g/cm^3

Solubility in water: none
Auto-ignition temperature: (cadmium metal dust) 250/C

ENVIRONMENTAL DATA

NOTES

Reacts violently with fire extinguishing agents such as water, foam, carbon dioxide and halons.
Depending on the degree of exposure, periodic medical examination is indicated.
The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.
Do NOT take working clothes home.
Cadmium also exists in a pyrophoric form (EC No. 048-011-00-X), which bears the additional EU labelling symbol F, R phrase 17, and S phrases 7/8 and 43. UN numbers and packing group will vary according to the physical form of the substance.

ADDITIONAL INFORMATION

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COPPER

0240
September 1993

CAS No: 7440-50-8
RTECS No: GL5325000
UN No:
EC No:

Cu
Atomic mass: 63.5

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Special powder, dry sand, NO other agents.
EXPLOSION			
EXPOSURE		**PREVENT DISPERSION OF DUST!**	
Inhalation	Cough. Headache. Shortness of breath. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder. Then remove to safe place (extra personal protection: P2 filter respirator for harmful particles).	Symbol R: S:

EMERGENCY RESPONSE	STORAGE
	Separated from: see Chemical Dangers.

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IMPORTANT DATA

Physical State; Appearance
RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.

Chemical Dangers
Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxides and azides. Reacts with strong oxidants like chlorates, bromates and iodates, causing explosion hazard.

Occupational Exposure Limits
TLV: ppm; 0.2 mg/m^3 fume (ACGIH 1992-1993).
TLV (as Cu, dusts & mists): ppm; 1 mg/m3 (ACGIH 1992-1993).

Routes of Exposure
The substance can be absorbed into the body by inhalation and by ingestion.

Inhalation Risk
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

Effects of Short-term Exposure
Inhalation of fume may cause metal fever (see Notes).

Effects of Long-term or Repeated Exposure
Repeated or prolonged contact may cause skin sensitization.

PHYSICAL PROPERTIES

Boiling point: 2595°C
Melting point: 1083°C
Relative density (water = 1): 8.9
Solubility in water: none

ENVIRONMENTAL DATA

NOTES

The symptoms of metal fume fever do not become manifest until several hours.

ADDITIONAL INFORMATION

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LEAD

0052
October 2002

CAS No: 7439-92-1
RTECS No: OF7525000

Lead metal
Plumbum
(powder)
Pb
Atomic mass: 207.2

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	**See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.**	**PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!**	
Inhalation		Local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles.	

EMERGENCY RESPONSE	SAFE STORAGE
	Separated from food and feedstuffs and incompatible materials. See Chemical Dangers.

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IMPORTANT DATA

Physical State; Appearance
BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.

Physical dangers
Dust explosion possible if in powder or granular form, mixed with air.

Chemical dangers
On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.

Occupational exposure limits
TLV: 0.05 mg/m^3 as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004).
MAK: Carcinogen category: 3B; Germ cell mutagen group: 3A; (DFG 2004).
EU OEL: as TWA 0.15 mg/m^3; (EU 2002).

Routes of exposure
The substance can be absorbed into the body by inhalation and by ingestion.

Inhalation risk
A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

Effects of long-term or repeated exposure
The substance may have effects on the blood, bone marrow, central nervous system, peripheral nervous system and kidneys, resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 1740/C
Melting point: 327.5/C
Density: 11.34 g/cm^3
Solubility in water: none

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
Do NOT take working clothes home.
Card has been partly updated in April 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

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MERCURY

0056
April 2004

CAS No: 7439-97-6	Quicksilver
RTECS No: OV4550000	Liquid silver
UN No: 2809	Hg
EC No: 080-001-00-0	Atomic mass: 200.6

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Risk of fire and explosion.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		**STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!**	**IN ALL CASES CONSULT A DOCTOR!**
Inhalation	Abdominal pain. Cough. Diarrhoea. Shortness of breath. Vomiting. Fever or elevated body temperature.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
Skin	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
Eyes		Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work. Wash hands before eating.	Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING	
Evacuate danger area in case of a large spill! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable non-metallic containers as far as possible. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Chemical protection suit including self-contained breathing apparatus.	T Symbol N Symbol R: 23-33-50/53 S: (1/2-)7-45-60-61 UN Hazard Class: 8 UN Pack Group: III	Special material. Do not transport with food and feedstuffs.

EMERGENCY RESPONSE	STORAGE
Transport Emergency Card: TEC (R)-80GC9-II+III	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. Well closed.

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IMPORTANT DATA

Physical State; Appearance
ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL.

Chemical dangers
Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams.

Occupational exposure limits
TLV: 0.025 mg/m^3 as TWA; (skin); A4; BEI issued; (ACGIH 2004).
MAK: 0.1 mg/m^3; Sh; Peak limitation category: II(8); Carcinogen category: 3B; (DFG 2003).

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour and through the skin, also as a vapour!

Inhalation risk
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20/C.

Effects of short-term exposure
The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous system and kidneys. The effects may be delayed. Medical observation is indicated.

Effects of long-term or repeated exposure
The substance may have effects on the central nervous system and kidneys, resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. May cause inflammation and discoloration of the gums. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.

PHYSICAL PROPERTIES

Boiling point: 357/C
Melting point: -39/C
Relative density (water = 1): 13.5
Solubility in water: none

Vapour pressure, Pa at 20/C: 0.26
Relative vapour density (air = 1): 6.93
Relative density of the vapour/air-mixture at 20/C (air = 1): 1.009

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish.

NOTES

Depending on the degree of exposure, periodic medical examination is indicated.
No odour warning if toxic concentrations are present.
Do NOT take working clothes home.

ADDITIONAL INFORMATION

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NICKEL

0062
October 2001

CAS No: 7440-02-0 (powder)
RTECS No: QR5950000 Ni
EC No: 028-002-00-7 Atomic mass: 58.7

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Flammable as dust. Toxic fumes may be released in a fire.		Dry sand. NO carbon dioxide. NO water.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		**PREVENT DISPERSION OF DUST! AVOID ALL CONTACT!**	
Inhalation	Cough. Shortness of breath.	Local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Safety spectacles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place. Personal protection: P2 filter respirator for harmful particles.	Xn Symbol R: 40-43 S: (2-)22-36

EMERGENCY RESPONSE	SAFE STORAGE
	Separated from strong acids.

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IMPORTANT DATA

Physical State; Appearance
SILVERY METALLIC SOLID IN VARIOUS FORMS.

Physical dangers
Dust explosion possible if in powder or granular form, mixed with air.

Chemical dangers
Reacts violently, in powder form, with titanium powder and potassium perchlorate, and oxidants such as ammonium nitrate, causing fire and explosion hazard. Reacts slowly with non-oxidizing acids and more rapidly with oxidizing acids. Toxic gases and vapours (such as nickel carbonyl) may be released in a fire involving nickel.

Occupational exposure limits
TLV: (Inhalable fraction) 1.5 mg/m^3 as TWA; A5 (not suspected as a human carcinogen); (ACGIH 2004).
MAK: (Inhalable fraction); sensitization of respiratory tract and skin (Sah); Carcinogen category: 1; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of the dust.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

Effects of short-term exposure
May cause mechanical irritation. Inhalation of fumes may cause pneumonitis.

Effects of long-term or repeated exposure
Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 2730/C
Melting point: 1455/C
Density: 8.9 g/cm^3
Solubility in water: none

ENVIRONMENTAL DATA

NOTES

At high temperatures, nickel oxide fumes will be formed.
Depending on the degree of exposure, periodic medical examination is suggested.
The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.
Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance.
Card has been partly updated in April 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

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TOLUENE

0078
October 2002

CAS No: 108-88-3
RTECS No: XS5250000
UN No: 1294
EC No: 601-021-00-3

Methylbenzene
Toluol
Phenylmethane
$C_6H_5CH_3$ / C_7H_8
Molecular mass: 92.1

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		**STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!**	
Inhalation	Cough. Sore throat. Dizziness. Drowsiness. Headache. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
Eyes	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Evacuate danger area in large spill! Consult an expert in large spill! Remove all ignition sources. Ventilation. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Personal protection: self-contained breathing apparatus in large spill.	F Symbol Xn Symbol R: 11-38-48/20-63-65-67 S: (2-)36/37-46-62 UN Hazard Class: 3 UN Pack Group: II

EMERGENCY RESPONSE	SAFE STORAGE
Transport Emergency Card: TEC (R)-30S1294 NFPA Code: H 2; F 3; R 0	Fireproof. Separated from strong oxidants.

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SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
COLOURLESS LIQUID, WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour mixes well with air, explosive mixtures are formed easily. As a result of flow, agitation, etc., electrostatic charges can be generated.

Chemical dangers
Reacts violently with strong oxidants causing fire and explosion hazard.

Occupational exposure limits
TLV: 50 ppm as TWA; (skin); A4; BEI issued; (ACGIH 2004).
MAK: 50 ppm, 190 mg/m^3; H; Peak limitation category: II(4); Pregnancy risk group: C; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Inhalation risk
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20/C.

Effects of short-term exposure
The substance is irritating to the eyes and the respiratory tract. The substance may cause effects on the central nervous system. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Exposure at high levels may result in cardiac dysrhythmia and unconsciousness.

Effects of long-term or repeated exposure
The liquid defats the skin. The substance may have effects on the central nervous system. Exposure to the substance may enhance hearing damage caused by exposure to noise. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 111/C
Melting point: -95/C
Relative density (water = 1): 0.87
Solubility in water: none
Vapour pressure, kPa at 25/C: 3.8
Relative vapour density (air = 1): 3.1
Relative density of the vapour/air-mixture at 20/C (air = 1): 1.01
Flash point: 4/C c.c.
Auto-ignition temperature: 480/C
Explosive limits, vol% in air: 1.1-7.1
Octanol/water partition coefficient as log Pow: 2.69

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
Use of alcoholic beverages enhances the harmful effect.
Card has been partly updated in October 2004. See sections Occupational Exposure Limits, EU classification, Emergency Response.

ADDITIONAL INFORMATION

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p-XYLENE

0086
August 2002

CAS No: 106-42-3
RTECS No: ZE2625000
UN No: 1307
EC No: 601-022-00-9

para-Xylene
1,4-Dimethylbenzene
p-Xylol
$C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 27/C explosive vapour/air mixtures may be formed.	Above 27/C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		**STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!**	
Inhalation	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	**EU classification** Xn Symbol R: 10-20/21-38 S: (2-)25 Note: C **UN classification** UN Hazard Class: 3 UN Pack Group: III

EMERGENCY RESPONSE	SAFE STORAGE
Transport Emergency Card: TEC (R)-30S1307-III NFPA Code: H 2; F 3; R 0	Fireproof. Separated from strong oxidants, and strong acids.

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SEE IMPORTANT INFORMATION ON THE BACK.

IMPORTANT DATA

Physical State; Appearance
COLOURLESS LIQUID, WITH CHARACTERISTIC ODOUR.

Physical dangers
As a result of flow, agitation, etc., electrostatic charges can be generated.

Chemical dangers
Reacts with strong acids and strong oxidants.

Occupational exposure limits
TLV: 100 ppm as TWA; 150 ppm as STEL A4 (ACGIH 2001). BEI specified by (ACGIH 2001).
MAK: 100 ppm, 440 mg/m^3. Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005).
EU OEL: 50 ppm as TWA; 100 ppm as STEL (skin) (EU 2000).

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20/C.

Effects of short-term exposure
The substance is irritating to the eyes and the skin. The substance may cause effects on the central nervous system. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.

Effects of long-term or repeated exposure
The liquid defats the skin. The substance may have effects on the central nervous system. Exposure to the substance may enhance hearing damage caused by exposure to noise. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 138/C
Melting point: 13/C
Relative density (water = 1): 0.86
Solubility in water: none
Vapour pressure, kPa at 20/C: 0.9
Relative vapour density (air = 1): 3.7
Relative density of the vapour/air-mixture at 20/C (air = 1): 1.02
Flash point: 27/C c.c.
Auto-ignition temperature: 528/C
Explosive limits, vol% in air: 1.1-7.0
Octanol/water partition coefficient as log Pow: 3.15

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms.

NOTES

Depending on the degree of exposure, periodic medical examination is indicated.
The recommendations on this Card also apply to technical xylene.
See ICSC 0084 o-Xylene and 0085 m-Xylene.

ADDITIONAL INFORMATION

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Appendix B
Activity Hazard Analyses

Project Identification Garvies Point Waterfront Revitalization Project	**Location** Various	**Estimated Dates** TBD
Phase of Work Mobilization/ Demobilization	**Page 1 of 1**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1. Mobilization and demobilization of equipment site tools, personnel	Slips/trips/falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Vehicular traffic	• Spotters will be used when backing up trucks and heavy equipment and when moving equipment.
	Overhead hazards	• Personnel will be required to wear hard hats that meet ANSI Standard Z89.1; • Ground personnel will stay clear of suspended loads; • Equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects; and • Overhead hazards will be identified prior to commencing work operations.
	Noise	• Ear plugs or ear muffs shall be worn for operations that exceed 85 decibels.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Biological hazards	• Be alert to the presence of biological hazards; • Wear insect repellent; • Follow procedures in Section 4.2.2 for tick bites; • FTL/SHSO should be aware of on-site personnel with allergic reactions in insect bites and stings.

Project Identification Garvies Point Waterfront Revitalization Project	**Location** Various	**Estimated Dates** TBD
Phase of Work Excavation	**Page 1 of 1**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1. Excavate to required depths; soil handing and transport	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Perform air monitoring per Community Air Monitoring Plan; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Hand and power tool usage	• Equip electrical equipment with GFCI's; • Inspect electrical equipment and tools prior to use; • Daily inspections will be performed; • Remove broken or damaged tools from service; • Use the tool for its intended purpose; • Use in accordance with manufacturer instructions; and Tag and remove defective equipment.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and, • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting devices.
	Fire/Explosion	• ABC type fire extinguishers shall be readily available; • No smoking in work area.
	Biological hazards	• Be alert to the presence of biological hazards; • Wear insect repellent; • Follow procedures in Section 4.2.2 for tick bites; • FTL/SHSO should be aware of on-site personnel with allergic reactions in insect bites and stings.
	Heavy equipment	• Ground personnel will stay clear of suspended loads; • Ground personnel will stay out of the swing radius; • Eye contact with operators will be made before approaching equipment; • Equipment will not be approached on blind sides; • Equipment will be equipped with backup alarms or spotters shall be used.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and mark and repair if possible tripping hazards are present.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.

Project Identification Garvies Point Waterfront Revitalization Project	**Location** Various	**Estimated Dates** TBD
Phase of Work Soil Sampling	**Page 1 of 1**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1.Collect soil samples.	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Track Hazards	• Caution will be used when working in close proximity to the electrified third rail (see “Electrocution” above). • Workers are required to have completed NYCT Track Safety Training • Flag men will be used when necessary (e.g., working in limited access track areas).

Project Identification Garvies Point Waterfront Revitalization Project	**Location** Various	**Estimated Dates** TBD
Phase of Work Decontamination	**Page 1 of 1**	**Analysis Approved by** Paul Boyce, PE, PM/HSM
TASKS	**HAZARDS**	**CONTROL MEASURES**
1.Decontaminate equipment	Chemical hazards	• Wear appropriate PPE per Table 6-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat/cold stress; • Monitor air temperatures when extreme weather conditions are present; and • Stay in visual and verbal contact with your buddy.
	Manual lifting and material handling	• Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available.
	Slips/Trips/Falls	• Maintain alertness to slip/trip/fall hazards; • Maintain good housekeeping; • Walk, do not run; • Wear footwear with soles that grip; • Unloading areas should be on even terrain; and • Mark and repair if possible tripping hazards.
	Electrocution	• Equipment will be equipped with GFCI; • A licensed electrician will conduct electrical work; • Equipment will stay a minimum of 15 feet from overhead-energized electrical lines and the electrified third rail (up to 50 kV). This distance will increase 0.4 inches for each 1 kV above 50 kV.
	Track Hazards	• Caution will be used when working in close proximity to the electrified third rail (see “Electrocution” above). • Workers are required to have completed NYCT Track Safety Training • Flag men will be used when necessary (e.g., working in limited access track areas).

Appendix C
Heat/Cold Stress Protocols

HEAT STRESS

Heat Stress (Hyperthermia)

Heat stress is the body's inability to regulate the core temperature. A worker's susceptibility to heat stress can vary according to his/her physical fitness, degree of acclimation to heat, humidity, age and diet.

1. Prior to site activity, the field team leader may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature, and body water loss) during actual site work if conditions warrant. In addition, the FTL is to ensure that each team member has been acclimatized to the prevailing environmental conditions, that personnel are aware of the signs and symptoms of heat sickness, that they have been adequately trained in first aid procedures, and that there are enough personnel on-site to rotate work assignments and schedule work during hours of reduced temperatures. Personnel should not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.

2. Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, some indicators are tobacco or medication use, dietary habits, body weight, and chronic conditions such as high blood pressure or diabetes.

3. *Heat cramps*, caused by profuse perspiration with inadequate fluid intake and salt replacement, most often afflict people in good physical condition who work in high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress rapidly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and replace lost fluids with water.

4. Thirst is not an adequate indicator of heat exposure. Drinking fluid by itself does not indicate sufficient water replacement during heat exposure. A general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every half pound of water lost, 8 ounces of water should be ingested. Water should be replaced by drinking 2 – 4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink split 50/50 with water.

5. *Heat exhaustion* results from salt and water loss along with peripheral pooling of blood. Like heat cramps, heat exhaustion tends to occur in persons in good physical health who are working in high temperatures and humidity. Heat exhaustion may come on suddenly as dizziness and collapse. Untreated, heat exhaustion may progress to heat stroke.

6. *Treatment for heat exhaustion*: Move the victim to a cool environment (e.g. air-conditioned room/car), lay victim down and fan him/her. If the air-conditioning is not available, remove the victim to a shaded area, remove shirt, and fan. If symptoms do not subside within an hour, notify 911 to transport to hospital.

7. *Heat stroke* results from the body's inability to dissipate excess heat. A true medical emergency that requires immediate care, it usually occurs when one ignores the signs of heat exhaustion and continues strenuous activities. Working when the relative humidity exceeds 60% is a particular problem. Workers in the early phase of heat stress may not be coherent of they will be confused, delirious or comatose. Changes in behavior, irritability and combativeness are useful early signs of heat stroke.

8. *Treatment of heat stroke*: Move the victim to a cool, air-conditioned environment. Place victim in a semi-reclined position with head elevated and strip to underclothing. Cool victim as rapidly as possible, applying ice packs to the arms and legs and massaging the neck and torso. Spray victim with tepid water and constantly fan to promote evaporation. Notify 911 to transport to hospital as soon as possible.

TABLE 1

SYMPTOMS OF HEAT STRESS

Heat cramps are caused by heavy sweating with inadequate fluid intake. Symptoms include;

- Muscle cramps
- Cramps in the hands, legs, feet and abdomen

Heat exhaustion occurs when body organs attempt to keep the body cool. Symptoms include;

- Pale, cool moist skin
- Core temperature elevated 1-2°
- Thirst
- Anxiety
- Rapid heart rate
- Heavy sweating
- Dizziness
- Nausea

Heat stroke is the most serious form of heat stress. Immediate action must be taken to cool the body before serious injury and death occur. Symptoms are;

- Red, hot, dry skin
- Lack of perspiration
- Seizures
- Dizziness and confusion
- Strong, rapid pulse
- Core temperature of 104° or above
- Coma

TABLE 2

HEAT STRESS INDICATORS

Heat stress indicator	When to measure	If Exceeds...	Action
Heart rate (pulse)	Beginning of rest period	110 beats per minute	Shorten next work period by 33%
Oral temperature	Beginning of rest period	99°F (after thermometer is under tongue for 3 minutes) 100.6°F	Shorten next work period by 33% Prohibit work in impermeable clothing
Body weight	1. Before workday begins (a.m.) 2. After workday ends (p.m.)		Increase fluid intake

COLD STRESS

Cold stress (Hypothermia)

In hypothermia the core body temperature drops below 95°F. Hypothermia can be attributed to a decrease in heat production, increased heat loss or both.

Prevention

Institute the following steps to prevent overexposure of workers to cold:

1. Maintain body core temperature at 98.6°F or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing that can keep the body warm even when the clothing is wet.
2. Avoid frostbite by adequately covering hands, feet and other extremities. Clothing such as insulated gloves or mittens, earmuffs and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below 20°F), workers should wear gloves. Tool handles should be covered with insulating material.
3. Adjust work schedules to provide adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide heated shelter. Workers should remove their outer layer(s) of clothing while in the shelter to allow sweat to evaporate.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the buildup of toxic or explosive gases or vapors. Care must be taken to keep a heat source away from flammable substances.
6. Using a wind chill chart such as the one in Table 3, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT of 20°F. For exposed skin, continuous exposure should not be permitted at or below an ECT of -25°F.

Frostbite

Personnel should be aware of symptoms of frostbite/hypothermia. If the following symptoms are noticed in any worker, he/she should immediately go to a warm shelter.

Condition	Skin Surface	Tissue Under Skin	Skin Color
Frostnip	Soft	Soft	Initially red, then white
Frostbite	Hard	Soft	White and waxy
Freezing	Hard	Hard	Blotchy, white to yellow-gray to gray

1. *Frostnip* is the incipient stage of frostbite, brought about by direct contact with a cold object or exposure of a body part to cool/cold air. Wind chill or cold water also can be major factors. This condition is not serious. Tissue damage is minor and the response to care is good. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostnip.

2. *Treatment of frostnip*: Care for frostnip by warming affected areas. Usually the worker can apply warmth from his/her bare hands, blow warm air on the site, or, if the fingers are involved, hold them in the armpits. During recovery, the worker may complain of tingling or burning sensation, which is normal. If the condition does not respond to this simple care, begin treatment for frostbite.

3. *Frostbite*: The skin and subcutaneous layers become involved. If frostnip goes untreated, it becomes superficial frostbite. This condition is serious. Tissue damage may be serious. The worker must be transported to a medical facility for evaluation. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostbite. The affected area will feel frozen, but only on the surface. The tissue below the surface must still be soft and have normal response to touch. *DO NOT* squeeze or poke the tissue. The condition of the deeper tissues can be determined by gently palpating the affected area. The skin will turn mottled or blotchy. It may also be white and then turn grayish-yellow.

4. *Treatment of frostbite*: When practical, transport victim as soon as possible. Get the worker inside and keep him/her warm. Do not allow any smoking or alcohol consumption. Thaw frozen parts by immersion, re-warming in a 100°F to 106°F water bath. Water temperature will drop rapidly, requiring additional warm water throughout the process. Cover the thawed part with a dry sterile dressing. Do not puncture or drain any blisters.

   NOTE: Never listen to myths and folk tales about the care of frostbite. *Never* rub a frostbitten or frozen area. *Never* rub snow on a frostbitten or frozen area. Rubbing the area may cause

serious damage to already injured tissues. Do not attempt to thaw a frozen area if there is any chance it will be re-frozen.

5. *General cooling/Hypothermia*: General cooling of the body is known as systemic hypothermia. This condition is not a common problem unless workers are exposed to cold for prolonged periods of time without any shelter.

Body Temperature	°C	Symptoms
99-96	37-35.5	Intense, uncontrollable shivering
95-91	35.5-32.7	Violent shivering persists. If victim is conscious, he has difficulty speaking.
90-86	32-30	Shivering decreases and is replaced by strong muscular rigidity. Muscle coordination is affected. Erratic or jerkey movements are produced. Thinking is less clear. General comprehension is dulled. There may be total amnesia. The worker is generally still able to maintain the appearance of psychological contact with his surroundings.
85-81	29.4-27.2	Victim becomes irrational, loses contact with his environment, and drifts into a stuporous state. Muscular rigidity continues. Pulse and respirations are slow and the worker may develop cardiac arrhythmias.
80-78	26.6-18.5	Victim becomes unconscious. He does not respond to the spoken word. Most reflexes cease to function. Heartbeat becomes erratic
Below 78	25.5	Cardiac and respiratory centers of the brain fail. Ventricular fibrillation occurs; probably edema and hemorrhage in the lungs; death.

6. *Treatment of hypothermia*: Keep worker dry. Remove any wet clothing and replace with dry clothes, or wrap person in dry blankets. Keep person at rest. Do not allow him/her to move around. Transport the victim to a medical facility as soon as possible.

TABLE 3[1]

COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS AN EQUIVALENT TEMPERATURE (UNDER CALM CONDITIONS)

Estimated wind Speed (in mph)	Actual Temperature Reading (°F)P											
	50	40	30	20	10	0	10	20	30	40	50	60
	Equivalent Chill Temperature (°F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	15	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-146
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER in < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute			GREAT DANGER may freeze within 30 seconds.				Flesh
	Trench foot and imersion foot may occur at any point on this chart											

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

(1) Reproduced from American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1985-1986, p.01.

Appendix D
Medical Data Sheet

MEDICAL DATA SHEET

The brief medical data sheet shall be completed by on-site personnel and will be kept in the Support Zone by the HSO as a project record during the conduct of site operations. It accompanies any personnel when medical assistance is needed or if transport to a hospital is required.

Project:
Name: Home Telephone: _____
Address: _____
Age: _____ Height: _____ Weight: _____ Blood Type: _____

Name and Telephone Number of Emergency Contact: _____

Drug or Other Allergies: _____

Particular Sensitivities: _____

Do You Wear Contacts? _____

Provide A Check List Of Previous Illnesses: _____

What Medications Are You Presently Using?_____

Do You Have Any Medical Restrictions? _____

Name, Address, And Phone Number Of Personal Physician:

Appendix E
General Health and Safety Work Practices

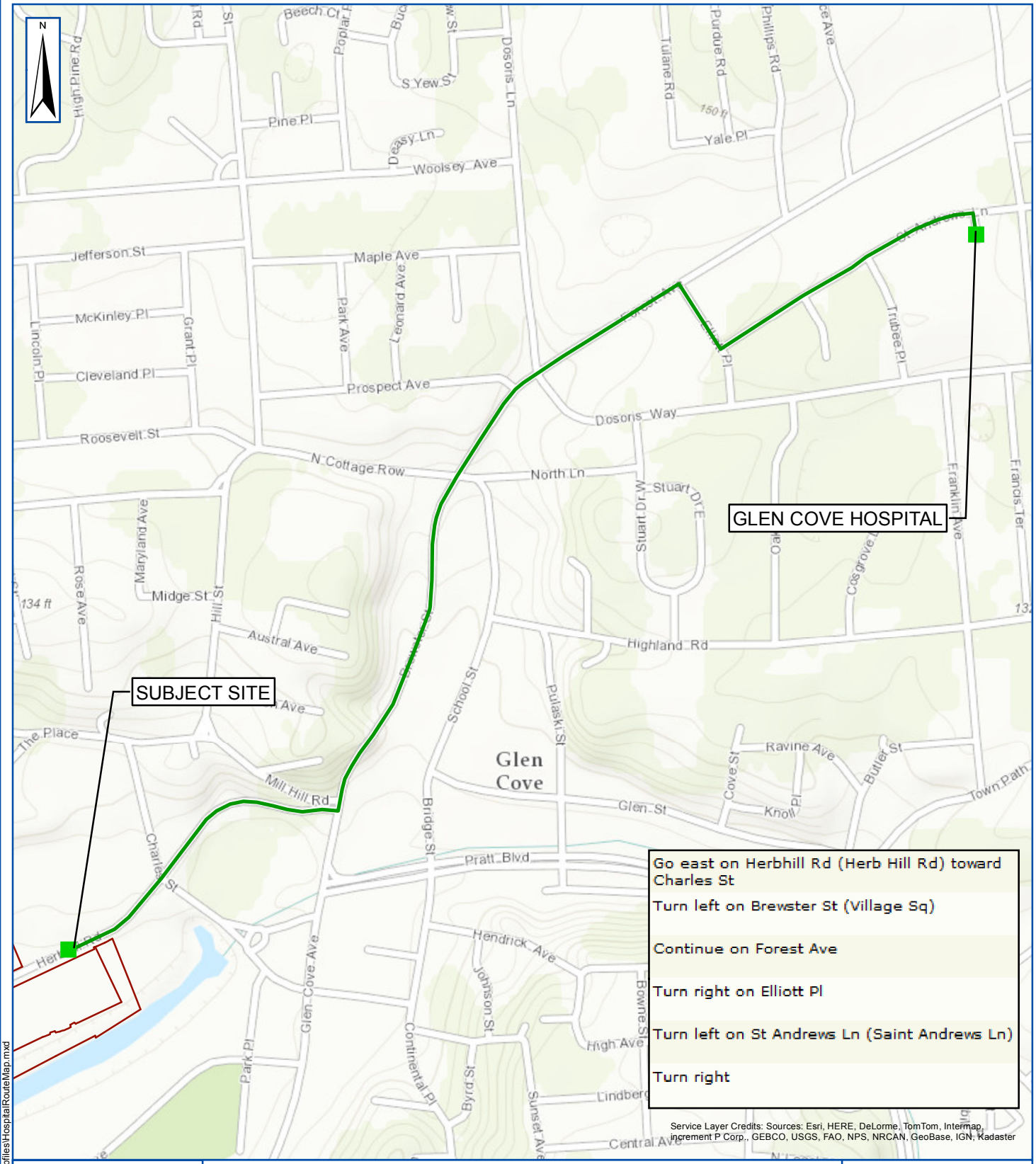
GENERAL HEALTH AND SAFETY WORK PRACTICES

1. Site personnel must attend each day's Daily Briefing and sign the attendance sheet.
2. Any individual taking prescribed drugs shall inform the FTL/HSO of the type of medication. The FTL/HSO will review the matter with the HSM and the Corporate Medical Consultant (CMC), who will decide if the employee can safely work on-site while taking the medication.
3. The personal protective equipment specified by the FTL/HSO and/or associated procedures shall be worn by site personnel. This includes hard hats and safety glasses which must be worn in active work areas.
4. Facial hair (beards, long sideburns or mustaches) which may interfere with a satisfactory fit of a respirator mask is not allowed on any person who may be required to wear a respirator.
5. Personnel must follow proper decontamination procedures and shower as soon as possible upon completion of work shift.
6. Eating, drinking, chewing tobacco or gum, smoking and any other practice that may increase the possibility of hand-to-mouth contact is prohibited in the exclusion zone or the contamination reduction zone. (Exceptions may be permitted by the HSM to allow fluid intake during heat stress conditions).
7. Lighters, matches, cigarettes and other forms of tobacco are prohibited in the Exclusion Zone.
8. Signs and demarcations shall be followed. Such signs and demarcation shall not be removed, except as authorized by the FTL/HSO.
9. No one shall enter a permit-required confined space without a permit and appropriate training. Confined space entry permits shall be implemented as issued.
10. Personnel must follow Hot Work Permits as issued.
11. Personnel must use the Buddy System in the Exclusion Zone.
12. Personnel must follow the work-rest regimens and other practices required by the heat stress program.
13. Personnel must follow lockout/tagout procedures when working on equipment involving moving parts or hazardous energy sources.
14. No person shall operate equipment unless trained and authorized.
15. No one may enter an excavation greater than four feet deep unless authorized by the Competent Person. Excavations must be sloped or shored properly. Safe means of access and egress from excavations must be maintained.
16. Ladders and scaffolds shall be solidly constructed, in good working condition, and inspected prior to use. No one may use defective ladders or scaffolds.

17. Fall protection or fall arrest systems must be in place when working at elevations greater than six feet for temporary working surfaces and four feet for fixed platforms.
18. Safety belts, harnesses and lanyards must be selected by the Supervisor. The user must inspect the equipment prior to use. No defective personal fall protection equipment shall be used. Personal fall protection that has been shock loaded must be discarded.
19. Hand and portable power tools must be inspected prior to use. Defective tools and equipment shall not be used.
20. Ground fault interrupters shall be used for cord and plug equipment used outdoors or in damp locations. Electrical cords shall be kept out walkways and puddles unless protected and rated for the service.
21. Improper use, mishandling, or tampering with health and safety equipment and samples is prohibited.
22. Horseplay of any kind is prohibited.
23. Possession or use of alcoholic beverages, controlled substances, or firearms on any site is forbidden.
24. Incidents, no matter how minor, must be reported immediately to the Supervisor.
25. Personnel shall be familiar with the Site Emergency Action Plan, which is contained in Section 12 of the HASP/EAP.

The above Health and Safety Rules are not all inclusive and it is your responsibility to comply with regulations set forth by OSHA, the client, PWGC Supervisors, and the FTL/HSO.

Appendix F
Hospital Route Map and Directions



HOSPITAL ROUTE MAP

0 0.09 0.18 0.27 0.36 Miles

PWGC
Strategic Environmental and Engineering Solutions
P.W. GROSSER CONSULTING, INC.
630 Johnson Avenue, • Suite 7
Bohemia • NY • 11716-2618
Phone: (631) 589-6353 • Fax: (631) 589-8705
E-mail: INFO@PWGROSSER.COM

Project:	
Date:	6/22/2015
Designed by:	DE
Drawn by:	JCG
Approved by:	DE
Figure No:	1

Document Path: G:\Projects\M-R\RGI\1504\mapfiles\HospitalRouteMap.mxd

Appendix G
Incident Report Form / Investigation Form

PWGC
Strategic Environmental Engineering Solutions

INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 1 OF 2			
TYPE OF INCIDENT - CHECK ALL THAT APPLY			
☐ INJURY/ILLNESS	☐ VEHICLE DAMAGE	☐ PROPERTY DAMAGE	☐ FIRE
☐ SPILL/RELEASE	☐ PERMIT EXCEEDENCE	☐ NEAR MISS	☐ OTHER
GENERAL INFORMATION			
PROJECT NAME:	DATE OF REPORT:	REPORT NO.:	
DATE OF INCIDENT:	TIME:	DAY OF WEEK:	
LOCATION OF INCIDENT:			
WEATHER CONDITIONS:	ADEQUATE LIGHTING AT SCENE? ☐ YES ☐ NO ☐ N/A		
DESCRIBE WHAT HAPPENED (STEP BY STEP - USE ADDITIONAL PAGES IF NECESSARY)			
AFFECTED EMPLOYEE INFORMATION			
NAME:	EMPLOYEE: ☐ YES ☐ NO		
HOME ADDRESS:			
SOCIAL SECURITY NO.:	HOME PHONE NO.:		
JOB CLASSIFICATION:	YEARS IN JOB CLASSIFICATION:		
HOURS WORKED ON SHIFT PRIOR TO INCIDENT:	AGE:		
DID INCIDENT RELATE TO ROUTINE TASK FOR JOB CLASSIFICATION? ☐ YES ☐ NO			
INJURY/ILLNESS INFORMATION			
NATURE OF INJURY OR ILLNESS:			
OBJECT/EQUIPMENT/SUBSTANCE CAUSING HARM:			
FIRST AID PROVIDED? ☐ YES ☐ NO			
IF YES, WHERE WAS IT GIVEN: ☐ ON-SITE ☐ OFF-SITE			
IF YES, WHO PROVIDED FIRST AID:			
WILL THE INJURY/ILLNESS RESULT IN: ☐ RESTRICTED DUTY ☐ LOST TIME ☐ UNKNOWN			

INCIDENT / NEAR MISS REPORT AND INVESTIGATION - PAGE 2 OF 2 REPORT NO.
MEDICAL TREATMENT INFORMATION
WAS MEDICAL TREATMENT PROVIDED? ☐ YES ☐ NO
IF YES, WAS MEDICAL TREATMENT PROVIDED: ☐ ON-SITE ☐ DR.'S OFFICE ☐ HOSPITAL
NAME OF PERSON(S) PROVIDING TREATMENT:
ADDRESS WHERE TREATMENT WAS PROVIDED:
TYPE OF TREATMENT:
VEHICLE AND PROPERTY DAMAGE INFORMATION
VEHICLE/PROPERTY DAMAGED:
DESCRIPTION OF DAMAGE:
SPILL AND AIR EMISSIONS INFORMATION:
SUBSTANCE SPILLED OR RELEASED: FROM WHERE: TO WHERE:
ESTIMATED QUANTITY/DURATION:
CERCLA HAZARDOUS SUBSTANCE? ☐ YES ☐ NO
REPORTABLE TO AGENCY? ☐ YES ☐ NO SPECIFY:
WRITTEN REPORT: ☐ YES ☐ NO TIME FRAME:
RESPONSE ACTION TAKEN:
PERMIT EXCEEDENCE
TYPE OF PERMIT: PERMIT #:
DATE OF EXCEEDENCE: DATE FIRST KNOWLEDGE OF EXCEEDENCE:
PERMITTED LEVEL OR CRITERIA:
EXCEEDENCE LEVEL OR CRITERIA:
REPORTABLE TO AGENCY? ☐ YES ☐ NO SPECIFY:
WRITTEN REPORT: ☐ YES ☐ NO TIME FRAME:
RESPONSE ACTION TAKEN:
NOTIFICATIONS
NAMES OF PERSONNEL NOTIFIED: DATE/TIME:
CLIENT NOTIFIED: DATE/TIME:
AGENCY NOTIFIED: DATE/TIME:
CONTACT NAME:
PERSONS PREPARING REPORT
EMPLOYEE'S NAME:(PRINT) SIGN:
SUPERVISOR'S NAME:(PRINT) SIGN:

PWGC
Strategic Environmental Engineering Solutions

INVESTIGATIVE REPORT			
DATE OF INCIDENT:	DATE OF REPORT:	REPORT NUMBER:	
INCIDENT COST: ESTIMATED: $_____	ACTUAL: $_____		
OSHA RECORDABLE(S): ☐ YES ☐ NO # RESTRICTED DAYS ____ # DAYS AWAY FROM WORK ____			
CAUSE ANALYSIS			
IMMEDIATE CAUSES - WHAT ACTIONS AND CONDITIONS CONTRIBUTED TO THIS EVENT?			
BASIC CAUSES - WHAT SPECIFIC PERSONAL OR JOB FACTORS CONTRIBUTED TO THIS EVENT?			
ACTION PLAN			
REMEDIAL ACTIONS - WHAT HAS AND OR SHOULD BE DONE TO CONTROL EACH OF THE CAUSES LISTED?			
ACTION	PERSON RESPONSIBLE	TARGET DATE	COMPLETION DATE
PERSONS PERFORMING INVESTIGATION			
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
INVESTIGATOR'S NAME: (PRINT)	SIGN:	DATE:	
MANAGEMENT REVIEW			
PROJECT MANAGER: (PRINT)	SIGN:	DATE:	
COMMENTS:			
H&S MANAGER: (PRINT)	SIGN:	DATE:	
COMMENTS:			

EXAMPLES OF IMMEDIATE CAUSES

Substandard Actions

1. Operating equipment without authority
2. Failure to warn
3. Failure to secure
4. Operating at improper speed
5. Making safety devices inoperable
6. Removing safety devices
7. Using defective equipment
8. Failure to use PPE properly
9. Improper loading
10. Improper placement
11. Improper lifting
12. Improper position for task
13. Servicing equipment in operation
14. Under influence of alcohol/drugs
15. Horseplay

Substandard Conditions

1. Guards or barriers
2. Protective equipment
3. Tools, equipment, or materials
4. Congestion
5. Warning system
6. Fire and explosion hazards
7. Poor housekeeping
8. Noise exposure
9. Exposure to hazardous materials
10. Extreme temperature exposure
11. Illumination
12. Ventilation
13. Visibility

EXAMPLES OF BASIC CAUSES

Personal Factors

1. Capability
2. Knowledge
3. Skill
4. Stress
5. Motivation
6. Work Standards
7. Wear and tear
8. Abuse or misuse

Job Factors

1. Supervision
2. Engineering
3. Purchasing
4. Maintenance
5. Tools/equipment

MANAGEMENT PROGRAMS FOR CONTROL OF INCIDENTS

1. Leadership and administration
2. Management training
3. Planned inspections
4. Task analysis and procedures
5. Task observation
6. Emergency preparedness
7. Organizational rules
8. Accident/incident analysis
9. Personal protective equipment
10. Health control
11. Program audits
12. Engineering controls
13. Personal communications
14. Group meetings
15. General promotion
16. Hiring and placement
17. Purchasing controls

Appendix H
Daily Briefing Sign-In Sheet

PWGC
Strategic Environmental Engineering Solutions

DAILY BRIEFING SIGN-IN SHEET

Date: _____ Project Name/Location: _____

Person Conducting Briefing: _____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc.)

_____

_____

_____

2. OTHER ISSUES (HASP/EAP changes, attendee comments, etc.)

_____

_____

_____

3. ATTENDEES (Print Name):

1.	21.
2.	22.
3.	23.
4.	24.
5.	25.
6.	26.
7.	27.
8.	28.
9.	29.
10.	30.
11.	31.
12.	32.
13.	33.
14.	34.
15.	35.
16.	36.
17.	37.
18.	38.
19.	39.
20.	40.

APENDIX B
QUALITY ASSURANCE PROJECT PLAN

SITE-SPECIFIC UNIFORM FEDERAL POLICY (UFP)

QUALITY ASSURANCE PROJECT PLAN (QAPP)

FORMER CAPTAINS COVE SITE

Glen Cove, New York

Prepared By:

P.W. Grosser Consulting, Inc. (PWGC)

630 Johnson Avenue, Suite 7

Bohemia, New York 11716

AUGUST 2016

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ATTACHMENTS

ATTACHMENTS

A Standard Operating Procedures (SOPs)

ACRONYM	DEFINITION
%R	Percent Recovery
AES	Atomic Emission Spectrometry
ASP	Analytical Services Protocol
COC	Chain-of-Custody
D&B	D&B Engineers & Architects, P.C.
DQI	Data Quality Indicator
EDD	Electronic Data Deliverables
ELAP	Environmental Laboratory Approval Program
ERT	Environmental Response Team
ESD	Explanation of Significant Differences
FTL	Field Team Leader
ICP	Inductively Coupled Plasma
LDC	Laboratory Data Consultants, Inc.
LOQ	Limit of Quantitation
MDL	Method Detection Limit
MS	Mass Spectrometry
NFG	National Functional Guidance
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety & Health Administration
PM	Program Manager
POC	Point of Contact
PQO	Project Quality Objective
PWGC	P.W. Grosser Consulting, Inc.
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RACR	Remedial Action Completion Report
RAWP	Remedial Action Work Plan
RL	Reporting Limit
ROD	Record of Decision
RPD	Relative Percent Difference
SOP	Standard Operating Procedure
SSRC	Site Specific Removal Criteria
SVOC	Semi-Volatile Organic Compound
TAL	Test America Laboratories, Inc.
TBD	To Be Determined
TOC	Table of Contents
UFP	Uniform Federal Policy
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

CROSSWALK

The following table provides a "cross-walk" between the QAPP elements outlined in the UFP for QAPP (UFP-QAPP Manual), the necessary information, and the location of the information within the text document and corresponding QAPP Worksheet. Any QAPP elements and required information that are not applicable to the project are circled.

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
Project Management and Objectives			
2.1 Title and Approval Page	-Title and Approval Page	Approval Page	1
2.2 Document Format and Table of Contents 2.2.1 Document Control Format 2.2.2 Document Control 2.2.3 TOC 2.2.4 QAPP Identifying Information	-TOC -QAPP Identifying Information	TOC Approval Page	2
2.3 Distribution List and Personnel Sign-Off Sheet 2.3.1 Distribution List 2.3.2 Project Personnel Sign-Off Sheet	-Distribution List -Project Personnel Sign-Off Sheet	Approval Page	3 4
2.4 Project Organization 2.4.1 Project Organizational Chart 2.4.2 Communication Pathways 2.4.3 Personnel Responsibilities and Qualifications 2.4.4 Special Training Requirements and Certifications	-Project Organizational Chart -Communication Pathways -Personnel Responsibilities and Qualifications -Special Personnel Training Requirements	2	5 6 7 8
2.5 Project Planning/Problem Definition 2.5.1 Project Planning (Scoping) 2.5.2 Problem Definition, Site History, & Background	-Project Planning Session Documentation -Project Scoping Session -Problem Definition, Site History, & Background -Site Maps	1	9 10
2.6 Project Quality Objectives and Measurement Performance Criteria 2.6.1 Development of Project Quality Objectives (PQOs) Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	-Site Specific PQOs -Measurement Performance Criteria	3	11 12
2.7 Secondary Data Evaluation	-Sources of Secondary Data and Information -Secondary Data Criteria and Limitations	1 2	13
2.8 Project Overview and Schedule 2.8.1 Project Overview	-Summary of Project Tasks	4	14

2.8.2 Project Schedule	-Reference Limits and Evaluation -Project Schedule/Timeline		15 16
Measurement/Data Acquisition			
3.1 Sample Tasks 3.1.1 Sampling Process Design and Rationale 3.1.2 Sampling Procedures and Requirements 3.1.2.1 Sampling Collection Procedures 3.1.2.2 Sample Containers, Volume, and Preservation 3.1.2.3 Equipment/Sample Containers Cleaning & Decontamination Procedures 3.1.2.4 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures 3.1.2.5 Supply Inspection and Acceptance Procedures 3.1.2.6 Field Documentation Procedures	-Sampling Design and Rationale -Sample Location Map -Sampling Locations and Methods/SOP Requirements -Analytical Methods/SOP Requirements -Field Quality Control Sample Summary -Sampling SOPs -Project Sampling SOP References -Field Equipment Calibration, Maintenance, Testing, and Inspection	5	17 18 19 20 21 22
3.2 Analytical Tasks 3.2.1 Analytical SOPs 3.2.2 Analytical Instrument Calibration 3.2.3 Analytical Instrument and Equipment Maintenance, Testing & Inspection Procedures 3.2.4 Analytical Supply Inspection & Acceptance Procedures	-Analytical SOPs -Analytical SOP References -Analytical Instrument Calibration -Analytical Instrument & Equipment Maintenance, Testing & Inspection	6	23 24 25
3.3 Sample Collection Documentation, Handling, Tracking, & Custody Procedures 3.3.1 Sample Collection Documentation 3.3.2 Sample Handling and Tracking System 3.3.3 Sample Custody	-Sample Collection Documentation Handling, Tracking, & Custody SOPs -Sample Container Identification -Sample Handling Flow Diagram -Example Chain-of-Custody (COC) Form and Seal	7	27 26
3.4 Quality Control (QC) Samples 3.4.1 Sampling QC Samples 3.4.2 Analytical QC Samples	-QC Samples -Screening/Confirmatory Analysis Decision Tree	5	28

3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling & Management 3.5.5 Data Tracking and Control	-Project Documents & Records -Analytical Services -Data Management SOPs	6	29 30
Assessment/Oversight			
4.1 Assessments & Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings & Corrective Action Responses	-Assessments & Response Actions -Planned Project Assessments -Audit Checklists -Assessment Findings & Corrective Action Responses	8	31 32
4.2 Quality Assurance (QA) Management Reports	-QA Management Reports		33
4.3 Final Project Report	-Final Report(s)		
Data Review			
5.1 Overview			
5.2 Data Review Steps 5.2.1 Step I: Verification 5.2.2 Step II: Validation 5.2.2.1 Step IIa Validation Activities 5.2.2.2 Step IIb Validation Activities 5.2.3 Step III: Usability Assessment 5.2.3.1 Data Limitations and Actions from Usability Assessment 5.2.3.2 Activities	-Verifications (Step I) Process -Validation (Step IIa and IIb) Process -Validation (Step IIa and IIb) Summary -Usability Assessment	9	34 35 36 37

QAPP Worksheet #1 & 2: Title and Approval Page

(UFP-QAPP Manual Section 2.1)
(United States Environmental Protection Agency (USEPA) 2106-G-05 Section 2.2.1)

1. Project Identifying Information
   a. Site name/project name: Former Captains Cove Site
   b. Site location/number: Garvies Point Road, Glen Cove, New York 11542 / 1-30-032

2. Lead Organization – PWGC

   a. Project Manager (PM) — Derek Ersbak/PM/PWGC
   Printed Name/Title/Organization

   _____
   Signature/Date

   b. State Regulatory Agency — Heidi-Marie Dudek, PE/PM/NYSDEC[1]
   Printed Name/Title/Organization

   _____
   Signature/Date

   c. Federal Regulatory Agency — Lorenzo Thantu/Remedial PM/USEPA
   Printed Name/Title/Organization

   _____
   Signature/Date

3. List plans and reports from previous investigations relevant to this project
   a. Roux Associates, Inc., Final Remedial Investigation Report, January 1999;
   b. Metron Development Services, Glen Isle Field Verification Program Certification Sampling Event #1, May 2004;
   c. PWGC, Pre-Construction Confirmatory/Insurance Data Gap Subsurface Investigation Report, May 2014;
   d. Gannett Fleming Engineers, P.C., Draft Contaminated Material Assessment Report, January 2015;
   e. PWGC, Leachable Arsenic and Lead Sampling Report, February 2015;
   f. PWGC, Pre-Construction Confirmatory/Insurance Data Gap Subsurface Investigation Report Addendum 1, February 2016; and,

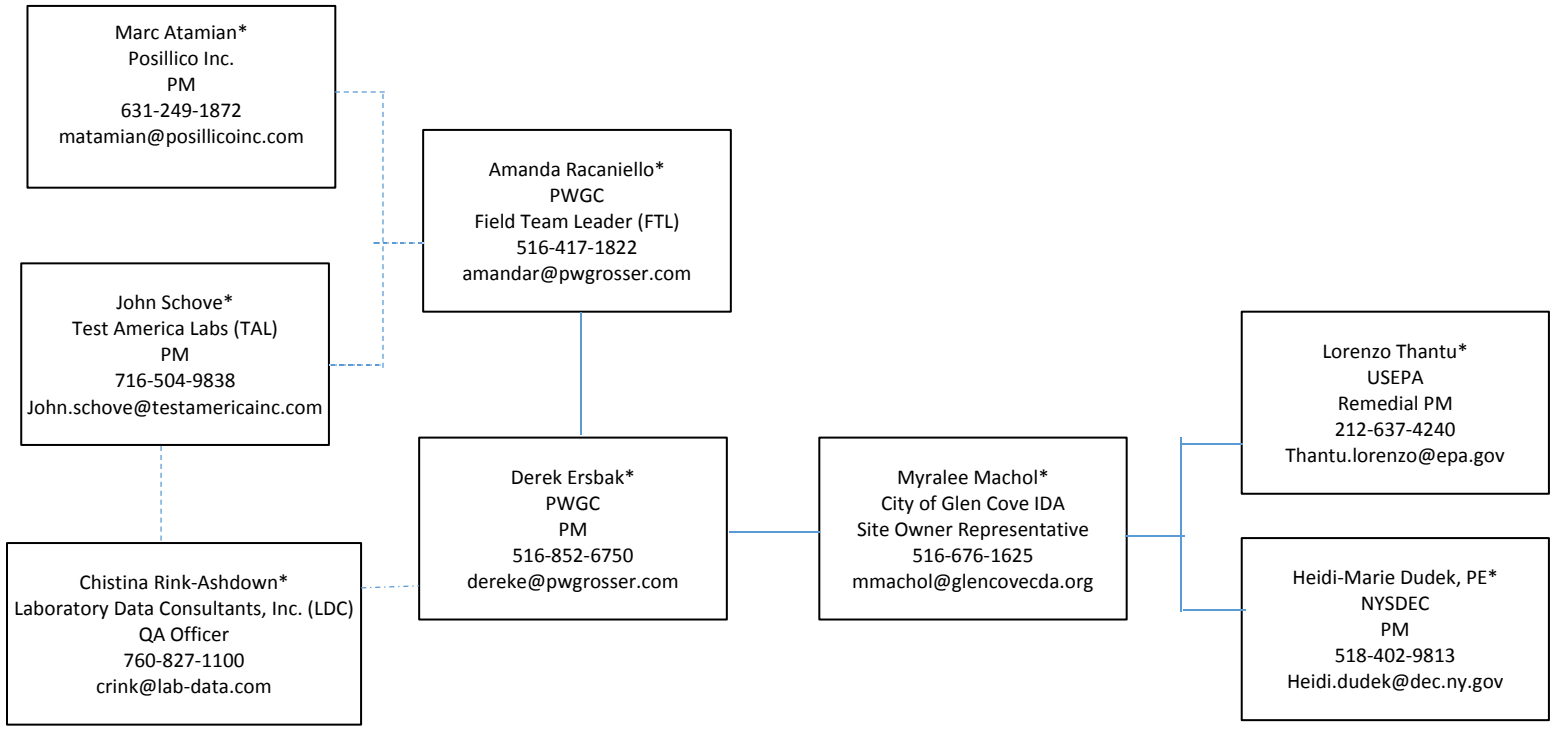
[1] NYSDEC – New York State Department of Environmental Conservation

g. PWGC, Synthetic Precipitation Leaching Procedure Investigation/Red Flag Area Characterization Report, February 2016.

QAPP Worksheet #3 & 5: Project Organization and QAPP Distribution

(UFP-QAPP Manual Section 2.3 and 2.4)
(USEPA 2106-G-05 Section 2.2.3 and 2.2.4)

*QAPP recipient Lines of authority _____ Lines of Communication - - - - - - - -



QAPP Worksheet #4, 7 & 8: Personnel Qualifications
(UFP-QAPP Manual Sections 2.3.2 – 2.3.4)
(USEPA 2106-G-05 Section 2.2.1 and 2.2.7)

ORGANIZATION: Prime Consultant - PWGC

Name	Project Title/Role	Education/Experience	Specialized Training/Certifications
Derek Ersbak	PM / Maintains direct contact with POC for site activities.	B.S. Biology (Ecology, Evolution & Behavior) SUNY Binghamton, over 9 years' experience with field and laboratory QA/QC procedures and preparing QAPPs.	40-Hour Occupational Safety & Health Administration (OSHA) Hazardous Waste Site Worker Training; 8-Hour OSHA Refresher Training; 8 Hour OSHA Supervisor Training, and 10-Hour Construction Safety & Health Training.
Amanda Racaniello	FTL/Maintains direct contact with PM, manages daily field activities, ensures implementation of QAPP.	B.A. Environmental Studies SUNY Stony Brook, over 3-years' experience with field sampling / QA/QC protocol.	40-Hour OSHA Hazardous Waste Site Worker Training; 8-Hour OSHA Refresher Training; 8 Hour OSHA Supervisor Training, and 10-Hour Construction Safety & Health Training.

ORGANIZATION: Prime Contractor – Posillico Inc.

Name	Project Title/Role	Education/Experience	Specialized Training/Certifications
Mark Atamian, CHMM	PM/Manages construction team	B.S. Earth Science, 11.5 years' experience	Certified Hazardous Materials Manager (CHMM), 40-Hour OSHA Hazardous Waste Site Worker Training; 8-Hour OSHA Refresher Training; 30 Hour OSHA Construction Training, and 10-Hour Construction Safety & Health Training.

ORGANIZATION: Laboratory - TAL

Name	Project Title/Role	Education/Experience	Specialized Training/Certifications
John Schove	PM/Manages sample transportation, orders, and QA/QC	B.S. Chemistry SUNY Fredonia/Over 17 years' of experience with environmental laboratory work	

ORGANIZATION: Data Validation Consultant - LDC

Name	Project Title/Role	Education/Experience	Specialized Training/Certifications
Christina Rink-Ashdown	QA Officer/Manages the validation of data.	B.S. Biology UC San Diego/Over 8 years' experience with environmental laboratory and data validation.	

QAPP Worksheet #6: Communication Pathways

(UFP-QAPP Manual Section 2.4.2)
(USEPA 2106-G-05 Section 2.2.4)

Communication Driver	Organization	Name	Contact Information	Procedure (timing, pathway, documentation, etc.)
Regulatory agency interface	USEPA	Lorenzo Thantu	212-637-4240 Thantu.lorenzo@epa.gov	Maintains lines of communication between USEPA, NYSDEC and D&B, approves site-specific QAPPs in accordance with USEPA guidance documents and policy, and provides guidance or instruction for site-specific QA documents.
	NYSDEC	Heidi-Marie Dudek	518-402-9813 Heidi.dudek@dec.ny.gov	
Field progress reports	PWGC FTL	Amanda Racaniello	516-417-1822 amandar@pwgrosser.com	Prepares daily field report and submits to PWGC PM.
Stop work due to safety issues	PWGC FTL	Amanda Racaniello	516-417-1822 amandar@pwgrosser.com	Communicates with PWGC PM regarding safety issues/reporting on a daily basis, when required.
QAPP changes prior to field work	PWGC PM	Derek Ersbak	631-589-6353 dereke@pwgrosser.com	Communicates changes to QAPP to D&B and USEPA/NYSDEC and determines need for field and analytical corrective actions.
QAPP changes during project execution	PWGC FTL	Amanda Racaniello	516-417-1822 amandar@pwgrosser.com	Communicates QAPP to PWGC PM on a daily basis, when required.
Field corrective actions	PWGC FTL	Amanda Racaniello	516-417-1822 amandar@pwgrosser.com	Communicates field activities to PWGC PM on a daily basis, when required.
Sample receipt variances	TAL PM	John Schove	718-504-9838 John.schove@testamericainc.com	The TAL PM will report any issues with project samples to the PWGC PM.

Laboratory quality control variances	TAL QA Manager	Carl Armbruster	732-549-3900 Carl.armbruster@testamericainc.com	The TAL QA manager will report any issues with project samples to the PWGC PM.
Analytical corrective actions	TAL QA Manager	Carl Armbruster	732-549-3900 Carl.armbruster@testamericainc.com	The TAL QA manager will report any issues with project samples to the PWGC PM.
Data verification issues, e.g., incomplete records	TAL QA Manager	Carl Armbruster	732-549-3900 Carl.armbruster@testamericainc.com	The TAL QA manager will report any issues with project samples to the PWGC PM.
Data validation issues, e.g., non-compliance with procedures	TAL QA Manager	Carl Armbruster	732-549-3900 Carl.armbruster@testamericainc.com	The TAL QA manager will report any issues with project samples to the PWGC PM.
Data review corrective actions	LDC PM	Christina Rink-Ashdown	760-827-1100 crink@lab-data.com	The LDC PM will report any issues with the analytical results to the TAL and PWGC PM.

QAPP Worksheet #9: Project Planning Session Summary

(UFP-QAPP Manual Section 2.5.1 and Figures 9-12)
(USEPA 2106-G-05 Section 2.2.5)

Date of planning session: February 3, 2016
Location: NYSDEC Central Office Room 919
Purpose: This meeting was conducted to define the approach for the Glen Cove Waterfront Revitalization Project

Participants:

Name	Organization	Name	Organization
D. Garbarini	USEPA	C. Bethoney	NYSDOH
S. Badalamenti	USEPA	B. Boyd	NYSDOH
L. Thantu	USEPA	M. Machol	GCIDA/GCCDA
J. Doyle	USEPA	F. DeVita	D&B
M. Ludmer	USEPA	J. VanHorn	D&B
R. Schick	NYSDEC	M. Graham	Phillips Lytle, LLP
M. Cruden	NYSDEC	A. Lacchetta	Phillips Lytle, LLP
J. Harrington	NYSDEC	F. Haftel	RXRGIP
W. Parish	NYSDEC	J. Laserson	RXRGIP
G. Burke	NYSDEC	G. Allen	RXRGIP
H. Dudek	NYSDEC		
R. Rusinco	NYSDEC		
B. Conlon	NYSDEC		

Consensus decisions made: The USEPA intends to amend the decision documents for the Li Tungsten Site and the NYSDEC intends to amend the decision documents for the Captain's Cove Site. The GCIDA in partnership with RXRGIP will submit a separate Remedial Action Scope of Work for each site to implement the amended remedy at each site.

Action Items:

Action	Responsible Party	Due Date
Amend Decision Document6s for the Li Tungsten Site	USEPA	3/7/2016

Action	Responsible Party	Due Date
Amend the Decision Documents for the Captain's Cove Site	NYSDEC	3/7/2016
Submit RASOW for Agency	GCIDA/RXRGIP	3/8/2016

QAPP Worksheet #10: Conceptual Site Model

(UFP-QAPP Manual Section 2.5.2)
(USEPA 2106-G-05 Section 2.2.5)

BACKGROUND INFORMATION

Site Location and Description

The Site is located in Glen Cove, Nassau County, New York. The Site is approximately 16.6-acres in size and is bounded by Garvies Point Road and Garvies Point Preserve to the north, Glen Cove Creek to the south, Glen Cove Angler's Club to the east, and Glen Cove Industrial Development Agency owned property to the west. Please note that the Site, as defined in this QAPP, does not include the eastern extent of the property. This portion of the Site has been remediated and is currently being utilized by the City for Ferry Terminal operations.

Site History

Beginning in the late 1950s and continuing until approximately the late 1970's, a portion of the Site was predominantly used as a "community dump" for the disposal of incinerator ash, sewage sludge, rubbish, household debris, and creek sediments. The Site was also used by local industry, including the Former Li Tungsten operation for the disposal of industrial wastes. Low levels of radioactive ore residuals from the Li Tungsten facility were disposed of on the western and eastern ends of the property. Materials dredged from Glen Cove Creek were also disposed of at the Site. Captain's Cove was purchased by Village Green Realty at Garvies Point, Inc. (Village Green Realty) in 1983 with the intention of developing a residential complex at the Site. Redevelopment efforts were abandoned in 1986 when the NYSDEC designated the property as a Class 2 Inactive Hazardous Waste Site (State Superfund Site) as a result of organic and inorganic contamination in soil and groundwater at the Site. Several condominium structures (condo shells) were partially constructed on-site prior to the State Superfund designation and were never completed. These structures were subsequently demolished by the City.

The following presents a brief summary of the regulatory history for the Site. There are a significant number of documents, including reports, correspondence, etc., related to the Site and remedial activities completed at the Site which have been compiled in a document repository located at the Glen Cove public library. The NYSDEC issued a Record of Decision (ROD) for the Site in March 1999. Additionally, due to the disposal of spent ore residuals from the Former Li Tungsten Site, a portion of the Site is also referenced accordingly in the September 1999 ROD and May 2005 Explanation of Significant Differences (ESD) issued by the USEPA for the Former Li Tungsten Site. The following provides a more detailed description of the RODs and ESD for the Site.

<u>March 1999 NYSDEC ROD</u>

The March 1999 ROD issued by the NYSDEC included the following major remedial components for the Site:

- Excavation of landfill materials and separation of waste streams into various components including: solid waste, hazardous waste, construction and demolition debris and radiological waste. The latter of the three waste streams were disposed off-site, while solid waste materials were allowed to be re-deposited at the Site given specific gradation requirements and that it would be covered with a minimum of 2-feet of clean soil or other suitable material.
- Implementation of a monitoring program (i.e., groundwater quality and soil gas) for a minimum of 5-years to verify the effectiveness of the remedy once completed; and

- Implementation of a deed restriction preventing the Site from being used for residential purposes (i.e., long term single or multi-family housing) and controls to ensure protection of public health during future subsurface activities.

September 1999 USEPA ROD

The September 1999 ROD issued by the USEPA for the Former Li Tungsten Site included a comprehensive remedy to address spent ore deposits found to exist along the western and eastern portion of the Site (otherwise known as Li Tungsten OU-2, Areas A and G). The major components of the remedy included the excavation, volume reduction and off-site disposal of waste ore residuals within these areas of the Site. As there was no evidence of groundwater being contaminated with radionuclides at the Site, no groundwater remedial alternatives were evaluated for Li Tungsten OU-2 as part of this ROD.

May 2005 USEPA ESD

The May 2005 ESD issued by the USEPA for the Former Li Tungsten Site re-evaluated the September 1999 ROD's cleanup criteria in order to address the City's decision to revise the Glen Cove Creek Revitalization Plan to include future residential use of the Site, including Li Tungsten Site OU-2. As part of the ESD, revised radiological soil cleanup objectives were issued for the Site consisting of the following: Radium-226 + Radium-228 (soil) – less than or equal to 5 pCi/g plus background level (1 pCi/g); and Thorium-230 + Thorium-232 (soil) - less than or equal to 5 pCi/g plus background level (1 pCi/g).

March 2016 NYSDEC Proposed Amended ROD and Proposed Remedial Action Plan

The Proposed Amended Record of Decision (ROD) and the Proposed Remedial Action Plan publically noticed by the NYSDEC in March 2016 included requirements for the excavation and off-site disposal of isolated pockets of residual soil contamination as delineated by the Pre-Construction Investigation Report dated March 2016 containing contaminants concentrations above the following site specific removal criteria:

1.	Arsenic	175 mg/kg
2.	Lead	660 mg/kg
3.	Radium-226	> 5 pCi/g*
4.	Thorium-232	> 5 pCi/g*
5.	Grossly Contaminated Media	As defined in 6 NYCRR Part 375-1.2(u)**
6.	Non-Aqueous Phase Liquid (NAPL)	As defined in 6 NYCRR Part 375-1.2(ac)***

* Not including the natural background radiation of nuclide of approximately 1 pCi/g

** Grossly Contaminated media means soil, sediment, surface water or groundwater which contains sources or substantial quantities of mobile contamination in the form of NAPL, as defined in subdivision 375-1.2 (ac), that is identifiable either visually, through strong odor, by elevated contaminant vapor levels or is otherwise readily detectable without laboratory analysis.

*** NAPL means a contaminant that is a liquid which may be denser or lighter than water and does not mix easily or dissolve in water, but remains as a separate phase.

It is understood that the Proposed Amended ROD and the Proposed Remedial Action Plan publically noticed by the NYSDEC in March 2016, including respective SSRC listed above, are preliminary and subject to public review/comment and final issuance. Therefore, the work conducted under this SOW will be conducted at risk and is subject to revision until final issuance of the decision documents for the Site.

NATURE AND EXTENT OF CONTAMINATION

The following section describes the investigative techniques used to determine the nature and extent of contamination identified at the subject property.

Identification of Source Areas

Sampling conducted at the subject property identified arsenic, lead and grossly contaminated media in several of the subsurface soil samples collected across the subject property.

Extent of Contamination in Soil

The following sample locations contain constituents in exceedance of the site specific Remedial Action Removal Criteria:

- CC-C-004 (Lead)
- CC-C-008 (Lead)
- CC-C-017 (Arsenic)
- CC-C-019 (Arsenic & Lead)
- CC-C-022 (Arsenic)
- CC-C-023 (Lead)
- CC-C-028 (Arsenic & Lead)
- CC-C-029 (Lead)
- CC-C-030 (Lead)
- CC-C-048 (Lead)
- CC-C-051 (Grossly Contaminated Media)
- CC-GI-006 (Lead)
- CC-GI-007 (Lead)
- D2 (Grossly Contaminated Media)

QUALITATIVE EXPOSURE ASSESSMENT

The following sections discuss the qualitative exposure assessments. The qualitative exposure assessments include an evaluation of contaminant sources, potential receptors and contaminant release and transport.

Human Health Exposure Assessment

Appearance and odor vary depending upon the specific organic arsenic. Arsenic may have an adverse effect on human health and can be inhaled, ingested, or absorbed through the skin/eyes. Chronic exposures may have effects on the gastrointestinal tract, reproductive system and liver.

Lead may appear as a bluish-white or silvery-grey solid in various forms. The substance, when heated releases toxic fumes. Lead can have an adverse effect on human health and can be absorbed after inhalation or oral exposure. Chronic exposure may have effects on the blood, bone marrow, central nervous system, resulting in anemia.

Potential Receptor Populations

The subject property is within an area containing a mix of commercial and industrial uses. The area is served by municipal water.

Contaminant Release and Transport

Metals are present in the subsurface soil at the subject property. Spread and migration of subsurface soil is unlikely.

Points of Exposure

There are no plausible off-site pathways for oral, inhalation, or dermal exposure to metals from the contamination identified at the subject property. The only possible on-site exposure pathways are by ingestion or dermal exposure by a trespasser, an employee, or worker at the subject property. Ingestion and dermal exposure would not likely be extensive given the intermittent nature of exposure. Contaminants would most likely be transferred from surfaces containing residual soil (an article of clothing or object such as equipment) that have come into contact with contaminated soil and not through direct ingestion of or contact with the contaminated soil.

QAPP Worksheet #11: Project/Data Quality Objectives

(UFP-QAPP Manual Section 2.6.1)
(USEPA 2106-G-05 Section 2.2.6)

State the Problem

Arsenic, Lead, and grossly contaminated media have been detected in the subsurface soils at the subject property in excess of Remedial Action Removal Criteria. It is believed that the contaminants are a result of historical site operations.

The USEPA/NYSDEC have requested that the contaminants be removed from the subject site to allow for restricted-residential redevelopment.

Identify the Goals of the Remedy

The goal of this remedial program is to remove contaminated materials identified at the Site in excess of the Remedial Action Removal Criteria to facilitate the redevelopment of the Site for restricted-residential purposes.

Identify Information Inputs

To support the above objectives, the following data will be collected:

- Validated soil sample analytical data.
- Geospatial data of sampling locations.
- Field documentation and photographs of site activities.

Define the Boundaries of the Remedy

Spatial Boundaries: The Site is located in Glen Cove, Nassau County, New York. The Site is approximately 16.6-acres in size and is bounded by Garvies Point Road and Garvies Point Preserve to the north, Glen Cove Creek to the south, Glen Cove Angler's Club to the east, and Glen Cove Industrial Development Agency owned property to the west.

Temporal Boundaries: The data collected will represent existing conditions after impact has been removed. A sampling schedule and sampling plan is included in Worksheets 14, 16, and 17.

Practical Constraints on Data Collection: Scheduling adjustments will be made if physical constraints on planned field events occur due to weather, safety considerations, or problems that may impact the technical quality of the measurements or samples.

Develop the Analytic Approach

Samples will be collected from locations designated in the Scope of Work (SOW). Confirmatory soil samples will be analyzed for the suite of constituents identified at each excavation as specified below:

- Metals remediation areas will be analyzed for arsenic and lead by USEPA Method 6010; and,

- Grossly contaminated media areas will be analyzed for Volatile Organic Compounds (VOCs) by USEPA Method 8260 and Semi-volatile Organic Compounds (SVOCs) by USEPA Method 8270, in addition to arsenic and lead by USEPA Method 6010.

Specify Performance or Acceptance Criteria

All data will be reviewed and verified to ensure that they are acceptable for the intended use. All data will be validated in accordance with the procedures specified in Worksheet 36. QC criteria for analytical data are listed in Worksheet 28.

Decision errors will be limited to the extent practicable by following approved USEPA methods and applicable SOPs listed in Worksheet #21. Any deviation from the QAPP will be documented.

Develop the Detailed Plan for Obtaining Data

Soil samples will be collected at the locations detailed in the RAWP. Worksheets 17, 18, 20, and 21 present the sampling design and procedures.

Worksheets 19, 20, 24-28 and 30 specify analytical requirements. Data from the laboratories will be delivered in electronic data deliverable (EDD) and Adobe pdf format. The data will be documented in a Construction Completion Report (CCR).

QAPP Worksheet #12A: Measurement Performance Criteria

(UFP-QAPP Manual Section 2.6.2)
(USEPA 2106-G-05 Section 2.2.6)

Laboratory: TAL
Matrix: Soil
Analytical Group or Method: Volatile Organics, 8260C
Concentration Level: All

Data Quality Indicator (DQI)	QC sample or measurement performance activity	Measurement Performance Criteria
Overall Precision	Field Duplicates	1 per 20 samples per matrix Relative Percent Difference (RPD) ≤ 30% when metals are detected in both samples ≥ sample-specific Limit of Quantitation (LOQ)
Accuracy	Tuning	Every 12 hours. Injection of BFB evaluated against method tune criteria (Table 3 of EPA 8260C)
Accuracy	Initial Calibration (ICAL)	Initially and when CCV fails Minimum 5-standards; must contain all targets and lowest standard ≤RL. % RSD ≤ 20% for all compounds and minimum RF found in Table 4 of method or 'r' ≥0.99.
Accuracy	Initial Calibration Verification (ICV)	Daily after calibration. Separate-source from calibration standards; Must contain all target analytes at the mid-range of the calibration curve ICV: 80-120% recovery.
Accuracy	Continuing Calibration Verification (CCV)	1 every 10 samples and at end of run Concentration level near mid-point of ICAL curve containing all target compounds; minimum RRF criteria met. % D of ≤ 20% for all compounds.
Accuracy &	Method Blank (MB)	1 per batch - not to exceed 20 field samples

Sensitivity (Contamination)		MB: < RL
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	1 per batch - not to exceed 20 field samples Must contain all target analytes and be matrix-specific; Evaluate against lab generated recovery limits.
Analytical Accuracy/Bias (laboratory)	Matrix Spike	1 per ≤20 field samples per matrix (when requested) Must be performed on a Site field sample & must contain all target analytes. Evaluate against lab generated recovery limits.
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	1 per ≤20 field samples per matrix (when requested) RPD: <30%
Accuracy	Surrogates	Every sample including QC Minimum of 3 surrogates. Evaluate recovery against lab generated limits.
Accuracy	Internal Standards (IS)	Every sample including QC. Minimum of 3 internal standards. Areas 50-200% of the most recent midpoint CCV standard. Retention times ±30 seconds from midpoint ICAL standard.
Accuracy (preservation)	Sample preservation	Soil/Sediment: < 6º C per SW-846 Chapter 3 Table 3-2 but allow for < 2º C if freezing samples are intact. Preserve per SW5035A within 48 hours of sampling.
Overall accuracy/bias (contamination)	Equipment Blanks	1 per 20 samples per matrix or 1 per day for non-dedicated sampling equipment No target analyte concentrations ≥ 1/2 LOQ
Completeness	See Worksheet #34	See Worksheet #34

QAPP Worksheet #12B: Measurement Performance Criteria

(UFP-QAPP Manual Section 2.6.2)
(USEPA 2106-G-05 Section 2.2.6)

Laboratory: TAL
Matrix: Soil
Analytical Group or Method: Semi-volatile Organics, 8270D
Concentration Level: All

Data Quality Indicator (DQI)	QC sample or measurement performance activity	Measurement Performance Criteria
Overall Precision	Field Duplicates	1 per 20 samples per matrix RPD ≤ 30% when metals are detected in both samples ≥ sample-specific LOQ
Accuracy	Tuning	Every 12 hours. Injection of DFTPP evaluated against method tune criteria (Table 3 of EPA 8270D)
Accuracy	Initial Calibration (ICAL)	Initially and when CCV fails Minimum 5-standards; must contain all targets and lowest standard ≤RL. % RSD ≤ 20% for all compounds and minimum RF found in Table 4 of method or 'r' ≥0.99.
Accuracy	Initial Calibration Verification (ICV)	Daily after calibration. Separate-source from calibration standards; Must contain all target analytes at the mid-range of the calibration curve ICV: 80-120% recovery.
Accuracy	Continuing Calibration Verification (CCV)	1 every 10 samples and at end of run Concentration level near mid-point of ICAL curve containing all target compounds; minimum RRF criteria met. % D of ≤ 20% for CCCs and 30% for all other compounds.

Accuracy & Sensitivity (Contamination)	Method Blank (MB)	1 per batch - not to exceed 20 field samples MB: < RL
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	1 per batch - not to exceed 20 field samples Must contain all target analytes and be matrix-specific; Evaluate against lab generated recovery limits.
Analytical Accuracy/Bias (laboratory)	Matrix Spike	1 per ≤20 field samples per matrix (when requested) Must be performed on a Site field sample & must contain all target analytes. Evaluate against lab generated recovery limits.
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	1 per ≤20 field samples per matrix (when requested) RPD:<30%
Accuracy	Surrogates	Every sample including QC Minimum of 3 base neutral and 3 acid surrogates. Evaluate recovery against lab generated limits.
Accuracy	Internal Standards (IS)	Every sample including QC. Minimum of 6 internal standards. Areas 50-200% of the most recent midpoint CCV standard. Retention times ±30 seconds from midpoint ICAL standard.
Accuracy (preservation)	Sample preservation	Soil/Sediment: < 6º C per SW-846 Chapter 3 Table 3-2 but allow for <2º C if freezing samples are intact
Overall accuracy/bias (contamination)	Equipment Blanks	1 per 20 samples per matrix or 1 per day for non-dedicated sampling equipment No target analyte concentrations ≥ 1/2 LOQ
Completeness	See Worksheet #34	See Worksheet #34

QAPP Worksheet #12C: Measurement Performance Criteria

(UFP-QAPP Manual Section 2.6.2)
(USEPA 2106-G-05 Section 2.2.6)

Laboratory: TAL
Matrix: Soils and Water
Analytical Group or Method: Metals, 6010C
Concentration Level: All

Data Quality Indicator (DQI)	QC sample or measurement performance activity	Measurement Performance Criteria
Overall Precision	Field Duplicates	1 per 20 samples per matrix RPD ≤ 30% when metals are detected in both samples ≥ sample-specific LOQ
Accuracy	Initial Calibration (ICAL)	Daily prior to sample analysis. Minimum of a calibration blank plus a standard per manufacturing recommended procedures; RL standard may be included in multipoint calibration curve; linear curve fit with correlation coefficient >0.998.
Accuracy	Initial Calibration Verification (ICV)	Daily after calibration. Separate-source from calibration standards; Must contain all target analytes at the mid-range of the calibration curve ICV: 90-110% recovery.
Sensitivity	Low Level Initial CalibrationCheck Verification (LLICV)	At the beginning of the run before any samples and at the end of the run. Same source as calibration standards; must contain all target analytes at level of the RL LLCV: 70-130% recovery
Accuracy	Interference Check Standards (ICSA and ICSAB)	Daily after calibration.

		ICSA & ICSB: 80-120% recovery ICSA: non-spiked analytes < 2x RL
Accuracy	Continuing Calibration Verification (CCV)	1 every 10 samples and at end of run Same source as initial calibration standards; Must contain all target analytes at the mid-range of the calibration curve CCV: 90 - 110% recovery
Accuracy & Sensitivity (Contamination)	Method Blank (MB)	1 per digestion batch - not to exceed 20 field samples Must be digested with samples using same preparation method and amount of acids; MB: < RL
Analytical Precision (laboratory)	Sample Duplicates	1 per < 20 field samples if an MS/MSD was not performed RPD: <20% RPD aqueous; <35% solids; If results <5xRL: absolute difference between result and RL.
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	1 per digestion batch - not to exceed 20 field samples Must contain all target analytes and be matrix-specific; Aqueous LCS: 80-120% recovery; Soil/Sediment/Solid LCS: vendor control limits (95% confidence limits)
Analytical Accuracy/Bias (laboratory)	Matrix Spike	1 per ≤20 field samples per matrix (when requested) Must be performed on a Site field sample & must contain all target analytes. 75-125% recovery (professional judgment if sample concentration is ≥ 4x spike concentration)
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicates	1 per ≤20 field samples per matrix (when requested) RPD: <20% RPD aqueous; <35% solids; If results <5xRL: absolute difference between result and RL.
Accuracy	Post-Digestion Spike	1 per < 20 field samples if less than acceptable accuracy and

		precision data are generated. Should be performed if MS/MSD recoveries were unacceptable: 80-120% recovery
Accuracy	Serial Dilution	1 per < 20 field samples if less than acceptable accuracy and precision data are generated Perform 5x dilution on same sample used for MS % Difference < 10% for results >10x RL.
Accuracy (preservation)	Sample preservation	Aq.: Total Metals: HNO3 pH < 2; (Dissolved Metals: filter on site or at the lab then HNO3 pH < 2 but cannot be used for regulatory compliance) Soil/Sediment: collect unpreserved per SW-846 Chapter 3 Table 3-2
Overall accuracy/bias (contamination)	Equipment Blanks	1 per 20 samples per matrix or 1 per day for non-dedicated sampling equipment No target analyte concentrations ≥ 1/2 LOQ
Completeness	See Worksheet #34	See Worksheet #34

QAPP Worksheet #12D: Measurement Performance Criteria

(UFP-QAPP Manual Section 2.6.2)
(USEPA 2106-G-05 Section 2.2.6)

Laboratory: TAL
Matrix: Soils
Analytical Group or Method: RA-226 by Gamma Spectroscopy, HASL 300-GA-01-R
Concentration Level: All

Data Quality Indicator (DQI)	QC sample or measurement performance activity	Measurement Performance Criteria
Overall Precision	Field Duplicates	1 per 20 samples per matrix Relative Percent Difference (RPD) ≤ 40%
Accuracy	Initial Calibration (ICAL) for Energy and FWHM	Annual calibration Within 0.5% or 0.1 KeV for all calibration points. Verified with second source that contains at least Am-241, Co-60, and Cs-137
Accuracy	Background	Monthly Acceptance criterion is 12 hours to determine background levels
Accuracy & Sensitivity (Contamination)	Method Blank (MB)	1 per batch - not to exceed 20 field samples MB: < RL
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	1 per batch - not to exceed 20 field samples Must contain one isotope for low, mid, and high range energies; Evaluate against lab generated recovery limits.
Precision	Sample Duplicate	1 per ≤20 field samples per matrix (when requested) Must be performed on a Site field sample Evaluate against lab generated precision limits.
Accuracy (preservation)	Sample preservation	Soil/Sediment: no preservation required

Completeness	See Worksheet #34	See Worksheet #34

QAPP Worksheet #12E: Measurement Performance Criteria

(UFP-QAPP Manual Section 2.6.2)
(USEPA 2106-G-05 Section 2.2.6)

Laboratory: TAL
Matrix: Soils
Analytical Group or Method: Th-232 by Alpha Spectrometry, HASL 300-A-01-R
Concentration Level: All

Data Quality Indicator (DQI)	QC sample or measurement performance activity	Measurement Performance Criteria
Overall Precision	Field Duplicates	1 per 20 samples per matrix Relative Percent Difference (RPD) ≤ 40%
Accuracy	Energy Calibration and efficiency calibration and background check	Monthly Three isotopes in 3-6 meV range all within +/- 40 KeV of expected value. Greater than 20% efficiency.
Accuracy	Pulser check and background check	Daily Pulser energy, peak centroid, peak resolution, peak area, calibration and background must pass statistical "boundary" out-of-range test
Accuracy & Sensitivity (Contamination)	Method Blank (MB)	1 per batch - not to exceed 20 field samples MB: < RL
Analytical Accuracy/Bias (laboratory)	Laboratory Control Samples	1 per batch - not to exceed 20 field samples Evaluate against lab generated recovery limits.
Precision	Sample Duplicate	1 per ≤20 field samples per matrix (when requested) Must be performed on a Site field sample Evaluate against lab generated precision limits.
Accuracy	Tracer	Every sample including QC

		Evaluate recovery against lab generated limits.
Accuracy (preservation)	Sample preservation	Soil/Sediment: no preservation required
Completeness	See Worksheet #34	See Worksheet #34

QAPP Worksheet #13: Secondary Data Uses and Limitations

(UFP-QAPP Manual Section 2.7)

(USEPA 2106-G-05 Chapter 3: QAPP Elements for Evaluating Existing Data)

Sources and types of secondary data include but are not limited to the following:

Data type	Source	Data uses relative to current project	Factors affecting the reliability of data and limitations on data use
Concentrations of metals in soil	Final Remedial Investigation Report (1999)	Comparison to metals concentrations in surface and subsurface soils.	NA
Concentrations of metals / grossly contaminated media in soil	Glen Isle Verification Program Certification Sampling Event #1 (2004)	Comparison to metals / grossly contaminated media concentrations in surface and subsurface soils.	NA
Concentrations of metals / grossly contaminated media in soil	Pre-Construction Confirmatory/Insurance Data Gap Subsurface Investigation Report (2014)	Comparison to metals / grossly contaminated media concentrations in surface and subsurface soils.	NA
Concentrations of metals in soil	Draft Contaminated Material Assessment Report (2015)	Comparison to metals concentrations in surface and subsurface soils.	NA
Concentrations of metals in soil	Leachable Arsenic and Lead Sampling Report (2015)	Comparison to metals concentrations in surface and subsurface soils.	NA
Concentrations of metals in soil	Pre-Construction Confirmatory/Insurance Data Gap Subsurface Investigation Report Addendum 1(2016)	Comparison to metals concentrations in surface and subsurface soils.	NA
Concentrations of metals in soil	Synthetic Precipitation Leaching Procedure Investigation/Red Flag Area Characterization Report (2016)	Comparison to metals concentrations in surface and subsurface soils.	NA

The project team has carefully evaluated the quality of secondary data (in terms of precision, bias, representativeness, comparability, and completeness) to ensure they are of the type and quality necessary to support their intended uses. When evaluating the reliability of secondary data and determining limitations on their uses, the project team will consider the source of the data, the time period during which they were collected, data collection methods, potential sources of uncertainty, the type of supporting documentation available, and the comparability of data collection methods to the currently proposed methods. With respect to secondary analytical data that will be utilized to support critical

decisions, such as comparison of contaminant levels with applicable standards, a detailed review of the data will be necessary to determine the usability of the data. In addition to the qualitative rating of the data source, the project team should complete a data quality review and document the review in a data usability summary. The protocol for completing the data usability report is provided in Worksheet 37.

In accordance with USEPA guidance documents *A Summary of General Assessment Factors for Evaluating the Quality of Scientific and Technical Information* (June 2003) and *Guidance for Evaluating and Documenting the Quality of Existing Scientific and Technical Information* (December 2012) (Appendix Q), the following assessment factors will be utilized to assess the quality and relevance of scientific and technical information:

1. Soundness – the extent to which the scientific and technical procedures, measures, methods or models employed to generate the information are reasonable for, and consistent with, the intended application.
2. Applicability and Utility – the extent to which the information is relevant for the Agency's intended use.
3. Clarity and Completeness – the degree of clarity and completeness with which the data, assumptions, methods, QA, sponsoring organizations and analyses employed to generate the information are documented.
4. Uncertainty and Variability – the extent to which the variability and uncertainty (quantitative and qualitative) in the information or in the procedures, measures, methods or models are evaluated and characterized.
5. Evaluation and Review – the extent of independent verification, validation and peer review of the information or of the procedures, measures, methods or models.

QAPP Worksheet #14/16: Project Tasks & Schedule

(UFP-QAPP Manual Section 2.8.2)
(USEPA 2106-G-05 Section 2.2.4)

Activity	Responsible party	Planned start date	Planned completion date	Deliverable(s)	Deliverable due date
Project Initiation	USEPA/NYSDEC/PWGC/COGC	February 3, 2016	February 3, 2016	NA	NA
Develop RAWP/QAPP	PWGC	February 3, 2016	May 9, 2016	SOW/QAPP	May 9, 2016
Mobilization/demobilization	PWGC/Posillico	September 09, 2016	September 23, 2016	Field notes	NA
Sample collection Tasks	PWGC	September 09, 2016	September 23, 2016	Field notes	TBD
Analysis	TAL	September 10, 2016	September 23, 2016	Report of Analyses/Data package	1 Days from receipt
Validation	LDC	September 13, 2016	September 23, 2016	Validation Summary report	3 Days from receipt
Summarize data	PWGC	September 10, 2016	Daily or as needed	Daily Update/CCR	September 30, 2016

QAPP Worksheet #15: Project Action Limits and Laboratory-Specific Detection/Quantitation Limits

(UFP-QAPP Manual Section 2.6.2.3 and Figure 15)
(USEPA 2106-G-05 Section 2.2.6)

Matrix: Soil
Analytical Method: 6010C
Concentration level (if applicable): Low

Analyte	CAS Number	Remedial Action Removal Criteria (mg/kg)	Achievable Laboratory limits	
			Method Detection Limits (MDLs) (mg/kg)	Reporting Limits (RLs) (mg/kg)
Arsenic	7440-38-2	175	0.000983	0.003
Lead	7439-92-1	660	0.000785	0.002

Matrix: Soil
Analytical Method: 8260C
Concentration level (if applicable): Low

Analyte	CAS Number	Remedial Action Removal Criteria (mg/kg)	Achievable Laboratory limits	
			Method Detection Limits (MDLs) (mg/kg)	Reporting Limits (RLs) (mg/kg)
1,1,1-Trichloroethane	71-55-6		0.00038	0.001
1,1-Dichloroethane	75-34-3		0.00034	0.001
1,1-Dichloroethene	75-35-4		0.00041	0.001
1,2-Dichloroethane	107-06-2		0.00011	0.001
Cis-1,2-Dichloroethene	156-59-2		0.00022	0.001
Trans-1,2-Dichloroethene	156-60-5		0.00039	0.001
1,3-Dichlorbenzene	541-73-1		0.00012	0.001
1,4-Dichlorobenzene	106-46-7		0.00013	0.001
1,4-Dioxane	123-91-1		0.00639	0.02

Analyte	CAS Number	Remedial Action Removal Criteria (mg/kg)	Achievable Laboratory limits	
			Method Detection Limits (MDLs) (mg/kg)	Reporting Limits (RLs) (mg/kg)
Acetone	67-64-1		0.00106	0.005
Benzene	71-43		0.0002	0.001
n-Butylbenzene	104-51-8		0.00021	0.001
Carbon Tetrachloride	56-23-5		0.00043	0.001
Chlorobenzene	108-90-7		0.00014	0.001
Chloroform	67-66-3		0.00021	0.001
Ethylbenzene	100-41-4		0.00018	0.001
Methy Ethyl Ketone	78-93-3		0.00077	0.005
Methyl Tert-butyl Ether	1634-04-4		0.00017	0.001
Methylene Chloride	75-09-2		0.00032	0.001
n-Propylbenzene	103-65-1		0.00018	0.001
Sec-Butylbenzene	135-98-8		0.00017	0.001
Tert-Butylbenzene	98-06-6		0.00034	0.001
Tetrachloroethene	127-18-4		0.00028	0.001
Toluene	108-88-3		0.00019	0.001
1,2,4-Trimethylbenzene	95-636		0.00034	0.001
1,3,5-Trimethylbenzene	108-67-8		0.00013	0.001
Vinyl Chloride	75-01-4		0.00039	0.001
Xylenes (mixed)	1330-20-7		0.00011	0.002

Matrix: Soil
Analytical Method: 8270D
Concentration level (if applicable): Low

Analyte	CAS Number	Remedial Action Removal Criteria (mg/kg)	Achievable Laboratory limits	
			Method Detection Limits (MDLs) (mg/kg)	Reporting Limits (RLs) (mg/kg)
Acenaphthene	83-32-9		0.008	0.33
Acenapthylene	208-96-8		0.0085	0.33
Anthracene	120-12-7		0.0314	0.33
Benzo(a)anthracene	56-55-3		0.0276	0.033
Benzo(a)pyrene	50-32-8		0.01	0.033
Benzo(b)fluoranthene	205-99-2		0.0129	0.033
Benzo(g,h,i)perylene	191-24-2		0.019	0.33
Benzo(k)fluoranthene	207-08-9		0.0144	0.033
Chrysene	218-01-9		0.009	0.33
Dibenzo(a,h)anthracene	53-70-3		0.0172	0.033
Fluoranthene	206-44-0		0.0098	0.33
Fluorene	86-73-7		0.0072	0.33
Hexachlorobenzene	118-74-1		0.0134	0.033
Indeno(1,2,3-cd)pyrene	193-39-5		0.022	0.033
m-Cresol	108-39-4		0.009	0.33
Naphthalene	91-20-3		0.0084	0.33
o-Cresol	95-48-7		0.0144	0.33
p-Cresol	106-44-5		0.009	0.33
Pentachlorophenol	87-86-5		0.04	0.266
Phenanthrene	85-01-8		0.0088	0.33

Analyte	CAS Number	Remedial Action Removal Criteria (mg/kg)	Achievable Laboratory limits	
			Method Detection Limits (MDLs) (mg/kg)	Reporting Limits (RLs) (mg/kg)
Phenol	108-95-2		0.0108	0.33
Pyrene	129-00-0		0.015	0.33

Matrix: Soil
Analytical Method: Alpha Spec and Gamma Spec
Concentration level (if applicable): Low

Analyte	CAS Number	Remedial Action Removal Criteria (pCi/g)	Achievable Laboratory limits	
			Method Detection Limits (MDLs) (pCi/g)	Target MDC (RLs) (pCi/g)
Thorium-232	7440-29-1	5	N/A	1.0
Radium-226	13982-63-3	5	N/A	1.0

QAPP Worksheet #17: Sampling Design and Rationale

(UFP-QAPP Manual Section 3.1.1)
(USEPA 2106-G-05 Section 2.3.1)

As part of the SOW, PWGC is tasked with the collection of post-excavation confirmatory samples. Samples will be collected to confirm achievement of Remedial Action Removal Criteria both horizontally and vertically. The samples collected will be submitted to an Environmental Laboratory Approval Program (ELAP) laboratory.

CONFIRMATORY SAMPLING

Following removal of impacted soils, confirmatory soil samples will be collected from each excavation area to confirm the effectiveness of remedial activities. Confirmatory soil samples will be collected in accordance with NYSDEC DER-10.

As specified in DER-10, verification sampling will consist of collecting confirmatory soil samples from within each excavation area. DER-10 specifies a sampling frequency of one bottom sample from each excavation for every 900 square feet of bottom, and one sidewall sample for every 30 linear feet of sidewall. A minimum of four sidewall samples and one bottom sample will be collected from each excavation area. Should the excavation expand, additional sidewall and bottom samples will be collected at the frequency specified above. Note that sidewall samples will be collected from each zone of contamination in the event that multiple contamination zones exist for the respective excavation.

Confirmatory soil samples will be analyzed for the suite of constituents identified at each excavation as specified below:

- Metals remediation areas will be analyzed for arsenic and lead by USEPA Method 6010; and,
- Grossly contaminated media areas will be analyzed for VOCs by USEPA Method 8260 and SVOCs by USEPA Method 8270, in addition to arsenic and lead by USEPA Method 6010.
- If any areas exceed radiological action levels they will also be analyzed for radium-226 and thorium-232 by Method A-01-R-Isotopic Thorium (Alpha Spectrometry) and Method GA-01-R-Radium-226 & Other Gamma Emitters, as applicable.

Samples collected for volatile organic analysis will be collected utilizing tera-core sampling devices. The remaining sample volume will be transferred to a stainless steel bowl and homogenized. Once homogenized, samples will be transferred to laboratory supplied glassware, packed in a cooler with ice and shipped under proper chain-of-custody procedures to a New York State Department of Health (NYSDOH) ELAP certified laboratory for analysis in accordance with NYSDEC Analytical Services Protocol (ASP) Category B Data Deliverable packages and EDDs, in EQuIS format will be furnished by the laboratory.

All non-disposable sampling equipment used during field-sampling activities will be decontaminated in accordance to USEPA/Environmental Response Team (ERT) SOP #2006 prior to and subsequent to sampling (See Attachment B). Decontamination of sampling equipment will be conducted as follows:

1. Alconox detergent and potable water scrub.
2. Potable water rinse.
3. Deionized water rinse.
4. Air dry (sufficient time will be allowed for the equipment to completely dry).
5. Deionized water rinse and air dry.

Management of Investigation Derived Waste

Waste materials generated from the field operations may consist of decontamination water and miscellaneous solid materials such as personal protective equipment and supplies. Investigative derived waste generated during field operations will be disposed of in accordance with applicable regulations.

Decontamination water generated during the field activities will be stored in 55-gallon drums. Drums will be labeled to indicate the source of the fluid and will be stored in a designated area onsite. Drummed liquids will be sampled to determine if discharge to the surface of the site is appropriate or off-site disposal is required. Following receipt of the liquid sampling results, recommendations for disposition of the water will be provided to USEPA/NYSDEC.

QAPP Worksheet #18: Sampling Locations and Methods

(UFP-QAPP Manual Section 3.1.1 and 3.1.2)
(USEPA 2106-G-05 Section 2.3.1 and 2.3.2)

Sample ID	Matrix[1]	Depth (feet bgs)	Type	Analyte/ Analytical Group	Sampling SOP	Comments
CC-C-004_N_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-004_N_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-004_S_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-004_S_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-004_E_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-004_E_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-004_W_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-004_W_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-004_B_001	Soil	10-10.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-008_N_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-008_S_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-008_E_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-008_W_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-008_B_001	Soil	8-8.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-017_N_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-017_S_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-017_E_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	

Sample ID	Matrix[1]	Depth (feet bgs)	Type	Analyte/ Analytical Group	Sampling SOP	Comments
CC-C-017_W_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-017_B_001	Soil	2-2.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-019_N_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-019_S_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-019_E_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-019_W_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-019_B_001	Soil	2-2.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-022_N_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-022_N_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-022_S_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-022_S_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-022_E_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-022_E_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-022_W_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-022_W_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-022_B_001	Soil	4-4.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-023_N_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-023_S_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-023_E_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-023_W_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-023_B_001	Soil	8-8.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-028_N_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	

Sample ID	Matrix[1]	Depth (feet bgs)	Type	Analyte/ Analytical Group	Sampling SOP	Comments
CC-C-028_S_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-028_E_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-028_W_001	Soil	0-2’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-028_B_001	Soil	2-2.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-029_N_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-029_S_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-029_E_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-029_W_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-029_B_001	Soil	10-10.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-030_N_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-030_S_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-030_E_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-030_W_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-030_B_001	Soil	10-10.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-048_N_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-048_S_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-048_E_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-048_W_001	Soil	8-10’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-048_B_001	Soil	10-10.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-C-051_N_001	Soil	8-10’	Hand Auger	VOCs,SVOCs,As&Pb	USEPA/ERT SOP2001	
CC-C-051_S_001	Soil	8-10’	Hand Auger	VOCs,SVOCs,As&Pb	USEPA/ERT SOP2001	
CC-C-051_E_001	Soil	8-10’	Hand Auger	VOCs,SVOCs,As&Pb	USEPA/ERT SOP2001	

Sample ID	Matrix[1]	Depth (feet bgs)	Type	Analyte/ Analytical Group	Sampling SOP	Comments
CC-C-051_W_001	Soil	8-10’	Hand Auger	VOCs,SVOCs,As&Pb	USEPA/ERT SOP2001	
CC-C-051_B_001	Soil	10-10.5’	Hand Auger	VOCs,SVOCs,As&Pb	USEPA/ERT SOP2001	
CC-GI-006_N_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-006_S_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-006_E_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-006_W_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-006_B_001	Soil	4-4.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_N_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_N_001	Soil	4-6’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_N_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_S_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_S_001	Soil	4-6’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_S_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_E_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_E_001	Soil	4-6’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_E_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_W_001	Soil	2-4’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_W_001	Soil	4-6’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_W_001	Soil	6-8’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
CC-GI-007_B_001	Soil	8-8.5’	Hand Auger	As & Pb	USEPA/ERT SOP2001	
D2_N_001	Soil	2-3’	Hand Auger	VOCs,SVOCs,As&Pb	USEPA/ERT SOP2001	
D2_S_001	Soil	2-3’	Hand Auger	VOCs,SVOCs,As&Pb	USEPA/ERT SOP2001	

Sample ID	Matrix[1]	Depth (feet bgs)	Type	Analyte/ Analytical Group	Sampling SOP	Comments
D2_E_001	Soil	2-3’	Hand Auger	VOCs,SVOCs,As&Pb	USEPA/ERT SOP2001	
D2_W_001	Soil	2-3’	Hand Auger	VOCs,SVOCs,As&Pb	USEPA/ERT SOP2001	
D2_B_001	Soil	3-3.5’	Hand Auger	VOCs,SVOCs,As&Pb	USEPA/ERT SOP2001	

QAPP Worksheet #19 & 30: Sample Containers, Preservation, and Hold Times
(UFP-QAPP Manual Section 3.1.2.2)
(USEPA 2106-G-05 Section 2.3.2)

Laboratory: TAL
Address: 777 New Durham Road, Edison, NJ 08817
Contact: John Schove
Email: john.schove@testamericainc.com
Phone: 716-504-9838

List any required accreditations/certifications: NYSDEC ELAP

Back-up Laboratory: American Analytical Laboratories

Sample Delivery Method: Courier

Analyte/ Analyte Group	**Matrix**	**Method/ SOP**	**Accreditation Expiration Date**	**Container(s) (number, size & type per sample)**	**Preservation**	**Preparation Holding Time**	**Analytical Holding Time**	**Data Package Turnaround**
As, Pb	Soil	EPA 6010C	01 Apr 2016	4 oz, amber glass	Metals ex.	6 months	6 months	1 Day
VOCs	Soil	EPA 8260C	01 Apr 2016	3 x 40 ml VOA vial	1 x Methanol 2 x DI H2O	48 hours	14 Days	1 Day
SVOCs	Soil	EPA 8270D	01 Apr 2016	4 oz, amber glass	Cool $\leq$ 6 ^{o}C	14 Days	14 Days	1 Day
Ra-226 / Gamma Spec	Soil	HASL 300 GA-01-R	30 June 2016	32 oz, plastic	None	None	180 days	30 days
Th-232 / Alpha Spec	Soil	HASL 300 A-01-R	30 June 2016	4 oz, plastic	None	None	180 days	30 days

QAPP Worksheet #20: Field QC Summary

(UFP-QAPP Section 3.1.1 and 3.1.2)
(USEPA 2106-G-05 Section 2.3.5)

Matrix	Analyte/Analytical Group	Field Samples	Field Duplicates	Matrix Spikes	Matrix Spike Duplicates	Field Blanks	Equipment Blanks	Trip Blanks	Other	Total # analyses
Soil	As, Pb	86	5	5	5	5	5	0	N/A	111
Soil	VOCs	10	1	1	1	1	1	1	N/A	16
Soil	SVOCs	10	1	1	1	1	1	0	N/A	15
Soil	Ra-226	0	0	0	0	0	0	0	N/A	0
Soil	Th-232	0	0	0	0	0	0	0	N/A	0

QAPP Worksheet #21: Field SOPs

(UFP-QAPP Manual Section 3.1.2)
(USEPA 2106-G-05 Section 2.3.2)

SOP # or reference	Title, Revision, Date, and URL (if available)	Originating Organization	SOP option or Equipment Type (if SOP provides different options)	Modified for Project? Y/N	Comments
2001	General Field Sampling Guidelines, Revision 0, August 11, 1994	ERT – USEPA	NA	N	
2006	Sampling Equipment Decontaminations, Revision 0, August 11, 1994	ERT – USEPA	NA	N	

QAPP Worksheet #22: Field Equipment Calibration, Maintenance, Testing, and Inspection

(UFP-QAPP Manual Section 3.1.2.4)
(USEPA 2106-G-05 Section 2.3.6)

Field Equipment	Activity	SOP Reference	Title or position of responsible person	Frequency	Acceptance Criteria	Corrective Action
Photo-ionization Detector	Screening	Manufacturer Reference	PWGC FTL	Check daily before each use	Pass/fail	Return to rental company for replacement
Dust Meter	Monitoring	Manufacturer Reference	PWGC FTL	Check daily before each use	Pass/Fail	Return to rental company for replacement

QAPP Worksheet #23: Analytical SOP's

(UFP-QAPP Manual Section 3.2.1)
(USEPA 2106-G-05 Section 2.3.4)

Laboratory: TAL

SOP #	Title, Date, and URL (if available)	Definitive or Screening Data	Matrix/Analytical Group	SOP Option or Equipment Type	‡Modified for Project? Y/N
ED-MT-004	Trace Metals Analysis by Inductively Coupled Plasma Emission Spectroscopy by using SW846 Method 6010B and 6010C	Definitive	Soil and Aqueous/Metals	ICP-AES	N
ED-MTP-005	Hot Block Digestion of Sediments, Sludges, and Soils using SW846 Method 3050B	Definitive	Soil/Metals	Prep	N
ED-MTP-003	Digestion of Water and Wastewater Samples for Analysis by ICP using Method 3010A	Definitive	Soil/Aqueous	Prep	N
ED-MSV-014	SW846 Method 8260C Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry	Definitive	Soil and Aqueous/Volatile Organics	Purge and Trap GC-MS	N

SOP #	Title, Date, and URL (if available)	Definitive or Screening Data	Matrix/Analytical Group	SOP Option or Equipment Type	‡Modified for Project? Y/N
ED-MSV-002	SW846 Method 5035A, Closed System Purge and Trap and Extraction for Volatile Organics in Soil	Definitive	Soil/Volatile Organics	Prep	N
ED-MSV-001	Purge and Trap for Aqueous Samples Method 5030, SW846	Definitive	Aqueous/Volatile Organics	Prep	N
ED-MSS-009	SW8270D, Semivolatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS)	Definitive	Soil and Aqueous/Semivolatile Organics	GC/MS	N
ED-ORP-044	SW846 Method 3546: Microwave Extraction of Solids	Defnitive	Soil/Semivolatile Organics	Prep	N

SOP #	Title, Date, and URL (if available)	Definitive or Screening Data	Matrix/Analytical Group	SOP Option or Equipment Type	‡Modified for Project? Y/N
ED-ORP-002	SW846 Method 3510C-Extraction of Semi-Volatile Organic Compounds in Water by Separatory Funnel	Definitive	Aqueous/Semivolatile Organics	Prep	N
ST-RC-0025	Preparation of Samples for Gamma Spectroscopy	Definitive	Soil/Gamma Spec	Prep	N
ST-RD-0102	GammaVision Analysis	Definitive	Soil/Gamma Spec	Gamma Spec	N
ST-RC-0242	Isotopic Thorium in Various Matrices by Eichrom TEVA Separation Resin	Definitive	Soil/Alpha Spec	Prep	N
ST-RD-0210	Alpha Spectroscopy Analysis	Definitive	Soil/Alpha Spec	Alpha Spec	N

QAPP Worksheet #24: Analytical Instrument Calibration
(UFP-QAPP Manual Section 3.2.2)
(USEPA 2106-G-05 Section 2.3.6)

Laboratory: TAL

Instrument	Calibration Procedure	Calibration Range	Frequency	Acceptance Criteria	Corrective Action (CA)	Title/position responsible for Corrective Action	SOP Reference
Metals	**1)** Initial calibration (ICAL) **2)** Initial Calibration Verification (ICV) (second source) **3)** Continuing Calibration Verification (CCV)	2.0-250000 ppb (varies by analyte)	**1)** Daily **2)** After ICAL before sample analysis **3)** At the beginning and end of analysis and after every 10 samples	**1)**Correlation≥0.998 **2)** Within +/- 10% of the true value **3)** Within +/- 10% of the true value	All: Table 2 of SOP.	Analyst/Department Manager	ED-MT-004
GC/MS (Semivolatiles)	**1)** MS Tuning Check (BFB) **2)** Initial calibration (ICAL) **3)** Initial Calibration Verification (ICV) (second source) Continuing Calibration Verification (CCV)	ICAL range = 5-120 ppm	**1)** 12 hours **2)** Initially and as needed. **3)** After ICAL 12 hours (after tuning check)	**1)** Criteria outlined in Sec. 9.2.1 of SOP. **2)** Criteria outlined in Sec. 9.2.4.2 of SOP. **3)** Criteria outlined in Sect. 9.2.4.3 of SOP. Criteria outlined in Sec. 9.2.4.2 of SOP.	**1)** Outlined in Sec. 9.2.1 of SOP. **2)** Outlined in Sec. 9.2.4.2 of SOP. **3)** Outlined in Sect. 9.2.4.3 of SOP. Outlined in Sec. 9.2.4.2 of SOP.	Analyst/Department Manager	ED-MSS-009
GC/MS (Volatiles)	**1)** MS Tuning Check (BFB) **2)** Initial calibration (ICAL) **3)** Initial Calibration Verification (ICV) (second source) **4)** Continuing Calibration Verification (CCV)	ICAL range 0.5-500 ppb	**1)** 12 hours **2)** Initially and as needed. **3)** After ICAL 12 hours (after tuning check)	**1)** Criteria outlined in Sec. 9.2.1 of SOP. **2)** Criteria outlined in Sec. 9.2.4.2 of SOP. **3)** Criteria outlined in Sect. 9.2.4.3 of SOP. Criteria outlined in Sec. 9.2.4.2 of SOP.	**1)** Outlined in Sec. 9.2.1 of SOP. **2)** Outlined in Sec. 9.2.4.2 of SOP. **3)** Outlined in Sect. 9.2.4.3 of SOP. Outlined in Sec. 9.2.4.2 of SOP.	Analyst/Department Manager	ED-MSV-014
Gamma Spec	1. Energy calibration 2. FWHM calibration **5)** Background	N/A	1. Annual 2. Annual 3. Monthly **4)**	For Energy and FWHM calibration: • Within 0.5% or 0.1 KeV for all calibration points	• Recalibrate • Instrument maintenance **4)** Consult with Technical Director	TestAmerica – St. Louis Group Leader	ST-RD-0102

Instrument	Calibration Procedure	Calibration Range	Frequency	Acceptance Criteria	Corrective Action (CA)	Title/position responsible for Corrective Action	SOP Reference
				• Within 8% for all calibration points • Verify with second source that always contains at least Am-241, Co-60, and Cs-137 • Must be ± 10%D for each nuclide **4)** For Background, acceptance criterion is 12 hours			
Alpha Spec	1. Energy calibration 2. Efficiency calibration and background check 3. Subtraction spectrum **6)** Pulser check and background check	N/A	1. Monthly 2. Monthly 3. Monthly 4. Daily **5)**	1. Three isotopes in 3–6 MeV range all within ± 40 KeV of expected value 2. >20% 3. Ultra Low Level: < 2 CPM Low Level: < 2–4 CPM Routine Level: < 4–10 CPM High Level: < 10–20 CPM **5)** Pulser energy, peak centroid, peak resolution, peak area, calibration and background must pass statistical "boundary" out-of-range test	• Recalibrate • Instrument maintenance • Consult with Technical Director **5)** • If background check is > 20 CPM, then detector requires maintenance	TestAmerica – St. Louis Group Leader	ST-RC-0210

QAPP Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection

(UFP-QAPP Manual Section 3.2.3)
(USEPA 2106-G-05 Section 2.3.6)

Laboratory: TAL

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Title/position responsible for corrective action	Reference
Gas Chromatograph/ Mass Spectrometer (GC.MS) (VOA and SVOA)	-Dust around instrument and instrument surface. -Check all fans and clean filter -Remove syringe, clean, reinstall or replace (SVs) -Remove all glassware and acid wash(VOC)	NA	NA	Monthly	Per SOP	Per SOP	Analyst	ED-MSS-009 ED-MSV-014
	-Replace roughing pump oil -Replace aux pump oil (VOC)	NA	NA	Every 6 months				

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Title/position responsible for corrective action	Reference
	-Replace forline trap absorbent. -Lubricate turbo pump -Methanol rinse Tekmar (VOC) -Renew chemical filter -Clean injection port -Clean source -Change Column Change trap	NA NA	NA NA	Yearly As needed				
Inductively Coupled Plasma (ICP) (Metals)	Perform leak test, change pump tubing, change torch and window, clean filters	Monitor instrument performance via CCV and CCB	Monitor instrument performance via CCV and CCB	Daily, after every 10 samples	Per Laboratory SOP	Replace pump tubing, replace torch and window, clean all filters	Laboratory analyst	ED-MT-004
Gas Chromatograph	Compare standard response to previous day	Monitor instrument performance via CCV and CCB,	As required	Daily	Per Laboratory SOP	Replace Septa, Clean and replace Injection Port Liner, Replace or clip Guard and or	Laboratory Analyst	ED-GCS-016

Instrument / Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Title/position responsible for corrective action	Reference
	or since last initial calibration Check carrier gas flow rate in column Check temp. of detector, inlet, column oven					analytical Columns Clean Detector		
Gamma Spectrometer	1. Clean cave; fill dewar with N_2 QA check	1. Physical check 2. Background and source check	1. Physical check Check deviation	1. Weekly Daily	1. Acceptable background Within 3 sigma of measured population	• Recalibrate • Instrument maintenance Consult with Technical Director	TestAmerica – St. Louis Group Leader / Analyst	ST-RD-0102
Alpha Spectrometer	Clean planchette holders	Physical check	Physical check	Monthly	Acceptable background and calibration efficiencies	• Recalibrate • Instrument maintenance Consult with Technical Director	TestAmerica – St. Louis Group Leader / Analyst	ST-RC-0210

QAPP Worksheet #26 & 27: Sample Handling, Custody, and Disposal
(UFP-QAPP Manual Section 3.3)
(USEPA 2106-G-05 Section 2.3.3)

Sampling Organization: PWGC
Laboratory: TAL
Method of sample delivery (shipper/carrier): Laboratory Courier
Number of days from reporting until sample disposal: 90

Activity	Organization and title or position of person responsible for the activity	Protocol
Sample labeling	PWGC/FTL	See Below
Chain-of-custody form completion	PWGC/FTL	See Below
Packaging	PWGC/FTL	See Below
Shipping coordination	PWGC/PM	See Below
Sample receipt, inspection, & log-in	TAL/Sample Receipt Tech	See Below
Sample custody and storage	TAL/Lab Team Leader	See Below
Sample disposal	TAL/Lab Waste Manager	See Below

Sample Collection: PWGC staff will collect all samples. Sample numbers will be assigned as described below. A coding system will be used to identify each sample collected during the duration of the project. This coding system will provide a tracking record to allow retrieval of information about a particular sample and ensure that each sample is uniquely identified. Each sample is identified by a unique code which indicates the sample type, sample number, and, in some cases, sample depth. A sample numbering system is described below which provides a unique identifier for all samples that will be collected during the site field investigation. The total number and types of samples collected are detailed in Worksheet #18.

Sample Packaging: Qualified PWGC personnel will perform the sample packaging. Samples will be packed in dedicated coolers and ice added in double sealed Ziploc bags when necessary for preservation. This task will be assigned to experienced field personnel.

Coordination of Shipment: FTL, PWGC and Lab coordinator.

Type of Shipment/Carrier: Laboratory Couriers will drop off empty sample jars at the site and pick up completed samples at the site.

SAMPLE RECEIPT AND ANALYSIS

Sample Receipt (Personnel/Organization): Laboratory Sample Custodian - TBD. The Laboratory assignment sheet will indicate the laboratory sample custodian, and if a subcontract laboratory is required. The laboratory project officer will notify the field team of the laboratory sample custodian.

Sample Custody and Storage (Personnel/Organization): TBD

Sample Preparation (Personnel/Organization): TBD

Sample Determinative Analysis (Personnel/Organization): TBD

SAMPLE ARCHIVING

Field Sample Storage (No. of days from sample collection): All samples will be shipped to a laboratory or a subcontract laboratory on the day of collection via laboratory courier.

Sample Extract/ Digestate Storage (No. of days from extraction/digestion): Refer to Worksheet #19 for holding time requirements

SAMPLE DISPOSAL

Laboratory responsible for analysis will dispose of samples in accordance with the applicable regulations.

Number of Days from Analysis: 90 days

Sample Identification Procedures: Each sample will be labeled with a specific sample ID that depicts a specific location. Depending on the type of sample, additional information such as depth, sampling round, date, etc. will be added.

Examples are provided below.

Confirmatory Soil Samples

Samples will be named Excavation Location - Sample Location - Sample Number. An example would be CC-C-019_N_001.

Field Blanks

Field blanks will be named FB- MMDDYYYY- identifier, where FB refers to field blank, MMDDYYYY refers to the date, and the identifier will be added to identify what type of equipment the field blank was collected from. An example would be FB-09052011-P (P refers to pump).

Additional Notes

Duplicates will use the same sampling scheme as described for each media above, however the sample # will be modified by adding a 90 before the number.

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):

Packaging for all shipments will be performed as detailed above. To maintain a record of sample collection, transfer between field personnel, shipment, and receipt by the laboratory, the applicable sample chain-of-custody paperwork is completed for each shipment (i.e., cooler) of packed sample bottles. The team member actually performing the sampling is personally responsible for the care and custody of the samples collected until they are transferred properly. The field technician will review all field sampling activities to confirm that proper custody procedures were followed during the field work. PWGC personnel relinquishing the sample to the courier will sign the chain of custody record.

All courier receipts and/or paperwork associated with the shipment of samples will serve as a custody record for the samples while they are in transit from the field to the laboratory. Custody seals should remain intact during this transfer.

Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal): A sample custodian at the laboratory will accept custody of shipped samples, and check them for discrepancies, proper preservation, integrity, etc. If noted, issues will be forwarded to the laboratory manager for corrective action. The sample custodian will relinquish custody to the appropriate department for analysis. Samples may be archived at the laboratory if sufficient sample volume exists following initial analysis. Disposal of the samples will occur only after analyses and QA/QC checks are completed. This will complete sample transfer.

It will be each laboratory's responsibility to maintain internal logbooks and records that provide a custody record throughout sample preparation and analysis. To track field samples through data handling, the subcontractors responsible for sampling will maintain photocopies of all chain-of-custody forms.

QAPP Worksheet #28a: Analytical Quality Control and Corrective Action
(UFP-QAPP Manual Section 3.4 and Tables 4, 5, and 6)
(USEPA 2106-G-05 Section 2.3.5)

Laboratory: TAL
Matrix: Soils
Analytical Group: Metals
Analytical Method/SOP: SW-846 6010C/SOP# ED-MT-004

QC Sample	Number/Frequency	Method/SOP Acceptance Criteria	Corrective Action	Title/position of person responsible for corrective action	Project-Specific MPC
ICV/CCV	Once per calibration; every ten samples afterwards	90-110%; 90-110% on continuing	Rerun once; recalibrate on continued failure	Analyst	Accuracy
ICB/CCB	Once per calibration; every ten samples afterwards	< RL; > 2x RL if below zero	Rerun once; recalibrate on continued failure	Analyst	Accuracy
CRI	Once per calibration	70-130%	Rerun once; recalibrate on continued failure	Analyst	RL Accuracy
Method Blank	1/batch	< RL, > 2x RL if below zero	Rerun once, re-digest batch on continued failure	Analyst	Accuracy

QC Sample	Number/Frequency	Method/SOP Acceptance Criteria	Corrective Action	Title/position of person responsible for corrective action	Project-Specific MPC
LCS	1/batch	80-120% for aqueous; Vendor limits for soils	Rerun once, re-digest batch on continued failure	Analyst	Accuracy
Matrix Spike	1/20 samples	75-125%	Check LCS; If recoveries are acceptable in LCS, qualify data and narrate non-conformance	Analyst	Accuracy
Post Spike	1/20 samples	80-120%	Review data for errors and narrate non-conformance	Analyst	Accuracy
Sample Duplicate	1/20 samples	≤ 20% RPD	Review data for errors and narrate non-conformance	Analyst	Precision
Blind Duplicate	1/20 Samples	2XQL	If > 5XQL and RPD > 100; estimate results in the field duplicate pair If < 5X QL; the sample and duplicate results must be within 2 X QL	QA Officer	Precision
Equipment Blank	1 per Day	<2X RL	If <RL and ≤ AL, qualify as non-detect at the RL If >RL and ≤ AL, qualify as not detected at the reported concentration	QA Officer	Precision

QC Sample	Number/Frequency	Method/SOP Acceptance Criteria	Corrective Action	Title/position of person responsible for corrective action	Project-Specific MPC
			If > RL and > AL, reject sample result		

QAPP Worksheet #28b: Analytical Quality Control and Corrective Action
(UFP-QAPP Manual Section 3.4 and Tables 4, 5, and 6)
(USEPA 2106-G-05 Section 2.3.5)

Matrix: Soil
Analytical Group: VOA
Analytical Method/SOP: SW-846 8260C/SOP No. ED-MSV-014

QC Sample	Number/Frequency	Method/SOP Acceptance Criteria	Corrective Action	Title/position of person responsible for corrective action	Project-Specific MPC
Method Blank	1/batch	<RL, Common contaminants (acetone, methylene chloride, MEK) must be <5x RL	Reanalyze. Report non-conformances in narrative. 'B' flag as needed.	Analyst	Accuracy
LCS	1/batch	Recoveries within lab generated limits.	Reanalyze if necessary, qualify data and narrate.	Analyst	Accuracy
Matrix Spike	1/20 samples	Recoveries within lab generated limits.	Check LCS; If recoveries are acceptable in LCS, qualify data and narrate non-conformance	Analyst	Accuracy
Matrix Spike Duplicate	1/20 samples	≤ 30% RPD	Check LCS; If recoveries are acceptable in LCS, qualify data and narrate non-conformance	Analyst	Precision

QC Sample	Number/Frequency	Method/SOP Acceptance Criteria	Corrective Action	Title/position of person responsible for corrective action	Project-Specific MPC
Blind Duplicate	1/20 Samples	2XQL	If > 5XQL and RPD > 100; estimate results in the field duplicate pair If < 5X QL; the sample and duplicate results must be within 2 X QL	QA Officer	Precision
Field Blanks	1 per Day	<2X RL	If <RL and ≤ AL, qualify as non-detect at the RL If >RL and ≤ AL, qualify as not detected at the reported concentration If > RL and > AL, reject sample result	QA Officer	Precision

QAPP Worksheet #28c: Analytical Quality Control and Corrective Action
(UFP-QAPP Manual Section 3.4 and Tables 4, 5, and 6)
(USEPA 2106-G-05 Section 2.3.5)

Laboratory: Test America Laboratories, Inc.
Matrix: Soil
Analytical Group: SVOCs
Analytical Method/SOP: SW-846 8270D/SOP# ED-MSS-009

QC Sample	Number/Frequency	Method/SOP Acceptance Criteria	Corrective Action	Title/position of person responsible for corrective action	Project-Specific MPC
ICV/CCV	Once/Calibration, every ten samples afterwards	80-120%	Rerun once, recalibrate on continued failure	Analyst	Accuracy
Method Blank	1/batch	<RL, Common contaminants (phthalates) must be <5x RL	Reanalyze. Report non-conformances in narrative. 'B' flag as needed.	Analyst	Accuracy
LCS	1/batch	Recoveries within lab generated limits.	Reanalyze if necessary, qualify data and narrate.	Analyst	Accuracy
Matrix Spike	1/20 samples	Recoveries within lab generated limits.	Check LCS; If recoveries are acceptable in LCS, qualify data and narrate non-conformance	Analyst	Accuracy

QC Sample	Number/Frequency	Method/SOP Acceptance Criteria	Corrective Action	Title/position of person responsible for corrective action	Project-Specific MPC
Matrix Spike Duplicate	1/20 samples	≤ 30% RPD	Check LCS; If recoveries are acceptable in LCS, qualify data and narrate non-conformance	Analyst	Precision
Blind Duplicate	1/20 Samples	2XQL	If > 5XQL and RPD > 100; estimate results in the field duplicate pair If < 5X QL; the sample and duplicate results must be within 2 X QL	QA Officer	Precision
Field Blanks	1 per Day	<2X RL	If <RL and ≤ AL, qualify as non-detect at the RL If >RL and ≤ AL, qualify as not detected at the reported concentration If > RL and > AL, reject sample result	QA Officer	Precision

QAPP Worksheet #28d: Analytical Quality Control and Corrective Action
(UFP-QAPP Manual Section 3.4 and Tables 4, 5, and 6)
(USEPA 2106-G-05 Section 2.3.5)

Laboratory: Test America Laboratories, Inc.
Matrix: Soil
Analytical Group: Gamma Spec
Analytical Method/SOP: HASL 300-GA-01-R/SOP No. ST-RD-00102

QC Sample	Number/Frequency	Method/SOP Acceptance Criteria	Corrective Action	Title/position of person responsible for corrective action	Project-Specific MPC
Method Blank	1/batch	<RL	Reanalyze. Report non-conformances in narrative.	Analyst	Accuracy
LCS	1/batch	Recoveries within lab generated limits.	Reanalyze if necessary, qualify data and narrate.	Analyst	Accuracy
Sample Duplicate	1/20 samples	≤ 40% RPD	Review data for errors and narrate non-conformance	Analyst	Precision
Blind Duplicate	1/20 Samples	2XQL	If > 5XQL and RPD > 100; estimate results in the field duplicate pair	QA Officer	Precision

QC Sample	Number/Frequency	Method/SOP Acceptance Criteria	Corrective Action	Title/position of person responsible for corrective action	Project-Specific MPC
			If < 5X QL; the sample and duplicate results must be within 2 X QL		
Field Blanks	1 per Day	<2X RL	If <RL and ≤ AL, qualify as non-detect at the RL If >RL and ≤ AL, qualify as not detected at the reported concentration If > RL and > AL, reject sample result	QA Officer	Precision

QAPP Worksheet #28e: Analytical Quality Control and Corrective Action
(UFP-QAPP Manual Section 3.4 and Tables 4, 5, and 6)
(USEPA 2106-G-05 Section 2.3.5)

Laboratory: Test America Laboratories, Inc.
Matrix: Soil
Analytical Group: Alpha Spec
Analytical Method/SOP: HASL 300-A-01-R/SOP No. ST-RD-0201

QC Sample	Number/Frequency	Method/SOP Acceptance Criteria	Corrective Action	Title/position of person responsible for corrective action	Project-Specific MPC
Method Blank	1/batch	<RL	Reanalyze. Report non-conformances in narrative.	Analyst	Accuracy
LCS	1/batch	Recoveries within lab generated limits.	Reanalyze if necessary, qualify data and narrate.	Analyst	Accuracy
Tracer	Every Sample	Recoveries within lab generated limits.	Reanalyze if necessary, qualify data and narrate.	Analyst	Accuracy
Sample Duplicate	1/20 samples	≤ 40% RPD	Review data for errors and narrate non-conformance	Analyst	Precision

QC Sample	Number/Frequency	Method/SOP Acceptance Criteria	Corrective Action	Title/position of person responsible for corrective action	Project-Specific MPC
Blind Duplicate	1/20 Samples	2XQL	If > 5XQL and RPD > 100; estimate results in the field duplicate pair If < 5X QL; the sample and duplicate results must be within 2 X QL	QA Officer	Precision
Field Blanks	1 per Day	<2X RL	If <RL and ≤ AL, qualify as non-detect at the RL If >RL and ≤ AL, qualify as not detected at the reported concentration If > RL and > AL, reject sample result	QA Officer	Precision

QAPP Worksheet #29: Project Documents and Records

(UFP-QAPP Manual Section 3.5.1)
(USEPA 2106-G-05 Section 2.2.8)

Sample Collection and Field Records			
Record	Generation	Verification	Storage location/archival
Field logbook or data collection sheets	PWGC FTL	PWGC PM	Project File
Chain-of-Custody Forms	PWGC FTL	PWGC PM	Project File
Photo-documentation	PWGC FTL	PWGC PM	Project File

Project Assessments			
Record	Generation	Verification	Storage location/archival
Data validation report	Data Validator	PWGC PM	Project File
Data usability assessment report	Data Validator	PWGC PM	Project File

QAPP Worksheet #31, 32 & 33: Assessments and Corrective Action

(UFP-QAPP Manual Sections 4.1.1 and 4.1.2)
(USEPA 2106-G-05 Section 2.4 and 2.5.5)

Assessments:

Assessment Type	Frequency	Internal or External	Organization Performance Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Actions	Person(s) Responsible for Monitoring Effectiveness of Corrective Actions
Laboratory Technical Systems/Performance Audits	TBD	External	PWGC/USEPA/NYSDEC	TBD	TAL	TAL	PWGC/USEPA/NYSDEC
Performance Evaluation Samples	TBD	External	PWGC/USEPA/NYSDEC	TBD	TAL	TAL	PWGC/USEPA/NYSDEC
Sample Collection and Documentation	Once	Internal	PWGC	TBD	TBD	TBD	PWGC
Health and Safety	Once If warranted	Internal	PWGC	TBD	TBD	TBD	PWGC
Field Audit	Once	Internal	PWGC	TBD	TBD	TBD	PWGC
Data Review	Once	Internal	PWGC	TBD	TBD	TBD	PWGC

Assessment Response and Corrective Action:

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response	Timeframe for Response
Laboratory Technical Systems/Performance Audits	Written Report	Laboratory Manager & PWGC	30 days	Letter	TAL	14 days
Performance Evaluation Samples	Electronic Report	Laboratory Manager & PWGC	30 days	Letter or Written Report	TAL	14 days
Project Readiness Review	Checklist or logbook entry	PWGC FTL	Immediately to within 24 hours of review	Checklist or logbook entry	PWGC FTL	Immediately to within 24 hours of review
Field Observations/Deviations from work plan	Logbook	PWGC FTL	Immediately to within 24 hours of deviation	Logbook	PWGC FTL	Immediately to within 24 hours of deviation
On-Site Field Inspection	Written Report	PWGC FTL	7 calendar days after completion of the audit	Letter/Internal Memorandum	PWGC FTL	To be identified in the cover letter of the report
Health and Safety	Audit Checklist	PWGC PM	Notify by phone immediately	Memorandum and checklist	PWGC Health & Safety Manager	10-30 days from notice
Field Audit	Field Audit Report	PWGC PM	Provide summary of findings to field team on day of audit	Corrective Action Plan	PWGC QA Manager	
Data Review	Memorandum	Data Validator	Notify by phone – 24 hours	Memorandum	PWGC PM	TBD

QAPP Worksheet #34: Data Verification and Validation Inputs

(UFP-QAPP Manual Section 5.2.1 and Table 9)
(USEPA 2106-G-05 Section 2.5.1)

Item	Description	Verification (completeness)	Validation (conformance to specifications)
Planning Documents/Records			
1	Approved QAPP	X	
2	Field SOPs	X	
3	Laboratory SOPs	X	
Field Records			
4	Field logbooks	X	X
5	Equipment calibration records	X	X
6	Chain-of-Custody Forms	X	X
7	Sampling diagrams/surveys	X	X
8	Drilling logs	X	X
9	Relevant Correspondence	X	X
10	Field audit reports	X	X
11	Field corrective action reports	X	X
Analytical Data Package			
12	Cover sheet (laboratory identifying information)	X	X
13	Case narrative	X	X
14	Internal laboratory chain-of-custody	X	X
15	Sample receipt records	X	X
16	Sample chronology (i.e. dates and times of receipt, preparation, & analysis)	X	X
17	Communication records	X	X
18	Project-specific PT sample results	X	X
19	LOD/LOQ establishment and verification	X	X
20	Standards Traceability	X	X
21	Instrument calibration records	X	X
22	Definition of laboratory qualifiers	X	X
23	Results reporting forms	X	X
24	QC sample results	X	X
25	Corrective action reports	X	X
26	Raw data	X	X
27	Electronic data deliverable	X	X

QAPP Worksheet #35: Data Verification Procedures

(UFP-QAPP Manual Section 5.2.2)
(EPA 2106-G-05 Section 2.5.1)

Records Reviewed	Requirement Documents	Process Description	Responsible Person, Organization
Field logbook	QAPP	Verify that records are present and complete for each day of field activities. Verify that all planned samples including field QC samples were collected and that sample collection locations are documented. Verify that meteorological data were provided for each day of field activities. Verify that changes/exceptions are documented and were reported in accordance with requirements. Verify that any required field monitoring was performed and results are documented.	Daily – PWGC PM At conclusion of field activities - Project QA Manager
COC forms	QAPP	Verify the completeness of chain-of-custody records. Examine entries for consistency with the field logbook. Check that appropriate methods and sample preservation have been recorded. Verify that the required volume of sample has been collected and that sufficient sample volume is available for QC samples (e.g., MS/MSD). Verify that all required signatures and dates are present. Check for transcription errors.	Daily – PWGC FTL At conclusion of field activities - Project Chemist

Laboratory Deliverable	QAPP	Verify that the laboratory deliverable contains all records specified in the QAPP. Check sample receipt records to ensure sample condition upon receipt was noted, and any missing/broken sample containers were noted and reported according to plan. Compare the data package with the COCs to verify that results were provided for all collected samples. Review the narrative to ensure all QC exceptions are described. Check for evidence that any required notifications were provided to project personnel as specified in the QAPP. Verify that necessary signatures and dates are present.	Before release – Laboratory QA Manager Upon receipt - Project Chemist
Audit Reports, Corrective Action Reports	QAPP	Verify that all planned audits were conducted. Examine audit reports. For any deficiencies noted, verify that corrective action was implemented according to plan.	Project QA Manager

QAPP Worksheet #36: Data Validation Procedures

(UFP-QAPP Manual Section 5.2.2)
(USEPA 2106-G-05 Section 2.5.1)

Data Validator: LDC

Analytical Group/Method:	Volatile Organics – SW-846 8260	Semivolatile Organics – SW-846 8270	Metals – SW-846 6010
Data deliverable requirements:	Category B (pdf)	Category B (pdf)	Category B (pdf)
Analytical specifications:	WS 28-1	WS-28-2	WS 28-3
Measurement performance criteria:	WS 12	WS 12	WS 12
Percent of data packages to be validated:	100%	100%	100%
Percent of raw data reviewed:	100%	100%	100%
Percent of results to be recalculated:	10%	10%	10%
Validation procedure:	EPA Region 2 – Category B	EPA Region 2 – Category B	EPA Region 2 – Category B
Validation code (*see attached table):	S4VM	S4VM	S4VM
Electronic validation program/version:	Not applicable	Not applicable	Not applicable

Validation Code and Label Identifier Table (To be attached to the QAPP)

Validation Code*	Validation Label	Description/Reference
S1VE	Stage 1 Validation Electronic	EPA 540-R-08-005
S1VM	Stage 1 Validation Manual	EPA 540-R-08-005
S1VEM	Stage 1 Validation Electronic and Manual	EPA 540-R-08-005
S2aVE	Stage 2a Validation Electronic	EPA 540-R-08-005
S2aVM	Stage 2a Validation Manual	EPA 540-R-08-005

S2aVEM	Stage 2a Validation Electronic and Manual	EPA 540-R-08-005
S2bVE	Stage 2b Validation Electronic	EPA 540-R-08-005
S2bVM	Stage 2b Validation Manual	EPA 540-R-08-005
S2bVEM	Stage 2b Validation Electronic and Manual	EPA 540-R-08-005
S3VE	Stage 3 Validation Electronic	EPA 540-R-08-005
S3VM	Stage 3 Validation Manual	EPA 540-R-08-005
S3VEM	Stage 3 Validation Electronic and Manual	EPA 540-R-08-005
S4VE	Stage 4 Validation Electronic	EPA 540-R-08-005
S4VM	Stage 4 Validation Manual	EPA 540-R-08-005
S4VEM	Stage 4 Validation Electronic and Manual	EPA 540-R-08-005
NV	Not Validated	EPA 540-R-08-005

The following data qualifiers will be applied during data validation by a third party. Potential impacts on project-specific data quality objectives will be discussed in the data validation report.

U - The analyte was analyzed for, but due to blank contamination was flagged as nondetect (U). The result is usable as a nondetect.

J - Data are flagged (J) when a QC analysis fails outside the primary acceptance limits. The qualified "J" data are not excluded from further review or consideration. However, only one flag (J) is applied to a sample result, even though several associated QC analyses may fail. The 'J' data may be biased high or low or the direction of the bias may be indeterminable.

UJ - The analyte was not detected above the reported sample quantitation limit. Data are flagged (UJ) when a QC analysis fails outside the primary acceptance limits. The qualified "UJ" data are not excluded from further review or consideration. However, only one flag is applied to a sample result, even though several associated QC analyses may fail. The 'UJ' data may be biased low.

JN - The analysis indicates the presence of a compound that has been "tentatively identified" (N) and the associated numerical value represents its approximate (J) concentration.

R - Data rejected (R) on the basis of an unacceptable QC analysis should be excluded from further review or consideration. Data are rejected when associated QC analysis results exceed the expanded control limits of the QC criteria. The rejected data are known to contain significant errors based on documented information. The data user must not use the rejected data to make environmental decisions. The presence or absence of the analyte cannot be verified.

Category B Data Package Deliverables

All Analytical Fractions

Case Narrative – A detailed case narrative per analytical fraction and will include explanation of any non-compliance and/or exceptions and corrective action.
Sample ID Cross Reference Sheet (Lab ID's and Client ID's)
Completed Chain of Custody and any sample receipt information
Sample preparation (extraction/digestion) logs

Form * GC/MS Organic Fractions

1 Sample results + raw
2 Surrogate Recovery Summary (w/ applicable control limits)
3 MS/MSD Accuracy & Precision Summary ** + raw
3 LCS Accuracy Summary + raw
4 Method Blank Summary + raw
5 Instrument Tuning Summary (including tuning summary for applicable initial calibrations)
6 Initial Calibration Summary (including concentration levels of standards) + raw
7 Continuing Calibration Summary + raw
8 Internal Standard Summary (including applicable initial calibrations)

Form * Metals Inorganic Fractions ***

1 Sample Results + raw
2A Initial and Continuing Calibration Summary + raw
3 Initial and Continuing Calibration Blanks and Method Blanks Summary + raw
4 Interference Check Standard Summary + raw
5A Pre-digestion Matrix Spike Recoveries Summary + raw
5B Post-digestion Spike Recoveries Summary + raw
6 Native Duplicate or MS/MSD Precision Summary ** + raw
7 Laboratory Control Sample Recovery Summary + raw
8 Serial Dilutions and Method of Standard Addition (if necessary) + raw
9 Instrument or Method Detection Limit Summary
10 ICP Interelement Correction Factors
11 Linear Range Summary
12 Preparation Log Summary + raw
13 Analytical Run Sequence + raw

Form * General Chemistry Fractions *:** (Includes potentiometric, gravimetric, colorimetric, and titrimetric analytical techniques. Examples, TPH (418.1), TOC, etc.)

1B	Sample Results + raw
2	Initial and Continuing Calibration Verifications and Blanks (if necessary) + raw
3	Method Blanks Summary + raw
5	Pre-digestion Matrix Spike/Matrix Spike Duplicate Recoveries and Precision Summary + raw
6	Duplicate Precision Summary ** + raw
7A	Laboratory Control Sample Recovery Summary + raw
9	Reporting Limit / Method Detection Limit Summary
12	Preparation Log Summary (if necessary) + raw
13	Analytical Run Sequence + raw

* CLP Form or summary form with equivalent information
** with RPD calculated according to method specifications (CLP using % recovery, SW-846 using concentration)
*** All raw data is reported after the summary forms and not in each individual section

QAPP Worksheet #37: Data Usability Assessment

(UFP-QAPP Manual Section 5.2.3 including Table 12)
(USEPA 2106-G-05 Section 2.5.2, 2.5.3, and 2.5.4)

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used: The Data Usability Assessment will be performed by a team of personnel at LDC. LDC will be responsible for information in the Usability Assessment and will also be responsible for assigning task work to the individual task members who will be supporting the Data Usability Assessment. Note that the Data Usability Assessment will be conducted on validated data. After the Data Usability Assessment has been performed, data deemed appropriate for use will then be used in the S*I Report*. The results of the Data Usability Assessment will be presented in the project-specific report. The following items will be assessed and conclusions drawn based on their results.

Precision – Results of laboratory duplicates will be assessed during data validation and data will be qualified according to the data validation procedures cited on Worksheet #36. Field duplicates will be assessed by matrix using the RPD for each pair of results reported above CRQL for organic and inorganic analyses respectively. RPD acceptance criteria, presented in Worksheet #12, will be used to access field sampling precision. Absolute difference will be used for low results as described in worksheets 12 and 28. A discussion summarizing the results of laboratory and field precision and any limitations on the use of the data will be described.

Field duplicates – The data validator will review the extent of exceedance of the field duplicate criteria. For groundwater, the sample results will be flagged according to the data validation protocol. For soils, the exceedances will be compared with the field lithological logs and grain size results, if available. Based on this review, the project manager will determine whether the exceedance is due to inherent soil heterogeneity or the result of sample handling in the field or laboratory. This information will be included in the data assessment report. As an added measure, the field team leader will be asked to inspect the soil coning and quartering procedures and re-train staff if needed. The data assessor will review the data validation report. If the field duplicate comparison is not included, it will be performed by the assessor.

Accuracy/Bias Contamination –Laboratory blank results will be assessed as part of data validation. During the data validation process the validator will qualify the data following the procedures listed on Worksheet #36. A discussion summarizing the results of laboratory accuracy and bias based on contamination will be presented and limitations on the use of the data will be described.

Overall Accuracy/Bias – The results of instrument calibration and matrix spike recoveries will be reviewed and data will be qualified according to the data validation procedures cited on Worksheet #36. A discussion summarizing the results of laboratory accuracy and any limitations on the use of the data will be described.

Sensitivity – Data results will be compared to criteria provided on Worksheet #15. A discussion summarizing any conclusions about sensitivity of the analyses will be presented and any limitations on the use of the data will be described.

Representativeness – A review of adherence to the sampling plan, field procedures and of project QA audits will be performed in order to assess the representativeness of the sampling program. Data validation narratives will also be reviewed and any conclusions about the representativeness of the data set will be discussed.

Comparability – Study results will be used in conjunction with existing data to make qualitative and quantitative assessments of the data to be used to produce the Site reports.

Reconciliation – The DQIs presented in Worksheet #12 will be examined to determine if the MPC were met. This examination will include a combined overall assessment of the results of each analysis pertinent to an objective. Each analysis will first be evaluated separately in terms of major impacts observed from data validation, data quality indicators and measurement performance criteria assessments. Based on the results of these assessments, the quality of the data will be determined. Based on the quality determined, the usability of the data for each analysis will be determined. Ba sed on the combined usability of the data from all analyses for an objective, it will be determined if the DQIs were met and whether project goals were achieved. As part of the reconciliation of each objective, conclusions will be drawn and any limitations on the usability of any of the data will be described.

Completeness - The Environmental Quality Information Systems (EQuIS) database will be queried to summarize the number of samples in each analytical fraction that are estimated and rejected. This data will be used along with the planned samples indicated in the QAPP to calculate the completeness of the obtained data set.

Data validation reports will be reviewed to determine the quality of the data and potential impacts on data usability. Field duplicates will be evaluated against the MPCs outlined in worksheet #12. Non-compliant data will be discussed in the usability report. The following equations will be used:

1. To calculate field duplicate precision: RPD = 100 x 2 |X1 - X2 | / (X1 + X2) where X1 and X2 are the reported concentrations for each duplicate or replicate

2. To calculate completeness: % Completeness = V/n x 100

where V= number of measurements judged valid; n = total number of measurements made and % Completeness = C/x x 100

where C= number of samples collected; x = total number of measurements planned

2. *Describe the evaluative procedures used to assess overall measurement error associated with the project:* PWGC will determine if quality control data is within specifications (MPC) through the data assessment and data validation process.

3. Identify the personnel responsible for performing the usability assessment: Richard Kampf or designee

4. Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies: A usability report will describe the rationale for the data used and present any data limitations. The report will include a discussion of the accuracy, precision, representativeness, completeness and comparability of the data set and deviations from planned procedures and analysis and the impact on the project objectives. Tables will be prepared, including: a summary of planned samples, collected samples and parameters analyzed; detections in field and trip blanks; comparison of field duplicates; and a comparison of planned and actual detection limits.

5. Discuss the impacts of any qualified data, any deviations from original plan or sampling procedures, whether the project objectives were met, etc.

The following procedures will be followed for using data in preparing the RACR.

- Defining the nature and extent of contamination – [PWGC will evaluate individual sample results for the RACR. The sample results will be compared to the site specific screening criteria defined as project action limits on worksheet #15. In addition, as part of the RACR, figures will be generated in order to further refine the understanding of the nature and extent of contamination and to help identify data gaps. Figures will include geological profiles and cross-sections, water table maps, contaminant iso-concentration maps, and longitudinal and cross-sectional profiles of groundwater contamination.
- Identifying data gaps - Data gaps will be identified while writing the SI Report. As soon as data gaps are identified, PWGC will discuss them with USEPA/NYSDEC. To identify data gaps, PWGC will evaluate the analytical results by media and determine if results indicate levels or locations of contamination that need to be further delineated.
    - Using qualified data - PWGC utilizes all data not rejected during validation to determine the nature and extent of contamination.
- Deciding if high results are legitimate or outliers - PWGC will assume that all data not rejected during validation will be considered in defining the nature and extent of contamination at the site. PWGC will work with USEPA/NYSDEC if there is a concern about the statistical validity of the sample results. In particular, high “outlier” results that have no surrounding comparable results as confirmation will be discussed with USEPA/NYSDEC.

ATTACHMENT A

GENERAL FIELD SAMPLING GUIDELINES

SOP#: 2001
DATE: 08/11/94
REV. #: 0.0

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to provide general field sampling guidelines that will assist REAC personnel in choosing sampling strategies, location, and frequency for proper assessment of site characteristics. This SOP is applicable to all field activities that involve sampling.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent on site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

2.0 METHOD SUMMARY

Sampling is the selection of a representative portion of a larger population, universe, or body. Through examination of a sample, the characteristics of the larger body from which the sample was drawn can be inferred. In this manner, sampling can be a valuable tool for determining the presence, type, and extent of contamination by hazardous substances in the environment.

The primary objective of all sampling activities is to characterize a hazardous waste site accurately so that its impact on human health and the environment can be properly evaluated. It is only through sampling and analysis that site hazards can be measured and the job of cleanup and restoration can be accomplished effectively with minimal risk. The sampling itself must be conducted so that every sample collected retains its original physical form and chemical composition. In this way, sample integrity is insured, quality assurance standards are maintained, and the sample can accurately represent the larger body of material under investigation.

The extent to which valid inferences can be drawn from a sample depends on the degree to which the sampling effort conforms to the project's objectives. For example, as few as one sample may produce adequate, technically valid data to address the project's objectives. Meeting the project's objectives requires thorough planning of sampling activities, and implementation of the most appropriate sampling and analytical procedures. These issues will be discussed in this procedure.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The amount of sample to be collected, and the proper sample container type (i.e., glass, plastic), chemical preservation, and storage requirements are dependent on the matrix being sampled and the parameter(s) of interest. Sample preservation, containers, handling, and storage for air and waste samples are discussed in the specific SOPs for air and waste sampling techniques.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

The nature of the object or materials being sampled may be a potential problem to the sampler. If a material is homogeneous, it will generally have a uniform composition throughout. In this case, any sample increment can be considered representative of the material. On the other hand, heterogeneous samples present problems to the sampler because of changes in the material over distance, both laterally and vertically.

Samples of hazardous materials may pose a safety threat to both field and laboratory personnel. Proper health and safety precautions should be implemented when handling this type of sample.

Environmental conditions, weather conditions, or non-target chemicals may cause problems and/or interferences when performing sampling activities or when sampling for a specific parameter. Refer to the specific SOPs for sampling techniques.

5.0 EQUIPMENT/APPARATUS

The equipment/apparatus required to collect samples must be determined on a site specific basis. Due to the wide variety of sampling equipment available, refer to the specific SOPs for sampling techniques which include lists of the equipment/apparatus required for sampling.

6.0 REAGENTS

Reagents may be utilized for preservation of samples and for decontamination of sampling equipment. The preservatives required are specified by the analysis to be performed. Decontamination solutions are specified in ERT SOP #2006, Sampling Equipment Decontamination.

7.0 PROCEDURE

7.1 Types of Samples

In relation to the media to be sampled, two basic types of samples can be considered: the environmental sample and the hazardous sample.

Environmental samples are those collected from streams, ponds, lakes, wells, and are off-site samples that are not expected to be contaminated with hazardous materials. They usually do not require the special handling procedures typically used for concentrated wastes. However, in certain instances, environmental samples can contain elevated concentrations of pollutants and in such cases would have to be handled as hazardous samples.

Hazardous or concentrated samples are those collected from drums, tanks, lagoons, pits, waste piles, fresh spills, or areas previously identified as contaminated, and require special handling procedures because of their potential toxicity or hazard. These samples can be further subdivided based on their degree of hazard; however, care should be taken when handling and shipping any wastes believed to be concentrated regardless of the degree.

The importance of making the distinction between environmental and hazardous samples is two-fold:

(1) Personnel safety requirements: Any sample thought to contain enough hazardous materials to pose a safety threat should be designated as hazardous and handled in a manner which ensures the safety of both field and laboratory personnel.

(2) Transportation requirements: Hazardous samples must be packaged, labeled, and shipped according to the International Air Transport Association (IATA) Dangerous Goods Regulations or Department of Transportation (DOT) regulations and U.S. EPA guidelines.

7.2 Sample Collection Techniques

In general, two basic types of sample collection techniques are recognized, both of which can be used for either environmental or hazardous samples.

<u>Grab Samples</u>

A grab sample is defined as a discrete aliquot representative of a specific location at a given point in time. The sample is collected all at once at one particular point in the sample medium. The representativeness of such samples is defined by the nature of the materials being sampled. In general, as sources vary over time and distance, the representativeness of grab samples will decrease.

<u>Composite Samples</u>

Composites are nondiscrete samples composed of more than one specific aliquot collected at various sampling locations and/or different points in time. Analysis of this type of sample produces an average value and can in certain instances be used as an alternative to analyzing a number of individual grab samples and calculating an average value. It should be noted, however, that compositing can mask problems by diluting isolated concentrations of some hazardous compounds below detection limits.

Compositing is often used for environmental samples and may be used for hazardous samples under certain conditions. For example, compositing of hazardous waste is often performed after compatibility tests have

been completed to determine an average value over a number of different locations (group of drums). This procedure generates data that can be useful by providing an average concentration within a number of units, can serve to keep analytical costs down, and can provide information useful to transporters and waste disposal operations.

For sampling situations involving hazardous wastes, grab sampling techniques are generally preferred because grab sampling minimizes the amount of time sampling personnel must be in contact with the wastes, reduces risks associated with compositing unknowns, and eliminates chemical changes that might occur due to compositing.

7.3 Types of Sampling Strategies

The number of samples that should be collected and analyzed depends on the objective of the investigation. There are three basic sampling strategies: random, systematic, and judgmental sampling.

Random sampling involves collection of samples in a nonsystematic fashion from the entire site or a specific portion of a site. Systematic sampling involves collection of samples based on a grid or a pattern which has been previously established. When judgmental sampling is performed, samples are collected only from the portion(s) of the site most likely to be contaminated. Often, a combination of these strategies is the best approach depending on the type of the suspected/known contamination, the uniformity and size of the site, the level/type of information desired, etc.

7.4 QA Work Plans (QAWP)

A QAWP is required when it becomes evident that a field investigation is necessary. It should be initiated in conjunction with, or immediately following, notification of the field investigation. This plan should be clear and concise and should detail the following basic components, with regard to sampling activities:

- Objective and purpose of the investigation.
- Basis upon which data will be evaluated.
- Information known about the site including location, type and size of the facility, and length of operations/abandonment.
- Type and volume of contaminated material, contaminants of concern (including concentration), and basis of the information/data.
- Technical approach including media/matrix to be sampled, sampling equipment to be used, sample equipment decontamination (if necessary), sampling design and rationale, and SOPs or description of the procedure to be implemented.
- Project management and reporting, schedule, project organization and responsibilities, manpower and cost projections, and required deliverables.
- QA objectives and protocols including tables summarizing field sampling and QA/QC analysis and objectives.

Note that this list of QAWP components is not all-inclusive and that additional elements may be added or altered depending on the specific requirements of the field investigation. It should also be recognized that although a detailed QAWP is quite important, it may be impractical in some instances. Emergency responses and accidental spills are prime examples of such instances where time might prohibit the development of site-specific QAWPs prior to field activities. In such cases, investigators would have to rely on general guidelines and personal judgment, and the sampling or response plans might simply be a strategy based on preliminary information and finalized on site. In any event, a plan of action should be developed, no matter how concise or informal, to aid investigators in maintaining a logical and consistent order to the implementation of their task.

7.5 Legal Implications

The data derived from sampling activities are often introduced as critical evidence during litigation of a hazardous waste site cleanup. Legal issues in which sampling data are important may include cleanup cost recovery, identification of pollution sources and responsible parties, and technical validation of remedial design methodologies. Because of the potential for involvement in legal actions, strict adherence to technical and administrative SOPs is essential during both the development and implementation of sampling activities.

Technically valid sampling begins with thorough planning and continues through the sample collection and analytical procedures. Administrative requirements involve thorough, accurate

documentation of all sampling activities. Documentation requirements include maintenance of a chain of custody, as well as accurate records of field activities and analytical instructions. Failure to observe these procedures fully and consistently may result in data that are questionable, invalid and non-defensible in court, and the consequent loss of enforcement proceedings.

8.0 CALCULATIONS

Refer to the specific SOPs for any calculations which are associated with sampling techniques.

9.0 QUALITY ASSURANCE/ QUALITY CONTROL

Refer to the specific SOPs for the type and frequency of QA/QC samples to be analyzed, the acceptance criteria for the QA/QC samples, and any other QA/QC activities which are associated with sampling techniques.

10.0 DATA VALIDATION

Refer to the specific SOPs for data validation activities that are associated with sampling techniques.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA, and corporate health and safety procedures.

SAMPLING EQUIPMENT DECONTAMINATION

SOP#: 2006
DATE: 08/11/94
REV. #: 0.0

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to provide a description of the methods used for preventing, minimizing, or limiting cross-contamination of samples due to inappropriate or inadequate equipment decontamination and to provide general guidelines for developing decontamination procedures for sampling equipment to be used during hazardous waste operations as per 29 Code of Federal Regulations (CFR) 1910.120. This SOP does not address personnel decontamination.

These are standard (i.e. typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitation, or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. Environmental Protection Agency (U.S. EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

Removing or neutralizing contaminants from equipment minimizes the likelihood of sample cross contamination, reduces or eliminates transfer of contaminants to clean areas, and prevents the mixing of incompatible substances.

Gross contamination can be removed by physical decontamination procedures. These abrasive and non-abrasive methods include the use of brushes, air and wet blasting, and high and low pressure water cleaning.

The first step, a soap and water wash, removes all visible particulate matter and residual oils and grease. This may be preceded by a steam or high pressure water wash to facilitate residuals removal. The second step involves a tap water rinse and a distilled/deionized water rinse to remove the detergent. An acid rinse provides a low pH media for trace metals removal and is included in the decontamination process if metal samples are to be collected. It is followed by another distilled/deionized water rinse. If sample analysis does not include metals, the acid rinse step can be omitted. Next, a high purity solvent rinse is performed for trace organics removal if organics are a concern at the site. Typical solvents used for removal of organic contaminants include acetone, hexane, or water. Acetone is typically chosen because it is an excellent solvent, miscible in water, and not a target analyte on the Priority Pollutant List. If acetone is known to be a contaminant of concern at a given site or if Target Compound List analysis (which includes acetone) is to be performed, another solvent may be substituted. The solvent must be allowed to evaporate completely and then a final distilled/deionized water rinse is performed. This rinse removes any residual traces of the solvent.

The decontamination procedure described above may be summarized as follows:

1. Physical removal
2. Non-phosphate detergent wash
3. Tap water rinse
4. Distilled/deionized water rinse
5. 10% nitric acid rinse
6. Distilled/deionized water rinse
7. Solvent rinse (pesticide grade)
8. Air dry
9. Distilled/deionized water rinse

If a particular contaminant fraction is not present at the site, the nine (9) step decontamination procedure specified above may be modified for site specificity. For example, the nitric acid rinse may be eliminated if metals are not of concern at a site. Similarly, the solvent rinse may be eliminated if organics are not of

concern at a site. Modifications to the standard procedure should be documented in the site specific work plan or subsequent report.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The amount of sample to be collected and the proper sample container type (i.e., glass, plastic), chemical preservation, and storage requirements are dependent on the matrix being sampled and the parameter(s) of interest.
More specifically, sample collection and analysis of decontamination waste may be required before beginning proper disposal of decontamination liquids and solids generated at a site. This should be determined prior to initiation of site activities.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

- The use of distilled/deionized water commonly available from commercial vendors may be acceptable for decontamination of sampling equipment provided that it has been verified by laboratory analysis to be analyte free (specifically for the contaminants of concern).

- The use of an untreated potable water supply is not an acceptable substitute for tap water. Tap water may be used from any municipal or industrial water treatment system.

- If acids or solvents are utilized in decontamination they raise health and safety, and waste disposal concerns.

- Damage can be incurred by acid and solvent washing of complex and sophisticated sampling equipment.

5.0 EQUIPMENT/APPARATUS

Decontamination equipment, materials, and supplies are generally selected based on availability. Other considerations include the ease of decontaminating or disposing of the equipment. Most equipment and supplies can be easily procured. For example, soft-bristle scrub brushes or long-handled bottle brushes can be used to remove contaminants. Large galvanized wash tubs, stock tanks, or buckets can hold wash and rinse solutions. Children's wading pools can also be used. Large plastic garbage cans or other similar containers lined with plastic bags can help segregate contaminated equipment. Contaminated liquid can be stored temporarily in metal or plastic cans or drums.

The following standard materials and equipment are recommended for decontamination activities:

5.1 Decontamination Solutions

- Non-phosphate detergent
- Selected solvents (acetone, hexane, nitric acid, etc.)
- Tap water
- Distilled or deionized water

5.2 Decontamination Tools/Supplies

- Long and short handled brushes
- Bottle brushes
- Drop cloth/plastic sheeting
- Paper towels
- Plastic or galvanized tubs or buckets
- Pressurized sprayers (H_2O)
- Solvent sprayers
- Aluminum foil

5.3 Health and Safety Equipment

Appropriate personal protective equipment (i.e., safety glasses or splash shield, appropriate gloves, aprons or coveralls, respirator, emergency eye wash)

5.4 Waste Disposal

- Trash bags
- Trash containers
- 55-gallon drums
- Metal/plastic buckets/containers for storage and disposal of decontamination solutions

6.0 REAGENTS

There are no reagents used in this procedure aside from the actual decontamination solutions. Table 1 (Appendix A) lists solvent rinses which may be required for elimination of particular chemicals. In

general, the following solvents are typically utilized for decontamination purposes:

- 10% nitric acid is typically used for inorganic compounds such as metals. An acid rinse may not be required if inorganics are not a contaminant of concern.
- Acetone (pesticide grade)[1]
- Hexane (pesticide grade)[1]
- Methanol[1]

[1] - Only if sample is to be analyzed for organics.

7.0 PROCEDURES

As part of the health and safety plan, a decontamination plan should be developed and reviewed. The decontamination line should be set up before any personnel or equipment enter the areas of potential exposure. The equipment decontamination plan should include:

- The number, location, and layout of decontamination stations.
- Decontamination equipment needed.
- Appropriate decontamination methods.
- Methods for disposal of contaminated clothing, equipment, and solutions.
- Procedures can be established to minimize the potential for contamination. This may include: (1) work practices that minimize contact with potential contaminants; (2) using remote sampling techniques; (3) covering monitoring and sampling equipment with plastic, aluminum foil, or other protective material; (4) watering down dusty areas; (5) avoiding laying down equipment in areas of obvious contamination; and (6) use of disposable sampling equipment.

7.1 Decontamination Methods

All samples and equipment leaving the contaminated area of a site must be decontaminated to remove any contamination that may have adhered to equipment. Various decontamination methods will remove contaminants by: (1) flushing or other physical action, or (2) chemical complexing to inactivate contaminants by neutralization, chemical reaction, disinfection, or sterilization.

Physical decontamination techniques can be grouped into two categories: abrasive methods and non-abrasive methods, as follows:

7.1.1 Abrasive Cleaning Methods

Abrasive cleaning methods work by rubbing and wearing away the top layer of the surface containing the contaminant. The mechanical abrasive cleaning methods are most commonly used at hazardous waste sites. The following abrasive methods are available:

<u>Mechanical</u>

Mechanical methods of decontamination include using metal or nylon brushes. The amount and type of contaminants removed will vary with the hardness of bristles, length of time brushed, degree of brush contact, degree of contamination, nature of the surface being cleaned, and degree of contaminant adherence to the surface.

<u>Air Blasting</u>

Air blasting equipment uses compressed air to force abrasive material through a nozzle at high velocities. The distance between nozzle and surface cleaned, air pressure, time of application, and angle at which the abrasive strikes the surface will dictate cleaning efficiency. Disadvantages of this method are the inability to control the amount of material removed and the large amount of waste generated.

<u>Wet Blasting</u>

Wet blast cleaning involves use of a suspended fine abrasive. The abrasive/water mixture is delivered by compressed air to the contaminated area. By using a very fine abrasive, the amount of materials removed can be carefully controlled.

7.1.2 Non-Abrasive Cleaning Methods

Non-abrasive cleaning methods work by forcing the contaminant off a surface with pressure. In general, the equipment surface is not removed using non-abrasive methods.

Low-Pressure Water

This method consists of a container which is filled with water. The user pumps air out of the container to create a vacuum. A slender nozzle and hose allow the user to spray in hard-to-reach places.

High-Pressure Water

This method consists of a high-pressure pump, an operator controlled directional nozzle, and a high-pressure hose. Operating pressure usually ranges from 340 to 680 atmospheres (atm) and flow rates usually range from 20 to 140 liters per minute.

Ultra-High-Pressure Water

This system produces a water jet that is pressured from 1,000 to 4,000 atmospheres. This ultra-high-pressure spray can remove tightly-adhered surface films. The water velocity ranges from 500 meters/second (m/s) (1,000 atm) to 900 m/s (4,000 atm). Additives can be used to enhance the cleaning action.

Rinsing

Contaminants are removed by rinsing through dilution, physical attraction, and solubilization.

Damp Cloth Removal

In some instances, due to sensitive, non-waterproof equipment or due to the unlikelihood of equipment being contaminated, it is not necessary to conduct an extensive decontamination procedure. For example, air sampling pumps hooked on a fence, placed on a drum, or wrapped in plastic bags are not likely to become heavily contaminated. A damp cloth should be used to wipe off contaminants which may have adhered to equipment through airborne contaminants or from surfaces upon which the equipment was set.

Disinfection/Sterilization

Disinfectants are a practical means of inactivating infectious agents. Unfortunately, standard sterilization methods are impractical for large equipment. This method of decontamination is typically performed off-site.

7.2 Field Sampling Equipment Decontamination Procedures

The decontamination line is setup so that the first station is used to clean the most contaminated item. It progresses to the last station where the least contaminated item is cleaned. The spread of contaminants is further reduced by separating each decontamination station by a minimum of three (3) feet. Ideally, the contamination should decrease as the equipment progresses from one station to another farther along in the line.

A site is typically divided up into the following boundaries: Hot Zone or Exclusion Zone (EZ), the Contamination Reduction Zone (CRZ), and the Support or Safe Zone (SZ). The decontamination line should be setup in the Contamination Reduction Corridor (CRC) which is in the CRZ. Figure 1 (Appendix B) shows a typical contaminant reduction zone layout. The CRC controls access into and out of the exclusion zone and confines decontamination activities to a limited area. The CRC boundaries should be conspicuously marked. The far end is the hotline, the boundary between the exclusion zone and the contamination reduction zone. The size of the decontamination corridor depends on the number of stations in the decontamination process, overall dimensions of the work zones, and amount of space available at the site. Whenever possible, it should be a straight line.

Anyone in the CRC should be wearing the level of protection designated for the decontamination crew. Another corridor may be required for the entry and exit of heavy equipment. Sampling and monitoring equipment and sampling supplies are all maintained outside of the CRC. Personnel don their equipment away from the CRC and enter the exclusion zone through a separate access control point at the hotline. One person (or more) dedicated to decontaminating equipment is recommended.

7.2.1 Decontamination Setup

Starting with the most contaminated station, the decontamination setup should be as follows:

Station 1: Segregate Equipment Drop

Place plastic sheeting on the ground (Figure 2, Appendix B). Size will depend on amount of

equipment to be decontaminated. Provide containers lined with plastic if equipment is to be segregated. Segregation may be required if sensitive equipment or mildly contaminated equipment is used at the same time as equipment which is likely to be heavily contaminated.

Station 2: Physical Removal With A High-Pressure Washer (Optional)

As indicated in 7.1.2, a high-pressure wash may be required for compounds which are difficult to remove by washing with brushes. The elevated temperature of the water from the high-pressure washers is excellent at removing greasy/oily compounds. High pressure washers require water and electricity.

A decontamination pad may be required for the high-pressure wash area. An example of a wash pad may consist of an approximately 1 1/2 foot-deep basin lined with plastic sheeting and sloped to a sump at one corner. A layer of sand can be placed over the plastic and the basin is filled with gravel or shell. The sump is also lined with visqueen and a barrel is placed in the hole to prevent collapse. A sump pump is used to remove the water from the sump for transfer into a drum.

Typically heavy machinery is decontaminated at the end of the day unless site sampling requires that the machinery be decontaminated frequently. A separate decontamination pad may be required for heavy equipment.

Station 3: Physical Removal With Brushes And A Wash Basin

Prior to setting up Station 3, place plastic sheeting on the ground to cover areas under Station 3 through Station 10.
Fill a wash basin, a large bucket, or child's swimming pool with non-phosphate detergent and tap water. Several bottle and bristle brushes to physically remove contamination should be dedicated to this station . Approximately 10 - 50 gallons of water may be required initially depending upon the amount of equipment to decontaminate and the amount of gross contamination.

Station 4: Water Basin

Fill a wash basin, a large bucket, or child's swimming pool with tap water. Several bottle and bristle brushes should be dedicated to this station. Approximately 10-50 gallons of water may be required initially depending upon the amount of equipment to decontaminate and the amount of gross contamination.

Station 5: Low-Pressure Sprayers

Fill a low-pressure sprayer with distilled/deionized water. Provide a 5-gallon bucket or basin to contain the water during the rinsing process. Approximately 10-20 gallons of water may be required initially depending upon the amount of equipment to decontaminate and the amount of gross contamination.

Station 6: Nitric Acid Sprayers

Fill a spray bottle with 10% nitric acid. An acid rinse may not be required if inorganics are not a contaminant of concern. The amount of acid will depend on the amount of equipment to be decontaminated. Provide a 5-gallon bucket or basin to collect acid during the rinsing process.

Station 7: Low-Pressure Sprayers

Fill a low-pressure sprayer with distilled/deionized water. Provide a 5-gallon bucket or basin to collect water during the rinsate process.

Station 8: Organic Solvent Sprayers

Fill a spray bottle with an organic solvent. After each solvent rinse, the equipment should be rinsed with distilled/deionized water and air dried. Amount of solvent will depend on the amount of equipment to decontaminate. Provide a 5-gallon bucket or basin to collect the solvent during the rinsing process.

Solvent rinses may not be required unless organics are a contaminant of concern, and may be eliminated from the station sequence.

Station 9: Low-Pressure Sprayers

Fill a low-pressure sprayer with distilled/deionized water. Provide a 5-gallon bucket or basin to collect water during the rinsate process.

Station 10: Clean Equipment Drop

Lay a clean piece of plastic sheeting over the bottom

plastic layer. This will allow easy removal of the plastic in the event that it becomes dirty. Provide aluminum foil, plastic, or other protective material to wrap clean equipment.

7.2.2 Decontamination Procedures

Station 1: Segregate Equipment Drop

Deposit equipment used on-site (i.e., tools, sampling devices and containers, monitoring instruments radios, clipboards, etc.) on the plastic drop cloth/sheet or in different containers with plastic liners. Each will be contaminated to a different degree. Segregation at the drop reduces the probability of cross contamination. Loose leaf sampling data sheets or maps can be placed in plastic zip lock bags if contamination is evident.

Station 2: Physical Removal With A High-Pressure Washer (Optional)

Use high pressure wash on grossly contaminated equipment. Do not use high- pressure wash on sensitive or non-waterproof equipment.

Station 3: Physical Removal With Brushes And A Wash Basin

Scrub equipment with soap and water using bottle and bristle brushes. Only sensitive equipment (i.e., radios, air monitoring and sampling equipment) which is waterproof should be washed. Equipment which is not waterproof should have plastic bags removed and wiped down with a damp cloth. Acids and organic rinses may also ruin sensitive equipment. Consult the manufacturers for recommended decontamination solutions.

Station 4: Equipment Rinse

Wash soap off of equipment with water by immersing the equipment in the water while brushing. Repeat as many times as necessary.

Station 5: Low-Pressure Rinse

Rinse sampling equipment with distilled/deionized water with a low-pressure sprayer.

Station 6: Nitric Acid Sprayers (required only if metals are a contaminant of concern)

Using a spray bottle rinse sampling equipment with nitric acid. Begin spraying (inside and outside) at one end of the equipment allowing the acid to drip to the other end into a 5-gallon bucket. A rinsate blank may be required at this station. Refer to Section 9.

Station 7: Low-Pressure Sprayers

Rinse sampling equipment with distilled/deionized water with a low-pressure sprayer.

Station 8: Organic Solvent Sprayers

Rinse sampling equipment with a solvent. Begin spraying (inside and outside) at one end of the equipment allowing the solvent to drip to the other end into a 5-gallon bucket. Allow the solvent to evaporate from the equipment before going to the next station. A QC rinsate sample may be required at this station.

Station 9: Low-Pressure Sprayers

Rinse sampling equipment with distilled/deionized water with a low-pressure washer.

Station 10 : Clean Equipment Drop

Lay clean equipment on plastic sheeting. Once air dried, wrap sampling equipment with aluminum foil, plastic, or other protective material.

7.2.3 Post Decontamination Procedures

1. Collect high-pressure pad and heavy equipment decontamination area liquid and waste and store in appropriate drum or container. A sump pump can aid in the collection process. Refer to the Department of Transportation (DOT) requirements for appropriate containers based on the contaminant of concern.

2. Collect high-pressure pad and heavy equipment decontamination area solid waste and store in appropriate drum or container. Refer to the DOT requirements for appropriate containers based on the contaminant of concern.

3. Empty soap and water liquid wastes from basins and buckets and store in appropriate

drum or container. Refer to the DOT requirements for appropriate containers based on the contaminant of concern.

4. Empty acid rinse waste and place in appropriate container or neutralize with a base and place in appropriate drum. pH paper or an equivalent pH test is required for neutralization. Consult DOT requirements for appropriate drum for acid rinse waste.

5. Empty solvent rinse sprayer and solvent waste into an appropriate container. Consult DOT requirements for appropriate drum for solvent rinse waste.

6. Using low-pressure sprayers, rinse basins, and brushes. Place liquid generated from this process into the wash water rinse container.

7. Empty low-pressure sprayer water onto the ground.

8. Place all solid waste materials generated from the decontamination area (i.e., gloves and plastic sheeting, etc.) in an approved DOT drum. Refer to the DOT requirements for appropriate containers based on the contaminant of concern.

9. Write appropriate labels for waste and make arrangements for disposal. Consult DOT regulations for the appropriate label for each drum generated from the decontamination process.

8.0 CALCULATIONS

This section is not applicable to this SOP.

9.0 QUALITYASSURANCE/ QUALITY CONTROL

A rinsate blank is one specific type of quality control sample associated with the field decontamination process. This sample will provide information on the effectiveness of the decontamination process employed in the field.

Rinsate blanks are samples obtained by running analyte free water over decontaminated sampling equipment to test for residual contamination. The blank water is collected in sample containers for handling, shipment, and analysis. These samples are treated identical to samples collected that day. A rinsate blank is used to assess cross contamination brought about by improper decontamination procedures. Where dedicated sampling equipment is not utilized, collect one rinsate blank per day per type of sampling device samples to meet QA2 and QA3 objectives.

If sampling equipment requires the use of plastic tubing it should be disposed of as contaminated and replaced with clean tubing before additional sampling occurs.

10.0 DATA VALIDATION

Results of quality control samples will be evaluated for contamination. This information will be utilized to qualify the environmental sample results in accordance with the project's data quality objectives.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow OSHA, U.S. EPA, corporate, and other applicable health and safety procedures.

Decontamination can pose hazards under certain circumstances. Hazardous substances may be incompatible with decontamination materials. For example, the decontamination solution may react with contaminants to produce heat, explosion, or toxic products. Also, vapors from decontamination solutions may pose a direct health hazard to workers by inhalation, contact, fire, or explosion.

The decontamination solutions must be determined to be acceptable before use. Decontamination materials may degrade protective clothing or equipment; some solvents can permeate protective clothing. If decontamination materials do pose a health hazard, measures should be taken to protect personnel or substitutions should be made to eliminate the hazard. The choice of respiratory protection based on contaminants of concern from the site may not be appropriate for solvents used in the decontamination process.

Safety considerations should be addressed when using abrasive and non-abrasive decontamination

equipment. Maximum air pressure produced by abrasive equipment could cause physical injury. Displaced material requires control mechanisms.

Material generated from decontamination activities requires proper handling, storage, and disposal. Personal Protective Equipment may be required for these activities.

Material safety data sheets are required for all decontamination solvents or solutions as required by the Hazard Communication Standard (i.e., acetone, alcohol, and trisodiumphosphate).

In some jurisdictions, phosphate containing detergents (i.e., TSP) are banned.

12.0 REFERENCES

Field Sampling Procedures Manual, New Jersey Department of Environmental Protection, February, 1988.

A Compendium of Superfund Field Operations Methods, EPA 540/p-87/001.

Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, USEPA Region IV, April 1, 1986.

Guidelines for the Selection of Chemical Protective Clothing, Volume 1, Third Edition, American Conference of Governmental Industrial Hygienists, Inc., February, 1987.

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH/OSHA/USCG/EPA, October, 1985.

APPENDIX A

Table

Table 1. Soluble Contaminants and Recommended Solvent Rinse

TABLE 1 Soluble Contaminants and Recommended Solvent Rinse		
SOLVENT[1]	EXAMPLES OF SOLVENTS	SOLUBLE CONTAMINANTS
Water	Deionized water Tap water	Low-chain hydrocarbons Inorganic compounds Salts Some organic acids and other polar compounds
Dilute Acids	Nitric acid Acetic acid Boric acid	Basic (caustic) compounds (e.g., amines and hydrazines)
Dilute Bases	Sodium bicarbonate (e.g., soap detergent)	Acidic compounds Phenol Thiols Some nitro and sulfonic compounds
Organic Solvents [2]	Alcohols Ethers Ketones Aromatics Straight chain alkalines (e.g., hexane) Common petroleum products (e.g., fuel, oil, kerosene)	Nonpolar compounds (e.g., some organic compounds)
Organic Solvent[2]	Hexane	PCBs

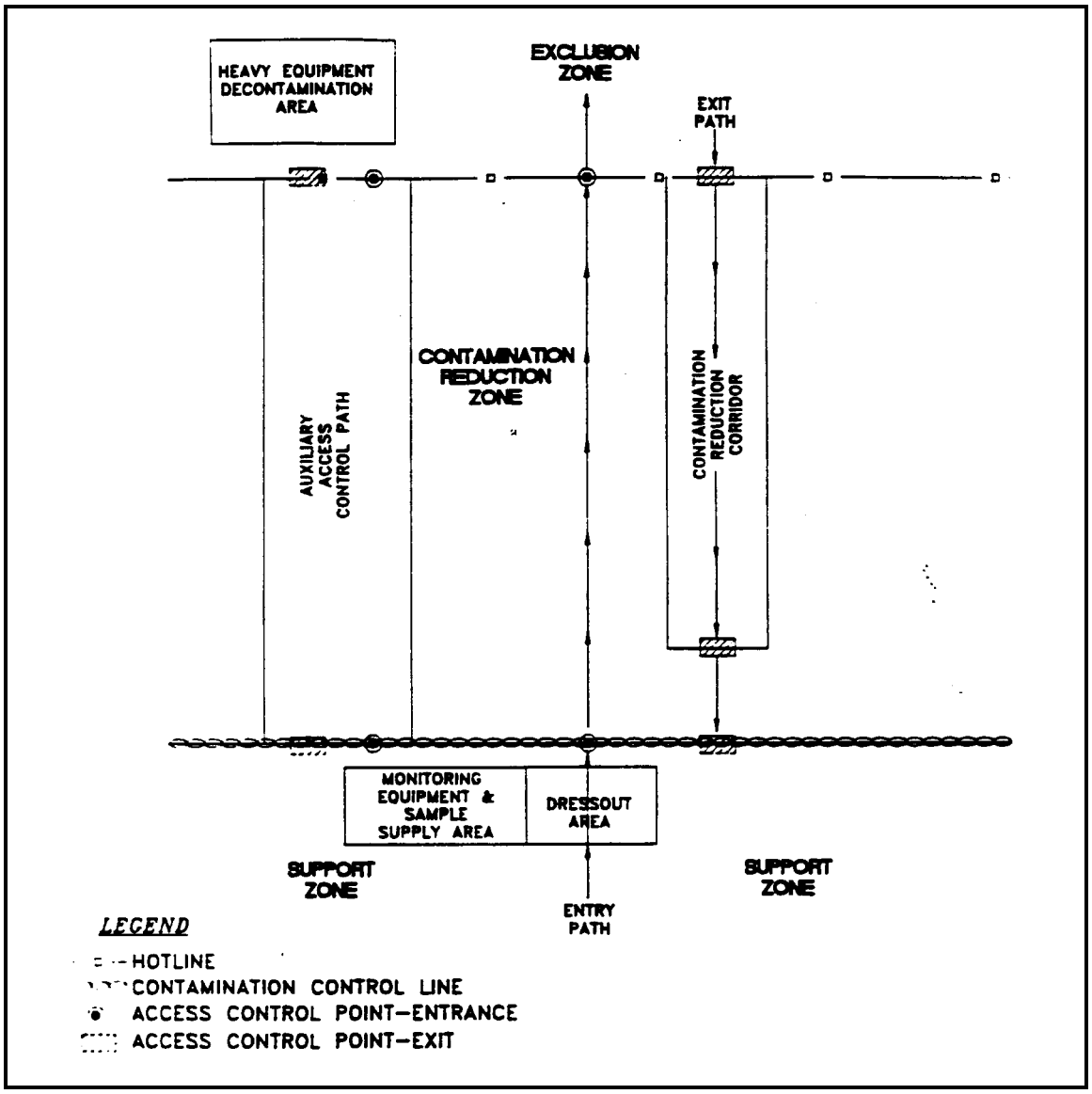
[1] - Material safety data sheets are required for all decontamination solvents or solutions as required by the Hazard Communication Standard

[2] - WARNING: Some organic solvents can permeate and/or degrade the protective clothing

APPENDIX B

Figures

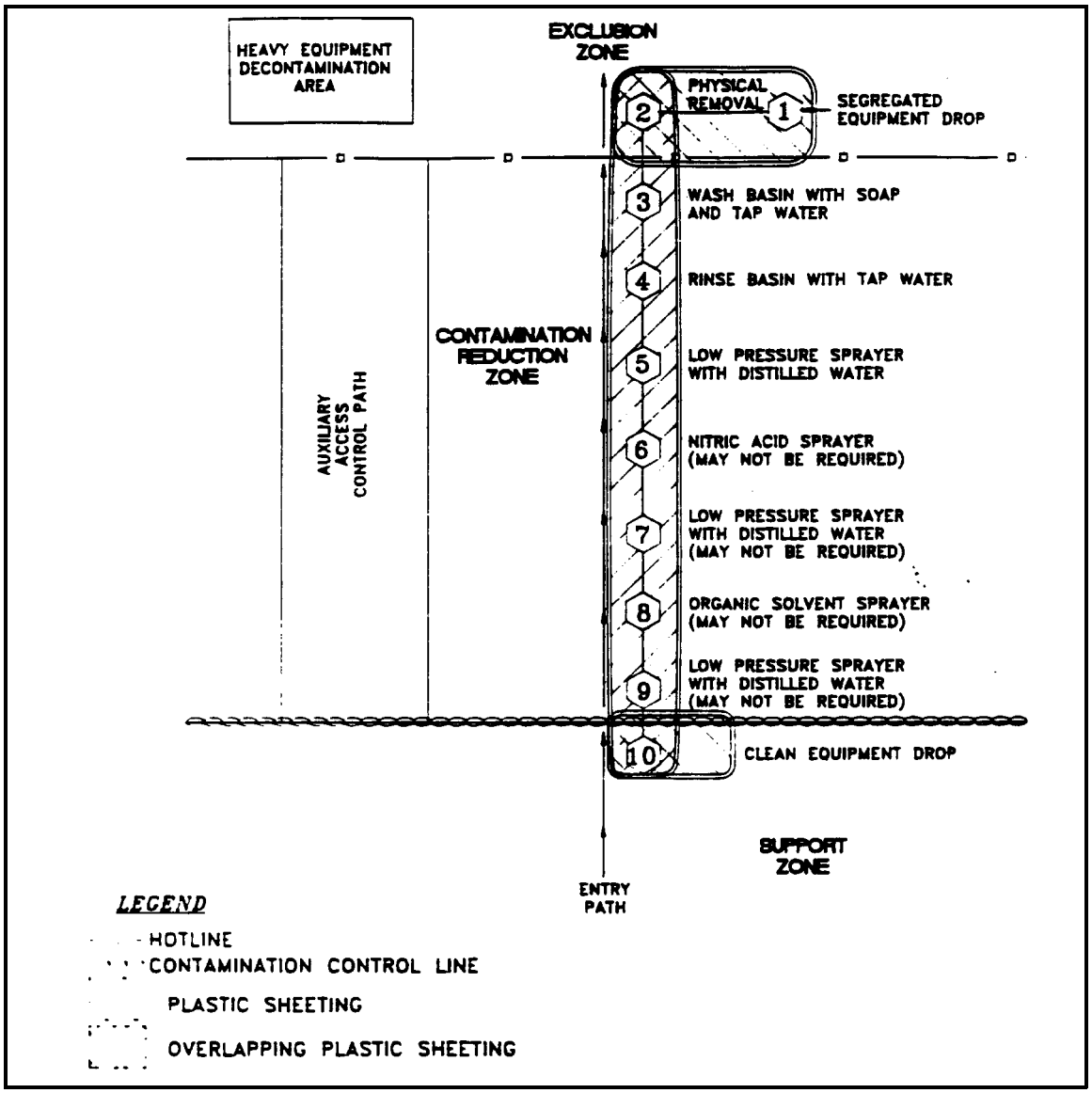
Figure 1. Contamination Reduction Zone Layout



APPENDIX B (Cont'd.)

Figures

Figure 2. Decontamination Layout



APPENDIX C
COMMUNITY AIR MONITORING PLAN

P.W. GROSSER CONSULTING, INC.
PROJECT No. RGI1504

COMMUNITY AIR MONITORING PLAN

GARVIES POINT WATERFRONT REVITALIZATION PROJECT
GELN COVE, NEW YORK

SUBMITTED:
AUGUST 2016

PREPARED FOR:
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1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) provides measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved) from potential airborne contaminant releases resulting from remedial action at the Captain's Cove Site, Glen Cove, New York.

The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air.

The primary concerns for this site are VOCs, SVOCs, metals and dust particulates.

1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- 29 CFR 1910.120(h): This regulation specifies that air shall be monitored to identify and quantify levels of airborne hazardous substances and health hazards, and to determine the appropriate level of protection for workers.
- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan: This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air.
- New York State Department of Environmental Conservation (NYSDEC) Technical and Guidance Memorandum (TAGM) #4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites: This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2.0 AIR MONITORING

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

2.1 Real-Time Monitoring

This section addresses the real-time monitoring that will be conducted within the work area, and along the site perimeter, during intrusive activities such as excavation, manipulation of soil piles, soil sampling, etc.

2.1.1 *Work Area*

The following instruments will be used for work area monitoring:

- Photoionization Detector (PID)
- Dust Monitor

Table 1-1 presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. Table 1-2 lists the Real-Time Air Monitoring Action Levels to be used in all work areas.

2.1.2 *Community Air Monitoring Requirements*

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before excavation activities begin. These points will be monitored periodically in series during the site work.

Fugitive respirable dust will be monitored using a Thermo Electron Corporation Model pDR-1000AN/1200 aerosol monitor or equivalent. Air will be monitored for VOCs with a portable Photovac MicroTip photoionization detector (PID), or equivalent. Table 1-1 presents a breakdown of each main activity and provides the instrumentation, frequency and location of the real-time monitoring for the site. Table 1-2 lists the Real-Time Air Monitoring Action Levels to be used in all work areas. All air monitoring data is documented in a site log book by the designated site safety officer. PWGC's site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. All instruments will be zeroed daily and checked for accuracy. A daily log will be kept. If additional monitoring is required, the protocols will be developed and appended to this plan.

Table 1-1
Frequency and Location of Air Monitoring

ACTIVITY	AIR MONITORING INSTRUMENT	FREQUENCY AND LOCATION
Sampling & Excavation	PID, Dust Monitor	Continuous in Breathing Zone (BZ) during intrusive activities or if odors become apparent, screening in the BZ every 30 minutes during non-intrusive activities Every 60 minutes at the perimeter during intrusive activities

Table 1-2
Real-Time Air Monitoring Action Levels

AIR MONITORING INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON
PID	Breathing Zone	0-25 ppm, non-transient	None	Exposure below established exposure limits
PID	Breathing Zone	25-100 ppm, non-transient	Don APR	Based on potential exposure to VOCs
PID	Breathing Zone	>100 ppm, non-transient	Don ASR or SCBA, Institute vapor/odor suppression measures, Notify HSM.	Increased exposure to site contaminants, potential for vapor release to public areas.
PID	Work Area Perimeter	< 5 ppm	None	Exposure below established exposure limits.
PID	Work Area Perimeter	> 5 ppm	Stop work and implement vapor release response plan until readings return to acceptable levels, Notify HSM.	Increased exposure to site contaminants, potential for vapor release to public areas
Aerosol Monitor	Work Area Perimeter	>100 but < 150 $\mu g/m^3$ for 15 minutes	Institute dust suppression measures, Notify HSM.	Work to continue if particulate concentrations remain below 150 $\mu g/m^3$

AIR MONITORING INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON
Aerosol Monitor	Work Area Perimeter	>150 µg/m^3	Don ASR or SCBA, Institute dust suppression measures, Notify HSM.	Stop work and implement dust suppression techniques until readings return to acceptable levels, Notify HSM.

3.0 VAPOR EMISSION RESPONSE PLAN

This section is excerpted from the NYSDOH guidance for Community Air Monitoring Plan - Ground Intrusive Activities.

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. Vapor suppression measures can also be taken at this time. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down. When work shutdown occurs, downwind air monitoring as directed by the Site Health & Safety Officer (SHSO) 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 Response Plan Section.

4.0 MAJOR VAPOR EMISSION RESPONSE PLAN

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source (see Section 5.0) are unsuccessful and if organic vapor levels are approaching 5 ppm above background for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect.

However, the Major Vapor Emission Response Plan shall be immediately placed in effect if organic vapor levels are greater than 10 ppm above background.

Upon activation, the following activities will be undertaken:

1. All emergency Response Contacts as listed in the Health & Safety Plan will go into effect.
2. The local police authorities will immediately be contacted by the Health & Safety Officer and advised of the situation.
3. 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 Health & Safety Officer.

5.0 VAPOR SUPPRESSION TECHNIQUES

Vapor suppression techniques must be employed when action levels warrant the use of these techniques.

The techniques to be implemented for control of VOCs from stockpiled soil or from the open excavation will include one or more of the following:

- cover with plastic
- cover with “clean soil”
- vapor suppressant foam
- limit working hours to favorable wind and temperature conditions

6.0 DUST SUPPRESSION TECHNIQUES

Reasonable dust-suppression techniques must be employed during all work that may generate dust, such as excavation, grading, and placement of clean fill. The following techniques were shown to be effective for controlling the generation and migration of dust during remedial activities:

- Wetting equipment and excavation faces;
- Spraying water on buckets during excavation and dumping;
- Hauling materials in properly covered containers; and,
- Restricting vehicle speeds to 10 mph.

Using atomizing sprays will prevent overly wet conditions, conserve water, and offer an effective means of suppressing fugitive dust. It is imperative that utilizing water for suppressing dust will not create surface runoff.

7.0 DATA QUALITY ASSURANCE

7.1 Calibration

Instrument calibration shall be documented in the designated field logbook. All instruments shall be calibrated before each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

7.2 Operations

All instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on-site by the FOL/HSO for reference.

7.3 Data Review

The Field Team Leader FOL/SHSO will interpret all monitoring data based on Table 1-2 and his/her professional judgment. The FOL/HSO shall review the data with the HSM to evaluate the potential for worker exposure, upgrades/downgrades in level of protection, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with all sample documentation will be periodically reviewed by the HSM.

8.0 RECORDS AND REPORTING

All readings must be recorded and available for review by personnel from NYSDEC and USEPA. Should any of the action levels be exceeded, the NYSDEC Division of Air Resources must be notified in writing within five (5) working days.

The notification shall include a description of the control measures implemented to prevent further exceedances.

APPENDIX D
RADIATION MONITORING PLAN

RADIATION MONITORING PLAN

Garvies Point Development
Captain's Cove and Li Tungsten Sites
Glen Cove, New York

Prepared for:

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Revision 0
April 2016

RADIATION MONITORING PLAN

Garvies Point Development
Captain's Cove and Li Tungsten Sites
Glen Cove, New York

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Revision 0
April 2016

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Attachments

Attachment 1: Agency Position Letters
Attachment 2: Example Survey Record Forms

1.0 Introduction

This Radiation Monitoring Plan (RMP) has been prepared for use as part of the Site Management Plan(s) (SMP) for the Captain's Cove and Li Tungsten sites located in Glen Cove, New York (NY). For the purposes of this RMP, Captain's Cove and Li Tungsten will hereafter be collectively referred to as the "Site."

This RMP will be implemented during Site redevelopment and will remain in place following completion of Site development and during Site occupancy. All parties performing intrusive activities are required to comply with this RMP (as used here, intrusive activities are defined as disturbances below the cover system or any soil disturbances prior to the installation of the cover system). This RMP may be revised in the future based on additional data, changes in land-use controls, or other valid reasons provided that any proposed changes are reviewed and approved by stakeholders, which at a minimum, must include a health physicist certified by the American Board of Health Physics and the New York State Department of Environmental Conservation (NYSDEC).

NYSDEC should be notified a minimum of 15 days prior to planned intrusive activities.

2.0 Site History

The Site consists of the Captain's Cove property and the historic Li Tungsten property. The Li Tungsten property includes several parcels that have historically been referred to as Parcel A, Parcel B, Lower Parcel C, Upper Parcel C, and Parcel C Prime.

Radionuclides of concern from historical operations on the Site have been identified as radium-226 (Ra-226), Ra-228, thorium-230 (Th-230), and Th-232. The radioactive cleanup criteria for the Site were provided in the 1999 *Record of Decision* as modified in the 2005 *Explanation of Significant Difference* (ESD) and consist of a total radium (Ra-226 + Ra-228) criterion of 5.0 pCi/g above background, and a total thorium (Th-230 + Th-232) criterion of 5.0 pCi/g above background.

Remedial investigations and removal actions on the Site date back to 1988. Remedial actions at the Site were begun in 2000 and radiological clearance surveys of the Site were concluded in 2015 with the completion of the data gap final status surveys on Parcels A and C. All areas of the Site have been remediated such that they may be redeveloped for their intended usage in accordance with NYSDEC and U.S.

Environmental Protection Agency (USEPA) decisions provided in letters dated 2/4/16 and 2/3/16, respectively (**Attachment 1**).

3.0 Scope

This RMP shall apply to all intrusive activities prior to installation of the cover system, where any earthwork (e.g., excavating, trenching, grading, drilling) is being performed. Additionally, this RMP shall apply after the cover system has been installed if any intrusive activity breaches, penetrates, or temporarily removes the cover system and the underlying soils are disturbed.

4.0 Radiological Monitoring Methodology

This section describes the methodology by which this RMP will be implemented. Contingency protocols describing actions to take in the event that elevated radioactivity is identified are addressed in **Section 5.0**.

4.1 Radiological Monitoring Technician Qualifications

A qualified individual who has experience measuring and evaluating background levels of radiation, and experience operating and maintaining the required instrumentation must implement this RMP. An individual will be considered qualified if they have a minimum of 2 years experience performing environmental radiation monitoring. Alternatively, a minimum of 4 years experience as a radiation protection technician or radiation control technician will be considered acceptable. Additionally, it is recommended that the qualified individual(s) be provided by an independent company with demonstrated health physics experience, an active Radioactive Materials License/NYS Reciprocity agreement, and resources including an on-staff certified health physicist.

4.2 Instrumentation

Based on the characteristic of the radionuclides of concern and the equilibrium of their associated decay series, the following instrumentation should be available during implementation of this RMP.

4.2.1 Gamma Radiation Detectors

The vast majority of radiation monitoring on the Site performed under this RMP will involve detection and measurement of gamma radiation. Prior remedial work on the Site utilized 2-inch by 2-inch sodium iodide (NaI) scintillation detectors coupled to scalar/ratemeters. Due to the large volume of data collected on the Site using these

detectors, which has allowed screening criteria to be established, it is recommended that all gamma surveys performed under this RMP be performed using a 2-inch by 2-inch NaI detector (Ludlum 44-10 or equivalent). Alternative detectors may be used provided adequate Site backgrounds and screening criteria are established. The use of alternative gamma detectors shall be approved by a certified health physicist.

4.2.2 Alpha and Beta Radiation Detectors

The radionuclides of concern and their associated decay chains emit both alpha and beta radiations in addition to gamma radiation. Due to the relatively high backgrounds associated with gamma detectors, it is more appropriate to use alpha or beta detectors for certain applications such as scanning personnel or equipment. Therefore, at a minimum, a Geiger-Muller (GM) detector capable of detecting alpha, beta, and gamma radiation will be available during implementation of this RMP. A suitable GM detector for this purpose is a Ludlum Model 44-9 (or equivalent) coupled with a Ludlum Model 12 ratemeter (or equivalent).

While a GM detector can detect alpha particles, it is far more efficient at detecting beta and gamma radiations; therefore, it is recommended that a zinc-sulfide (ZnS) alpha scintillation detector be available during implementation of this RMP (e.g., Ludlum Model 43-93 or equivalent). However, for routine implementation of this RMP, an alpha scintillation detector should not be necessary due to the numerous beta and gamma radiations associated with the radionuclides of concern and their decay chains.

4.2.3 Dose/Exposure Rate Detectors

A micro-roentgen (μR) exposure rate meter such as a Ludlum Model 19 (or equivalent), and/or a dose rate meter such as a Bicron micro-rem meter (or equivalent) shall be available during implementation of this RMP. The exposure rate meter will be used to evaluate external radiation hazards on the Site and will be used to verify that all material derived from intrusive activities are within acceptable levels prior to leaving the Site. For measurements of background levels of radiation, dose and exposure may be considered equivalent; using exposure to estimate dose is considered conservative since the Ludlum Model 19 (or equivalent) tends to over-respond to low energy gamma rays and x-rays. However, if significantly elevated radiation fields are encountered, dose rate should be measured using the Bicron micro-rem meter (or equivalent), although conversion of exposure rate to dose rate may performed by a certified health physicist.

4.2.4 Instrument Calibration and Quality Assurance

All instrumentation used during implementation of this RMP shall be within 12 months of calibration to a National Institute of Standards and Technology (NIST) traceable source. Sources used shall have energies representative of the nuclides of concern and/or their daughter nuclides. Operational field checks shall be performed daily when an instrument is used in support of this RMP. Operational field checks shall include verifying that daily instrument backgrounds and instrument response checks are within expected ranges, that instrument settings (e.g., high voltage, thresholds) and battery life are within tolerance, and that the instrument controls are properly set for the intended use. Instrument quality assurance checks shall be documented.

4.3 Radiation Background Levels and Screening Criteria

This section details the observed background levels on the Site and establishes the screening criteria to be applied during implementation of this RMP. In general, a screening level of 2-times background applies to all measurements unless specifically addressed below.

4.3.1 Native Soil Gamma Radiation (2-inch by 2-inch NaI)

Based on data reviewed during a historical Site assessment, background levels on the site were found to vary between 5,000 counts per minute (cpm) and 10,000 cpm using a Ludlum 44-10, 2-inch by 2-inch NaI detector with an average of approximately 7,500 cpm. Additionally, isotopic data associated with readings as high as 14,892 cpm were found to be below the site-specific cleanup criteria. Therefore, for the purposes of this RMP, a screening criteria of 15,000 cpm (approximately 2-times background) will be used to evaluate field gamma measurements using a Ludlum 44-10 (or equivalent).

It should be noted that the background values and screening criteria assume a flat earth geometry. Elevated instrument responses are expected with certain geometries (e.g., a trench, near excavation sidewalls, inside a well boring); therefore, the radiation monitoring technician must be savvy to these changing geometries and evaluate measurements accordingly; if practical, backgrounds for specific geometries should be established and documented.

Radiation levels in excess of the 15,000 cpm screening criteria do not necessarily pose a hazard to on-site workers. However, sustained readings in excess of 15,000 cpm will prompt contingency actions as described in **Section 5.0**.

4.3.2 Dose/Exposure Rates

Ambient background exposure rates measured at approximately 1 meter above the surface range between 3 and 8 μR/hour throughout the Site. In order to establish localized dose/exposure rate background levels, a site-wide baseline dose/exposure rate survey will be performed prior to Site redevelopment activities. Following redevelopment, baseline surveys should establish background levels for the designated areas of intrusive activities.

The site-specific screening criterion of 2-times background applies to dose/exposure rates, but the absolute value of the screening criterion will fluctuate depending on the background of the location being investigated. Therefore, the 2-times background criterion is expected to vary between 6 and 16 μR/hour depending on localized backgrounds. Due to this variation, documentation of dose rate surveys shall indicate the applicable background on a survey-by-survey basis. General area dose/exposure rates in excess of 2-times background will prompt contingency actions as described in **Section 5.1**. Note that the 2-times background criterion may also be applied to transportation surveys. Transportation dose/exposure rates in excess of 2-times background (on contact) will prompt contingency actions as described in **Section 5.2**. General area dose rates in excess of 2 millirem(mrem)/hr will prompt contingency actions as described in **Section 6.2**.

4.3.3 Personnel and Equipment (Free Release Limits)

Personnel and equipment that contact native soil during Site activities will be periodically surveyed to ensure that they are free from contamination. The criteria for determining whether personnel and equipment are contaminated are based on the free release surface contamination levels promulgated in NYS Code 12 NYCCR 38.41. **Table 1** summarizes these acceptable surface contamination levels.

Table 1: Acceptable Surface Contamination Levels for Free Release

Radioisotope	Average (dpm/100 cm^2)	Maximum (dpm/100 cm^2)	Removable (dpm/100 cm^2)
Uranium 238 + associated decay products	5,000	15,000	1,000
Ra-226, Ra-228, Th-230	100	300	20
Natural Thorium, Th-232	1,000	3,000	200
Beta-Gamma Emitters	5,000	15,000	1,000

4.3.4 NORM and Other Considerations

Rocks and boulders may contain naturally occurring radioactive material (NORM) that is not related to historical Site activities and should not be considered contamination in accordance with 6 CRR-NY 380-1.2. If a natural rock is observed to have gamma radiation in excess of the 15,000 cpm screening criteria, then it should be properly investigated to ensure that it is the rock itself and not any soil adhered to the rock that is causing elevated measurements. Verified NORM rocks should not prompt contingency actions.

Subsurface concrete features, concrete debris, and brick debris may also contain NORM at levels exceeding the screening criteria. If it can be verified that the building material itself is the source of the elevated gamma readings, then it too should not be considered contamination in accordance with 6 CRR-NY 380-1.2.

Finally, it is not possible to predict all situations that may occur or all subsurface features that may be encountered. In general, a screening criterion of 2-times background should be appropriate for all ground intrusive tasks; however, a 2-inch by 2-inch NaI detector may not be appropriate for all tasks. Therefore, any alternate equipment will be specified in the project-specific excavation work plan for approval by the NYSDEC prior to implementation. Additionally, it is up to the qualified radiation monitoring technician to use appropriate instruments and establish instrument-specific background levels if needed. For example, during geo-core activities, a smaller NaI detector may be used for down-hole gamma scanning and would require its own set of background and screening values. The use of alternative background data may be subject to NYSDEC approval. It should be noted that historical Site data may contain previously approved background data, or data suitable for establishing background values, for a variety of tasks.

4.4 Radiation Monitoring During Earthwork Activities

Several definable features of work have been identified and the general radiation monitoring protocols for each definable feature are detailed below. Radiation monitoring should be performed in accordance with applicable guidance from Chapter 6 of the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM), "Field Measurement Methods and Instrumentation."

The following methodologies prescribe a level of radiation monitoring that will ensure worker safety during intrusive activities. However, it should be noted that following the completion of intrusive activities, it is critical that 100% of all *as-left* surfaces be surveyed to ensure that radiation and contamination levels are acceptable. This requirement will ensure that the regulatory decisions (see

Attachment 1) regarding future use of the Site remain valid. Final As-left surfaces to be surveyed include all surfaces that contain, or potentially contain, disturbed native soil (e.g., the final Site-derived backfill surface, the surface of staging areas after stockpiled material has been removed, and any newly exposed excavation surfaces which remain exposed following completion of intrusive activities).

4.4.1 Pre-excavation

Prior to any intrusive activities, the designated area of disturbance should be identified along with the location(s) where any displaced soils will be staged. The excavation and staging areas should be given unique identifiers and a gamma walkover survey (GWS) shall be performed over each area using a 2-inch by 2-inch NaI detector (or equivalent); the range of observed count rates shall be documented. A dose/exposure rate survey should also be performed if the site-wide baseline survey is not applicable.

Baseline surveys of equipment should also be performed prior to work activities. A baseline survey shall consist of direct measurements using a Ludlum 44-9 detector (or equivalent) and will include scanning and timed stationary measurements on the equipment. Baseline surveys may also include indirect measurements, if warranted, based on the results of direct measurements. Indirect measurements are performed by swiping a target surface with either a cloth smear (for 100 cm^2 areas) or a Masslinn smear (for large areas) and then field counting the smear for removable radioactivity.

4.4.2 Excavation and Stockpiling

Provided that the excavation is performed within the designated limits, and that spoils are being placed in the designated area(s), excavation may be allowed to continue until completion, or until a routine stopping point occurs due to reasons other than radiation monitoring. However, the radiation-monitoring technician does have the authority to temporarily stop excavation for the sole purpose of radiation monitoring.

4.4.2.1 Interim Surveys

The radiation monitoring technician may perform interim surveys during any work stoppage. Interim surveys may include a GWS of the open excavation and stockpiles, and/or surveys of personnel and equipment.

Note that if excavations are not safe to enter, radiation measurements will be limited to stockpiled materials. Once it becomes apparent that an excavation will be

unsafe to enter, the frequency of interim stockpile surveys may be increased at the discretion of the radiation monitoring technician.

4.4.2.2 Final Excavation Surveys

Upon completion of excavation, 100% of *safely accessible* areas within the excavation should be surveyed via GWS. No entry shall be made into an excavation that could be considered a permit-required confined space. No entry shall be made into an excavation that is greater than 4 feet deep unless adequate sidewall sloping/benching is in place and the air quality within the excavation has been monitored. If an excavation is not safe to enter, then sidewalls may be scanned from the surface *provided it is safe to do so*. Each excavation should be given unique identifiers and the areas surveyed within an excavation shall be documented along with instrumentation used and the observed range of gamma readings; areas within the excavation that were not surveyed will also be noted. Survey information may be recorded on the survey form(s) found in **Attachment 2**.

4.4.2.3 Final Stockpile Surveys

Additionally, upon completion of excavation, 100% of *safely accessible* areas of the stockpile(s) should be surveyed via GWS. Stockpiles should be constructed with the need for pedestrian access in mind. If larger stockpiles (i.e., >200 cubic yards) are necessary, then the radiation-monitoring technician may periodically pause stockpiling to allow for interim GWS in addition to performing surveys during routine work stoppages. All stockpile survey documentation shall indicate the stockpile's unique identifier, the surfaces surveyed (e.g., in-progress surface, final surface), instrumentation used, and the range of observed gamma readings. Survey information may be recorded on the survey form(s) found in **Attachment 2**.

4.4.3 Excavation and Direct Loading

In the event that excavated material will be directly loaded for transportation instead of stockpiled, the same protocols detailed in **Section 4.4.2** still apply, with the exception that the transportation package will be surveyed once it is at capacity. For off-site transportation of material derived from intrusive activities, transportation surveys will be performed (refer to **Section 4.4.5**).

4.4.4 Backfilling with Site-Derived Fill

Excavated material may be used for backfill on the Site provided the procedures defined for material reuse in the SMP are followed and approval for reuse is provided by the NYSDEC. If materials derived from intrusive activities on the Site are used as backfill, then the material should be surveyed via GWS after each lift is placed and/or compacted (if applicable). The final as-left surface of the site-derived

fill shall be surveyed via GWS, and any material found to exceed the 2-times background criteria will prompt contingency actions as described in **Section 5.1**. Documentation shall indicate the backfilled area's unique identifier, the surfaces surveyed (e.g., lift number/elevation, final surface/elevation), instrumentation used, and the range of observed gamma readings. Survey information may be recorded on the survey form(s) found in **Attachment 2**. Note that this requirement only applies to site-derived fill; imported fill is not covered under this RMP.

4.4.5 Off-site Disposal

All material and transportation packages derived from intrusive activities shall be surveyed prior to leaving the Site. Transportation surveys will be performed with a Ludlum Model 19 μR meter (or equivalent) and in general, on contact readings should be less than 2-times above background, and exposure rates measured at 100-cm should be less than 10 μR/hr above background (refer to **Section 4.3.2** for a discussion on establishing background). Measurements above these criteria will prompt contingency actions (**Section 5.2**). Survey information may be recorded on the survey form(s) found in **Attachment 2**.

4.4.6 Run-off and Debris

Run-off control measures shall be implemented in accordance with the SMP; however, if run-off beyond the identified staging area occurs, then the radiation monitoring technician shall be notified and the affected areas shall be surveyed.

Debris encountered during excavation shall be segregated from the soil stockpiles and the debris will be surveyed to ensure that radiation levels do not exceed 2-times background. Non-NORM debris with measurements above this criterion will prompt contingency actions as described in **Section 5.1**.

4.4.7 Personnel and Equipment

Personnel and equipment that come into contact with material derived from intrusive activities should be periodically surveyed during work activities using a Ludlum 44-9 detector (or equivalent), and shall be surveyed prior to leaving the Site. Surveys of personnel will be performed using standard scanning techniques of holding the detector 2 cm above the body and moving it at a rate of 2 inches per second. Surveys may be limited to, or focus on, areas of the body which have the highest potential for contamination based on the work performed (e.g., feet, hands, face). Survey results will be compared to the free release limits shown in **Table 1**. Measurements exceeding free release criteria will prompt contingency actions as described in **Section 5.3**.

Equipment surveys shall consist of direct measurements using a Ludlum 44-9 detector (or equivalent) and/or an alpha/beta scintillation detector (Ludlum 43-93 or equivalent). Equipment surveys will, at a minimum, include scanning and timed stationary measurements. Baseline surveys may also include indirect measurements, if warranted, based on results of the direct measurements. Indirect measurements are performed by swiping a target surface with either a cloth smear (for 100 cm^2 areas) or a Masslinn smear (for large areas) and then field counting the smear for removable radioactivity.

5.0 Contingency

5.1 Soil and Debris

If any radiation levels are detected that exceed the 2-times background criteria, the source of the elevated levels must be adequately investigated. The extent of the above-criteria material shall be delineated and removed to a secure, bermed stockpile on-site. Soil samples should be taken at a frequency of one sample per 100 cubic yards and sent off-site to a certified radioanalytical laboratory to be analyzed by gamma spectroscopy using EPA Method 901.1. Further actions on the above-criteria stockpiled materials will be based on isotopic results. If isotopic data indicate that concentrations of the radionuclides of concern are below cleanup criteria, the soil may be placed back on the Site provided the procedures defined for material reuse in the SMP are followed and approval for reuse is provided by the NYSDEC. Elevated isotopic results will require an alternative disposition.

Once all of the 2-times background material has been removed to the secure, bermed stockpile, and subsequent surveying of the work area indicates all remaining material is below the 2-times background criteria, work may proceed without the need to await isotopic results.

5.2 Transportation

In the event that transportation packages containing materials derived from intrusive activities are in excess of the criteria stated in **Section 4.4.5**, the transportation package will not be allowed to leave the Site until the elevated readings are thoroughly investigated. Investigation may require repackaging of material. Any material in excess of 2-times background shall be segregated to a secure, bermed stockpile and investigated as in **Section 5.1**. If these contingency measures reduce dose rates to below the **Section 4.4.5** criteria, then the transportation package may leave the Site.

5.3 Personnel and Equipment

In the event that personnel or equipment are contaminated in excess of free release criteria as defined in **Section 4.3.3**, all work on-site shall be stopped until the extent and source of the contamination is identified. The personnel and equipment shall be decontaminated in accordance with the site-specific health and safety plan and resurveyed until all levels are acceptable for free release.

6.0 Health and Safety

6.1 Personal Protective Equipment

Radiation levels measured up to 2-times background are not considered to be a hazard. Radiation levels in excess of 2-times background will result in a controlled disposition as detailed in this RMP; however, radiation in excess of 2-times background is not expected to be at a level that would be considered hazardous to on-site workers. Therefore, routine work may be performed under this RMP using standard Level D personal protective equipment (PPE). This level of PPE is considered appropriate considering the small potential for radiation hazards and risks based on an historical Site assessment that included previous site-wide investigations and remedial actions. However, a best-work practice of avoiding direct skin contact with soils is recommended; therefore gloves should be worn when handling potentially contaminated soil and personnel/PPE contacting potentially contaminated soil shall be surveyed in accordance with **Section 4.4.7**. PPE may be modified to a more protective level by the radiation monitoring technician based on measurement data.

6.2 Worker Training

Worker training will adhere to As-Low-As-Reasonably-Achievable (ALARA) philosophies and will be commensurate with the radiation hazards, or potential radiation hazards, present. Workers shall be briefed on the radiological status of the Site and on the potential contamination that may be encountered during intrusive activities. All workers are expected to understand the roles and responsibilities of the radiation monitoring technicians and will be expected to work under the direction of the radiation monitoring technicians if applicable. No formal radiation worker training is necessary unless radiation levels require that dosimetry devices be issued (see **Section 6.3**). In lieu of formal radiation worker training, general employee training shall include radiation awareness and safety training, which will be provided by the radiation monitoring contractor for all workers prior to their participation in intrusive work activities. The training shall be documented and workers will be required to sign a training form to acknowledge that they have

received training prior to commencing work activities. Topics covered in the radiation awareness training shall include, at a minimum, the following:

- Site-specific information on the quantity, type, distribution, and associated risks of the potential radiological contaminants on-site
- Basic ALARA and good-work practices to minimize potential external and internal radiation hazards
- An introduction to the site-specific radiation monitoring program as well as the roles and responsibilities of the radiation monitoring technicians
- PPE requirements and instructions on proper use

Additionally, pre-job briefings, daily safety meetings, and post-job critiques shall include radiation safety topics prepared by the radiation monitoring contractor and these topics shall address Site-specific radiation hazards and/or general radiation safety topics. The information discussed will be recorded, which will serve as confirmation that the information was presented to those persons whose signatures are on the form. There will be at least one signed form for each work shift.

In the event that formal radiation worker training is required (i.e., dose rates exceed 2 mrem/hr and dosimetry is issued), a radiation protection program, including worker training requirements, will be developed in accordance with 10 NYCRR 16.

6.3 Dosimetry

No personal dosimetry is required to perform work under this RMP based on the historical site assessment, which indicates no potential for dose to exceed 10% of the 10 NYCRR 16 regulatory limits. However, dose/exposure levels will be monitored daily with instrumentation and documented. As a protective measure against radiation dose to on-site workers, dose rates above 2 mrem/hr (10 NYCRR 16 public dose limit) will be considered a potential worker dose risk. Soil that exhibits readings above background but below the threshold for worker dose risk will be handled as described in the SMP, as there is no significant exposure risk at these levels. At background levels, dose rates may be approximated by exposure rates and dose/exposure rates will be periodically measured through site-wide exposure rate surveys using the Ludlum Model 19 meter (or equivalent). These surveys should focus on frequently occupied areas and on areas of stockpiled material derived from intrusive activities. If significantly elevated exposure rates are observed, a dose rate survey using a Bicron micro-rem meter (or equivalent) shall be performed (alternatively, exposure rates may be converted to dose rates by a certified health physicist). Dose levels in excess of 2 mrem/hr will prompt

application of administrative controls (e.g., postings, instructions to workers, restricting area access) and a re-evaluation of dosimeter use.

The periodicity of routine dose/exposure rate surveys should be commensurate with the magnitude of changing Site conditions relative to the potentially contaminated material derived from intrusive activities, and with the magnitude of radiation encountered. Based on process knowledge and historical remediation activities, it is considered highly unlikely that dose rates will ever be observed in the range of mrem.

6.4 Air Monitoring

Historical data indicate that there is no appreciable level of airborne radiation hazard and no appreciable risk of internal inhalation dose associated with the form and quantity of potential radiological contamination on the Site. Additionally, work plans associated with the applicable Site Management Plan require dust control and dust monitoring to ensure that airborne particulates do not exceed a concentration of 150 $\mu g/m^3$. Provided that dust is controlled and maintained to the 150 $\mu g/m^3$ administrative limit, there is essentially no potential to exceed occupational or effluent derived air concentrations (DACs). Therefore, no radio-particulate air monitoring is required under this RMP with the following caveats:

- Calculations were performed assuming dust concentrations of 150 $\mu g/m^3$ and applying the most restrictive DAC values from 10CFR20 (i.e., effluent DACs). These values (along with conservative assumptions related to the volume, distribution, and dispersion-potential of the radionuclides) were used to derive soil concentrations that might create an effluent DAC atmosphere. As a protective measure, 50% of this conservatively-derived value was used as an action level. The derived soil-concentration action levels for the nuclides of concern on the Site are as follows: 13 pCi/g Th-232; 66 pCi/g Th-230; 3,000 pCi/g Ra-226; and 6,600 pCi/g Ra-228. Soil concentrations exceeding a sum-of-fractions unity calculation using these values will prompt a reevaluation of the need for air monitoring and a reevaluation of worker respiratory protection. If it is determined air monitoring is required, potential dose received between that determination and the implementation of air monitoring will be based on airborne particulate records and isotopic soil data. This methodology will ensure compliance with 10 NYCRR 16.7.
- The above calculations are based on dust being controlled to 150 $\mu g/m^3$ or less. Sustained exceedances of this limit will prompt a reevaluation of the need for air monitoring and a reevaluation of worker respiratory protection.

Attachment 1

Agency Position Letters
Regarding Radiological Status of Site as of
February 4, 2016

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation
625 Broadway, 12th Floor, Albany, New York 12233-7011
P: (518) 402-9706 | F: (518) 402-9020
www.dec.ny.gov

SENT VIA E-MAIL ONLY February 4, 2016

Myralee Machol, Executive Director
Glen Cove Community Development Agency
City Hall, 9 Glen Street
Glen Cove, New York 11542

RE: Li Tungsten, Site No. C360107A
Captain's Cove Condominium, Site No. 130032
City of Glen Cove, Nassau County
September Release Request

Dear Ms. Machol:

The New York State Department of Environmental Conservation (DEC), in consultation with the New York State Department of Health, has reviewed the City of Glen Cove's September 17, 2015 request for a determination that the release criteria for radiological contamination at the Li Tungsten Site and Captain's Cove Condominium Site (collectively, the "Site") have been met.

Based on DEC's review of the radiological status of the Site, including but not limited to recently completed MARSSIM surveys and Data Gap Analysis results, it has been determined that the properties in question have been remediated such that they may be redeveloped for their intended usage. However, while the information available to date indicates that there is no evidence of significant residual radiological surficial contamination left on-Site, based on the historical documentation of contamination at the Site, certain restrictions will still have to be complied with for any subsurface excavations.

As such, DEC can only approve a release with respect to radiological contamination which is subject to the imposition of certain institutional and engineering controls. The institutional controls will be implemented in the form of a recorded Environmental Easement; the engineering controls will be implemented through an approved Site Management Plan ("SMP"). The recorded Environmental Easement will require adherence to the approved SMP that will specify the need for radiological monitoring for intrusive work beneath the existing grade level. This is very similar to precautions that are required for historic chemical contamination at any site. Please note that this letter is limited to the topic of potential radiological contamination and has no bearing on any other environmental issues related to the Site.

If there are any questions, comments or concerns regarding this matter, please contact Heidi Dudek, the project manager for these sites, by telephone at 518-402-9814, or by email at heidi.dudek@dec.ny.gov.

Sincerely,

Michael J. Ryan, P.E., Assistant Division Director
Division of Environmental Remediation

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

ec: Michael Cruden, DEC
Jim Harrington, DEC
Gerard Burke, DEC
Timothy Rice, DEC
Jerry Riggi, DEC
Cynthia Costello, DOH
Charlotte Bethoney, DOH
Jerry Collins, DOH
Bridget Boyd, DOH
Doug Garbarini, USEPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

FEB - 3 2016

Myralee Machol
Executive Director
Glen Cove Community Development Agency
Administrative Director
Glen Cove Industrial Development Agency
City Hall, 9 Glen Street
Glen Cove, New York 11542

Subject: Li Tungsten and Captain's Cove Condominium Sites (EPA ID# NYD986882660 and NYS Registry# 1-30-032): City of Glen Cove's September 17, 2015 Letter Requesting No Further Action on Radiological Waste Remediation

Dear Ms. Machol:

The Environmental Protection Agency (EPA), in consultation with the New York State Department of Environmental Conservation, has reviewed the City of Glen Cove's September 17, 2015 request for a determination that the release criteria for radiological contamination at the Li Tungsten Site and Captain's Cove Condominium Site (collectively, the "Site") have been met.

Based on the EPA's review of the radiological status of the Site, including but not limited to recently completed MARSSIM surveys and Data Gap Analysis results, it has been determined that the properties in question have been remediated such that they may be redeveloped for their anticipated future uses. However, while the information available to date indicates that there is no evidence of unacceptable residual radiological surficial contamination left on-Site, based on the historical documentation of contamination at the Site, certain restrictions, described below, will still have to be imposed for any subsurface excavations.

While EPA concurs that the Site surface is free of unacceptable residual radiological surficial contamination, the word "release" is inappropriate for the Agency to apply to any of its authorities regarding this matter. As such, the EPA's concurrence on the determination that the properties may be developed for their anticipated future uses is subject to the imposition of certain institutional and engineering controls. The institutional controls will be implemented in the form of a recorded Environmental Easement; the engineering controls will be implemented through an approved Site Management Plan ("SMP"). The recorded Environmental Easement will require adherence with the approved SMP that will specify the need for radiological monitoring for intrusive work beneath the existing grade level. This is very similar to precautions that are required for historic chemical contamination at any site where material may remain post-remediation. Please note that this letter is limited to the topic of potential radiological contamination and does not address any other environmental issues related to the Site.

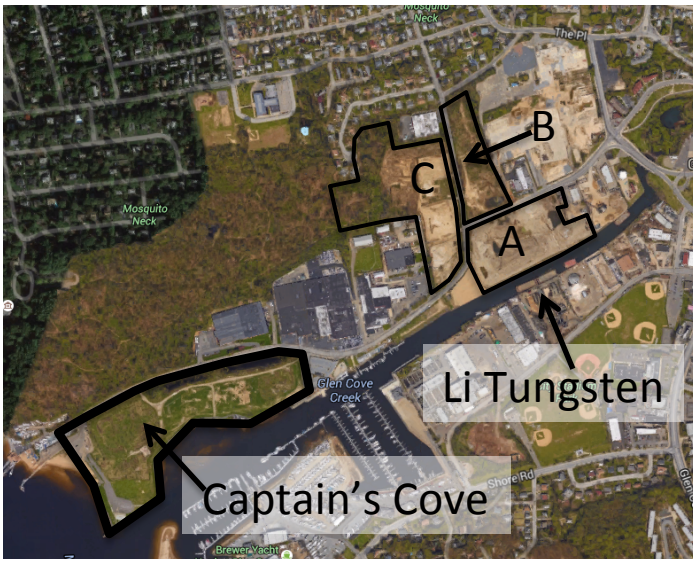
If you have any questions regarding this letter, please contact Lorenzo Thantu at (212) 637-4240 or email him at thantu.lorenzo@epa.gov.

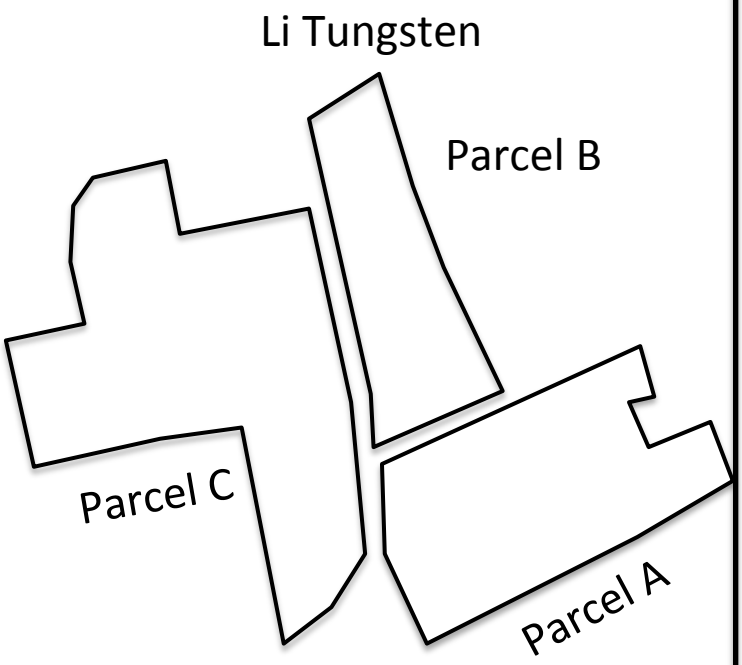
Sincerely,

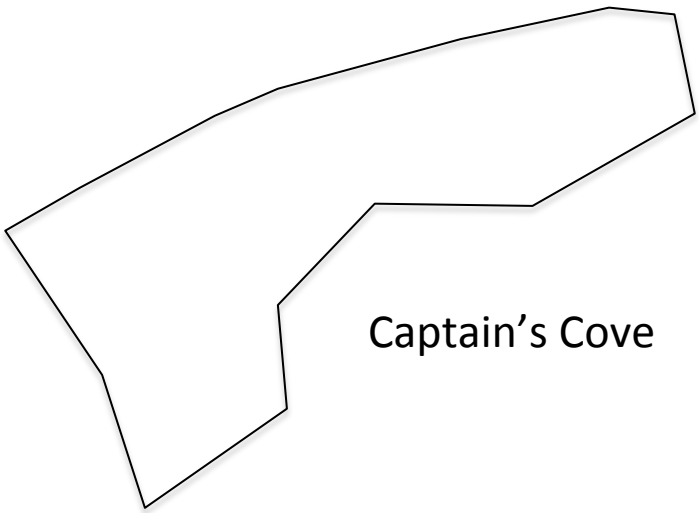
Doug Garbarini, Chief
New York Remediation Branch

Cc: M. Cruden, NYSDEC
J. Harrington, NYSDEC
G. Burke, NYSDEC
T. Rice, NYSDEC
J. Riggi, NYSDEC
C. Costello, NYSDOH
C. Bethoney, NYSDOH
J. Collins, NYSDOH
B. Boyd, NYSDOH

Attachment 2
Example Survey Record Forms







RMP Survey Record

Location ID: _____

Description of Work:_____

_____

_____

Date:_____

Location: (Plot Location on Side Map)

Coordinates: N:_____

(If available) E: _____

GWS Results

Pre-excavation:_____

Pre-stockpile: _____

Interim Survey Results:

_____

_____

_____

_____

Final As-left Surface Results:

_____

_____

Notes:_____

_____

_____

_____

Instrumentation

Meter:_____

Probe:_____

Cal Due:_____

Reviewed By:_____

Survey Data Sheet

Survey No.:		**Item Surveyed:**		**Project:**
Date:		**Contaminant/Limits:**		
Survey Tech.:		**Comments:**		
Count Rm. Tech.:				
Date Counted:				
Survey Type:				
Level of Posting:				

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

**Bcpm = Background cpm = R_b

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per 100cm^2

Parameters	*Instrument Information*	*Total*		*Removable*	
		Alpha	Beta-Gamma	Alpha	Beta-Gamma
Instrument Model:					
Instrument SN:					
Cal. Due Date:					
x, y int.: / *Efficiency:*					
BKG: / *Bcpm**:*					
ACF:					
tB:					
tS:					
Lc:					
MDC:					

No.	*Descriptions*	*uR/hr*	*Commenets*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
1											
2											
3											
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APPENDIX E
DECONTAMINATION PLAN

P.W. GROSSER CONSULTING, INC.
PROJECT No. RGI1504

DECONTAMINATION PLAN

GARVIES POINT WATERFRONT REVITALIZATION PROJECT
GLEN COVE, NEW YORK

Submitted:
AUGUST 2016

PREPARED FOR:
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau A, Section C
625 Broadway
Albany, New York 12233

United States Environmental Protection Agency
Region 2
290 Broadway, 20th Floor
New York, New York 10007

ON BEHALF OF:
RXR-Glen Isle Partners, LLC
625 RXR Plaza
Uniondale, New York 11556

PREPARED BY:
P.W. Grosser Consulting, Inc.
630 Johnson Avenue, Suite 7
Bohemia, New York 11716

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1.0 INTRODUCTION

1.1 Purpose

This document describes general and specific procedures, methods and considerations to be used and observed with regard to decontamination procedures during the course of the remedial action (RA).

The decontamination plan takes into account the specific contaminates inherent to the site and presents the minimum requirements which are to be met by P.W. Grosser Consulting, Inc. (PWGC), its subcontractors, and other on-site personnel in order to prevent the spread of contamination to areas which are free of impact.

Questions or issues concerning site decontamination procedures are to be made directly to the Project Manager or Field Team Leader.

1.2 Scope

This decontamination plan addresses decontamination activities which will be undertaken during the RA activities. The primary decontamination activities include the following:

- Personnel Decontamination
- Field Equipment Decontamination
- Vehicle Decontamination

1.3 Application

The decontamination plan applies to all personnel involved within the work area, including but not limited to:

- PWGC employees and subcontractors;
- Client representatives; and
- Federal, state or local representatives.

2.0 DECONTAMINATION PROCEDURES

This section specified the decontamination procedures for each of the activities specified in Section 1.2.

2.1 Personnel Decontamination

This section covers the procedures to be followed during the RA to decontaminate personnel who have come in contact with contaminates. Given the nature of the RA, where soil removal will be handled by heavy equipment and human contact with site contaminates will be minimized, it is PWGC's opinion that this procedure may not be required, however, PWGC will include this procedure as a contingency.

This procedure has been prepared based upon field personnel utilizing level C/D (tyvek suit, boots, gloves) personnel protective equipment (PPE).

A personnel decontamination area will be established onsite during site mobilization. The decontamination areas will be established in the transition from the work area to the staging area.

The personnel decontamination area will have large children's wading pools or other vessels for cleaning (as required). Liquid generated during cleaning will be transferred from the cleaning pool to storage drums tank via transfer buckets as needed. Generated liquids will be properly disposed of at the completion of remedial activities. An additional drum will be present to collect impacted single use PPE such has gloves, Tyvek suits, and boot covers.

Personnel decontamination procedures, specifically, will include the following steps:

1. Exit the work area after removing gross contamination and leaving it in contaminated area for later disposal. Enter the decontamination area.
2. Remove protective clothing with the exception of inner latex gloves.
3. Place disposable clothing in waste drum.
4. Remove and dispose of inner gloves and exit decontamination area.

In the unlikely condition that site conditions require the use of non-disposable equipment (level A suit, SCBA, etc) the decontamination plan will be modified as required to include cleaning steps for the reusable equipment.

2.2 Field Equipment Decontamination

This section covers the procedures to be followed concerning decontamination of field equipment. Following use, non-disposable equipment, such as hand tools, shovels, hand augers, and sampling pumps will be properly decontaminated.

The equipment decontamination area will be established adjacent to the personnel decontamination area as all equipment leaving the work area to the support zone are to be decontaminated. In addition, a temporary equipment decontamination area may be established based upon the requirements of the project since sampling equipment may require decontamination between the collection of each sample. The equipment decontamination procedure is to consist of cleaning by brush with a water / detergent solution followed by a potable water rinse. Specialized equipment, such as groundwater sampling pumps, will be decontaminated as per manufacturer recommendations.

Waste water generated during the decontamination process with be collected and stored in drums. Generated liquids will be properly disposed of at the completion of remedial activities. Liquid disposal procedures will be discussed in the construction water management plan.

Expendable equipment (e.g., disposable bailers, twine, etc.) will not be decontaminated but will be drummed as waste.

2.3 Vehicle Decontamination

In order to prevent the spread of contamination by means of vehicles and heavy equipment, the following vehicle decontamination procedure will be followed. This procedure is to be followed for any vehicle leaving the work zone.

The vehicle decontamination procedure will be as follows:

1. Prior to leaving the work area loose soils will be scraped / brushed from the vehicle to the extent possible;
2. An environmentally friendly cleaning agent will be applied to the contaminated parts of the equipment;
3. The equipment will be wiped down with pads; and
4. Once cleaned, the vehicle may proceed off site.

APPENDIX F
STORMWATER POLLUTION PREVENTION PLAN

FORMER CAPTAIN'S COVE SITE
GARVIES POINT ROAD
GLEN COVE, NEW YORK 11542

STORM-WATER POLLUTION PREVENTION PLAN
FORMER CAPTAIN'S COVE SITE

STATE OF NEW YORK
GERRY D. ROSEN
07549
LICENSED PROFESSIONAL ENGINEER
7/19/2016

PREPARED FOR:

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PWGC Project Number: RGI1604

JULY 2016

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A NRCS County Soil Mapping Report
B Construction Duration Inspection Checklist (6 pages)
C Notice of Intent
D New York State Historic Preservation Office Confirmation

1.0 NARRATIVE

This Stormwater Pollution Prevention Plan (SWPPP) has been prepared on behalf of RXR Glen Isle Partners, LLC (RXR). This SWPPP shall support proposed activities associated with the Pre-Construction Remedial Action Scope of Work for the Site. The Site is located along Garvies Point Road in Glen Cove, New York. This SWPPP has been prepared in accordance with the latest requirements of the New York State Standards and Specifications for Erosion and Sediment Control and New York State Stormwater Management Design Manual. The SWPPP has been developed to maximize the potential benefits of pollution prevention and sediment and erosion control measures at construction sites. A key map identifying the site is included in **Figure G-100**.

1.1 Project Description

The site measures approximately 35.24 acres in size, however less than 5 acres will be disturbed during site activities. These activities include removing and stockpiling contaminated soils for transport off-site to a disposal facility. The SWPP Plan is shown in **Figure C-100** and **Figure C-200**.

1.2 Site Description

This SWPPP is being prepared for the Captain's Cove Site. The Site is approximately 35.24-acres in size and is bounded by Garvies Point Road and Garvies Point Preserve to the north, Glen Cove Creek to the south, Glen Cove Angler's Club to the east, and Glen Cove Industrial Development Agency owned property to the west. The nearest surface water body likely to receive stormwater runoff from the site is the Glen Cove Creek located adjacently South of the Site. Refer to **Figure C-100** – Overall Site Plan for a location of the Site.

The Federal Emergency Management Agency (FEMA) indicates that the Site is located within the Floodway Area in Zone AE (0.1-percent-annual-chance flood) and Zone X (0.2-percent-annual-chance flood).

1.3 Adjacent Property

Land use of the surrounding property consist of commercial and parkland to the north, east, and west. Glen Cove Creek runs adjacent to the south side of the site.

1.4 Soils

A soil survey for Captain's Cove was completed as part of the National Cooperative Soil Survey by the joint effort of the National Resources Conservation Service (NRCS) United States Department of Agriculture and other State and Local agencies. The soil survey was most recently updated in 2016. The soil survey indicates that the soil on the Site consists of 0.8% Beaches (Bc), 86.7% Udorthents, refuse substratum (Uf),

and 12.5% Water (W). Copies of the NRCS County Soil Mapping Report have been included in **Appendix A**.

Since the completion of remedial actions performed at the Site by the USEPA and NYSDEC, multiple investigations have been performed to characterize post remedial conditions for soil.

- In general, soils were characterized as medium to fine sands with silt and trace gravel overlain by clay and bog layers. Construction related debris (brick, concrete, cobble, wood) were detected throughout the site. Saturated soils indicating the groundwater table were encountered between 4 feet bgs near the bulkhead and increased towards the north to 10 feet bgs. Analytical results identified arsenic and/or lead in excess at varying locations and depths and grossly contaminated media at two locations in excess of Site-Specific Removal Criteria.

1.5 Groundwater

Groundwater was encountered at a depth of two (2) to ten (10) feet below ground surface. Groundwater flow direction has been documented to have both a southern and western flow component.

2.0 EROSION AND SEDIMENT CONTROL

The purpose of this section is to identify and address pollutants and activities that could impact stormwater during activities. Site-related pollutants include impacted soils. Activities that could impact stormwater include earthwork, waste disposal, and vehicular traffic. Site-related pollutants can originate from the handling, sorting, temporary storage, transport and disposal of soil that will be generated as a result of site activities. This section also serves to identify the types of temporary erosion and sediment controls that will be used during site activities. These erosion and sediment controls will provide soil stabilization for disturbed areas and structural controls to divert runoff and remove sediment.

2.1 Identification and Control of Potential Storm-water Pollutants

The purpose of this subsection is to identify and address pollutants that could impact storm-water during site activities.

2.1.1 Significant Material Inventory

Pollutants that result from stockpiled soils that have the potential to be present in storm-water runoff are listed in Table 2-1. This table includes information regarding material type, chemical and physical description, and the specific regulated storm-water pollutants associated with each material.

Table 2-1
Potential Site Stormwater Pollutants

Trade Name Material	Chemical/Physical Description	Stormwater Pollutants
Hydraulic oil/fluids	Brown oily petroleum hydrocarbon	Mineral oil
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethylbenzene, toluene, xylenes
Diesel Fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil & grease, naphthalene, xylenes
Kerosene	Pale yellow liquid petroleum Hydrocarbon	Coal oil, petroleum distillates
Antifreeze/coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)
Erosion	Solid particles	Soil, sediment

2.1.2 Potential Areas for Storm-water Pollution

The following potential source areas of stormwater pollution were identified and evaluated:

- Construction site entrance,

- Drive area construction,
- Remedial equipment,
- Waste material storage area,
- Stockpiled soil; and,
- Cleared and graded areas.

Table 2-2 presents site-specific information regarding the storm-water pollution potential from each of these areas.

Table 2-2
Locations of Potential Sources of Stormwater Pollution

Potential Storm Water Pollution Point	Potential Pollutants	Potential Problem
Construction site entrances. Drive areas. Remedial equipment and waste material storage area.	Asphalt, hydraulic oil, gasoline, antifreeze, soil erosion	Leaking hydraulic oil and antifreeze from clearing and grading equipment. Gasoline and diesel fuel spills while fueling equipment, and erosion of exposed and stockpiled soils. Tracking of soil into the road through the construction site entrance(s).
Stockpiled soils	Soil erosion, arsenic, lead, and grossly contaminated media.	Erosion of soils from cleared and graded areas have the potential to discharge into local surface water bodies.

2.1.3 Good Housekeeping Practices to Minimize Storm-water Pollution

Good housekeeping and spill control practices will be followed during site activities to minimize storm-water contamination from soil, preservatives, paints, petroleum products and waste materials. Good housekeeping and spill control practices include the following:

- Materials and equipment necessary for spill cleanup shall be maintained onsite in the equipment and waste material storage area, covered and secured. Equipment will include, but is not limited to, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, saw dust, and plastic and metal trash containers;

- On-site vehicles shall be monitored for leaks and will receive regular preventive maintenance to reduce the possibility of leakage;
- Petroleum products shall be stored in tightly sealed containers which are clearly labeled;
- Spill kits shall be included with all fueling sources and maintenance activities;
- Spills shall be cleaned up immediately upon discovery. Spills large enough to reach the storm system will be reported to the National Response Center at 1-800-424-8802;
- Dump trucks hauling material from the site shall be covered with a tarpaulin;
- Paved streets adjacent to the site entrances shall be swept as needed to remove excess mud, dirt, or rock tracked from the site;
- Ruts caused by equipment used for clearing and grubbing shall be graded; and,
- Waste materials shall be collected and stored in securely covered metal dumpsters rented from a licensed solid waste management company. Trash and debris from the site will be deposited in the dumpsters. The dumpsters will be emptied at least weekly and the trash will be hauled to a solid waste landfill. The dumpsters will be located near the construction entrance. Materials generated by site activities will not be buried on-site.

Vehicles and equipment associated with remedial activities shall be inspected to ensure fluids, oils, and lubricants are not leaking and the fuels and fluids are stored in properly labeled containers. Spills, leaking fluids, and/or improperly stored fluids shall be brought to the attention of the Project Manager immediately. Applicable regulations governing the storage, transport, use and disposal of fluids and reporting requirements for spills shall be adhered to. If a release of a chemical, fluid, or petroleum occurs it must be reported to the designated Site Safety Inspector and the New York State Department of Environmental Conservation (NYSDEC) Spill Division (1-800-457-7362).

Chemicals stored in staging areas shall have appropriate Material Safety Data Sheets (MSDS). Petroleum products and chemical substances shall be managed in a manner to minimize potential threats to human health and the environment. Oily rags used for equipment maintenance shall be stored in a labeled drum (5 to 55 gallons) for containment and proper disposal. Trash and other debris generated by site activities shall not be buried but placed in the appropriate receptacle(s).

2.2 Temporary Erosion Control Practices

The purpose of this subsection is to identify the types of temporary erosion and sediment controls that will be used during site activities. Each of the practices listed below are located on **Figure C-200** and detailed on **Figure C-400**.

2.2.1 Phasing Plan

This list of items has been prepared to generally outline the major construction elements and implementation of the soil erosion and sediment control measures.

- Obtain all required local, state, and federal permits and approvals prior to commencing earthwork.
- Flag the limits of work.
- Install silt fencing along the perimeter of the work area in accordance with **Figure C-200** and **Figure C-400**.
- Install the Stabilized Construction Entrance prior to commencement of work within that area.
- Perform remedial excavations which will include excavation of contaminated soils and stockpiling of contaminated soils. Install silt fencing and hay bales around the perimeter of each stock pile in accordance with the detail located on **Figure C-400.**
- Perform testing of contaminated soils, off-site disposal of contaminated soils, and placement of approved fill material.
- Stabilize the disturbed areas by mulching and seeding and in accordance with **Figure C-300**.
- Once disturbance activities are complete and the work area has been stabilized, remove the soil erosion and sediment control devices for the work area.

2.2.1.1 Stabilized Construction Entrance

A stabilized construction entrance (SCE) will be established along the perimeter of the work area at the location indicated on **Figure C-200** – Erosion and Sediment Control Plan. The SCE will also be used as a temporary vehicle wash area. Water will be supplied via hose from a nearby building. Waste water generated during the decontamination process with be collected and stored in drums. Generated liquids will be properly disposed of at the completion of remedial activities.

SCE's shall be constructed with a 10-inch layer of aggregate as indicated on **Figure C-400**. The length of the SCE should be a minimum of 50-feet. The location and length of the SCE shall be determined by the contractor and owner on a case by case basis. Additional stone shall be added to the SCE's as site activities progresses as needed. The stabilized entrance shall capture mud and debris from vehicles before entering public roads to reduce the tracking of sediments off of the property (refer to **Figure C-200**) and assist in controlling dust on the site. SCE's shall be positioned such that stormwater runoff that exits the sites shall run through the SCE to allow for the SCE to assist in filtering out sediment from the stormwater runoff. SCE's shall be installed and removed throughout site activities as the sequencing requires. Additional SCE's shall be installed as necessary at the work site if additional entrances are required as part of the proposed work.

The SCE has been designed in excess of the NYSDEC standards because of the remedial nature of the project and in accordance with the excavation plan prepared by PWGC for the project.

2.2.1.2 Perimeter Sediment Controls (Silt Fencing)

Silt fencing with wire mesh backing will be installed as shown on **Figure C-200** and in accordance with the detail located on **Figure C-400.**

2.2.1.3 Contaminated Stockpile Controls (Silt Fencing and Hay Bales)

Contaminated soils excavated during site activities will be stockpiled at the work area as indicated on **Figure C-200** – Erosion and Sediment Control Plan. Each stockpile will be surrounded with silt fencing and straw bales and covered at all times except when cover will interfere with removal, disposal, or stockpiling operations and in accordance with **Figure C-400**.

The stockpile detail has been designed in excess of the NYSDEC standards because of the remedial nature of the project and in accordance with the excavation plan prepared by PWGC for the project.

2.2.1.3 Dust Control

Dust control measures will be implemented in areas where excessive dust can be generated as indicated on **Figure C-200** – Erosion and Sediment Control Plan and in accordance with **Figure C-400** - Details.

2.2.1.4 Erosion Control (Stabilization)

In areas where soil disturbance activity has temporarily or permanently ceased, the application soil stabilization measures will be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. Temporary and permanent soil stabilization measures included seeding and mulching.

Upon completion of remediation activities, work area will be seeded and restored to its expected condition (**Figure C-300** – Soil Stabilization Plan and **Figure C-500** – Permanent and Temporary Soil Stabilization).

2.2.2 Inspection Schedule and Maintenance Procedures

Inspection schedule shall be two (2) inspections every seven (7) calendar days with at least two (2) days between inspections and within 24 hours of any storm event producing 0.5 inch of precipitation or more. Inspections will be conducted by a qualified inspector or under the supervision of a qualified inspector. A qualified inspector is knowledgeable in the principles and practices of erosion and sediment controls. Qualified inspectors include Licensed Professional Engineers, Registered Landscape Architects, a Certified Professional in Erosion and Sediment Control (CPESC), or other Department endorsed individuals. The inspection will verify that the structural Stormwater Management Practices (SMP's) described previously in this SWPPP are in good condition and are effectively minimizing erosion at the Site. The inspection will also verify that the procedures used to prevent stormwater pollution from site activities are effective.

A Construction Duration Inspection checklist and report prepared by a qualified professional shall be completed after each site inspection and shall include digital photographs with a date stamp clearly showing the condition of the SMP's which may need to be corrected in order to be in compliance with the SWPPP. Digital photographs with a date stamp clearly showing the condition of the SMP's upon completion of corrective action shall also be included. A copy of the Construction Duration Inspection Checklist can be found in **Appendix B**. All records shall be maintained on-site during the duration of activities with the active SWPPP. Following final stabilization of the site, the completed forms will be retained by RXR for a minimum of five (5) years after the date of final stabilization.

The following maintenance practices will be used to maintain erosion and sediment controls:

- Stabilized Construction Entranceway: The SCE swill be maintained in a condition that will prevent tracking or flowing of sediment onto the public right of way. All spilled, dropped, washed or tracked sediment must be removed immediately. When washing is required, it will be performed in accordance with **Figure C-400 – Details**.
- Silt Fencing: Maintenance of all silt fence installed along the perimeter of the work area and along the perimeter of the stockpiles will be performed as needed. When sediment has developed on the fence and has compromised or damaged the fence, the material will be removed and the fence shall be replaced to keep the fence functioning properly.

- Hay Bales: Maintenance of the hay bales installed along the perimeter of the stockpiles will be performed as needed. Hay bales have an estimated design life of three (3) years and shall be replaced promptly as required.
- Dust Control: Maintain dust control measures through dry weather periods until all areas are stabilized.
- Seeding/Mulching: All seeded areas will be fertilized, reseeded and mulched as necessary to maintain vigorous, dense vegetative cover.

Parties Responsible for Maintenance

RXR Glen Isle Partners, LLC
Frank Haftel
625 RXR Plaza
Uniondale, NY 11556
(516)506-6000

2.2.3 Plan Amendments

RXR will amend the SWPPP for any of the following cases:

- When a significant change in design, remediation, operation, or maintenance occurs which may have a significant effect on the potential for discharge of pollutants to the waters of the United States and which has not otherwise been addressed in this SWPPP;
- When the SWPPP proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified in this plan;
- When the SWPPP proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges; or,
- To identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modifications to the SWPPP will be described and recorded on the Construction Duration Inspection Checklist form located in **Appendix B**.

2.2.4 Employee Training

An employee training program will be developed and implemented to educate employees on the requirements of the SWPPP. This education program will include background on the components and goals of the SWPPP. The program will also include hands-on training in erosion controls, spill prevention

and response, good housekeeping, proper material handling, disposal and control of waste, equipment fueling, and proper storage, washing, and inspection procedures. On-site employees will be trained prior to their first day on the site.

3.0 REMEDIATION SCHEDULING

A schedule for activities before, during and after is presented below. Included is the sequence of implementing the Erosion and Sediment Control Plan.

The remedial sequence is expected to start in 2016.

3.1 Pre-Demolition/ Remediation Actions

Measures listed below shall be installed prior to the commencement of site activities at the site. Stabilization measures shall be implemented throughout demolition and site activities.

- Silt Fencing
    - Installed along work perimeter
    - Removed as work reaches completion
- Stabilized Construction Entrances
    - Installed once site boundary protection has been installed
    - Removed as work reaches completion

3.2 During Remediation

The Erosion & Sediment Control (ESC) measures listed below shall be installed during site activities as necessary.

- Silt Fencing and Hay Bales
    - Installed along stockpiled areas
    - Removed as work reaches completion
- Dust Control
    - Dust Control measures shall be implemented throughout the duration of the work as needed
- Inspection, maintenance and plan amendments for ESC measures shall be performed as necessary throughout demolition and site activities

3.3 Completion of Remediation

Permanent soil stabilization measures listed below shall be installed upon completion of the remedial activities as necessary.

- Final stabilization (seeding and mulching), grading and repair shall be performed at the close of proposed site activities.

4.0 CERTIFICATIONS

All required documentation will be signed prior to commencement of remedial activities.

4.1 Contractors & Subcontractors Certifications

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

_____
Trained Contractor's Name

_____
Signature

_____
Title

_____
Firm Name

_____
Firm Address

_____
Firm Telephone Number

_____
Site Address

_____
Certification Date

Responsible for the following SWPPP Measures:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

FIGURES

CAPTAIN'S COVE
STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

CITY OF GLEN COVE, NASSAU COUNTY, NY

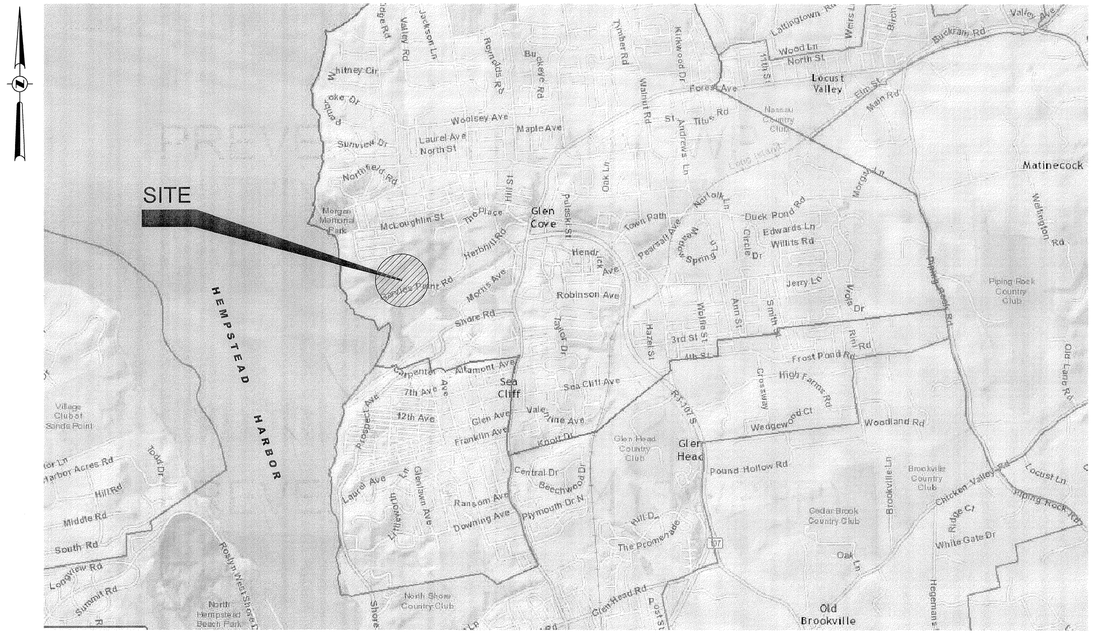
SWPPP

ISSUED FOR: PERMIT

DATE ISSUED: JULY 18, 2016

INDEX

No.	DRAWING TITLE	LATEST ISSUE
G-100	TITLE SHEET	JULY 18, 2016
C-100	OVERALL SITE PLAN	JULY 18, 2016
C-200	EROSION & SEDIMENT CONTROL PLAN	JULY 18, 2016
C-300	SOIL STABILIZATION PLAN	JULY 18, 2016
C-400	DETAILS	JULY 18, 2016
C-500	PERMANENT AND TEMPORARY SOIL STABILIZATION	JULY 18, 2016



VICINITY MAP

SCALE : 1" = 2,000'

0 2,000 4,000

PROPERTY INFORMATION

SITE:
GARVIES POINT REDEVELOPMENT
CITY OF GLEN COVE, NEW YORK

TAX MAP:
PARCELS 2, 4, 5, 6, AND 7, SECTION 21, BLOCK A, LOTS 1, 12, 14, 15, 114, 459, 541, AND 648-650
BLOCK, 259, LOTS 2, 3, AND 4

AREA:
1,534,877 S.F. (35.24 ACRES)

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Strategic Environmental and Engineering Solutions
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CONSULTANTS

Number	Revision Description	Revision Date
7		
6		
5		
4		
3		
2		
1	RXR COMMENTS	10/22/14

Designed By	RN/DE	Date Submitted	07-18-16
Drawn By	RN	Date Created	06-17-16
Approved By	GR	Scale	

Client:
RXR GLEN ISLE PARTNERSHIP, LLC

Project:
GARVIES POINT REDEVELOPMENT
REMEDIAL ACTION SCOPE OF WORK
STORMWATER POLLUTION
PREVENTION PLAN (SWPPP)

Project Address:
CITY OF GLEN COVE, NASSAU COUNTY, NEW YORK

County Tax Map Number:
Contract Number:
Regulatory Reference Number:

Title of Drawing:

TITLE SHEET

STATE OF NEW YORK
JERRY D. ROSSER
LICENSED PROFESSIONAL ENGINEER
071454

Unauthorized alteration or addition to this drawing and related documents is a violation of Section 7209 of the New York State Education Law

Drawing Number:
G-100

Sheet 1 of 6

PWGC Project Number:
RGI1604

SITE PLAN

SCALE : 1" = 100'

0 100 200

SCALE: 1" = 100'

Erosion Control Measures

Sediment and Erosion Control Notes

1. THE PROPOSED EROSION CONTROL MEASURES SHOWN ON THIS PLAN SHALL BE INSTALLED PRIOR TO THE START OF CONSTRUCTION. ADDITIONAL EROSION CONTROLS MAY BE NECESSARY, BASED UPON FIELD CONDITIONS THAT MAY DEVELOP AS CONSTRUCTION PROGRESSES AND AS MAY BE REQUIRED BY THE OWNER OR DESIGNATED OWNERS REPRESENTATIVE. THE FOLLOWING GENERAL CONDITIONS SHALL BE OBSERVED.

   A. ANY EXISTING VEGETATION NOT SCHEDULED FOR REMOVAL SHALL BE PROTECTED AND REMAIN UNDISTURBED.
   B. CLEARING AND GRADING SHALL BE SCHEDULED SO AS TO MINIMIZE THE SIZE OF EXPOSED AREAS AND THE LENGTH OF TIME THAT AREAS ARE EXPOSED.
   C. THE LENGTH AND STEEPNESS OF CLEARED SLOPES SHALL BE MINIMIZED TO REDUCE RUNOFF VELOCITIES AND QUANTITIES.
   D. RUNOFF SHALL BE DIVERTED AWAY FROM CLEARED SLOPES.
   E. SEDIMENT SHALL BE TRAPPED ON THE SITE.

2. SOIL STAGING METHODS
   A. EXCAVATED SOIL FROM SUSPECTED AREA OF CONTAMINATION WILL BE STOCKPILED SEPARATELY FROM CLEAN SOIL AND CONSTRUCTION MATERIALS BY THE CONTRACTOR.
   B. ALL STOCKPILE AREAS SHALL BE SIZED BY THE CONTRACTOR AS NECESSARY TO PERFORM THEIR WORK, SHALL CONFORM TO THE STOCKPILE DETAILS ON C-400, AND; SHALL NOT EXCEED 5,000 CUBIC YARDS IN SIZE, WHERE POSSIBLE AND BE LOCATED AT LEAST 50 FEET FROM THE PROPERTY BOUNDARY, AND SHALL NOT HAVE A SLOPE GREATER THAN 26 DEGREES.
   C. EXCAVATED SOILS WILL BE STOCKPILED BY THE CONTRACTOR ON, AT MINIMUM, DOUBLE LAYERS OF 10-MIL SHEETING AND WILL BE KEPT COVERED AT ALL TIMES WITH, AT A MINIMUM, ONE LAYER OF 10-MIL SHEETING.
   D. SOIL STOCKPILES WILL BE CONTINUOUSLY ENCIRCLED WITH A SILT FENCE. SILT FENCING WILL BE USED AS NEEDED NEAR CATCH BASINS, SURFACE WATERS AND OTHER DISCHARGE POINTS.
   E. WHILE IN PLACE, STOCKPILES WILL BE INSPECTED DAILY BY THE CONTRACTOR, AND BEFORE AND AFTER EVERY STORM EVENT. RESULTS OF INSPECTIONS WILL BE RECORDED IN A LOGBOOK AND MAINTAINED AT THE SITE AND AVAILABLE FOR INSPECTION. DEFICIENCIES WILL BE REPORTED TO A QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) BY THE CONTRACTOR WITHIN 24 HOURS WITH A DESCRIPTION OF APPROPRIATE CORRECTION ACTION.
   F. STOCKPILE AREAS SHALL BE LABELED ACCORDING TO ALL APPLICABLE LOCAL, STATE, AND FEDERAL REQUIREMENTS.
   G. CONTRACTOR TO MAINTAIN STOCKPILES INCLUDING: DAMAGED STOCKPILES COVERS AND LINERS SHALL BE IMMEDIATELY TAKEN OUT OF SERVICE, THE MATERIAL REMOVED IF NECESSARY TO REPAIR THE DAMAGED COVERS AND LINERS, AND ANY VISIBLE RELEASES TO THE ENVIRONMENT CONTAINED. THE CAUSE OF THE RELEASE SHALL BE DETERMINED AND REPAIRED, OR THE COVER/LINER PERMANENTLY TAKEN OUT OF SERVICE. ANY REPAIRS MUST BE INSPECTED BY THE QEP AND APPROVED BY THE QEP PRIOR TO THE ITEM BEING PLACED BACK IN SERVICE.
   H. AT PROJECT CLOSEOUT, ALL WASTE RESIDUES, CONTAINMENT SYSTEMS, AND OTHER EQUIPMENT SHALL BE DECONTAMINATED AND DISPOSED OFF-SITE AT AN APPROPRIATE FACILITY BY THE CONTRACTOR.
   I. EROSION AND SEDIMENT CONTROL SPECIFICATIONS AND DETAILS SHALL BE IMPLEMENTED ACCORDING TO THE SITE SPECIFIC SWPPP.

3. SPECIFIC METHODS AND MATERIALS EMPLOYED IN THE INSTALLATION AND MAINTENANCE OF EROSION CONTROL MEASURES SHALL CONFORM TO THE "NEW YORK STATE STANDARD AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL, LATEST EDITION".

4. SEDIMENT BARRIERS (SILT FENCE OR APPROVED EQUAL) SHALL BE INSTALLED PRIOR TO ANY GRADING OR EXCAVATION WORK ALONG THE LIMITS OF DISTURBANCE AND SHOULD BE MAINTAINED FOR THE DURATION OF THE WORK. NO SEDIMENT FROM THE SITE SHALL BE PERMITTED TO WASH ONTO ADJACENT PROPERTIES, WETLANDS OR ROADS.

5. PROPER MAINTENANCE OF EROSION CONTROL STRUCTURES IS TO BE PERFORMED BY PERIODIC INSPECTION AND AFTER HEAVY OR PROLONGED STORMS. MAINTENANCE MEASURES INCLUDE, BUT ARE NOT LIMITED TO, CLEANING OF SEDIMENT BASINS OR TRAPS, AND CLEANING OR REPAIR OF SEDIMENT BARRIERS.

6. APPROPRIATE MEANS SHALL BE USED TO CONTROL DUST DURING CONSTRUCTION.

7. A STABILIZED CONSTRUCTION ENTRANCE SHALL BE MAINTAINED TO PREVENT SOIL AND LOOSE DEBRIS FROM BEING TRACKED ONTO LOCAL ROADS. THE CONSTRUCTION ENTRANCE SHALL BE MAINTAINED UNTIL THE SITE IS PERMANENTLY STABILIZED.

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CONSULTANTS

Number	Revision Description	Revision Date
7		
6		
5		
4		
3		
2		
1	RXR COMMENTS	10/22/14

Designed By: RN/DE	Date Submitted: 07-18-16
Drawn By: RN	Date Created: 06-17-16
Approved By: GR	Scale:

Client:
RXR GLEN ISLE PARTNERSHIP, LLC

Project:
GARVIES POINT REDEVELOPMENT REMEDIAL ACTION SCOPE OF WORK STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

Project Address:
CITY OF GLEN COVE, NASSAU COUNTY, NEW YORK

County Tax Map Number:
Contract Number:
Regulatory Reference Number:

Title of Drawing:
OVERALL SITE PLAN

Drawing Number:
C-100

Sheet 2 of 6

PWGC Project Number:
RGI1604

STATE OF NEW YORK
JERRY D. ROSSER
077542
LICENSED PROFESSIONAL ENGINEER

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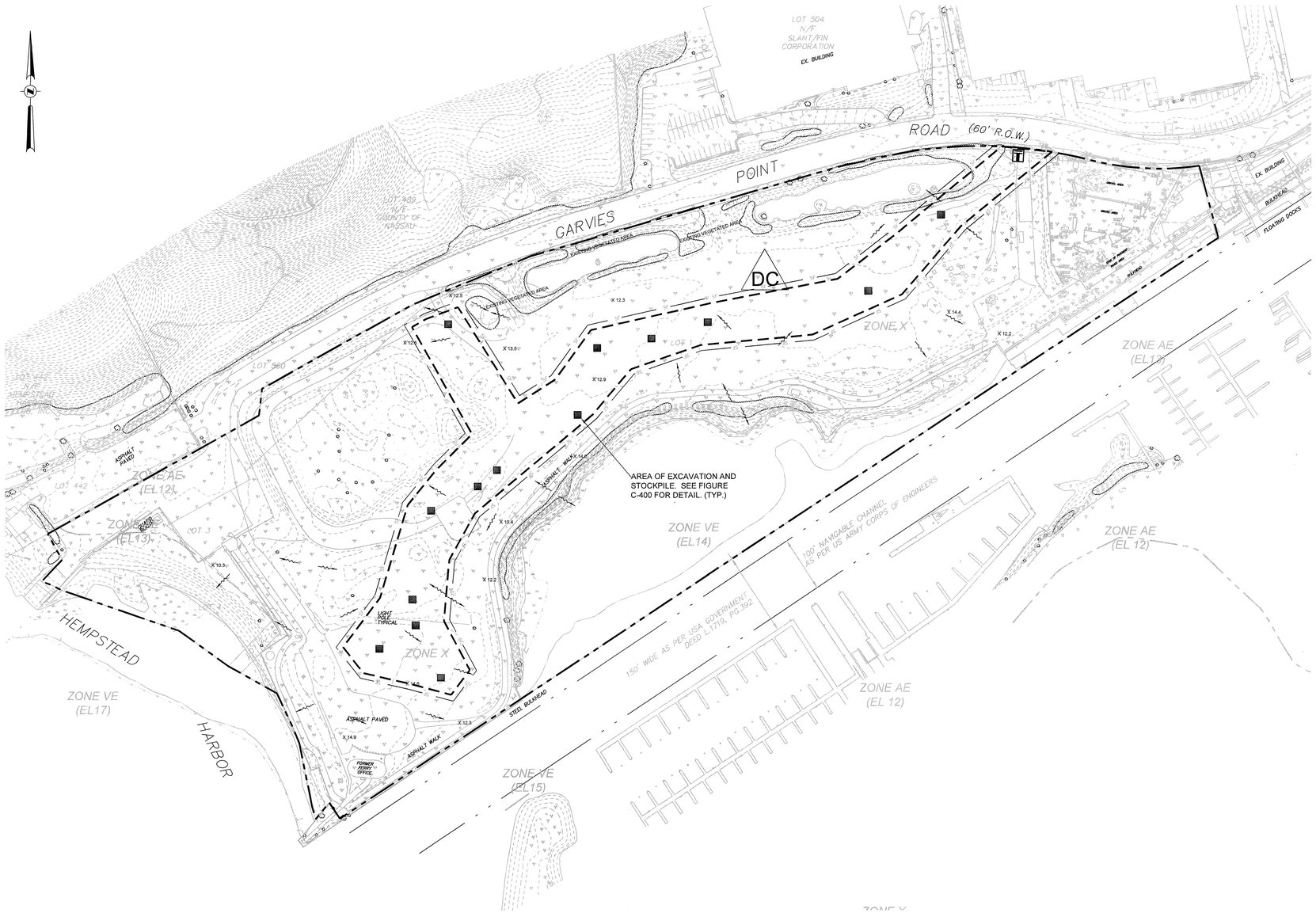

PROPOSED CAPTAIN'S COVE AREAS OF EXCAVATION
PROVIDED BY: KEVIN McMANUS, P.E.
DATED 8-10-14

SITE PLAN

SCALE : 1" = 100'

0 100 200

SCALE: 1" = 100'

Erosion and Sediment Control Legend

ITEMS	NOTES
	PROPERTY BOUNDARY
	LIMIT OF WORK AREA
SF	SILT FENCE WITH WIRE FENCING SUPPORT
	STABILIZED CONSTRUCTION ENTRANCE
DC	DUST CONTROL
X 13.5	EXISTING SPOT ELEVATIONS
	FLOW ARROW
	AREA OF EXCAVATION (SILT FENCE/HAY BALES INSTALLED ONLY AROUND STOCKPILES)

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Drawn By: RN	Date Created: 06-17-16
Approved By: GR	Scale:

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RXR GLEN ISLE PARTNERSHIP, LLC

Project:
GARVIES POINT REDEVELOPMENT
REMEDIAL ACTION SCOPE OF WORK
STORMWATER POLLUTION
PREVENTION PLAN (SWPPP)

Project Address:
CITY OF GLEN COVE
NASSAU COUNTY
NEW YORK

County Tax Map Number:
Contract Number:
Regulatory Reference Number:

Title of Drawing:

EROSION & SEDIMENT CONTROL PLAN CAPTAIN'S COVE

STATE OF NEW YORK
JERRY D. ROSSER
077648
LICENSED PROFESSIONAL ENGINEER

Drawing Number:
C-200

Sheet 3 of 6

PWGC Project Number:
RGI1604

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Soil Stabilization

Notes

1. THE PROPOSED SOIL STABILIZATION MEASURES SHOWN ON THIS PLAN SHALL BE INSTALLED AT THE END REMEDIAL ACTIVITIES.
2. REFER TO SHEET C-500 FOR DETAILS.

PROPOSED CAPTAIN'S COVE AREAS OF EXCAVATION
PROVIDED BY: KEVIN McMANUS, P.E.
DATED 8-10-14

SITE PLAN

SCALE : 1" = 100'

0 100 200

SCALE: 1" = 100'

Soil Stabilization Plan Legend

ITEMS	NOTES
	PROPERTY BOUNDARY
	LIMIT OF WORK AREA
	PERMANENT SOIL STABILIZATION (SEEDING)

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Drawn By: RN — Date Created: 06-17-16
Approved By: GR — Scale:

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RXR GLEN ISLE PARTNERSHIP, LLC

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GARVIES POINT REDEVELOPMENT
REMEDIAL ACTION SCOPE OF WORK
STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

Project Address:
CITY OF GLEN COVE
NASSAU COUNTY
NEW YORK

County Tax Map Number: Contract Number:
Regulatory Reference Number:

Title of Drawing:
SOIL STABILIZATION PLAN

STATE OF NEW YORK · GERRY D. ROSSI · 077542 · LICENSED PROFESSIONAL ENGINEER · 7-14-2017

Drawing Number: **C-300**

Sheet 4 of 6

PWGC Project Number: RGI1604

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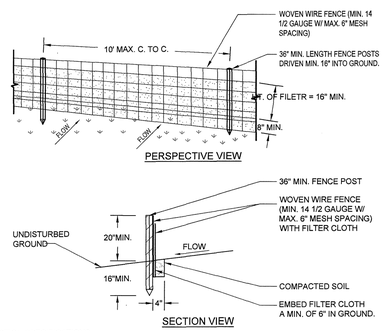
SYMBOL

SF

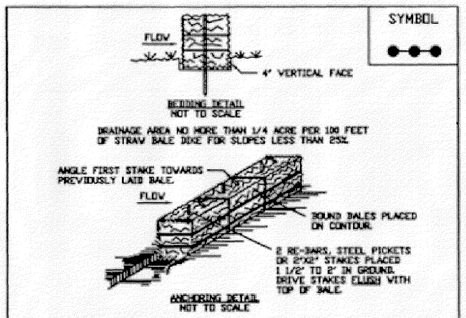


CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 12 1/2 GAUGE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER- LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

SILT FENCE DETAIL

SYMBOL



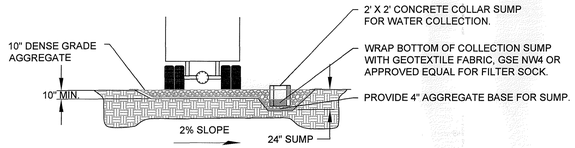
CONSTRUCTION SPECIFICATIONS

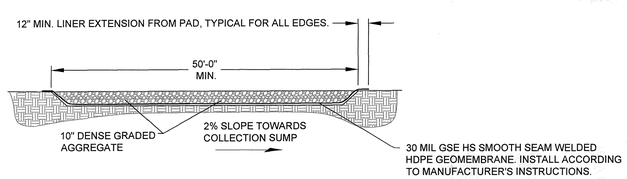
1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MADE PROMTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULLNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

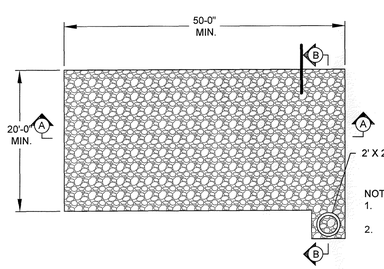
ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

STRAW BALE DIKE

SYMBOL



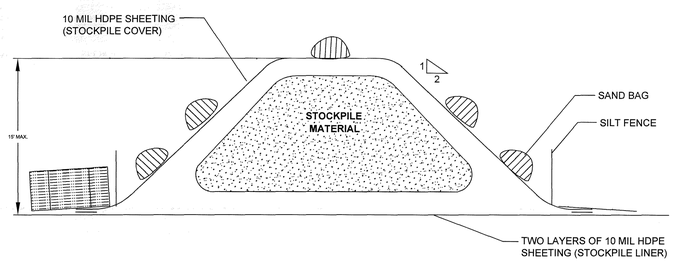




NOTES:
1. DECONTAMINATION PAD SHALL BE SIZED TO ACCOMMODATE THE FULL LENGTH OF VEHICLES REQUIRING DECONTAMINATION.
2. CONSTRUCTION ENTRANCE TO BE REINFORCED WITH ADDITIONAL AGGREGATE AS NEEDED TO PREVENT MATERIAL FROM BEING TRACKED OFF-SITE.

CONSTRUCTION ENTRANCE DETAIL

SYMBOL

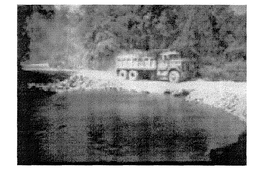


INSTALLATION NOTES:

1. AREA CHOSEN FOR STOCKPILING OPERATION SHALL BE DRY AND STABLE.
2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 26 DEGREES.
3. EACH PILE SHALL BE SURROUNDED WITH SILT FENCING AND STRAW BALES. STOCKPILE SHOULD BE COVERED AT ALL TIMES EXCEPT WHEN COVER WOULD INTERFERE WITH REMOVAL, DISPOSAL OR STOCKPILING OPERATIONS.
4. SEE SILT FENCE DETAIL FOR INSTALLATION OF SILT FENCE.

CONTAMINATED STOCKPILE DETAIL

STANDARD AND SPECIFICATIONS FOR DUST CONTROL



Definition

The control of dust resulting from land-disturbing activities.

Purpose

To prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures shall be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Water quality must be considered when materials are selected for dust control. Where there is a potential for the material to wash off to a stream, ingredient information must be provided to the local permitting authority.

Construction Specifications

A. **Non-driving Areas –** These areas use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

All Stormwater Pollution Prevention Plans must contain the NYS DEC issued "Conditions for Use" and "Application Instructions" for any polymers used on the site. This information can be obtained from the NYS DEC website.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

Vegetative Cover – For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see Section 3).

Mulch (including gravel mulch) – Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

Spray adhesives – These are products generally composed of polymers in a liquid or solid form that are mixed with water to form an emulsion that is sprayed on the soil surface with typical hydroseeding equipment. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations for the specific soils on the site. In no case should the application of these adhesives be made on wet soils or if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators and others working with the material.

B. **Driving Areas –** These areas utilize water, polymer emulsions, and barriers to prevent dust movement from the traffic surface into the air.

Sprinkling – The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access routes.

Polymer Additives – These polymers are mixed with water and applied to the driving surface by a water truck with a gravity feed drip bar, spray bar or automated distributor truck. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations. Incorporation of the emulsion into the soil will be done to the appropriate depth based on expected traffic. Compaction after incorporation will be by vibratory roller to a minimum of 95%. The prepared surface shall be moist and no application of the polymer will be made if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators working with the material.

Barriers – Woven geotextiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

Windbreak – A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

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DETAILS

STATE OF NEW YORK · GEOFFRY D. GROSSER · 077343 · LICENSED PROFESSIONAL ENGINEER

Drawing Number:
C-400

Sheet 5 of 6

PWGC Project Number:
RGI1604

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STANDARD AND SPECIFICATIONS FOR MULCHING

Definition

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface.

Purpose

The primary purpose is to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch is also used alone for temporary stabilization in non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Determine local availability.

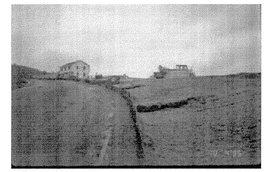
Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 3.7
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7"	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2"	9 cu. yds.	405 cu. yds.	3"	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/yd. 60-90 lbs./roll	48" x 50 yds. or 48" x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers speeifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	8" x 100" 2-sided plastic, 48" x 180" 1-sided plastic	—	—	Use without additional mulch. Excellent for seeding establishment. Tie down as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Compost	Up to 3" pieces, moderately to highly stable	3-9 cu. yds.	134-402 cu. yds.	1-3"	Coarser textured mulches may be more effective in reducing weed growth and wind erosion.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

STANDARD AND SPECIFICATIONS FOR TEMPORARY CRITICAL AREA PLANTINGS



Definition

Providing erosion control protection to a critical area for an interim period. A critical area is any disturbed, denuded slope subject to erosion.

Purpose

To provide temporary erosion and sediment control. Temporary control is achieved by covering all bare ground areas that exist as a result of construction or a natural event.

Conditions Where Practice Applies

Temporary seedings may be necessary on construction sites to protect an area, or section, where final grading is complete, when preparing for winter work shutdown, or to provide cover when permanent seedings are likely to fail due to mid-summer heat and drought. The intent is to provide temporary protective cover during temporary shutdown of construction and/or while waiting for optimal planting time.

Criteria

Water management practices must be installed as appropriate for site conditions. The area must be rough graded and slopes physically stable. Large debris and rocks are usually removed. Seedbed must be seeded within 24 hours of disturbance or scarification of the soil surface will be necessary prior to seeding.

Fertilizer or lime are not typically used for temporary seedings.

IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.).
IF: Late fall or early winter, then seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs./1000 sq. ft.).

Any seeding method may be used that will provide uniform application of seed to the area and result in relatively good soil to seed contact.

Mulch the area with hay or straw at 2 tons/acre (approx. 90 lbs./1000 sq. ft. or 2 bales). Quality of hay or straw mulch allowable will be determined based on long term use and visual concerns. Mulch anchoring will be required where wind or areas of concentrated water are of concern. Wood fiber hydromulch or other sprayable products approved for erosion control (nylon web or mesh) may be used if applied according to manufacturers' specification. Caution is advised when using nylon or other synthetic products. They may be difficult to remove prior to final seeding.

Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR PERMANENT CRITICAL AREA PLANTINGS

Definition

Establishing grasses with other forbs and/or shrubs to provide perennial vegetative cover on disturbed, denuded, slopes subject to erosion.

Purpose

To reduce erosion and sediment transport.

Conditions Where Practice Applies

This practice applies to all disturbed areas void of, or having insufficient, cover to prevent erosion and sediment transport. See additional standards for special situations such as sand dunes and sand and gravel pits.

Criteria

All water control measures will be installed as needed prior to final grading and seedbed preparation. Any severely compacted sections will require chiseling or disking to provide an adequate rooting zone, to a minimum depth of 12". The seedbed must be prepared to allow good soil to seed contact, with the soil not too soft and not too compact. Adequate soil moisture must be present to accomplish this. If surface is powder dry or sticky wet, postpone operations until moisture changes to a favorable condition. If seeding is accomplished within 24 hours of final grading, additional scarification is generally not needed, especially on ditch or stream banks. Remove all stones and other debris from the surface that are greater than 4 inches, or that will interfere with future mowing or maintenance.

Soil amendments should be incorporated into the upper 2 inches of soil when feasible. **The soil should be tested to determine the amounts of amendments needed.** Apply ground agricultural limestone to attain a pH of 6.0 in the upper 2 inches of soil. If soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 600 lbs. per acre of 5-10-10 or equivalent. If manure is used, apply a quantity to meet the nutrients of the above fertilizer. This requires an appropriate manure analysis prior to applying to the site. Do not use manure on sites to be planted with birdsfoot trefoil or in the path of concentrated water flow.

Seed mixtures may vary depending on location within the state and time of seeding. Generally, warm season grasses should only be seeded during early spring, April to May. These grasses are primarily used for vegetating excessively drained sands and gravels. See Standard and Specification for Sand and Gravel Mine Reclamation. Other grasses may be seeded any time of the year when the soil is not frozen and is workable. When legumes such as birdsfoot trefoil are included, spring seedings are preferred. See Table 3.1 "Permanent Critical Area Planting Mixture Recommendations" for additional seed mixtures.

General Seed Mix:
[1] add inoculant immediately prior to seeding

	Variety	lbs./acre	lbs/1000 sq. ft.
Birdsfoot trefoil[1] OR	Empire/Pardee	8[2]	0.20
Common white clover[1]	Common	8	0.20
PLUS			
Tall fescue	KY-31/Rebel	20	0.45
PLUS			
Redtop OR	Common	2	0.05
Ryegrass (perennial)	Pennfine/Linn	5	0.10

[2] Mix 4 lbs each of Empire and Pardee OR 4 lbs of Birdsfoot and 4 lbs white clover per acre.

Time of Seeding: The optimum timing for the general seed mixture is early spring. Permanent seedings may be made any time of year if properly mulched and adequate moisture is provided. Late June through early August is not a good time to seed, but may facilitate covering the land without additional disturbance if construction is completed. Portions of the seeding may fail due to drought and heat. These areas may need reseeding in late summer/fall or the following spring.

Method of seeding: Broadcasting, drilling, cultipack type seeding, or hydroseeding are acceptable methods. Proper soil to seed contact is key to successful seedings.

Mulching: Mulching is essential to obtain a uniform stand of seeded plants. Optimum benefits of mulching new seedings are obtained with the use of small grain straw applied at a rate of 2 tons per acre, and anchored with a netting or tackifier. See the mulch standard and specification for choices and requirements.

Irrigation: Watering may be essential to establish a new seeding when a drought condition occurs shortly after a new seeding emerges. Irrigation is a specialized practice and care must be taken not to exceed the application rate for the soil or subsoil. When disconnecting irrigation pipe, be sure pipes are drained in a safe manor, not creating an erosion concern.

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CONSULTANTS

Number	Revision Description	Revision Date
7		
6		
5		
4		
3		
2		
1	RXR COMMENTS	10/22/14

Designed By	RN/DE	Date Submitted	07-18-16
Drawn By	RN	Date Created	06-17-16
Approved By	GR	Scale	

Client:
RXR GLEN ISLE PARTNERSHIP, LLC

Project:
GARVIES POINT REDEVELOPMENT
REMEDIAL ACTION SCOPE OF WORK
STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

Project Address:
CITY OF GLEN COVE
NASSAU COUNTY
NEW YORK

County Tax Map Number: | Contract Number:
Regulatory Reference Number:

Title of Drawing:

PERMANENT AND TEMPORARY SOIL STABILZATION

STATE OF NEW YORK · JERRY D. ROSSER · 077549 · LICENSED PROFESSIONAL ENGINEER

Drawing Number:
C-500

Sheet 7 of 6

PWGC Project Number:
RGI1604

Unauthorized alteration or addition to this drawing and related documents is a violation of Section 7209 of the New York State Education Law

APPENDIX A

CAPTAIN'S COVE

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Nassau County, New York

June 16, 2016

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:3,210 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Nassau County, New York
Survey Area Data: Version 12, Sep 24, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 26, 2011—Apr 16, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Nassau County, New York (NY059)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Bc	Beaches	0.2	0.8%
Uf	Udorthents, refuse substratum	20.1	86.7%
W	Water	2.9	12.5%
Totals for Area of Interest		**23.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If

intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Nassau County, New York

Bc—Beaches

Map Unit Setting

National map unit symbol: 9tsk
Elevation: 0 to 100 feet
Mean annual precipitation: 42 to 46 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 190 to 230 days
Farmland classification: Not prime farmland

Map Unit Composition

Beaches: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beaches

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Uf—Udorthents, refuse substratum

Map Unit Setting

National map unit symbol: 9ttk
Elevation: 100 to 1,600 feet
Mean annual precipitation: 42 to 46 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 190 to 230 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, refuse substratum, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Refuse Substratum

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

W—Water

Map Unit Setting

National map unit symbol: 9tv7
Mean annual precipitation: 42 to 46 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 190 to 230 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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APPENDIX B

APPENDIX G
EROSION AND SEDIMENT CONTROL
PLAN REVIEW CHECKLIST

Project Name _____ Site Location _____

Applicant's Name & Address _____
_____

General

A narrative statement shall be provided that describes the proposed project nature and purpose; the existing site conditions including topography, vegetation and drainage; adjacent and off-site areas affected by the project; description of the soils on the site and key properties; notations of critical areas such as steep slopes, channels or wetlands; the overall phasing, sequencing and stabilization plan; total disturbed area and those not to be disturbed.

I. Construction Drawings

Are the following items shown on the construction drawings:	Yes	No
1. Vicinity Map with scale and north arrow	____	____
2. Legend, scales, N arrow on plan view	____	____
3. Existing and proposed topography shown with contours labeled with spots elevations in critical areas	____	____
4. Scope of the plan noted in the Title Block	____	____
5. Limits of clearing and grading shown	____	____
6. Existing vegetation delineated	____	____
7. Soil boundaries shown on the plan view	____	____
8. Existing drainage patterns, 100 year floodplain and sub-areas shown	____	____
9. Existing and proposed development facilities/ improvements shown	____	____
10. Location of Erosion and Sediment control practices as phased with construction	____	____
11. Phasing plan with 5 acre threshold limits shown	____	____
12. Stockpile locations, staging areas and access points clearly defined	____	____
13. Street profiles, utility locations, property boundaries and, easement delineations shown	____	____

II. Construction Notes & Details

	Yes	No
1. Specific sequence of operation given for each phase	____	____
2. Inspection and maintenance schedule shown for the specific practices	____	____
3. Design details show all dimensions and installation details necessary for construction	____	____
4. Implementation schedule for E&S practices is provided with removal criteria stated	____	____
5. Construction waste management plan incorporated in the notes	____	____
6. Site Inspections during construction are noted on the drawings and is in accordance with the General Permit for Stormwater Discharges from Construction Activities	____	____

III. Erosion & Sediment Control Practices

A. General

	Yes	No
1. Practice meets purpose and design criteria	____	____
2. Standard details and construction notes are provided	____	____
3. Special timing of practice noted if applicable	____	____
4. Provisions for traffic crossings shown on the drawings where necessary	____	____

B. Practices Controlling Runoff

	Yes	No
1. Positive drainage is maintained with contributing drainage area shown	____	____
2. Flow grades properly stabilized	____	____
3. Adequate outlet or discharge condition stabilized	____	____
4. Necessary dimensions, gradations, calculations, and materials shown	____	____

C. Practices Stabilizing Soil

	Yes	No
1. Seeding rates and areas properly shown on the drawings	____	____
2. Mulch materials and rates specified on the drawings	____	____
3. Sequencing and timing provisions limit soil exposure to 14 days	____	____

C. Practices Stabilizing Soil (cont'd)	Yes	No
4. Rolled Erosion Control Products (RECP's) used are specified to location and appropriate weight/tie down	____	____
5. All soil seed bed preparation and amendments are specified on the drawings or in the specifications	____	____
6. The seeding dates are specified to cover the entire year for both temporary and permanent seedings	____	____
7. Maximum created slope is no steeper than 2 foot horizontal to 1 foot vertical with Cut and Fill slopes shown	____	____

D. Practices Controlling Sediment	Yes	No
1. Sediment traps/basins are sized in accordance with criteria	____	____
2. The contributing drainage area is shown on the grading plan	____	____
3. All scaled dimensions and volumes are shown on the plan	____	____
4. Maintenance requirements and clean out elevations established for all sediment control practices (50% capacity)	____	____
5. All access points of the project are shown to be stabilized	____	____
6. Storm drain inlets adequately protected	____	____
7. Silt fences are shown on the contour lines with no more than one quarter acre per 100 foot drainage to it	____	____
8. Temporary sediment traps being used at locations of future stormwater infiltration facilities	____	____

Additional Comments

Plan Reviewed By: _____ Date: _____

APPENDIX H

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

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I. Pre-Construction Meeting Documents
   a. Preamble to Site Assessment and Inspections
   b. Operator's Certification
   c. Qualified Professional's Credentials & Certification
   d. Pre-Construction Site Assessment Checklist

II. Construction Duration Inspections
   a. Directions
   b. Modification to the SWPPP

III. Monthly Summary Reports

IV. Monitoring, Reporting, and Three-Month Status Reports
   a. Operator's Compliance Response Form

Properly completing forms such as those contained in Appendix H meet the inspection requirement of NYS-DEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

I. PRE-CONSTRUCTION MEETING DOCUMENTS
Project Name _____
Permit No. _____ **Date of Authorization** _____
Name of Operator _____
Prime Contractor _____

a. Preamble to Site Assessment and Inspections
The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

The operator shall also prepare a written summary of compliance with this general permit at a minimum frequency of every three months (Operator's Compliance Response Form), while coverage exists. The summary should address the status of achieving each component of the SWPPP.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).
2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.
3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Operators Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law.

Name (please print): _____

Title _____ **Date:** _____

Address: _____

Phone: _____ **Email:** _____

Signature: _____

c. Qualified Professional's Credentials & Certification

"I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction."

Name (please print): _____

Title _____ **Date:**_____

Address: _____

Phone: _____ **Email:** _____

Signature: _____

d. Pre-construction Site Assessment Checklist
(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?_____
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?_____
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?_____
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page _____
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? _____

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:
Inspection Forms will be filled out during the entire construction phase of the project.
Required Elements:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

(4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

(6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

_____	_____
Inspector (print name)	**Date of Inspection**
_____	_____
Qualified Professional (print name)	**Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA
[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease?
[ ] [ ] [ ] All disturbance is within the limits of the approved plans.
[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions
Yes No NA
[ ] [ ] [ ] Is construction site litter and debris appropriately managed?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing
Yes No NA
[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?
[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Runoff Control Practices

1. Excavation Dewatering
Yes No NA
[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales
Yes No NA
[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

Runoff Control Practices (continued)

4. Stone Check Dam

Yes No NA

[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence

Yes No NA

[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

Sediment Control Practices (continued)

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)

Yes No NA

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation ___% of design capacity.

4. Temporary Sediment Trap

Yes No NA

[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.

Sediment accumulation is ___% of design capacity.

5. Temporary Sediment Basin

Yes No NA

[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.

Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

III. Monthly Summary of Site Inspection Activities

Name of Permitted Facility:	**Today's Date:**	**Reporting Month:**
Location:	**Permit Identification #:**	
Name and Telephone Number of Site Inspector:		

Date of Inspection	Regular / Rainfall based Inspection	Name of Inspector	Items of Concern

Owner/Operator Certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Signature of Permittee or Duly Authorized Representative

Name of Permittee or Duly Authorized Representative Date

Duly authorized representatives must have written authorization, submitted to DEC, to sign any permit documents.

APPENDIX C

0644089821

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR [ ] [ ] [ ] [ ] [ ] [ ]
(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-15-002

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-

RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
RXR GLEN ISLE PARTNERS, LLC

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
HAFTEL

Owner/Operator Contact Person First Name
FRANK

Owner/Operator Mailing Address
625 RXR PLAZA

City
UNIONDALE

State
NY

Zip
11556 -

Phone (Owner/Operator)
516 - 506 - 6000

Fax (Owner/Operator)
0 - 0 -

Email (Owner/Operator)
FHAFTEL@RXRREALTY.COM

FED TAX ID
32 - 23254556 (not required for individuals)

Project Site Information

Project/Site Name

GARVIES POINT WTERFRONT REDEVELOPMENT

Street Address (NOT P.O. BOX)

GARVIES PT. ROAD

Side of Street

○ **North** ● **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)

CITY OF GLEN COVE

State: NY

Zip: 11542 -

County: NASSAU

DEC Region: 1

Name of Nearest Cross Street

HERB HILL ROAD

Distance to Nearest Cross Street (Feet)

1200

Project In Relation to Cross Street

○ **North** ● **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel

21-259-7

Tax Map Numbers

2 3 4

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting): 614032

Y Coordinates (Northing): 4523853

2. What is the nature of this construction project?

○ **New Construction**

○ **Redevelopment with increase in impervious area**

● **Redevelopment with no increase in impervious area**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ○ FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ● INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION — Number of Lots
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ● OTHER: Remediation

***Note:** for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	Total Area To Be Disturbed	Existing Impervious Area To Be Disturbed	Future Impervious Area Within Disturbed Area
035.2	04.1	00.0	00.0

5. Do you plan to disturb more than 5 acres of soil at any one time? ○ **Yes** ● **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	B	C	D
%	99 %	1 %	%

7. Is this a phased project? ○ **Yes** ● **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date 07/15/2016 – **End Date** 09/30/2016

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

GLEN COVE CREEK

HEMPSTEAD HARBOR

9a. Type of waterbody identified in Question 9?

- ○ Wetland / State Jurisdiction On Site (Answer 9b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

HARBOR

9b. How was the wetland identified?

- ○ Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-15-002? ● **Yes** ○ **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? ○ **Yes** ● **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ● **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ○ **No**
If Yes, what is the acreage to be disturbed?

0.

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ **Yes** ● **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ● **Yes** ○ **No** ○ **Unknown**

16. What is the name of the municipality/entity that owns the separate storm sewer system?

CITY OF GLEN COVE

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ **Yes** ● **No** ○ **Unknown**

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? ○ **Yes** ● **No**

19. Is this property owned by a state authority, state agency, federal government or local government? ● **Yes** ○ **No**

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) ● **Yes** ○ **No**

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? ● **Yes** ○ **No**

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ○ **Yes** ● **No**
If No, skip questions 23 and 27-39.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? ○ **Yes** ○ **No**

0251089825

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ● **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer: P.W. GROSSER CONSULTING, P.C.

Contact Name (Last, Space, First): ROSEN, GERRY

Mailing Address: 630 JOHNSON AVENUE, SUITE 7

City: BOHEMIA

State: NY Zip: 11716-

Phone: 631-589-6353 Fax: 631-589-8705

Email: GERRYR@PWGROSSER.COM

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-15-002. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

STATE OF NEW YORK ★ GERRY D. ROSEN ★ 077549 LICENSED PROFESSIONAL ENGINEER

First Name: GERRY **MI**: D

Last Name: ROSEN

Signature: Gerry Rosen

Date: 07/19/2016

25. Has a construction sequence schedule for the planned management practices been prepared? ● Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ Check Dams
- ○ Construction Road Stabilization
- ✓ Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ○ Sediment Basin
- ○ Sediment Traps
- ✓ Silt Fence
- ✓ Stabilized Construction Entrance
- ○ Storm Drain Inlet Protection
- ✓ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ○ Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ✓ Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ✓ Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ○ Temporary Swale
- ○ Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ○ Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ○ Retaining Wall
- ○ Riprap Slope Protection
- ○ Rock Outlet Protection
- ○ Streambank Protection

Other

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- ○ **Preservation of Undisturbed Areas**
- ○ **Preservation of Buffers**
- ○ **Reduction of Clearing and Grading**
- ○ **Locating Development in Less Sensitive Areas**
- ○ **Roadway Reduction**
- ○ **Sidewalk Reduction**
- ○ **Driveway Reduction**
- ○ **Cul-de-sac Reduction**
- ○ **Building Footprint Reduction**
- ○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

- ○ All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

0 . **acre-feet**

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

	Total Contributing Area (acres)		Total Contributing Impervious Area (acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1)	0.000	and/or	0.000
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)	0.000	and/or	0.000
○ Tree Planting/Tree Pit (RR-3)	0.000	and/or	0.000
○ Disconnection of Rooftop Runoff (RR-4)	0.000	and/or	0.000
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			0.000
○ Rain Garden (RR-6)			0.000
○ Stormwater Planter (RR-7)			0.000
○ Rain Barrel/Cistern (RR-8)			0.000
○ Porous Pavement (RR-9)			0.000
○ Green Roof (RR-10)			0.000
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			0.000
○ Infiltration Basin (I-2)			0.000
○ Dry Well (I-3)			0.000
○ Underground Infiltration System (I-4)			0.000
○ Bioretention (F-5)			0.000
○ Dry Swale (O-1)			0.000
Standard SMPs			
○ Micropool Extended Detention (P-1)			0.000
○ Wet Pond (P-2)			0.000
○ Wet Extended Detention (P-3)			0.000
○ Multiple Pond System (P-4)			0.000
○ Pocket Pond (P-5)			0.000
○ Surface Sand Filter (F-1)			0.000
○ Underground Sand Filter (F-2)			0.000
○ Perimeter Sand Filter (F-3)			0.000
○ Organic Filter (F-4)			0.000
○ Shallow Wetland (W-1)			0.000
○ Extended Detention Wetland (W-2)			0.000
○ Pond/Wetland System (W-3)			0.000
○ Pocket Wetland (W-4)			0.000
○ Wet Swale (O-2)			0.000

Table 2 - Alternative SMPs
(DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Alternative SMP	Total Contributing Impervious Area (acres)
○ **Hydrodynamic**	0.0
○ **Wet Vault**	0.0
○ **Media Filter**	0.0
○ **Other**	0.0

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name

Manufacturer

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

Total RRv provided

0.___ **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

○ **Yes** ○ **No**

If Yes, go to question 36.
If No, go to question 32.

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

Minimum RRv Required

0.___ **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

○ **Yes** ○ **No**

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

WQv Provided

0 . **acre-feet**

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a).

0 .

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ○ **Yes** ○ **No**

If Yes, go to question 36.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

CPv Required

0 . **acre-feet**

CPv Provided

0 . **acre-feet**

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

Total Overbank Flood Control Criteria (Qp)

Pre-Development

0 . **CFS**

Post-development

0 . **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

0 . **CFS**

Post-development

0 . **CFS**

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ○ **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP N Y R
- ○ Other
- ☑ None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ○ **Yes** ● **No**
If Yes, Indicate Size of Impact. 0 .

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ **Yes** ● **No**
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ **Yes** ● **No**

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. N Y R

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name: FRANK

MI:

Print Last Name: HAFTEL

Owner/Operator Signature:

Date: 07/07/2016

APPENDIX D

NEW YORK STATE OF OPPORTUNITY. | Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ROSE HARVEY
Commissioner

July 28, 2016

Ms. Naomi Handell
U.S. Army Corps of Engineers - New York District
Regulatory Branch-Eastern Section
26 Federal Plaza, Room 1937
New York, NY 10278

Re: USACE
Glen Cove Waterfront Redevelopment Project/51 acres/n side of Glen Cove Creek
City of Glen Cove, Nassau County, NY
09PR03528

Dear Ms. Handell:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources. They do not include other environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8).

Our office has received a request to review a proposal to conduct remediation activity on Parcel 2/Block 259/portion of Lot 1 and Parcel 3/Block G/Lot 311 (Saunders, 21 July 2016). Based on the information provided, we recommend that the area in question has a low archaeological potential and we have no objection to remediation actions being taken there. This recommendation pertains only to the specified area. The remainder of the project area remains under review. Please note that only the the relevant regulatory agencies have the authority to allow such work to proceed.

If you have any questions please don't hesitate to contact me.

Sincerely,

Philip A. Perazio, Historic Preservation Program Analyst - Archaeology Unit
Phone: 518-268-2175
e-mail: philip.perazio@parks.ny.gov via e-mail only

cc: Bridget Boyd, NYSDOH
Cece Saunders, HPI
Heide-Marie Dudek, DEC
James Byrne, Myralee Machol, and Richard Summa, Glen Cove
Lorenzo Thantu, EPA
Shashank Nemichand, RXR Realty