



**Pompton Lake Study Area  
Corrective Measures Implementation  
Work Plan**

**Appendix E – Construction Quality  
Assurance Plan**

Pompton Lakes Works  
Pompton Lakes, New Jersey

April 2016

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## **Acronyms and Abbreviations**

Chemours	The Chemours Company FC, LLC
CMI WP	Corrective Measures Implementation Work Plan
CQAP	Construction Quality Assurance Plan
EPA	United States Environmental Protection Agency
HSWA	Hazardous and Solid Waste Amendments of 1984
MS	matrix spike
MSD	matrix spike duplicate
NJDEP	New Jersey Department of Environmental Protection
PDR	Project Data Review
Permit Modification I	RCRA Permit Modification I to the HSWA Permit
PLW	Pompton Lakes Works
PLSA	Pompton Lakes Study Area
QA	quality assurance
QC	quality control
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RPD	relative percent differences
RTK DGPS	real-time kinematic differential global positioning system
Sevenson	Sevenson Environmental Services, Inc.

## **1. Introduction**

The Corrective Measures Implementation Work Plan (CMI WP) presents the remedial approach to be implemented within portions of the Pompton Lake Study Area (PLSA). This Construction Quality Assurance Plan (CQAP) is an appendix to, and part of, the CMI WP. It describes the quality control (QC) and quality assurance (QA) systems that will be established and followed to verify compliance with the technical approach included in the CMI WP.

Implementation of the corrective measures will be conducted by the Remedial Action Contractor (Sevenson Environmental Services, Inc. [Sevenson]) to perform activities listed in Permit Modification I to the Hazardous and Solid Waste Amendments of 1984 (HSWA) Permit (Permit Modification I) for the Site under the Resource Conservation and Recovery Act (RCRA) made effective by the United States Environmental Protection Agency (EPA) on June 22, 2015 and the CMI WP. These actions are designed to achieve the Remedial Action Objectives (RAOs) in the target remediation areas in the PLSA. Additional background information and details of the overall project can be found in Section 1 of the CMI WP.

This CQAP covers the following activities to be performed during implementation of the work described in the CMI WP: upland soil removal; in-water debris and sediment removal; monitoring; soil/sediment processing and disposition; ecological-layer placement; and other restoration. The term “construction” is used throughout this CQAP and refers to these activities.

### **1.1 Purpose and Requirements**

The approach to management of the quality of implementation of the corrective measures described in the CMI WP includes an integrated system of QC by the Remedial Action Contractor and QA by the Pompton Lakes Works (PLW) Site Resources (defined in Section 2.1). This CQAP details the systems and controls that have been put in place so that the quality of the work will meet the requirements specified in the CMI WP.

The Remedial Action Contractor is responsible for constructing the work in accordance with the CMI WP and meeting the requirements of the environmental permits, such that the required standards of quality are attained and problems resulting from construction deficiencies are mitigated and prevented to the extent practicable. The Remedial Action Contractor’s QC program is established to provide for production controls, tests,

and inspections of the work and materials used to complete the work as necessary; these activities are outlined throughout their Operations Plan (Appendix A of the CMI WP). This plan is designed to meet the requirements of the CMI WP through documented QA/QC elements to verify the effectiveness of the Remedial Action Contractor's QC program and confirm that the resultant construction activities comply with the quality standards and requirements established in the CMI WP.

## **1.2 Objectives**

The objectives of this CQAP are to:

- Describe the quality program to be implemented to verify that the project is constructed in accordance with the requirements of the CMI WP and environmental permits and industry standards;
- Define the QA team, associated roles and responsibilities, and communication process;
- Describe guidelines for inspection and testing of construction/operational activities, along with specifying the corresponding acceptance criteria; and
- Describe the documentation and record keeping protocol to be followed for pre-, during-, and post-construction activities, including specifying requirements for documenting any deficiencies or field changes.

## **1.3 Document Organization**

This CQAP is organized into the following sections:

- **Section 1 – Introduction:** provides the purpose of the QA/QC program and the objectives and organization of this CQAP.
- **Section 2 – Project and Personnel Responsibilities:** presents the key project roles involved in implementation of the corrective measures, their responsibilities, and the expected reporting structure and communication.
- **Section 3 – QA/QC Elements:** describes the QA/QC inspection activities to be conducted to monitor implementation of the corrective measures, as well as the

overall QA/QC elements, measurement approach, pass/fail criteria, and corrective action for all construction processes.

- **Section 4 – Documentation:** presents the procedures for processing pre-, during, and post-construction submittals and documentation, identifying construction deficiencies and acceptable corrective actions, identifying and approving field changes, as well as the requirements for document storage.
- **Section 5 – References:** provides references to key documents referred to in the body of this CQAP.

## **2. Project and Personnel Roles and Responsibilities**

This section presents the responsibilities of organizations and key personnel involved in implementation of the corrective measures. The organizations involved in the implementation of the work described in the CMI WP and their QA/QC roles and responsibilities are defined in Sections 2.1 through 2.4. An overall organization chart showing information known at this time is provided in the CMI WP (Figure 6-1); this chart should be considered preliminary only and is subject to change as the project progresses to construction.

### **2.1 Reporting Structure and Communication**

The EPA is the lead agency responsible for observing and monitoring the progress of the implementation of the corrective measures in accordance with Permit Modification I. As such, EPA exercises approval authority for the CMI WP and this CQAP.

The Chemours Company FC, LLC (Chemours) is responsible for implementing the corrective measures in accordance with Permit Modification I and the approved CMI WP. Chemours will be responsible for communicating directly with EPA.

The PLW Site Resources, and specifically the Construction Manager, are responsible for the overall coordination of the corrective measures, and will facilitate communication between Chemours, the Technical Team, the Remedial Action Contractor, and the laboratory.

### **2.2 PLW Site Resources**

The PLW Site Resources include a Construction Manager (designated as the PLW Site Representative), Health and Safety Site Manager, field inspectors, and monitoring personnel to provide onsite construction management, construction support, and QC duties.

The Construction Manager is responsible for implementation of this CQAP to verify compliance with the CMI WP and environmental permits. The Construction Manager will provide QA and will aid the Remedial Action Contractor's QC program by monitoring the day-by-day construction QC activities to document that the work is being performed in accordance with the CMI WP. The Construction Manager will serve as the primary point of contact for communication with the Remedial Action Contractor and the Chemours Project Director. The Construction Manager will support the Chemours Project Director in the overall communication with EPA, New Jersey



Department of Environmental Protection (NJDEP), Borough of Pompton Lakes, and other state and local officials.

The PLW Site Resources will also include the Health and Safety Site Manager, field inspectors, and monitoring personnel. These individuals will be present onsite to monitor the work performed by the Remedial Action Contractor and support the Construction Manager in assuring compliance with the requirements set forth in the CMI WP and this CQAP. These individuals will communicate all findings directly to the Construction Manager.

The PLW Site Resources will collectively have the following responsibilities:

- Provide overall coordination of the onsite remedial activities;
- Provide independent health and safety observation of all field activities, and utilize Stop Work Authority when appropriate (note that the Remedial Action Contractor will have primary responsibility for onsite health and safety);
- Conduct independent inspections to verify the quality of the work and check that the required documentation is submitted;
- Review all survey data to verify that the removal operations, backfill, ecological-layer placement, and other restoration work have been performed in accordance with the requirements specified in the CMI WP and this CQAP with respect to elevations and limits. The raw data and prepared drawings will be reviewed by the PLW Site Resources and used to confirm the requirements are met or inform the Remedial Action Contractor that additional work is required;
- Identify noted problems/deficiencies during the construction activities (based on QC testing results) so corrective actions can be taken;
- Communicate problem/deficiencies to the attention of the Project Technical Team (Section 2.2), as appropriate;
- Perform and document field and laboratory testing at the frequency established in this CQAP;
- Review QA/QC testing documentation completed on the project and relay the information regarding compliance with requirements to the Remedial Action Contractor. In incidences of non-compliance, record the requirements for re-work

and order the re-test, re-survey, or re-inspection when the Remedial Action Contractor indicates corrections have been made;

- Observe construction materials delivered to the Site to determine general conformance with the CMI WP and CQAP; and
- Observe and record daily field activities and prepare daily construction reports.

### **2.3 Technical Team**

The Technical Team will work as independent design professionals to provide design, engineering, and construction support services in connection with the project. The Technical Team will input on submittal and field change order review, as requested, and resolution of technical issues that may arise during implementation of corrective measures.

The Technical Team representatives will collectively have the following responsibilities:

- Provide the appropriate technical review of submittals and field change orders from the Remedial Action Contractor;
- Provide assistance in the review and interpretation of the field and laboratory testing results;
- Post monitoring and/or construction-related results to the project website per the CMI WP; and
- Identify noted problems/deficiencies during the construction activities so corrective actions can be taken.

The Technical Team includes the Engineer(s) of Record for the project.

### **2.4 Remedial Action Contractor**

The Remedial Action Contractor will provide the labor, materials, equipment, and subcontractors required to construct the project in accordance with the requirements set forth in the CMI WP, environmental permits, and CQAP. The Remedial Action Contractor will be responsible for the QC of their constructed work product as well as the necessary inspections and tests required to confirm that their work complies with

the CMI WP. They will exercise authority over their workforce, including QC personnel and any subcontracted QC support services.

The Remedial Action Contractor will have the following responsibilities for implementing the procedures presented in this CQAP:

- Submit a QC organization chart, subject to review and approval by the Construction Manager, developed to show QC personnel and how these personnel will integrate with other management, production, and construction functions and personnel [preliminary organization chart is provided in the CMI WP (Figure 6-1)];
- Review and be completely familiar with the requirements set forth in the CMI WP and this CQAP;
- Maintain lines of communication with the Construction Manager;
- Coordinate with all material and equipment suppliers to document compliance with the CQAP requirements;
- Provide the Construction Manager with at least five (5) days written notice of any construction material sample results, tests, or inspections required by the CQAP or other project documents; timely notice of all other tests and inspections; and an additional forty-eight (48) hours' notice prior to the actual performance of any test or inspection;
- Prepare and submit to the Construction Manager all QC testing results, shop drawings, and other required submittals specified in the CMI WP or CQAP;
- Identify any potential issues as early as possible to allow resolution in a manner that will not impact the quality or schedule of construction activities; and
- Maintain a continuous record of any approved changes or modifications to the approach presented in the CMI WP.

## **2.5 Laboratory Services**

Analytical samples will be submitted to a New Jersey certified laboratory services contractor. Analytical testing will be performed to assess borrow material suitability, the potential impacts of the remedial activities, and that corrective action levels are not exceeded in accordance with the CMI WP. The laboratory services contractor will be

**Appendix E  
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Project and Personnel Roles  
and Responsibilities

responsible for completion of the analytical procedures in accordance with set requirements of the analytical method and reporting limits, as well as generation and distribution of completed laboratory data packages for all field and QA/QC samples collected during performance of construction activities. The name of the selected laboratory(ies) will be provided to EPA once services have been procured.

### **3. QA/QC Elements**

Specific QA/QC elements have been identified for the various remedial processes to be performed by the Remedial Action Contractor or PLW Site Resources. Table 3-1 provides the overall quality assurance program to be implemented for all pre-construction and construction processes. This table specifically includes the QA/QC elements, measurement approach, pass/fail criteria, and corrective actions to be implemented as needed. Table 3-2 provides the monitoring program analytical and instrument reporting limits.

The remainder of this section describes the general approach for the work inspections and monitoring to be performed.

#### **3.1 Work Inspections**

The Construction Manager will be responsible for the QA program, which includes QC work by the Remedial Action Contractor and ongoing QA by the PLW Site Resources. Depending on the specific remedial activity conducted, the Construction Manager or Remedial Action Contractor will perform inspections, sampling, testing, and/or monitoring activities to document compliance with the CMI WP. These work inspections will be performed and documented during the pre-, during-, and post-construction or final inspection phases of the project.

Pre-construction inspections are done prior to starting a new feature of work. These inspections typically include review of the following items:

- Safety and environmental requirements;
- Approved documents, approved permits, equipment, materials and labor needed for each feature of work;
- Confirmation of inspection and testing requirements; and
- Availability of independent testing laboratories (when specified).

During-construction inspections are performed at the beginning of work on a new feature and also periodically during work activities. Inspections near the start of work are important to verify the quality of work and initial test results to confirm that the work

will be performed as specified. The periodic inspections are done to verify continued compliance with the approved drawings, specifications and permit requirements.

A post-construction or final inspection is performed at the completion of each feature of work. The purpose of the final inspection is to document that the work is complete and ready for Construction Manager's acceptance.

### **3.2 Monitoring**

The Construction Manager will be responsible for the QA program, which includes collection of samples and/or monitoring to assess the progress and acceptability of the work performed by the Remedial Action Contractor. The type of samples to be collected and/or monitoring to be performed is discussed in detail in Section 2.7 of the CMI WP. Attachment A provides a proposed outline of the standard operating procedures for monitoring.

## **4. Documentation**

The documentation collected over the course of the project will support a determination of whether construction activities are being/have been carried out in accordance with the CMI WP. The documentation process includes identification of construction tasks that will be observed and documented; assignment of responsibilities for the observation, testing, and documentation of these tasks; and the completion of the required reports, data sheets, forms, and checklists to provide an accurate record of the work performed in support of implementation of the corrective measures.

The results of QA/QC testing or other documentation procedures conducted to confirm that the construction activities meet applicable project criteria for the work specified in the CMI WP will be stored in the project QA/QC files and maintained as part of the permanent project record; these records will be made available for EPA review upon request.

Table 4-1 provides a listing of the required documentation by construction process, and the remainder of this section provides additional details on the submittals as needed.

### **4.1 Technical Submittal Review Process**

The Remedial Action Contractor will prepare and submit all submittals to the Construction Manager, and the Construction Manager will administer and control the processing of submittals. After being reviewed for completeness, submittal documents will be transmitted to the relevant project staff for review and verification for compliance with the requirements of the CMI WP. The submittal's disposition will be noted on the submittal, which will be signed, dated, and returned to the Remedial Action Contractor. If required, the Remedial Action Contractor will revise the submittal, incorporating the comments, and will resubmit it for review and verification for compliance.

Submittals will be numbered and a complete submittal transmittal form is required for all submittals. Submittals must be easily legible, clean, and clearly reproduced; any information contained in the submittal that is not applicable to the intent of the submittal should be clearly lined out or deleted. The actions that may be taken for each submittal are:

- Reviewed – Submittal meets requirements; no objections are observed or comments noted.

- Reviewed and Noted – Submittal meets requirements with minor corrections, comments, or additions noted. Resubmittal is not required. The Remedial Action Contractor must incorporate the required corrections into the work in the field.
- Revise and Resubmit – Submittal has some selected areas that do not meet requirements. These areas can be revised to meet requirements, and the entire submittal must be resubmitted for review and approval. No work will begin in the field until the revised submittal has been approved. When a submittal is to be revised and resubmitted, the Remedial Action Contractor will revise the submittal and indicate the revision by incrementing the revision number.
- Reject – Submittal is inadequate and does not meet the requirements. Revise the complete submittal and resubmit for approval. No work will begin in the field until the revised submittal has been approved.
- For Information Only – Submitted for information only; no response action required.

The Construction Manager is responsible for tracking the submittal package during the entire review process and advising all concerned of any schedule impacts to confirm that the review process timeframe is adhered to. The Construction Manager will retain copies of all submittal documents and revisions, and make sure that an accurate file is available during the life of the project. The Construction Manager will also maintain a comprehensive submittal log. As appropriate, certain submittals (i.e., those that demonstrably change the scope of work and/or implementation schedule for the corrective action) will also be provided to EPA for further review and approval.

## **4.2 Pre-Construction**

The pre-construction documentation is provided in Table 4-1 along with the responsible entity for completion. Additional details on the required documentation approach for the construction permits and imported material test results are provided below.

### **4.2.1 Permits and Associated Requirements**

The CMI WP and this CQAP will guide project construction activities. Such work activities shall also be governed by other permit authorizations/approvals (permits) beyond Permit Modification I that are required to be obtained prior to construction for specific activities/disturbances. The Remedial Action Contractor will be responsible for following the conditions contained within the State and local permits and permit



modifications for the project and the Remedial Action Contractor will retain copies of each at the project location for the duration of construction.

Property access agreements, as necessary, will be obtained by PLW Site Resources and provided to the Remedial Action Contractor. Additional approvals or authorization (not identified as permits) that are required for construction activities, will be obtained by the Remedial Action Contractor. Such authorizations or approvals may include, among others, scientific collection permit for wildlife relocation, utility connection/use, traffic control/access, NJ-One Call, and, off-site material disposal and/or staging. Written confirmation of understanding and intent to comply with conditions specific to project permits shall be provided to the Construction Manager by the Remedial Action Contractor.

Prior to construction, the Construction Manager will prepare a permit compliance matrix/database inclusive of all permits. The matrix/database will be made available to EPA prior to mobilization. This tracking register will be used to inform the PLW Site Resources, Remedial Action Contractor, and the Technical Team of compliance and action item requirements specific to each permit including, but not limited to:

1. Pre-construction notifications, signage;
2. Regulatory agency meetings;
3. Testing and documentation requirements;
4. Reporting requirements and schedule;
5. Audit expectations and necessary on-site materials;
6. Notifications and actions required in the event of changes during construction from approved plans;
7. Primary permit contacts;
8. Short-term and long-term monitoring and inspection parameters, reporting, and schedule requirements; and
9. Permit close-out procedures.

Such tracking and all permit related documentations will be updated and employed by the Construction Manager with Remedial Action Contractor support throughout the lifespan of the project, and will help guide work execution in compliance with all permit conditions and reporting requirements.

#### **4.2.2 Imported Materials Testing Results**

The Remedial Action Contractor will be responsible for all materials imported to the Site and confirming the materials meet NJDEP and CMI WP requirements and specifications, including provision of laboratory analytical results to the Construction Manager. The borrow source materials will be imported from a permitted/licensed facility, and testing results will be provided to EPA. The Construction Manager will maintain a log of deliveries of material, as well as a daily log of progress, including the quantity of material(s) placed at the project site.

#### **4.3 During-Construction**

During-construction documentation includes daily recordkeeping, daily reports of operations, associated photographs, inspection and testing report forms, survey data, and monitoring data reports (including laboratory electronic data). In addition, documentation necessary per waste management and disposal requirements will also be retained during construction activities. Table 4-1 provides a listing of all during-construction documentation as well as the responsible entity. The following sections provide additional details on the construction, monitoring, and off-site material transport report requirements.

##### **4.3.1 Construction Reports, Photographs, and Survey Data**

###### **Construction Reports and Photographs**

Construction reporting will include completion of daily logs as well as inspection and test reports each work day when the Remedial Action Contractor is performing on-site operations. PLW Site Resources will maintain a daily log of all observations and inspections performed for the operations. Inspection and test reports will also be completed, as needed, to document results. These reports will be signed by the responsible representative who prepared the report, and will be provided to the Construction Manager on the work day following the day of record. The reports will be available to EPA in electronic format upon request.

Weekly construction meetings will be held using a standing agenda that will be documented accordingly. These reports will be provided as part of the Construction Completion Report (on CD).

Based on the daily log and inspection/test reports, Daily Construction Summary Reports of each day's construction activities will be prepared by the Construction Manager. The Daily Construction Summary Report will contain, at a minimum, the following information:

- Date, project name, location, and number and names of people onsite;
- Time that work starts and ends, in addition to the time of work stoppages related to inclement weather, or insufficient equipment or personnel or other reasons;
- Record of visitors to the Site;
- Data on weather conditions, including temperature, humidity, wind direction and speed, cloud cover, and precipitation;
- Summary information regarding monitoring results;
- Remedial Action Contractor's workforce, equipment, and materials delivered to or removed from the job site;
- Chronological description of work in progress, including notices to or requests from the Remedial Action Contractor;
- Specific locations of operations during that day;
- Equipment and personnel working in each activity area, including subcontractors (if applicable);
- Documentation of safety meeting and a description of any health and safety issues;
- Results of inspections or testing performed onsite;
- Problem/deficiency identification and documentation describing corrective actions taken;

- A listing of laboratory samples collected, marked, and delivered to the laboratory;
- Identification of collected real-time data;
- A record of communications with other on-site parties, outside companies, and/or regulatory agencies regarding the day's construction activities; and
- A record of calibrations or standardizations performed on field testing equipment, including actions related to the results of recalibrations.

Supporting data sheets will be attached to the daily report where needed. In addition, progress photographs will be taken as needed to document observations, problems, deficiencies, and work in progress. At a minimum, photographs will be taken once a week when the Remedial Action Contractor is performing on-site construction operations. Photographs will be in color print format and will be filed in chronological order in a permanent protective computer storage system. Representative photographs will be included in the daily report, and a separate file and photographic log will be maintained for all photographs taken to document for each photograph the date and time, the location where the photograph was taken, and a brief description of the subject matter. The photographic log will be included in the Construction Completion Report (on CD).

### **Survey Data**

In the Uplands soil removal area, the horizontal limits of removal will be surveyed and staked in the field. The surveyor(s) will record surveyed field measurements, coincident with survey control points established in the CMI WP, to verify the target removal extent and elevations have been achieved for each excavation area. A post-remediation survey will be performed to document final remediation and restoration conditions and verify placement of backfill and restoration material (see Table 3-1 for additional details regarding the survey).

In the sediment removal areas, the horizontal limits of removal will be surveyed in the field and defined using buoys or other acceptable markers. A pre-construction bathymetric survey will be performed prior to initiation of removal or dredging activities. During removal activities, the Remedial Action Contractor will use a real-time kinematic differential global positioning system (RTK DGPS) and Dredgepack system to document that the target removal depths/elevations have been achieved. The surveyor(s) will perform a post-dredge survey to confirm the results used to verify that

the horizontal and vertical limits of removal have been achieved. A post-remediation survey will be performed to document final remediation conditions and verify placement of all ecological-layer material.

All surveying data will be provided by the Remedial Action Contractor to the Construction Manager. A summary of the final survey results (not detailed data from each point) will be included in the Construction Completion Report.

#### **4.3.2 Monitoring Data Reports**

Monitoring data reporting will include completion of reports each day that monitoring activities are conducted by PLW Site Resources. Specifically, monitoring personnel will develop a report log of all monitoring activities performed for the operations, and this log will be provided to the Construction Manager. These reports will be signed by the responsible representative who prepared the report, and will be provided to the Construction Manager on the work day following the day of record. A summary of the Monitoring Data Reports will be included as a component of the weekly meetings and agenda.

The Monitoring Data Report will contain, at a minimum, the following information:

- Date, project name, location, and names of monitoring inspectors;
- General data on weather conditions, including approximate temperature, wind direction and speed, cloud cover, and precipitation (i.e., general weather as provided by local forecasters);
- A record of calibrations or standardizations performed on field testing equipment, including actions related to the results of recalibrations;
- Specific locations of operations and construction activities during that day;
- Description of monitoring activities performed including a listing of laboratory samples collected, marked, and delivered to the laboratory;
- Monitoring results (real-time monitoring results completed immediately while analytical data will not be reported until received from the laboratory); and

- Identification of any corrective action level exceedances and corresponding corrective measures performed.

#### **4.3.3 Waste Management and Disposal Requirements**

The Waste Management Plan for this project is included in Attachment B. In summary, the primary materials that will require off-site disposal or re-cycling will be as follows:

- Soil from excavation of the Uplands area;
- Sediment from dredging in the Delta Area, Lake Area A, and Island Area;
- Debris recovered during excavation or dredging;
- Vegetation (e.g., trees, bushes, and branches) ;
- Personnel protective equipment and trash;
- Used/empty calibration gas canisters; and
- Used oil and hydraulic fluids.

QA work is required to document the quantity and type of waste materials generated, on-site processing of these materials, and off-site disposal or re-cycling. Records will be obtained on a daily basis to document the weight of debris, soil, and sediment that leaves the site and the results of the paint filter tests. The Remedial Action Contractor will provide records of the materials leaving the site to the Construction Manager. Disposal records will be included as an appendix in the Construction Completion Report (on CD).

#### **4.3.4 Laboratory Electronic Data Review**

As noted above, the laboratory services contractor will be responsible for generation and distribution of completed laboratory data packages for all field and QA/QC samples collected during performance of construction activities. This includes electronic data, which will undergo an independent review through the Project Data Review (PDR) process. The PDR is an automated internal review process to determine data usability. The electronic data deliverables received from the laboratory are loaded into the Locus EIM™ database and processed through a series of data quality checks, which are a

combination of software (Locus EIM™ database Data Validation Module) and manual reviewer evaluations. The data is evaluated against the following data usability checks:

- Field and laboratory blank contamination;
- EPA hold time criteria;
- Missing QC samples;
- Matrix spike (MS)/matrix spike duplicate (MSD) recoveries and the relative percent differences (RPDs) between these spikes;
- Laboratory control sample/control sample duplicate recoveries and the RPD between these spikes;
- Surrogate spike recoveries for organic analyses;
- RPD between field duplicate sample pairs;
- RPD between laboratory replicates for inorganic analyses; and
- Difference/percent difference between total and dissolved sample pairs.

The PDR applies the following data evaluation qualifiers to analysis results, as warranted:

<b>Qualifier</b>	<b>Definition</b>
B	Not detected substantially above the level reported in the laboratory or field blanks.
R	Unusable result. Analyte may or may not be present in the sample.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected. Reporting limit may not be accurate or precise.

## **4.4 Post-Construction**

Post-construction documentation includes Record Drawings, corrective measures implementation completion reports, and any reports necessary for compliance with permits received for performance of the CMI WP construction activities. These documentation requirements are listed in Table 4-1, and additional details are provided in the following sections.

### **4.4.1 Record Drawings**

The Remedial Action Contractor will submit draft Record Drawings to the Construction Manager for review and will prepare final Record Drawings based on the comments provided by the Construction Manager. The Record Drawings will document both the soil and sediment components of the remediation, and will include post-construction and post-restoration survey information.

The Remedial Action Contractor will be responsible for collecting actual construction data in the field as preparation for the Record Drawings. The Record Drawings will record approved actual field conditions upon completion of the work. Where there was a significant change from the remedial drawings to a specified material, dimension, location, or other feature, the final Record Drawings will indicate the change to the work performed. Final Record Drawings will be signed by the surveyor that performed and/or certifies the work.

Record Drawings will be compiled using AutoCAD software and a working electronic form (i.e., point and contour .dwg files) of the draft. Signed record drawings will also be provided to the Construction Manager.

### **4.4.2 Construction Completion Report**

Following completion of the work, a Construction Completion Report will be prepared in general accordance with EPA's May 1994 RCRA Corrective Action Plan guidance. The report will describe the following: purpose of the corrective measures; summary of soil/sediment remediated; detailed descriptions of the source and quantity of fill used; deviations from the CMI WP and/or modifications if any necessitated by field conditions; documentation regarding achievement of RAOs and all as-built drawings; summary of significant actions; and summary of inspection findings. A detailed description of restoration activities will also be included.



#### **4.4.3 Permitting Compliance Reports**

Post-construction project permits are expected to require written documentation of project completion, final statements of compliance with permit conditions, as-built conditions, documented deviations to approved plans, and other permit close-out procedures, notifications, and possible agency meetings. The Construction Manager will make use of the permit compliance database, Daily Reports and other project execution documentation to prepare required notification and/or reporting instruments in accordance with each permit-specific conditions and/or regulatory guidance.

#### **4.5 Construction Deficiency**

This section provides procedures for tracking construction deficiencies (non-compliance) from identification through acceptable corrective action. It defines the controls and related responsibilities and authorities for dealing with non-compliant products or services. Construction deficiencies and associated corrective measures will be summarized in the Construction Completion Report.

##### **4.5.1 Problem and/or Deficiency Identification**

A problem/deficiency occurs when a material, performed work, installation, or contracted operational process does not meet the requirements for the project. When such problem/deficiency is identified, the appropriate resources will take action so the non-conforming material, work, installation, or operational process is identified and controlled to prevent use or delivery. Specifically, upon notification of any non-compliance with any of the project requirements, the Remedial Action Contractor will notify other necessary parties as appropriate, immediately take corrective action, and notify the Construction Manager when the corrective action has occurred.

Minor problems/deficiencies, defined as those items that will not result in significant deviations from required quality standard if corrected immediately, will be documented in the Daily Construction Summary Report. Other problems and/or deficiencies will be documented using a Problems/Deficiency Identification and Corrective Action Form. If a minor problem/deficiency is not addressed by the Remedial Action Contractor within two days of having been notified, the issue will be documented in a Problems/Deficiency Identification and Corrective Action Form. Discussion of problems/deficiencies will be included as a component of the weekly meetings and agenda.

#### **4.5.2 Preventative and Corrective Actions**

The Remedial Action Contractor and QA/QC team will take preventative actions necessary to eliminate the causes of potential problems and/or deficiencies so as to prevent their occurrence. The Remedial Action Contractor is to incorporate quality improvement practices in to their work to continually improve construction practices and address quality problems at their source.

When material, performed work, installation, or an operational process is found to be deficient and/or does not meet the project criteria, the Remedial Action Contractor will assure that the problem/deficiency is corrected. In addition, the Remedial Action Contractor will take steps to identify, control, and prevent negative consequences due to the problem/deficiency. Corrective actions will include removal and replacement of deficient work, re-work, modification of work procedures, or separate corrective action using methods approved by the Construction Manager. Re-work or replacement will be subject to the same scope of QA/QC inspection and testing as the original work. If the re-work or replacement work is not in accordance with project requirements, the replacement work will be removed, replaced, re-inspected, and re-tested. Modifications in operational processes or best management practices are expected to result in removal of the problem/deficiency-causing situation.

#### **4.5.3 Problems/Deficiency Identification and Corrective Action Form**

A Problems/Deficiency Identification and Corrective Action Form will provide a formal notification to the Remedial Action Contractor that work and/or operational process does not meet the project requirements. In addition, the Problems/Deficiency Identification and Corrective Action Form will be used to track and verify that the appropriate corrective action has been completed such that the problem/deficiency has been resolved.

Problem and deficiency identification and corrective action documentation should include the following information:

- A description of the problem or deficiency, including reference to supplemental data or observations related to the determination of the problem or deficiency;
- Location of the problem or deficiency, including how and when the problem or deficiency was discovered; and

- The corrective action taken for resolving the problem or deficiency including the date implemented and observations or documentation showing that the problem or deficiency was resolved. If the problem or deficiency has not been resolved by the end of the day upon which it was discovered, the documentation will state that the deficiency was unresolved at the end of the day.

#### **4.6 Field Changes**

Based on changes in site conditions and/or site activities, field changes may be required to the construction/operations presented in the CMI WP and/or the activities presented in this CQAP. The procedures for making and obtaining approval for changes are described here.

The construction/operations procedures may be revised based on changes to conditions encountered in the field as compared to the CMI WP. Proposed changes will be communicated to the Construction Manager and Project Technical Team in writing and if approved a proposal will be submitted to EPA for review and approval.

The Remedial Action Contractor's QC measures may require revisions as necessary to achieve the goal of continual improvement and to correct unsatisfactory performance. At any time, the PLW Site Resources may require the Remedial Action Contractor to make changes to their QC measures, including personnel changes, as necessary to obtain the quality specified. Moreover, the Remedial Action Contractor may initiate changes to their QC measures to correct process problems, and is required to notify the Construction Manager in writing of any desired changes; all changes are subject to the PLW Site Resources' and Project Technical Team acceptance. Revisions to the Remedial Action Contractor's QC measures will be submitted to EPA for concurrence.

#### **4.7 Documentation Storage**

The Construction Manager will maintain all documentation for the project. Project documents will be managed through a combination of secure document filing and storage system and an electronic document tracking system.

## Tables

**Table 3-1: Construction Process and QA/QC Elements**  
**Appendix E: Construction Quality Assurance Plan**  
**Pompton Lake Study Area, Corrective Measures Implementation Work Plan**

Process	QA/QC Elements	Measurement Approach	Measurement Responsibility (see also Table 4-1)	Pass/Fail Criteria	Corrective Action	Documentation Requirements (see also Table 4-1)
<b>A. Pre-construction</b>						
A. Means/methods assessment	<ul style="list-style-type: none"> <li>Soil analytical testing for solids per standard method 2640G, density per standard method 2710F, pH per EPA SW 846 method 9045C, paint filter per EPA SW846 Method 9095, and per TCLP metals SW846 Method 1311, 6010, 7000, 7470</li> <li>Sediment analytical testing for solids per standard method 2640G, density per standard method 2710F, pH per EPA SW 846 method 9045C, paint filter per EPA SW846 Method 9095, TCLP metals per SW846 Method 1311, 6010, 7000, 7470, and particle size &lt;75 micron per Modified ASTM D-422</li> <li>Water analytical testing for total suspended solids per EPA SW 846 Method 160.2, pH per EPA SW 846 Method 9045C, volatile organic hydrocarbons per EPA SW 846 Method 8260B, semivolatile organic hydrocarbons per EPA SW 846 8270C, metals per SW846 Method 6010, 7000, 7470, ammonia per Standard Method 4500 NH3, and sulfides per Standard Method 4500 S</li> </ul>	<ul style="list-style-type: none"> <li>Sampling in accordance with the NJDEP Field Sampling Procedures Manual</li> <li>Field and laboratory QA/QC samples (see Table 3-3 for requirements)</li> <li>Laboratory testing as outlined in the analytical procedure</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Compliance with the NJDEP Field Sampling Procedures Manual</li> <li>Criteria as outlined in the analytical testing procedure</li> </ul>	<ul style="list-style-type: none"> <li>Re-testing or modifications to laboratory procedures</li> </ul>	Technical submittal to the Technical Team
B. Imported backfill and ecological layer materials use confirmation	<ul style="list-style-type: none"> <li>Laboratory data to demonstrate chemical levels comply with NJDEP requirements and be identified as 'clean' materials and physical characteristics comply with CMI WP and permit application specific gradation</li> </ul>	<ul style="list-style-type: none"> <li>Borrow source vendor provided laboratory data sheets with recent (within last six months) chemical and physical test results</li> <li>If data sheets not available, sampling and analytical testing of each borrow material</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Chemical test results: <u>Backfill:</u> Meet NJDEP clean fill requirements outlined in N.J.A.C. 7:26E, similar natural background levels and below NJRDCSRS <u>Ecological layer:</u> Meet NJDEP clean fill requirements.</li> <li>Physical test results: <u>Backfill:</u> Demonstrate natural material, no greater than gravel in size, and comprised of the following particle sizes: 100% passing 3-inch sieve and 10-30%</li> </ul>	<ul style="list-style-type: none"> <li>Identify new borrow material source if chemical or physical criteria are not achieved</li> </ul>	Technical submittal to the Construction Manager

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				passing No. 200 sieve Ecological layer: Sand (natural unwashed) per remedial action permit application		
C. Uplands survey, inventory, and establish control points and benchmarks for comparison to and use during remediation, restoration, and project closeout (see also Section 2.2 of the CMI WP)	<ul style="list-style-type: none"> <li>Compliance with NJ regulations on accuracy and licensure for surveyors</li> <li>Inventory database reviewed through PDR process</li> </ul>	<ul style="list-style-type: none"> <li>Surveyor to provide electronic and signed/stamped drawing with license number</li> <li>Perform twice daily checks (before and after each day's work) on survey equipment against known control point(s) to verify X, Y, and Z</li> <li>Inventory database of all feature surveys</li> </ul>	Technical Team	<ul style="list-style-type: none"> <li>Licensed land surveyor and per NJSA 45:8 and NJAC 13:40</li> <li>On-land survey work will be performed in accordance with accepted accuracy standards but not less than +/- 0.01 feet (horizontal and vertical)</li> <li>Firms demonstrate that inventory and surveys are adequate to document pre-mobilization conditions</li> </ul>	<ul style="list-style-type: none"> <li>New surveyor to be selected if compliance with regulations and/or licensing not achieved</li> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> <li>Complete additional surveys, as necessary to comprehensively document pre-construction conditions</li> </ul>	Contract submittal to the Remedial Action Contractor
D. Bathymetric survey to verify bed surface elevation	<ul style="list-style-type: none"> <li>Qualified firm to conduct in-water survey within one month of initiation of dredging</li> <li>Water level gage/transducer installation for daily verification of elevation</li> <li>Qualified firm to establish remedial extent and also elevations in shallow water areas on 50- foot spacing using DGPS</li> </ul>	<ul style="list-style-type: none"> <li>Verify firms have experience and appropriate methods for surveying efforts</li> <li>In-water bathymetric survey in areas with adequate water depths to establish a mixture of repeated bidirectional lines and lines running perpendicular to the standard line direction gridded at an approximate spacing of 50 feet (horizontal and vertical)</li> <li>Perform twice daily bar checks (before and after each day's work) to reduce speed of sound and transducer errors</li> <li>Perform twice daily checks (before and after each day's work) of survey equipment against known control point(s) to verify X, Y, and Z</li> <li>Check water levels daily</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Firms demonstrate adequate experience in methods</li> <li>Compliance with USACE Hydrographic Surveying Manual (EM 1110-2-1003)</li> <li>In-water survey work will be performed in accordance accuracy standards of +/- 0.2 feet (horizontal and vertical)</li> </ul>	<ul style="list-style-type: none"> <li>New firm to be selected if qualifications not acceptable</li> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> </ul>	Technical submittal to the Construction Manager
<b>B. Construction</b>						
A. Permits <sup>1</sup>	<ul style="list-style-type: none"> <li>Permit requirements to be determined</li> </ul>	<ul style="list-style-type: none"> <li>To be determined once permit received</li> <li>Permit compliance matrix/database will be prepared inclusive of all permits</li> </ul>	To be determined once permit received	<ul style="list-style-type: none"> <li>To be determined once permit received</li> </ul>	<ul style="list-style-type: none"> <li>To be determined once permit received</li> </ul>	To be determined once permit received
<b>B. Monitoring<sup>2,3</sup></b>						
Vibration (during sheeting installation/extraction) <sup>4</sup>	<ul style="list-style-type: none"> <li>Vibration level reading using a three-component</li> </ul>	<ul style="list-style-type: none"> <li>Daily calibration in accordance with</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Readings considering manufacturer's specification</li> </ul>	<ul style="list-style-type: none"> <li>Equipment to be recalibrated or replaced if</li> </ul>	Monitoring Reports and calibration sheets submitted to

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	seismograph (or equivalent) calibrated in accordance with the manufacturer's specifications	<ul style="list-style-type: none"> <li>manufacturer's specification</li> <li>Conform to test instrument descriptions in ISO 2631 and ISO 4866 where applicable</li> </ul>			out of compliance	the Construction Manager
Noise (start of new noise source, uplands excavation, and material processing)	<ul style="list-style-type: none"> <li>Noise level readings using real-time meter calibrated in accordance with the manufacturer's specifications</li> </ul>	<ul style="list-style-type: none"> <li>Daily calibration in accordance with manufacturer's specification (see Table 3-2 for instrument reporting limits)</li> </ul>	PLW Site Resources	<ul style="list-style-type: none"> <li>Readings considering manufacturer's specification</li> </ul>	<ul style="list-style-type: none"> <li>Equipment to be recalibrated or replaced if out of compliance</li> </ul>	Monitoring Reports and calibration sheets submitted to the Construction Manager
Water (uplands excavation, sediment dredging, ecological layer placement, and prior to sheeting/curtain removal)	<ul style="list-style-type: none"> <li>Mercury and TSS analytical testing per SW-846 7470A and SW 2540 D-1997, respectively</li> <li>Data reviewed through PDR process</li> <li>Turbidity level readings using real-time meter calibrated in accordance with the manufacturer's specifications</li> </ul>	<ul style="list-style-type: none"> <li>Sampling in accordance with the NJDEP Field Sampling Procedures Manual</li> <li>Field and laboratory QA/QC samples (see Table 3-3 for requirements)</li> <li>Laboratory testing as outlined in the analytical procedure (see Table 3-2 for LOQ)</li> <li>Daily calibration in accordance with manufacturer's specification (see Table 3-2 for instrument reporting limits)</li> </ul>	PLW Site Resources	<ul style="list-style-type: none"> <li>Compliance with the NJDEP Field Sampling Procedures Manual</li> <li>Criteria as outlined in the analytical testing procedure</li> <li>Readings considering manufacturer's specification</li> </ul>	<ul style="list-style-type: none"> <li>Re-sampling</li> <li>Re-testing or modifications to laboratory procedures</li> <li>Equipment to be recalibrated or replaced if out of compliance</li> </ul>	Monitoring Reports and calibration sheets submitted to the Construction Manager
Air (uplands excavation and material processing)	<ul style="list-style-type: none"> <li>PM<sub>10</sub> analytical testing per USEPA Method 40CFR 50 (Appendix J) and Method SW846-7471A</li> <li>Data reviewed through PDR process</li> <li>Dust level readings using real-time meter calibrated in accordance with the manufacturer's specifications</li> <li>Mercury vapor readings using real-time meter calibrated in accordance with the manufacturer's specifications</li> </ul>	<ul style="list-style-type: none"> <li>Sampling in accordance with the NJDEP Field Sampling Procedures Manual</li> <li>Field and laboratory QA/QC samples (see Table 3-3 for requirements)</li> <li>Laboratory testing as outlined in the analytical procedure (see Table 3-2 for LOQ)</li> <li>Daily calibration in accordance with manufacturer's specification (see Table 3-2 for instrument reporting limits)</li> </ul>	PLW Site Resources	<ul style="list-style-type: none"> <li>Compliance with the NJDEP Field Sampling Procedures Manual</li> <li>Criteria as outlined in the analytical testing procedure</li> <li>Readings considering manufacturer's specification</li> </ul>	<ul style="list-style-type: none"> <li>Re-sampling</li> <li>Re-testing or modifications to laboratory procedures</li> <li>Equipment to be recalibrated or replaced if out of compliance</li> </ul>	Monitoring Reports and calibration sheets submitted to the Construction Manager
C. Sheet pile installation/extraction	<ul style="list-style-type: none"> <li>Qualified firm to confirm installation location, depth, and top of sheet elevation in accordance with CMI WP</li> <li>See also monitoring rows (row B under construction)</li> </ul>	<ul style="list-style-type: none"> <li>Verify firm experience with surveying methods</li> <li>Perform twice daily checks (before and after each day's work) on survey equipment against known control point(s) to verify X, Y, and Z</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Firms demonstrate adequate experience in methods</li> <li>In-water survey work will be performed in accordance accuracy standards of +/- 0.2 feet (horizontal and vertical)</li> <li>Top of sheets above minimum elevation</li> <li>Bottom of sheets deeper</li> </ul>	<ul style="list-style-type: none"> <li>New firm to be selected if qualifications not acceptable</li> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> </ul>	Technical Submittal, Construction Reports and Photographs, and Driving Records submitted to the Construction Manager

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Process	QA/QC Elements	Measurement Approach	Measurement Responsibility (see also Table 4-1)	Pass/Fail Criteria	Corrective Action	Documentation Requirements (see also Table 4-1)
				than minimum depth below mudline		
D. Uplands excavation (removal completion is elevation based)	<ul style="list-style-type: none"> <li>NJ licensed surveyor to check extent and elevations post removal at pre-determined locations to demonstrate compliance with CMI WP</li> <li>Compliance with NJ regulations on accuracy and licensure for surveyors</li> <li>Volume calculation and checks against CMI WP estimates</li> <li>See also monitoring rows (row B under construction)</li> </ul>	<ul style="list-style-type: none"> <li>Surveyor to provide electronic and signed/stamped drawing with license number</li> <li>Perform twice daily checks (before and after each day's work) on survey equipment against known control point(s) to verify X, Y, and Z</li> <li>Document volume removed, processed, and transported for disposal</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Licensed land surveyor and per NJSA 45:8 and NJAC 13:40</li> <li>On-land survey work will be performed in accordance with accepted accuracy standards but not less than +/- 0.01 feet (horizontal and vertical)</li> <li>Tolerance will average -0.2 feet vertical and +0.2 feet horizontal across the removal area</li> </ul>	<ul style="list-style-type: none"> <li>New surveyor to be selected if compliance with regulations and/or licensing not achieved</li> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> <li>Additional excavation if target elevations not achieved within required accuracy</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
E. In-situ treatment areas (TCLP lead)	<ul style="list-style-type: none"> <li>Qualified firm to define areal extent</li> <li>Post-treatment samples for lead analytical testing per Method 6010B to confirm levels</li> <li>Data reviewed through PDR process</li> </ul>	<ul style="list-style-type: none"> <li>Verify firm experience with surveying methods</li> <li>Perform twice daily checks (before and after each day's work) on survey equipment against known control point(s) to verify X, Y, and Z</li> <li>One sample collected per treatment area</li> <li>Field and laboratory QA/QC samples</li> <li>Laboratory testing as outlined in the analytical procedure</li> <li>Verify, by weight, appropriate ratio of Maectite added to rolloff container with removed upland soil</li> <li>Verify, by weight with flow meters, appropriate ratio or Maectite injected into in-situ sediments</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Firms demonstrate adequate experience in methods</li> <li>On-land survey work will be performed in accordance with accepted accuracy standards but not less than +/- 0.01 feet (horizontal and vertical)</li> <li>In-water survey work will be performed in accordance accuracy standards of +/- 0.2 feet (horizontal and vertical)</li> <li>Criteria as outlined in the analytical testing procedure to confirm that TCLP lead is below levels of Characteristic Hazardous Waste (less than 5 mg/L)</li> </ul>	<ul style="list-style-type: none"> <li>New firm to be selected if qualifications not acceptable</li> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> <li>Re-testing or modifications to laboratory procedures</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
F. Uplands backfill	<ul style="list-style-type: none"> <li>Laboratory data to demonstrate chemical levels comply with NJDEP requirements and be identified as 'clean' materials and physical characteristics comply with CMI WP and permit application specific gradation</li> <li>NJ licensed surveyor to check extent and elevations post placement at pre-determined locations to</li> </ul>	<ul style="list-style-type: none"> <li>One sample every 5,000 cy for analytical testing of each borrow material if the source is well documented and sampled – otherwise equal to 1:1,000 cy and consistent with NJDEP clean fill criteria</li> <li>Surveyor to provide electronic and signed/stamped drawing with license number</li> <li>Perform twice daily checks (before and after each day's work) on survey equipment</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Chemical and physical levels as specified for 1A above</li> <li>Licensed land surveyor and per NJSA 45:8 and NJAC 13:40</li> <li>On-land survey work will be performed in accordance with accepted accuracy standards but not less than +/- 0.01 feet (horizontal and vertical)</li> </ul>	<ul style="list-style-type: none"> <li>Identify new borrow material source if chemical or physical criteria are not achieved</li> <li>New surveyor to be selected if compliance with regulations and/or licensing not achieved</li> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager



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	<p>demonstrate pre-construction or restoration design elevations achieved</p> <ul style="list-style-type: none"> <li>Compliance with NJ regulations on accuracy and licensure for surveyors</li> <li>See also monitoring and restoration rows (rows B and J under construction, respectively)</li> </ul>	<p>against known control point(s) to verify X, Y, and Z</p>				
G. Sediment removal (ABD, Lake Area A, and Island Area)	<ul style="list-style-type: none"> <li>RTK DGPS and Dredgepack system during removal to check elevation and extent</li> <li>Qualified firm to conduct in-water survey post-dredging</li> <li>Water level gage/transducer installation for daily verification of elevation</li> <li>Qualified firm to conduct survey post-dredging in shallow water areas on 50-foot spacing using DGPS</li> <li>Volume calculation and checks against CMI WP estimates</li> <li>See also monitoring rows (row B under construction)</li> </ul>	<ul style="list-style-type: none"> <li>Establish DMUs (3-5 acres in size; Area A and Island Area will be individual DMU)</li> <li>RTK DGPS equipment calibrated in accordance with the manufacturer's specifications</li> <li>Verify firms have experience and appropriate methods for surveying efforts</li> <li>In-water bathymetric survey in areas with adequate water depths to establish a mixture of repeated bidirectional lines and lines running perpendicular to the standard line direction gridded at an approximate spacing of 50 feet (horizontal and vertical)</li> <li>Perform twice daily bar checks (before and after each day's work) to reduce speed of sound and transducer errors</li> <li>Perform twice daily checks (before and after each day's work) of survey equipment against known control point(s) to verify X, Y, and Z</li> <li>Check water levels daily</li> <li>Routine volume checks through comparison of pre- and post-dredging topographic surfaces (AutoDesk Civil 3D software to compile pre-dredge bathymetric surface and post-dredge excavation template from RTK DGPS)</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Firms demonstrate adequate experience in methods</li> <li>Compliance with USACE Hydrographic Surveying Manual (EM 1110-2-1003)</li> <li>In-water survey work will be performed in accordance accuracy standards of +/- 0.2 feet (horizontal and vertical)</li> <li>Hydraulic dredging tolerance will average -0.2 feet vertical and +0.2 feet horizontal across the DMU</li> <li>Mechanical dredging tolerance will average -0.3 feet vertical and +0.3 feet horizontal across the DMU</li> <li>Dredging complete with achievement of target elevation at 90% of surveyed locations in DMU</li> </ul>	<ul style="list-style-type: none"> <li>New firm to be selected qualifications not acceptable</li> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> <li>Additional dredging required if target elevation not achieved in each DMU per specified criteria</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
H. Ecological layer placement	<ul style="list-style-type: none"> <li>Laboratory data to demonstrate chemical levels</li> </ul>	<ul style="list-style-type: none"> <li>One sample every 5,000 cy for analytical testing of each</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Chemical and physical levels as specified for 1A</li> </ul>	<ul style="list-style-type: none"> <li>Identify new borrow material source if chemical or</li> </ul>	Technical Submittal and Construction Reports and

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**Pompton Lake Study Area, Corrective Measures Implementation Work Plan**

Process	QA/QC Elements	Measurement Approach	Measurement Responsibility (see also Table 4-1)	Pass/Fail Criteria	Corrective Action	Documentation Requirements (see also Table 4-1)
	<p>comply with NJDEP requirements and be identified as 'clean' materials and physical characteristics comply with CMI WP and permit application specific gradation</p> <ul style="list-style-type: none"> <li>Lift thickness to be confirmed through core collection and calculation based on weight of material placed</li> <li>Qualified firm to conduct in-water survey post-dredging</li> <li>Water level gage/transducer installation for daily verification of elevation</li> <li>Qualified firm to conduct survey post-dredging in shallow water areas on 50-foot spacing using DGPS for surveyors</li> <li>Volume calculation and checks against CMI WP estimates</li> <li>See also monitoring rows (row B under construction)</li> </ul>	<p>borrow material if the source is well documented and sampled – otherwise equal to 1:1,000 cy and consistent with NJDEP clean fill criteria</p> <ul style="list-style-type: none"> <li>Establish DMUs (3-5 acres in size; Area A and Island Area will be individual DMU)</li> <li>Collect 4 cores per acre to visually confirm material thickness</li> <li>Calculate average thickness based on weight of material placed</li> <li>Verify firms have experience and appropriate methods for surveying efforts</li> <li>In-water bathymetric survey in areas with adequate water depths to establish a mixture of repeated bidirectional lines and lines running perpendicular to the standard line direction gridded at an approximate spacing of 50 feet (horizontal and vertical)</li> <li>Perform twice daily bar checks (before and after each day's work) to reduce speed of sound and transducer errors</li> <li>Perform twice daily checks (before and after each day's work) of survey equipment against known control point(s) to verify X, Y, and Z</li> <li>Check water levels daily</li> <li>Routine volume checks through comparison of pre- and post-dredging topographic surfaces</li> </ul>		<p>above</p> <ul style="list-style-type: none"> <li>In-water survey work will be performed in accordance accuracy standards of +/- 0.2 feet (horizontal and vertical)</li> <li>Placement completion based on target thickness with an allowable tolerance of -0 to +0.25 feet, based on data from cores and bathymetric survey</li> <li>Firms demonstrate adequate experience in methods</li> <li>Compliance with USACE Hydrographic Surveying Manual (EM 1110-2-1003)</li> <li>Placement complete with achievement of target elevation at 90% of surveyed locations in DMU</li> <li>No core can be less than 4 inches in total thickness</li> <li>Cap area is complete when core thickness average is 6.0 inches, no core is less than 4 inches, and minimum required tonnage for each one acre area has been documented</li> <li>If average of cores is less than 6 inches, core(s) with the least thickness will be re capped</li> <li>Once area(s) that require rework are complete, they will be cored and thickness of new core(s) will be substituted</li> </ul>	<p>physical criteria are not achieved</p> <ul style="list-style-type: none"> <li>New firm to be selected if qualifications not acceptable</li> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> <li>Additional placement required if target elevation not achieved in each DMU per specified criteria</li> <li>Assess placement methods and volume calculations</li> </ul>	<p>Photographs submitted to the Construction Manager</p>
<p>I. Material handling, transport, and disposal</p>	<ul style="list-style-type: none"> <li>Requirements set forth in the Waste Management Plan for disposal and recycling materials (Attachment B)</li> <li>Plan outlines general site waste generation information, classification justification, and storage and disposal procedures</li> </ul>	<ul style="list-style-type: none"> <li>See Attachment B</li> </ul>	<p>Remedial Action Contractor</p>	<ul style="list-style-type: none"> <li>See Attachment B</li> </ul>	<ul style="list-style-type: none"> <li>See Attachment B</li> </ul>	<p>Disposal Documentation submitted to the Construction Manager and Disposal Facility as needed</p>

**Table 3-1: Construction Process and QA/QC Elements**  
**Appendix E: Construction Quality Assurance Plan**  
**Pompton Lake Study Area, Corrective Measures Implementation Work Plan**

Process	QA/QC Elements	Measurement Approach	Measurement Responsibility (see also Table 4-1)	Pass/Fail Criteria	Corrective Action	Documentation Requirements (see also Table 4-1)
J. Restoration						
Restoration excavation (additional removal completion is elevation based) – may be performed concurrently with Uplands excavation	<ul style="list-style-type: none"> <li>NJ licensed surveyor to check extent and elevations post removal at pre-determined locations to demonstrate compliance with design drawings</li> <li>Compliance with NJ regulations on accuracy and licensure for surveyors</li> </ul>	<ul style="list-style-type: none"> <li>Surveyor to provide electronic and signed/stamped drawing with license number</li> <li>Perform twice daily checks (before and after each day's work) on survey equipment against known control point(s) to verify X, Y, and Z</li> <li>Document volume removed, processed, and transported for disposal</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Licensed land surveyor and per NJSA 45:8 and NJAC 13:40</li> <li>On-land survey work will be performed in accordance with accepted accuracy standards but not less than of +/- 0.01 feet (horizontal and vertical)</li> <li>Tolerance will not exceed +/- 0.1 feet horizontal / vertical</li> </ul>	<ul style="list-style-type: none"> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> <li>Additional excavation if target elevations not achieved within required accuracy</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
Restoration Earthwork	<ul style="list-style-type: none"> <li>Laboratory data to demonstrate chemical levels comply with NJDEP requirements to be identified as 'clean fill' materials and physical characteristics comply with CMI WP, design drawings, and project specific gradation</li> </ul>	<ul style="list-style-type: none"> <li>In accordance with NJDEP's April 2015 Fill Material Guidance for SRP Sites, Version 3.0</li> <li>One sample of each fill material type (standard fill, structural, topsoil) consistent with NJ Clean Fill requirements</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Chemical and physical levels as specified for 1B above</li> </ul>	<ul style="list-style-type: none"> <li>Identify replacement sources, as needed.</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
	<ul style="list-style-type: none"> <li>Laboratory analysis of topsoil for fertilizer recommendations and grain size distribution</li> <li>Analytical procedures are to be consistent with: <i>Recommended Soil Testing Procedures for the Northeastern United States</i> Northeastern Regional Publication No. 493, 3rd Edition; Agricultural Experiment Stations of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and West Virginia; Prepared by: The Northeast Coordinating Committee for Soil Testing (NEC-1012); Revised July 1, 2011</li> </ul>	<ul style="list-style-type: none"> <li>In accordance with NJDEP's April 2015 Fill Material Guidance for SRP Sites, Version 3.0</li> <li>Agronomy sample of topsoil sufficient to document fill characteristics (chemical/physical); minimum of one per source and/or 5,000 cy if the source is well documented and sampled – otherwise equal to 1:1,000 cy and consistent with NJDEP clean fill criteria</li> <li>Grain size distribution sample of fills; minimum one per source and/or 5,000 cy</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Evaluation of Contractor fertilizer recommendations and material grainsize for consistency with standard nutrient level ranges for each plant community; consistency with project documents and drawings for material grainsize</li> </ul>	<ul style="list-style-type: none"> <li>Modify fertilizer recommendations, if needed</li> <li>Require gradation change, if necessary</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager

**Table 3-1: Construction Process and QA/QC Elements**  
**Appendix E: Construction Quality Assurance Plan**  
**Pompton Lake Study Area, Corrective Measures Implementation Work Plan**

Process	QA/QC Elements	Measurement Approach	Measurement Responsibility (see also Table 4-1)	Pass/Fail Criteria	Corrective Action	Documentation Requirements (see also Table 4-1)
	<ul style="list-style-type: none"> <li>Lift thickness and restoration subgrade elevations to be confirmed through evaluation of direct survey collected by land surveyor</li> </ul>	<ul style="list-style-type: none"> <li>Lift thickness measured in field and documented in daily log</li> <li>Subgrade elevation established consistent with above element - Restoration excavation</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>General thickness consistency with project design documentation and drawings</li> <li>See survey criteria under Restoration excavation, above</li> </ul>	<ul style="list-style-type: none"> <li>Require change to fill process, if necessary</li> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> <li>Revise fill as needed to achieve design subgrade elevation</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
	<ul style="list-style-type: none"> <li>Subgrade decompaction,</li> </ul>	<ul style="list-style-type: none"> <li>Field estimate that &gt;95% of restoration area has been decompacted in accordance with design documents/drawings</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Consistency with design documents and drawings</li> </ul>	<ul style="list-style-type: none"> <li>Additional passes of equipment necessary to achieve desired decompaction</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
	<ul style="list-style-type: none"> <li>Final restoration grade/elevation - NJ licensed surveyor to check extent and elevations to demonstrate compliance design.</li> </ul>	<ul style="list-style-type: none"> <li>Surveyor to provide electronic and signed/stamped drawing with license number</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Licensed land surveyor and per NJSA 45:8 and NJAC 13:40</li> <li>On-land survey work will be performed in accordance with accepted accuracy standards but not less than +/- 0.01 feet (horizontal and vertical)</li> <li>Tolerance will not exceed - 0.1, 0.0+ feet vertical, +/-0.1 feet horizontal</li> </ul>	<ul style="list-style-type: none"> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> <li>Additional earthwork if target elevations not achieved within required accuracy</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
	<ul style="list-style-type: none"> <li>Microtopography of final restoration grade to be field verified.</li> </ul>	<ul style="list-style-type: none"> <li>Field estimate that &gt;95% of restoration area has been tilled, disked, or ripped in accordance with design documents/drawings</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Consistency with design documents and drawings</li> </ul>	<ul style="list-style-type: none"> <li>Additional passes of equipment necessary to achieve desired uneven final topography</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
Restoration Planting	<ul style="list-style-type: none"> <li>Pre-delivery manufacturer's specification and data for pending plant materials</li> </ul>	<ul style="list-style-type: none"> <li>Source seed and plant certifications, species, size, seed mixture, purity, germination percentage, weed seed content</li> <li>Materials Database</li> <li>Vendor provided data sheets</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Compliance with CMI WP, project documents and design drawings</li> </ul>	<ul style="list-style-type: none"> <li>Replace materials, as necessary.</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
	<ul style="list-style-type: none"> <li>Plant/Seed Quality/Quantity to be field verified and documented in materials database</li> </ul>	<ul style="list-style-type: none"> <li>Field Inspection upon delivery</li> <li>Materials database update</li> <li>Observation of handling and storage</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Compliance with CMI WP, project documents, and design drawings</li> </ul>	<ul style="list-style-type: none"> <li>Reject and replace materials, as necessary</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
	<ul style="list-style-type: none"> <li>Plant Installation and management via field inspection/oversight</li> </ul>	<ul style="list-style-type: none"> <li>Field Inspection of material handling, placement, protection, watering.</li> <li>Documentation and communication of daily installation quantities, material use/rejection, and maintenance / protection measures in construction log</li> </ul>	PLW Site Resources and Technical Team	<ul style="list-style-type: none"> <li>Compliance with CMI WP, project documents, and design drawings</li> </ul>	<ul style="list-style-type: none"> <li>Rejection and replacement of damaged materials.</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager

**Table 3-1: Construction Process and QA/QC Elements**  
**Appendix E: Construction Quality Assurance Plan**  
**Pompton Lake Study Area, Corrective Measures Implementation Work Plan**

Process	QA/QC Elements	Measurement Approach	Measurement Responsibility (see also Table 4-1)	Pass/Fail Criteria	Corrective Action	Documentation Requirements (see also Table 4-1)
	<ul style="list-style-type: none"> <li>Plant Protection – Fencing – material review and installation inspection</li> </ul>	<ul style="list-style-type: none"> <li>Field inspection of material and installation / repair / removal</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Compliance with CMI WP, project documents, and design drawings</li> </ul>	<ul style="list-style-type: none"> <li>Reject and replacement of inferior material, replacement of poorly installed or damaged materials</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
	<ul style="list-style-type: none"> <li>Plant replacement warranty</li> </ul>	<ul style="list-style-type: none"> <li>Bi-annual inspections, inventory, and reporting</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>85% survival required within 18 months from installation.</li> </ul>	<ul style="list-style-type: none"> <li>Remedial Action Contractor replacement planting if survival criteria not achieved.</li> <li>Replacement with in-kind material within first planting season following non-conformance determination.</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager
Restoration – Private Property Features, if necessary, and Public Utilities/Features	<ul style="list-style-type: none"> <li>Review of material submittals</li> <li>Inspection of material installation</li> <li>Final grade/elevation - NJ licensed surveyor to check extent and elevations to demonstrate compliance with design</li> <li>Compliance with NJ regulations on accuracy and licensure for surveyors</li> <li>Restoration warranty</li> </ul>	<ul style="list-style-type: none"> <li>In-kind or superior materials as compared to pre-construction inventory/survey</li> <li>Borough/property owner written concurrence on substitutions</li> <li>Field installation inspection</li> <li>Surveyor to provide electronic and signed/stamped drawing with license number</li> <li>Perform twice daily checks (before and after each day's work) on survey equipment against known control point(s) to verify X, Y, and Z</li> <li>Post-construction inspection, inventory, and reporting</li> </ul>	Remedial Action Contractor	<ul style="list-style-type: none"> <li>Licensed land surveyor and per NJSA 45:8 and NJAC 13:40</li> <li>On-land survey work will be performed in accordance with accepted accuracy standards but not less than +/- 0.01 feet (horizontal and vertical)</li> <li>Tolerance will not exceed +/- 0.1 feet horizontal / vertical</li> <li>Constructed materials and features required to be in accepted design condition and working order 12 months following installation</li> </ul>	<ul style="list-style-type: none"> <li>Survey to be re-performed by surveyor if accuracy standard not achieved</li> <li>Adjustment to material installation if target elevations/design standards, working conditions not achieved within required accuracy or warranty criteria.</li> <li>Replacement of materials, if necessary, within first construction season following warranty period</li> </ul>	Technical Submittal and Construction Reports and Photographs submitted to the Construction Manager

**Table 3-1: Construction Process and QA/QC Elements**  
**Appendix E: Construction Quality Assurance Plan**  
**Pompton Lake Study Area, Corrective Measures Implementation Work Plan**

Notes:

1. Permit applications are in progress. Once received, it is anticipated that these permits will have requirements to demonstrate compliance along with applicable QA/QC elements. These elements will be determined once the permit applications are received. The permit applications include Freshwater Wetlands General Permit 4, Flood Hazard Area Permit with Hardship Waiver, NJDEP Division of Air Quality approval for a Minor Facility - Preconstruction Permit, NJPDES (N.J.A.C. 7:14A) General Permit Number NJ0155438 (BGR) permit and Treatment Works Approval, NJDEP Division of Fish and Wildlife Scientific Collection Permit, Soil Erosion and Sediment Control Plan, NJPDES General Permit No. NJG0201332 for stormwater discharge during construction activities, coordination with New Jersey State Historic Preservation Office regarding potential impacts to cultural resources, coordination with New Jersey Natural Heritage Program and United States Fish and Wildlife Service regarding potential presence of state-listed and federally-listed threatened and/or endangered species, Soil Mining Ordinance, and Borough of Pompton Lakes Shade Tree Commission approval for impacts to certain shade trees.
2. Monitoring will be performed in accordance with project-specific SOPs to ensure methodologies are consistent with this CQAP and the CMI Work Plan. Project-specific SOPs are anticipated to include water column monitoring and sampling, air monitoring and sampling, noise monitoring, and water discharge monitoring and sampling. Such SOPs will be provided in a forthcoming Addendum to this CQAP, and will be developed following EPA approval of the CMI WP. An initial outline for the monitoring SOPs is provided in Attachment A.
3. The Corrective Measures Implementation Work Plan provides additional information on corrective action levels and potential corrective actions associated with the construction-related processes.
4. Based on the pre-construction survey and evaluations, other monitoring procedures may be required (i.e., crack gauges, survey of structures to document no post-settlement, etc.).

Acronyms/Abbreviations:

CMI WP = Corrective Measurements Implementation Work Plan  
DGPS = Differential Global Positioning System  
DMU = Dredge Management Unit  
LOQ = Limits of Quantification  
PDR = Project Data Review  
QA/QC = Quality Assurance/Quality Control  
NJ = New Jersey

NJDEP = New Jersey Department of Environmental Protection  
NJRDCSRS = New Jersey Residential Direct Contact Soil Remediation Standards  
NJSA = New Jersey Statutes Annotated  
NJAC = New Jersey Administrative Code  
RTK DGPS = Real-time Kinematic Differential Global Positioning System  
SOP = standard operating procedure  
USACE = United States Army Corps of Engineers

**Table 3-2: Monitoring Program Analytical and Instrument Reporting Limits  
Appendix E: Construction Quality Assurance Plan  
Pompton Lake Study Area, Corrective Measures Implementation Work Plan**

<b>Analysis/Parameter</b>	<b>Analytical Method Number</b>	<b>Limit of Quantification (LOQ)</b>	<b>Measurement Range</b>
<b>Water</b>			
Turbidity	---	---	0-1,000 NTUs, 0.1 NTU resolution
TSS	SW 2540 D-1997	3.0 mg/l	---
Metals Prep	3010	--	---
Dissolved Mercury	SW-846 7470A	0.2 ug/l	---
<b>Air</b>			
Particulate (Dust; PM10)	---	---	1-400,000 ug/m <sup>3</sup> , 0.1 ug/m <sup>3</sup> resolution
Mercury Vapor	---	---	0.05-500 ug/m <sup>3</sup> , 0.01 ug/m <sup>3</sup> resolution
Mercury in Air	NIOSH Method 6009	0.3 ug/m <sup>3</sup>	---
Noise	---	---	20-120 dBA, 0.1 dBA resolution
Vibration	---	---	2-250 Hz

Acronyms/Abbreviations:

- = not applicable
- dBA = A-weighted decibels
- mg/l = milligrams per liter
- NTU = Nephelometric Turbidity Units
- ug/l = micrograms per liter
- ug = micrograms
- ug/m<sup>3</sup> - micrograms per cubic meter

**Table 3-3: Field and Laboratory QA/QC Checks**  
**Appendix E: Construction Quality Assurance Plan**  
**Pompton Lake Study Area, Corrective Measures Implementation Work Plan**

QA/QC Sample	Frequency
Field	
Duplicate	1 per 20 samples minimum
Equipment and Field Blank	1 per 50 samples as needed
Temperature Blank	1 per shipment container
Laboratory	
Matrix spike/matrix spike duplicate (MS/MSD)	1 per 20 samples minimum

Notes:

1. All samples will be submitted to a New Jersey certified laboratory for analytical testing. QA/QC sampling and procedures will be performed consistent with past sampling events (Parson, June 2010), and will be collected in accordance with the QA/QC methods described in the 2005 NJDEP Field Sampling Procedures Manual.
2. QA/QC will be performed on field samples to assess the precision and representativeness of samples collected.
3. The PDR process outlined in Section 4.3.4 will be performed to determine data usability.



**Table 4-1: Documentation Listing**  
**Appendix E: Construction Quality Assurance Plan**  
**Pompton Lake Study Area, Corrective Measures Implementation Work Plan**

Process	Documentation Requirements	Responsible Party
<b>Pre-Construction</b>		
Pre-mobilization	<ul style="list-style-type: none"> <li>• Approved CMI WP (including Operations Plan and Contingency Plan)</li> <li>• Construction schedule</li> <li>• Verification that required permits/approvals obtained and regulatory notifications completed</li> <li>• Structural and utility inspections report</li> <li>• Property access agreements</li> <li>• Imported materials testing results</li> <li>• Waste Management Plan (see Attachment B)</li> <li>• Technical Submittals</li> <li>• Submittal Register</li> <li>• Materials database (to list all materials onsite)</li> </ul>	<ul style="list-style-type: none"> <li>• Technical Team</li> <li>• Remedial Action Contractor</li> <li>• Construction Manager</li> <li>• Remedial Action Contractor</li> <li>• PLW Site Resources</li> <li>• Remedial Action Contractor</li> <li>• Technical Team</li> <li>• Remedial Action Contractor</li> <li>• Construction Manager</li> <li>• Construction Manager</li> </ul>
Health and Safety	<ul style="list-style-type: none"> <li>• Contractor HASP including hazard communication and emergency response plan</li> <li>• Training certification</li> <li>• Medical monitoring certification</li> <li>• H&amp;S audit forms</li> </ul>	<ul style="list-style-type: none"> <li>• Remedial Action Contractor for all health and safety documentation</li> </ul>
<b>Construction</b>		
All activities	<ul style="list-style-type: none"> <li>• Weekly agenda/progress report (maintained electronically for information)</li> <li>• Construction reports and photographs</li> <li>• Survey data</li> <li>• Monitoring data reports, inspection forms, and calibration logs</li> <li>• Technical Submittals</li> <li>• Updated submittal register</li> <li>• Updated materials database</li> <li>• Updated construction schedule (as needed)</li> <li>• Safety audits</li> <li>• Problems/deficiency identification and corrective action form (as needed)</li> <li>• Field changes form (as needed)</li> <li>• Permitting compliance reports (as needed; see note 2)</li> </ul>	<ul style="list-style-type: none"> <li>• Construction Manager</li> <li>• Construction Manager</li> <li>• Remedial Action Contractor</li> <li>• PLW Site Resources</li> <li>• Remedial Action Contractor</li> <li>• Construction Manager</li> <li>• Construction Manager</li> <li>• Construction Manager</li> <li>• Remedial Action Contractor</li> <li>• PLW Site Resources</li> <li>• Construction Manager</li> <li>• Construction Manager and Remedial Action Contractor</li> </ul>
Sheet pile installation/extraction	<ul style="list-style-type: none"> <li>• Driving records</li> </ul>	<ul style="list-style-type: none"> <li>• Remedial Action Contractor</li> </ul>

**Table 4-1: Documentation Listing**  
**Appendix E: Construction Quality Assurance Plan**  
**Pompton Lake Study Area, Corrective Measures Implementation Work Plan**

<b>Process</b>	<b>Documentation Requirements</b>	<b>Responsible Party</b>
Uplands excavation	<ul style="list-style-type: none"> <li>Disposal documentation (Certificate of Disposal, Bills of Lading for each truck, and name/licensed hauler)</li> </ul>	<ul style="list-style-type: none"> <li>Remedial Action Contractor</li> </ul>
Uplands backfill	<ul style="list-style-type: none"> <li>Imported materials testing results</li> </ul>	<ul style="list-style-type: none"> <li>Remedial Action Contractor</li> </ul>
Sediment dredging	<ul style="list-style-type: none"> <li>Debris survey results</li> <li>Disposal documentation (Certificate of Disposal, Bills of Lading for each truck, and name/licensed hauler)</li> </ul>	<ul style="list-style-type: none"> <li>Remedial Action Contractor</li> <li>Remedial Action Contractor</li> </ul>
Ecological-layer placement	<ul style="list-style-type: none"> <li>Imported materials testing results</li> </ul>	<ul style="list-style-type: none"> <li>Remedial Action Contractor</li> </ul>
Restoration	<ul style="list-style-type: none"> <li>Material submittals (plant, seed, materials, etc.)</li> <li>Imported materials testing results</li> </ul>	<ul style="list-style-type: none"> <li>Remedial Action Contractor</li> <li>Remedial Action Contractor</li> </ul>
<b>Post-Construction</b>		
Post-uplands excavation/backfill, sediment removal/ecological layer placement, and restoration	<ul style="list-style-type: none"> <li>Record drawings</li> </ul>	<ul style="list-style-type: none"> <li>Remedial Action Contractor</li> </ul>
All activities	<ul style="list-style-type: none"> <li>Construction Completion Report</li> <li>Permitting Compliance Report</li> </ul>	<ul style="list-style-type: none"> <li>Construction Manager and Technical Team</li> <li>Construction Manager</li> </ul>

**Notes:**

1. Section 4 includes additional details on the information to be included in the reports.
2. Permit applications are in progress. Once received, it is anticipated that these permits will have specific reporting requirements to demonstrate compliance. These requirements will be determined once the permit applications are received.

## **Attachments**

**Attachment A**

Initial List of Standard Operating  
Procedures for the Monitoring  
Program

## **1. Remote Water Quality Monitoring Procedures**

- Equipment/buoy system set-up
- Boat operations
- Buoy anchoring system
- Initial calibration
- Telemetry system checks
- Remote alert system check
- Early Warning Level/Action Level criteria
- Contractor notification procedures
- Periodic checks & calibration
- Annual manufacturer service
- Meter/system troubleshooting

## **2. Water Quality Monitoring Sample Collection Procedures**

- Equipment set-up – sample collection procedures
- Boat operations
- Sample preservation
- Chain of Custody procedures
- Sample filtration
- Laboratory coordination for analysis (total suspended solids and mercury)

## **3. Process/Upland Area - Water Discharge Monitoring**

- Equipment set-up – sample collection procedures
- Flow meter measurements
- Sample frequency and sample parameters in accordance with the discharge permit
- Sample preservation
- Sample filtration
- Laboratory coordination for analysis

## **4. Remote Particulate (Dust) Monitoring Procedures**

- Equipment/station set-up – monitoring procedures
- Initial calibration
- Telemetry system checks
- Remote alert system check
- Early Warning Level/Action Level criteria
- Contractor notification procedures
- Periodic checks/calibration
- Annual manufacturer service
- Meter troubleshooting

**5. Mercury Verification Sampling Procedures (High Volume Samplers)**

- Equipment set-up – sample collection procedures
- Sample station location coordination (downwind & school locations)
- Initial calibration
- Laboratory coordination for analysis of Hg on filters
- Equipment troubleshooting

**6. Noise Monitoring Procedures**

- Equipment set-up – monitoring procedures
- Initial calibration
- Contractor notification procedures
- Periodic checks/calibration
- Annual manufacturer service
- Equipment troubleshooting

**7. Vibration Monitoring Procedures**

- Pre-work activities inspections (condition documentation)
- Monitoring location selection
- Monitoring equipment set-up – monitoring procedures
- Initial calibration
- Data downloading procedures / frequency
- Periodic checks/calibration
- Annual manufacturer service
- Equipment troubleshooting
- Post-work activities inspections (condition documentation)

**8. Odor Monitoring Procedures**

- Observation documentation

**Attachment B**

Project-Specific Waste  
Management Plan



Environment

Submitted on behalf of  
Chemours Company FC, LLC

Submitted by  
AECOM  
Sabre Building  
Suite 300  
4051 Ogletown Road  
Newark, DE 19713

# Project-Specific Waste Management Plan

Chemours Pompton Lakes Acid Brook Delta Area  
Corrective Measures Implementation

Chemours Pompton Lakes  
Pompton Lakes, New Jersey

AECOM Project #: 60395449.5067883

Chemours Project #: 507883

Parsons Project #: 446256

April 2016



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## **1.0 Purpose and Site Information**

### **1.1 Purpose**

The very nature of environmental remediation lends itself to the generation of solid waste, and investigation derived waste. This plan will outline general site waste generation information, classification justification, and storage and disposal procedures for project generated waste. This plan will be used by field teams associated with the Chemours Corporate Remediation Group (CRG).

The actual excavation/dredging operation of the Chemours Pompton Lakes Acid Brook Delta Area Corrective Measure Implementation will not inherently generate hazardous waste. However, this waste management plan is written to cover any anticipated generation of site waste for the duration of the project.

## 2.0 Scope of Work

This project-specific waste management plan (PSWMP) will document the waste related activities associated with the Chemours Acid Brook Delta final design of corrective measure implementation of the Chemours Pompton Lakes site located in Pompton Lakes, NJ.

The specific scope of activities to be conducted by the contractor designated by Chemours is detailed in the Pompton Lakes Revised Acid Brook Delta Corrective Measure Implementation Work Plan. The primary scope of work objectives include:

- Upland excavation, and delta dredging operation
- In-situ stabilization of lead-containing locations
- Final restoration of these implementation areas.

Specific handling and field logistics of the soils/sediment waste as part of this project are covered in the Pompton Lakes Acid Brook Delta area Revised Corrective Measures Implementation work plan, and plan specification addenda. Coordination with approved landfills is the responsibility of the remediation contractor. However, any waste profiling submitted on behalf of Chemours to the approved landfill by the remediation contractor will be first reviewed by the Chemours Waste Management resource. The Chemours Waste Management resource will issue a letter of approval of the waste characterization form to the remediation contractor prior to disposal.

Any additional waste characterization performed via analysis (e.g. TCLP) by any entity other than Chemours Waste Management resources/labs must be cleared in advance so that Chemours may verify that those entities/facilities are RCRA-trained and certified to perform waste characterization.

**Project Team Responsibilities**

<b>Task</b>	<b>Organization</b>	<b>Individual</b>
Conduct waste coordinator duties.	AECOM	Tim Pezzino
Coordinate sampling activities.	AECOM/ Remediation Contractor	Tim Pezzino/Construction Field Project Manager
Oversee waste management activities.	AECOM WM Network	Tim Pezzino
Label containers.	Remediation Contractor	Construction Field Project Manager
Move waste into the waste accumulation area.	Remediation Contractor	Construction Field Project Manager
Complete/submit Waste Management Field Documentation Form to the Waste Management Network.	Chemours designated oversight contractor	Field Team Lead
Provide/coordinate characterization testing bottles and final analyses reports.	AECOM	Candia Carle/Wanda Davis
Review analytical data to determine RCRA classification.	AECOM WM Network	Tim Pezzino
Inspect RCRA Hazardous and HAZARDOUS WASTE - PENDING ANALYSIS wastes weekly.	Not Applicable	n/a
Label waste containers for shipment.	Chemours designated oversight contractor	Field Team with assistance from waste vendor
Prepare shipping papers (i.e., manifests and LDR forms).	AECOM WM Network	Tim Pezzino or Chemours CRG waste management network designate

**Project Team Responsibilities**

<b>Task</b>	<b>Organization</b>	<b>Individual</b>
Notify project team [Project Director (PD) and Project Manager (PM)] of waste disposal completion of activities.	AECOM WM Network/Remediation Contractor	Tim Pezzino/Construction Field Project Manager
Prepare/submit related reporting.	AECOM WM Network	Tim Pezzino to Pompton Lakes plant Environmental Coordinator
Archive and maintain all required documents.	Chemours	Pompton Lakes Environmental Coordinator

## **3.0 Generator Waste Classification**

### **3.1 Potential Federal and State Waste Codes**

Identified waste streams from this project have been reviewed to determine if they meet federal and/or state listed waste definitions. Based on currently identified waste streams, there are no waste streams that meet the definition of a federal or state listed waste. Identified waste streams from this project have been reviewed and compared to previous data collected at adjacent locations to determine if they exhibit a RCRA defined characteristic. Based on currently identified waste streams, there are no waste streams that need to be sampled to determine the applicability of a RCRA hazardous waste characteristic.

However, some waste streams will be sampled to update and prepare profiles for off-site disposal as RCRA non-regulated industrial waste. This new data set will be used to gain disposal facility acceptance of these and similar waste streams over the next 3 years.

## 4.0 Waste Management Procedures

### 4.1 Project Waste

The following waste streams and correlating storage, classification, and labeling requirements are identified below.

<b>Anticipated Waste Streams</b>					
<b>Waste Stream</b>	<b>Proposed RCRA Classification</b>	<b>Anticipated Waste Characterization Testing</b>	<b>Container Requirements and Estimated Volume</b>	<b>Labeling Requirements</b>	<b>Anticipated Disposal Method</b>
<b>Upland soils excavation</b>					
Excess Soil (if additional sampling is required from upland delta area)	Non-hazardous/ RCRA non-regulated based on past soil data	Composite sample for TCLP of RCRA toxicity characteristic appropriate Metals	55-gallon open head drums or if Remediation Contractor has bulk containers on-site, these may be used.	Green Non-Hazardous Label	Disposal to Chemours audited/approved landfill
Soils from upland excavation	Non-hazardous/ RCRA non-regulated based on past soil data	None, predetermined upland excavation soils are Non-Hazardous, Non-Regulated	Bulk containers as specified by Remediation Contractor and approved by Chemours	Green Non-Hazardous Label	Disposal to Chemours audited/approved landfill or Chemours audited/approved vendor capable of final solidification & disposal
Equipment Decontamination Water and excavation solidification water	Non-hazardous/ RCRA non-regulated based on past soil data	None, via use of RCRA contained in rule	Place in 55-gallon drums DOT-approved for liquid service or if in large bulk form, confirm written permission from NJDEP to return to the enclosed dredging area.	Green Non-Hazardous Label	RCRA non-hazardous will be disposed of at Chemours-approved/audited TSDF or if in large bulk form, confirm written permission from NJDEP to return to the enclosed dredging area.
PPE, trash & debris	Non-regulated based on RCRA contained in rule	None	Place in plastic trash bags	None	On-site industrial waste dumpster
<b>Acid Brook Delta area dredging operation</b>					
Sediment from Acid Brook Delta excavation	Non-hazardous/ RCRA non-regulated based on past soil data	Sediment will be tested in-situ after stabilization	Bulk containers as specified by Remediation Contractor and approved by Chemours	Green Non-Hazardous Label	Disposal to Chemours audited/approved landfill or Chemours audited/approved vendor capable of final solidification & disposal

**Anticipated Waste Streams**

<b>Waste Stream</b>	<b>Proposed RCRA Classification</b>	<b>Anticipated Waste Characterization Testing</b>	<b>Container Requirements and Estimated Volume</b>	<b>Labeling Requirements</b>	<b>Anticipated Disposal Method</b>
Equipment Decontamination Water and excavation solidification water	Non-hazardous/ RCRA non-regulated based on past soil data	None, via use of RCRA contained in rule	Place in 55-gallon drums DOT-approved for liquid service or if in large bulk form, confirm written permission from NJDEP to return to the enclosed dredging area.	Green Non-Hazardous Label	RCRA non-hazardous will be disposed of at Chemours-approved/audited TSDf or if in large bulk form, confirm written permission from NJDEP to return to the enclosed dredging area.
PPE, trash & debris	Non-regulated based on RCRA contained in rule	None	Place in plastic trash bags	None	On-site industrial waste dumpster
Used / Empty Calibration Gas Canisters	Non-Hazardous	None	Place into industrial or other waste dumpster	Label "Empty" with permanent marker	To an industrial or other waste dumpsters with prior approval from CRG Waste Network resource
Used Oil and Hydraulic Fluids	Non-Hazardous	None	Place in DOT-approved 55-gallon steel drum until full	"Used Oil" or "Hydraulic Fluids" with date placed in container.	To Chemours-authorized recycling facility

**4.2 Special Wastes**

**4.2.1 Large Solid Waste Debris encountered during excavation**

During all excavation activities in the upland area and delta operation, large solid debris may be encountered and retrieved. This large debris (non-landfillable material) may include metal objects, tires, boulders, and large otherwise unanticipated objects. These must be segregated from all other wastes and evaluated by Chemours as encountered.

**4.2.2 Aerosol Cans/Calibration Gas Canisters**

Aerosol products such as equipment lubricants, marking paint, starter fluid, and disposable calibration gas canisters contain compressed gases. These containers, along with their contents, are potential RCRA-regulated hazardous wastes for disposal due to the following:

- Residual compressed gases within the container (e.g., empty spray cans can contain residual pressure)
- The nature of the product in the container (e.g., flammable solvents, flammable calibration gas)
- The nature of the aerosol propellant (e.g., propanol)

Because of the difficulty in managing aerosol cans, the AECOM project team should attempt to identify alternatives to using aerosol cans. Potential substitutions are listed below.

Common Aerosol	Alternative
WD-40	Liquid Wrench
Spray paint	Stakes and flags
Insect repellent	Pump spray bottle or lotion

**Site contractors who bring aerosol containers or calibration canisters on-site for field activities are responsible for their disposal. Spent cans or canisters must be taken with them when leaving the site.**

For simplicity, if substitutes for aerosol cans cannot be used by site personnel, the site should manage this waste stream as RCRA characteristically hazardous waste (e.g., D001, D003). The following outlines the procedures.

**Accumulation and Disposal of Waste Aerosol Cans**

Aerosol cans will be accumulated on-site in a Satellite Accumulation Area (SAA) until a less than 55-gallon size container is full (or the 55-gallon satellite limit has been exceeded where 55-gallon containers are used). The following are important SAA considerations and requirements:

- Clearly mark SAA (i.e., signage, painted floor area, etc.).
- Label container with the words “Hazardous Waste – Aerosol Cans” at the **point the first aerosol can is added**.
- Upon filling, date the container with the “date filled” and move to the permitted accumulation area within 3 days of filling.
- Maintain control of the container throughout the day by site personnel.
- Keep containers closed (i.e., lid on the drum) unless adding or removing aerosol cans.
- Do not co-mingle incompatible materials in the container; remove nozzles where possible to prevent spraying in the container due to the weight and arrangement of cans. Place in plastic bag if needed.
- Do not leave cans exposed to weather, causing damage to labels and complicating identification.
- Use only new or recertified DOT containers. The use of plastic bags or other non-DOT containers is not acceptable.
- Add absorbent if necessary to absorb any liquids leaking from cans in poor condition or punctured.
- **Do not add gas cylinders (e.g., propane bottles, calibration gas) to aerosol collection drums.**

Once the 55-gallon satellite accumulation limit has been exceeded, the RCRA accumulation start date, requirements begin, meaning the drum or container must be dated with the date filling was completed and must be moved to a permitted accumulation area within 3 days. Upon placement onto the permitted accumulation storage pad, proper accumulation area inspection procedures shall be followed. **For Conditionally Exempt Small Quantity Generators, wastes that are characterized as RCRA hazardous wastes cannot exceed an accumulation period of 365 days from**



**the date of generation.** Disposal arrangements will be completed by contacting the CRG Waste Disposal Consultant.

### **Disposal of Calibration Gas Canisters**

The following disposal method shall be used to dispose of used calibration gas canisters:

- Completely empty the calibration gas canister using **the regulator provided**. No pressure should record on the register gauge, and no hiss or escaping gas should be heard.
- Write the word “empty” on the outside of the canister with a permanent marker.
- When possible, dispose of any empty canister in a Chemours-controlled waste receptacle or scrap metal container. If this is not possible, discard the canister in an industrial or other waste dumpster.

**DO NOT SHIP PARTIALLY USED OR EMPTY CALIBRATION CANISTERS BACK TO THE VENDOR.**

### **4.2.3 Used Oil/Hydraulic Fluids**

Used oil and hydraulic fluids must be collected and deposited in approved containers. The containers must be a 55-gallon steel drum with a standard bung opening. If necessary, approved containers for used oil and hydraulic fluids will be stored in the satellite waste accumulation area and labeled “USED OIL” and “HYDRAULIC FLUIDS,” respectively, including the date containerized. A dip stick or other level indicating device shall be available to ensure that the containers do not overflow.

Once filled, the containers will be moved to a permitted waste accumulation area for disposal. This area will be located in the Uplands area on the side opposite the Lake, near the Haul Road shown on Drawing 2 of the Operations Plan (Appendix A of the CMI WP). The containers will be placed in secondary containment bins. Disposal arrangements will be completed by contacting a CRG Waste Disposal Consultant. Only used oil or hydraulic fluids may be disposed of in this manner. **NO PCB CONTAMINATED OILS ARE ALLOWED.**

## 5.0 Waste Handling Procedures

### 5.1 Waste Container Inventory Documentation

At the conclusion of the field event, the following documentation needs to be forwarded to the AECOM Waste Management Group (as necessary).

- Waste Management Field Documentation Form (see Appendix A)
- Waste Container and Equipment Log (see Appendix B)

### 5.2 Container Labeling Instructions

Example labels for the waste streams are included in Appendix C. Label information will be completed in a permanent marker.

### 5.3 General Awareness of Container Storage Time Limits and Inspection Requirements

Generation and accumulation of hazardous waste is not anticipated for this project. However, the following information in section 5.3 is listed as a general awareness.

Waste Type	Generator Status	Storage Time Limit	Inspection Requirement
RCRA Non-Hazardous	Not Applicable	1 Year	Initial inventory and as added
Universal Waste	Small Quantity Handler	1 Year	Initial inventory and as added
Universal Waste	Large Quantity Handler	1 Year	Initial inventory and as added

The accumulation start date is the date waste was first placed in the storage container (e.g., drum roll-off box or tank).

Waste containers may be stored in a designated waste accumulation area until characterization is completed and may remain in this area until shipment. An Accumulation Area Inspection Log for hazardous waste is included in Appendix F.

## 6.0 Spill Response and Reporting Requirements

Based on the identified scope compared to federal and state spill requirements, the following substances have been identified that may potentially enact spill reporting. If any of the identified substances are released, the following contacts will be made to determine spill reporting requirements.

Chemical Substance	Reportable Quantity
Petroleum Products (Motor Oil, Hydraulic Oil)	Produces Sheen on Surface Body > 5 Gallons
Contaminated Soil/Sediment During Transport to Landfill	Release on Truck Haul Route

## 6.1 Project Contacts

Should a release occur for any of the substances identified above or any others, it should be appropriately reported to the project contacts (and/or site emergency coordinator) identified below. Based on media affected and/or amount of substance, agency reporting may be necessary.

Name	Location	Telephone
Chemours Site Representative (CSR)	Pompton Lakes, NJ	973-492-7703
Dave Epps (Chemours CRG Project Director)	Pompton Lakes, NJ	973-492-7733
Sheryl Telford (Chemours CRG Remediation Team Manager)	Wilmington, DE	302-773-2597

\* **Dave Epps** will make the appropriate reporting within the CRG organization.

## 6.2 Reporting Requirements

Specific chemicals and their quantities that require agency reporting are established for each identified hazardous substance that will be used during the site activities. Prior to site activities, this list of chemicals will be maintained on site, and quantities tracked throughout the duration of the project.

## 6.3 Agency Spill Reporting Requirements and Contacts

If a release exceeds the quantity cited above, the release must be reported to the appropriate federal and/or state agency. The Chemours Project Director, or his designee, shall notify the following agencies as necessary.

**Emergency Response and Agency Contacts for Spill Reporting**

Name	Telephone
U.S. EPA National Response Center	1-800-624-8301
NJDEP Hotline	1-877-927-6337
Local Emergency	911

## Appendices

# Waste Management Field Documentation Form

The Chemours Site Representative (DSR) is to submit this form to the AECOM Waste Management Network Consultant via electronic mail at the completion of the project. The designated Waste Management Consultant(s) for this project are:

WM Name: Tim Pezzino Email: Timothy.Pezzino@aecom.com Phone: 716-278-5170

## General Information

Field Event Date(s): \_\_\_\_\_

CRG Project No. \_\_\_\_\_ Project Manager: \_\_\_\_\_

Site Name: Pompton Lakes Project Name: ABD area Corrective Measure Dredging

Site Address: \_\_\_\_\_

DSR: \_\_\_\_\_ Phone: \_\_\_\_\_

Site Environmental Coordinator/Contact: \_\_\_\_\_ Phone: \_\_\_\_\_

## Waste Information

1. Does this project need help from your AECOM WM Consultant to dispose of waste from this project?

\_\_\_\_\_ YES (Complete the attached waste inventory sheet)

\_\_\_\_\_ NO (Answer questions 2 and 3 below)

2. Who will be responsible for disposal of the waste?

\_\_\_\_\_

3. How was the waste disposed?

\_\_\_\_\_

## Waste Inventory Sheet

This is a template. Remediation contractor may substitute with a suitable form.

Container Number	Matrix (e.g., Soil, GW)	Container Type (e.g., roll-off, drum)	Percent Full	Label (e.g., Hazardous, Pending)	Accumulation Start Date	Waste Characterization Sample Name (If applicable)

### Waste Container and Equipment Log Tracking Sheet

This is a template. Remediation contractor may substitute with a suitable form.

Equipment (Tanker Truck, Roll-Off, Dump Truck, Baker Tank®)	Vendor	Delivery Date	Pickup Date	Container Volume	Final Destination
				tons	
				tons	
				tons	
				tons	
				tons	
				tons	
				tons	
				tons	

Sample Label for Soils

**NON-  
HAZARDOUS**

**Waste**

**OPTIONAL INFORMATION**

**SHIPPER** Chemours Pompton Lakes

**ADDRESS** 2000 Cannonball Road

**CITY, STATE, ZIP** Pompton Lakes, NJ 07742

**CONTENTS** Soil

**NON-HAZARDOUS WASTE**



# NON- HAZARDOUS

# Waste

## OPTIONAL INFORMATION

**SHIPPER** Chemours Pompton Lakes

**ADDRESS** 2000 Cannonball Road

**CITY, STATE, ZIP** Pompton Lakes, NJ 07742

**CONTENTS** Decontamination water

**NON-HAZARDOUS WASTE**