
**CONSTRUCTION
QUALITY CONTROL/QUALITY ASSURANCE PLAN
PHASE 1 FACILITY SITE WORK CONSTRUCTION
HUDSON RIVER PCBs SUPERFUND SITE**



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ACRONYMS AND ABBREVIATIONS

BBL	Blasland, Bouck and Lee, Inc.
CD	consent decree
CAD	computer-aided design
CM	Construction Manager
CMP	construction management plan
CPR	Canadian Pacific Railway
CQA	construction quality assurance
CQAO	construction quality assurance officer
CQAP	construction quality control / quality assurance plan
CQCP	contractor quality control plan
EIT	Engineer in Training
EPA	United States Environmental Protection Agency
FDR	final design report
FE	senior field engineer
FI	CM field inspector
FSWC	Facility Site Work Construction (Contract 1 and Contract 2)
GE	General Electric Company
GPS	geosynchronous positioning system
HASP	health and safety plan
HDR	HDR Engineering, Inc.
IFC	issue for construction
MPA	mass per unit area
NCR	noncompliance report
NICET	National Institute for Certification in Engineering Technologies
NYSDEC	New York State Department of Environmental Conservation
O&M	operation and maintenance
Parsons	Parsons Engineering of New York, Inc.
PCBs	polychlorinated biphenyls
PE	Professional Engineer

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Acronyms and Abbreviations (continued)

PEI	Process Equipment Installation (Contract 3a)
PSCP	performance standards compliance plan
QA	quality assurance
QC	quality control
QCM	quality control systems manager
QMP	quality management plan
QMS	quality management system
QoLPS	quality of life performance standards
RA	remedial action
RA CD	remedial action consent decree
RA HASP	remedial action health and safety plan
RAWP	remedial action work plan
RD AOC	Administrative Order on Consent for Hudson River Remedial Design and Cost Recovery
RM	river mile
ROD	record of decision
Site	Hudson River Sediment Remediation Site
SM	Site Manager
SOW	scope of work
SWPPP	stormwater pollution prevention plan
SPCCP	spill prevention, control, and countermeasure plan
TID	Thompson Island Dam

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SECTION 1

INTRODUCTION

The United States Environmental Protection Agency (EPA) issued a Superfund Record of Decision (ROD) on February 1, 2002 (EPA, 2002) calling for, among other things, the dredging and disposal of certain sediments from the Upper Hudson River containing polychlorinated biphenyls (PCBs). On August 18, 2003, the General Electric Company (GE) and EPA entered into an Administrative Order on Consent for Hudson River Remedial Design and Cost Recovery (RD AOC) (Index No. CERCLA-02-2003- 2027) (EPA/GE, 2003), under which GE agreed to design the remedy outlined in the ROD.

On October 6, 2005, the Consent Decree (CD) for the remedial action (RA) in the Upper Hudson River (Civil Action 1:05-CV-1270) was filed in Federal Court. After an extensive public review and comment period, the court approved and entered the CD as a final judgment on November 2, 2006, when it went into effect (EPA/GE, 2005).

GE prepared the Phase 1 Final Design Report (FDR) (BBL, 2006) and submitted it to EPA on March 21, 2006. On May 31, 2006, EPA approved the portion of the FDR that included the facility site work construction (Contract 1) and rail yard construction (Contract 2). However, EPA has not yet approved the designs for the access road and the work support marina.

Included as Appendix B to the CD is the *Statement of Work for Remedial Action and Operations, Maintenance and Monitoring* (SOW) which sets forth a number of requirements for implementing the remedial action set forth in the ROD. Section 2.1.2 of the SOW requires that a Construction Quality Control / Quality Assurance Plan (CQAP) be provided to EPA for review and approval. This document is being submitted to satisfy that requirement.

1.1 PROJECT SETTING

The Upper Hudson River is defined as the section of river from the Fenimore Bridge in Hudson Falls to the Federal Dam at Troy, New York. The ROD calls for, among other things, a remedial action to remove and dispose of sediments from the Upper Hudson River. Sediments to be removed are defined based on the PCB mass per unit area (MPA) and surface concentration or characteristic criteria (EPA, 2002).

EPA defined three sections of the Upper Hudson River for the sediment remediation activities outlined in the 2002 ROD:

- River Section 1: Former location of Fort Edward Dam to Thompson Island Dam (TID) (from river mile [RM] 194.8 to RM 188.5; approximately 6.3 river miles);

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- River Section 2: TID to Northumberland Dam (from RM 188.5 to RM 183.4; approximately 5.1 river miles); and
- River Section 3: Northumberland Dam to the Federal Dam at Troy (from RM 183.4 to RM 153.9; approximately 29.5 river miles).

The remedial action is to be conducted in two phases, designated Phase 1 and Phase 2. Phase 1 is defined as the first year of dredging and will be completed in a portion of River Section 1. Phase 1 also includes preparation of the land-based sediment processing facility. Phase 2 covers the remaining dredging in the three river sections.

1.2 PHASE 1 CONTRACTS DESCRIPTION

The project scope for Phase 1 activities will be conducted under at least seven separate contracts (excluding the rail transport and disposal contracts as well as agreements with the originating rail carrier for infrastructure improvements) and three separate Remedial Action Work Plans (RAWPs). The contracts and RAWPs are described below and summarized in Table 1-1. The table also includes the relationship of construction quality assurance (QA), quality control (QC) and health and safety to other Phase 1 activities.

Table 1-1. Organization of Phase 1 RA Work Plans

Phase 1 Contract Packages	Remedial Action Work Plans	Construction Quality Assurance Plans	Remedial Action Health and Safety Plan
Contract 1 – Facility Site Work Construction	RA Work Plan #1 Phase 1 Facility Site Work Construction	Construction Quality Control/Quality Assurance Plan	One umbrella RA Health and Safety Plan
Contract 2 – Rail Yard Construction			
Contract 3A – Processing Facility Construction	RA Work Plan #2 Phase 1 Processing Equipment Installation and Remaining Site Work	Dredging Construction Quality Control/Quality Assurance Plan	
Contract 3B – Processing Facility Operation	RA Work Plan #3 Phase 1 Dredging and Facility Operations		
Contract 4 – Dredging Operations			
Contract 5 – Habitat Construction			
Contract 6 – Rail Yard Operations			

The activities to be performed under Contract 1 (Facility Site Work Construction) and Contract 2 (Rail Yard Construction) are presented in detail in Sections 2 through 7 of RAWP #1,

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Remedial Action Work Plan for Phase 1 Facility Site Work Construction (Parsons, 2007). These activities include the following:

- Contract 1 – Facility Site Work Construction includes general civil work, such as grading, placement and compaction of fill and paving. Other work activities include wharf area construction, access road construction, river mooring installation and construction of a support marina.
- Contract 2 – Rail Yard Construction includes rail construction on the processing facility site property, and within the right-of-way of the commercial rail carrier, and rail yard facilities work.

The activities to be performed under Contract 3A – Processing Equipment Installation will be described in RAWP #2, *Remedial Action Work Plan for Phase 1 Processing Equipment Installation and Remaining Site Work*. RAWP #2 covers the remaining site work, such as processing facility buildings, and the installation of process equipment, piping, electrical, instrumentation, communications, and the commissioning of the systems.

The scope of work under Contract 3B, Contract 4, Contract 5, and Contract 6 will be addressed in RAWP #3, *Remedial Action Work Plan – Phase 1 Dredging and Processing Facility Operations*. Briefly, RAWP #3 covers the following:

- Contract 3B – Processing Facility Operations, including barge offloading, coarse material separation, sediment dewatering, water treatment (process and stormwater), stormwater management, and staging area management and maintenance. In the off season (when the Champlain Canal is closed), the contractor will winterize the processing facility and operate and maintain the stormwater collection and treatment system.
- Contract 4 – Dredging Operations, including resuspension containment system installation, debris removal, the performance of inventory and residual dredging operations and the transport of loaded sediment barges to the off-loading wharf at the processing facility. After dredging is completed in an area, the contractor will place appropriate backfill, cap, or shoreline stabilization structures.
- Contract 5 – Habitat Construction, including the supply and planting of subaquatic vegetation in certain dredged areas pursuant to habitat reconstruction plans.
- Contract 6 – Rail Yard Operations, including all activities required to operate and maintain the rail yard. This primarily will involve the loading of debris, coarse material and dewatered sediment into empty rail cars, setting up of outbound loaded trains, and receiving of inbound empty trains.

1.3 QUALITY PROGRAM OVERVIEW

GE's approach to management of the quality of the RA implementation includes a combination of quality control by the contractor and quality assurance by the Construction

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Manager. The CQAP details the systems and controls that GE has put in place so that the quality of the project will meet the requirements specified in the Phase 1 FDR. GE provides definition and overall management of the quality approach to be followed by its contractors and consultants. The quality of the RA implementation will be ensured through an integrated system of quality assurance performed by the Construction Manager and quality control provided by the contractors. GE's Construction Manager is responsible for the day-to-day coordination of quality assurance and quality control measures in the field.

This *Construction Quality Control/Quality Assurance Plan* (CQAP) is a companion document to RAWP #1 and RAWP #2. It establishes:

- project procedures and general responsibilities for the quality assurance and quality control (QC/QA) program; and
- protocols to ensure that the Phase 1 Facility Site Work Construction (FSWC) and Process Equipment Installation (PEI) will be executed in accordance with the relevant portions of the Phase 1 FDR.

This CQAP has been developed in accordance with Section 2.1.2 of the SOW.

The contractors are responsible for constructing the work in accordance with the plans and specifications. Each contractor is also responsible for controlling the quality of its work to meet contract plans, specifications, and related requirements. The contractor's QC is the systematic implementation of a program of inspections, tests, and production controls to attain the required standards of quality and to preclude problems resulting from noncompliance. Pursuant to Technical Specification Section 01400 Quality Requirements, each contractor will establish an independent QC program and write a Contractor Quality Control Plan (CQCP). The CQCP must provide for tests and inspections pursuant to various technical specifications. It will define procedures to ensure that activities affecting quality are properly documented and accomplished in accordance with contract documents; written instructions; and industry standards, codes and procedures. Furthermore, the CQCP will define methods for ensuring that activities affecting quality will be accomplished under controlled conditions.

Independently of the contractors, the construction manager (CM) will provide QA through daily monitoring and scheduled inspections to verify the effectiveness of the contractor's QC program and assure that the quality and contract requirements are met by the contractors. The CM assures that the contractor's QC is working effectively and that the resultant construction complies with the quality requirements established by the contract.

The objectives of this CQAP are to:

- Describe the quality program and organization to be implemented so that the project is constructed in accordance with the contract requirements and industry standards;

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- Describe guidelines for inspection and documentation of construction activities;
- Provide reasonable assurance that the completed work will meet or exceed the requirements of the construction drawings and specifications; and
- Describe how any unexpected changes or conditions that could affect the construction quality will be detected, documented, and addressed during construction.

1.4 QUALITY MANAGEMENT PLAN

Parsons Engineering of New York, Inc. (Parsons) has been retained to provide construction management services for this project. As GE's managing contractor, Parsons will carry out work on this project in accordance with the *Parsons Quality Management Plan (QMP)* (Parsons, 2005), which was submitted to EPA on November 1, 2005.

1.5 CQAP ORGANIZATION

This CQAP is organized into eleven sections.

- **Section 1 - Introduction:** describes the project setting, the Phase 1 contracts and related RAWPs, and the CQAP quality program overview.
- **Section 2 - Project QC/QA Organization:** presents the organizations and key personnel involved in the construction of the RA, their responsibilities and authorities, the structure of the QC/QA organization and the minimum training and experience of the Construction Quality Assurance Officer (CQAO) and personnel.
- **Section 3 - Submittals:** presents the procedures for processing submittals from Phase 1 contractors and vendors.
- **Section 4 - Performance Monitoring Requirements:** addresses QC/QA for performance monitoring requirements applicable to Phase 1 FSWC and PEI.
- **Section 5 - Inspection and Verification Activities:** provides procedures for tracking construction inspection and verification activities for the contract, construction acceptance criteria, and construction audits.
- **Section 6 - Construction Deficiencies:** describes the procedures for tracking construction deficiencies from identification through acceptable corrective action.
- **Section 7 - Documentation:** describes the procedures for the project documents that will be managed through a combination of a secure document filing and storage system and computerized Document Tracking System.
- **Section 8 - EPA Approvals:** describes EPA approvals applicable to the Phase 1 FSWC and PEI QC/QA.
- **Section 9 - Field Changes:** describes handling of quality plan changes to assure QC/QA objectives are met.

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- **Section 10 - Final Reporting:** describes the QC/QA documentation for Phase 1 FSWC and PEI to be submitted to EPA in the Phase 1 Construction Completion Report.
- **Section 11 - References:** provides bibliographic references to key documents referred to in the body of the plan.

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SECTION 2

PROJECT QC/QA ORGANIZATION

This section presents the responsibilities and authorities of organizations and key personnel involved in the construction of the RA, the structure of the QC/QA organization, the minimum training and experience of the QC/QA personnel, and the QC/QA training given to all onsite workers.

2.1 RESPONSIBILITIES AND AUTHORITIES OF ORGANIZATIONS

The organizations involved in the Phase 1 FSWC and PEI and their QC/QA roles and responsibilities are as follows.

2.1.1 Environmental Protection Agency

EPA is the lead agency responsible for observing and monitoring the progress of the Phase 1 FSWC and PEI in accordance with the CD. As such, EPA exercises approval authority for this CQAP.

2.1.2 General Electric Company

GE is responsible for implementing the RA in accordance with the CD and for ensuring that its contractors and subcontractors perform RA construction in accordance with the CD.

The CQAP details the systems GE has put in place in order that its responsibilities to quality are met. GE is responsible for verifying that the CM it has retained effectively implements and manages the systems detailed in the CQAP. GE is also responsible for formal communications with and submittals to EPA.

2.1.3 Engineer of Record

The Engineer of Record is an independent, duly qualified, licensed design professional, retained directly by GE to provide design and engineering services in connection with the project. This definition includes all subcontractors to the Engineer of Record.

Blasland, Bouck and Lee, Inc. (BBL) is the Engineer of Record for Phase 1 except for the rail yard. HDR Engineering, Inc. (HDR) is the Engineer of Record for the rail yard. BBL and HDR provide submittal review and resolution of design issues as they arise during construction.

2.1.4 Construction Manager

The CM is a duly qualified entity retained by GE to provide professional construction management and related services in connection with the project. The CM is responsible for implementation of this CQAP. The CM will manage construction contractors on behalf of GE

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and serve as the primary point of contact with the contractors for all communications to and from the contractors. The CM will provide Quality Assurance and monitor the day-by-day construction quality control activities performed by construction contractors to verify compliance with the contract plans and specifications. The CM will also manage, coordinate, and administer all QC/QA activities and requirements, including those of subcontractors to the CM. Additionally, the CM may be assigned management of any third party QA inspection and testing firms retained by GE.

2.1.5 Construction Contractors

The construction contractors are retained by GE to provide the labor, materials and equipment required to construct the project in accordance with the contract documents. Construction contractors are responsible for the quality control of their constructed work product as well as the necessary inspections and tests required to ensure that their work complies with the contract documents. They exercise authority over their workforce, including QC personnel and their third-party QC support services.

Pursuant to Specifications Section 01450, each contractor will submit a QC organization chart developed to show all QC personnel and how these personnel integrate with other management, production and construction functions and personnel. All QC staff members are subject to acceptance by GE. The requirements for the QC organization include a QC Systems Manager and a sufficient number of additional qualified personnel to ensure contract compliance. The contractor is to provide a QC organization that is represented on the site at all times during progress of the work and with authority to take any action necessary to ensure compliance with the contract.

2.2 STRUCTURE OF QC/QA ORGANIZATION

The QC and QA functions of the project organizations are functionally integrated although contractually separate. Figure 2.1 shows the functional structure of the project QC/QA team.

2.3 RESPONSIBILITIES AND AUTHORITIES OF KEY PERSONNEL

Key personnel involved in the Phase 1 FSWC and PEI and their QC/QA roles and responsibilities are described below in Section 2.3.1 and Section 2.3.2. Pursuant to the CD statement of work, names of QC/QA personnel assigned CQAP functions are to be communicated to EPA; these personnel are the CQAO and CM Field Inspectors. Since personnel assignments are subject to change over time, the CM will maintain a CQAP Staffing List of CQAP personnel assignments including each person's role and organization. This CQAP Staffing List is initially provided in Attachment 1 together with resumes of current CQAP personnel. When personnel changes occur, GE will provide an updated Attachment 1 to EPA.

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2.3.1 Construction Manager's Quality Assurance Personnel

Construction Manager

The Construction Manager (CM) is the primary point of contact for GE on all construction management issues. The CM is responsible for the overall management of activities related to the construction program, including the implementation of the CQAP and the health and safety program. As such, the CM will work directly with GE to exercise approval authority over contractor submittals including the CQCP. The CQCP must include the names and qualifications of contractor's QC personnel pursuant to Section 2.3.2 below.

Site Manager

The Site Manager (SM) monitors and works with GE to approve each contractor's quality, and progress submittals to ensure that the project is meeting the contract requirements. The SM will manage the field implementation of the CQAP at the project sites under control of the senior field engineer (FE) and the Construction QA Officer.

Construction Quality Assurance Officer

The CQAO is a full-time employee of the CM. The CQAO should have a minimum of five years of experience in related construction and prior QA experience on a project of comparable size and scope to this project. Additional qualifications for the CQAO include one or more of the following requirements:

- P.E. with one year of related construction experience acceptable to GE.
- Engineer in Training (EIT) with two years of related construction experience acceptable to GE.
- Three years of related experience acceptable to GE with a Bachelor of Science Degree in civil engineering, civil engineering technology, or construction.
- Construction materials technician certified at Level III by National Institute for Certification in Engineering Technologies (NICET).

The CQAO reports directly to the CM. The CQAO will have full authority delegated by the CM and GE to institute actions necessary for the successful implementation of the QC/QA program to ensure compliance with the contract plans and technical specifications (including stop-work authority). The CQAO is assigned to the project full time.

The CQAO works with GE to administer and implement the CQAP. This includes controlling this CQAP, making revisions as necessary, and implementing systematic actions to ensure compliance with the plan. The CQAO coordinates activities with the SM to ensure that the FE, inspection staff, third party inspection and testing firms as well as contractor QC staff carry out the requirements of the CQAP.

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The CQAO is supported by Parsons' QA Services. Parsons QA staff will provide expertise, on an as-needed or as-requested basis, in the investigation and handling of significant or unique quality issues.

The CQAO tracks and reports non-conformances to the CM, SM, and after notification to the CM, to contractor management and contractor QC staff. The CQAO also has full authority to obtain direct access to contractor QC files. Other CQAO responsibilities include:

- Reviewing contractor QC reports, tests, and inspection results;
- Facilitating the implementation of the four-phase inspection program and participating in the required inspections; and
- Ensuring that QA personnel conducting inspections are adequately trained and understand assignment limits and time frames.

Senior Field Engineer

The Senior Field Engineer (FE) administers the contract requirements, including the CQCP submittals by contractors, and assures that each contractor consistently conforms to its approved CQCP. The FE oversees inspection efforts, provides technical advice, and coordinates support from engineering support, administration, inspection services, safety, and other team members.

The FE coordinates resolution of unsatisfactory work items with contractors through final acceptance. The FE assures open noncompliance report (NCR) items are completed and accepted in a timely fashion. Acting in concert with GE, the SM and CQAO, the FE has the authority to require changes to the contractor's QC organization and plan as required to address apparent trends, to mitigate future NCRs and to obtain the quality specified in the contract documents.

The FE reviews QC and QA testing documentation with contractors, engineers, and inspectors. The FE also reviews plans and specifications for assigned projects and estimates the type and number of QA tests that should be accomplished for each specification section. The FE meets with third-party testing and inspection firms to review test requirements and coordinate testing and inspection services.

Field Inspectors

CM Field Inspectors (FIs) are responsible to the FE and support the FE's administration of the construction contracts. The FIs will hold a bachelors degree in engineering or construction and have three years experience in the type of work being performed on this project, or will have at least five years of related experience and will hold the construction materials technician certified at Level III by the NICET. Certification at an equivalent level by a state or nationally recognized organization will be acceptable in lieu of NICET certification. For inspection of the NY Route 196 intersection construction, QA inspectors must meet NICET Level II or higher

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certification in highway construction. Additional experience and training may be substituted for educational requirements, subject to GE's approval.

The FIs will monitor the day-to-day activities of the contractor. This includes ensuring that contractors comply with the plans and specifications, applicable building codes, good workmanship, and the QC requirements of the contract. As part of this effort, FIs will:

- conduct independent inspections to verify the quality of the work;
- participate in contractor four phase inspections;
- review test and inspection reports; and
- ensure that the required documentation is submitted.

The FIs must be alert to detecting, recording, and reporting any deviation from the contract documents, including calling any deficient item to the attention of the FE, the contractor's superintendent, and/or other representative. The FIs must keep accurate and detailed records of the contractor's performance and progress, delivery of materials, and other pertinent matters, including the daily inspection report.

2.3.2 Contractor's Quality Control Personnel

QC Systems Manager

The QC Systems Manager (QCM) is a full-time employee of the contractor, or a consultant engaged by the contractor. The QCM should have a minimum of five years of experience in related construction and prior QC experience on a project of comparable size and scope to the contractor's scope of work on this project. Additional qualifications for the QCM include at least one of the following requirements:

- PE with one year of related construction experience acceptable to the CM.
- EIT with two years of related construction experience acceptable to the CM.
- An individual with three years of related experience acceptable to the CM, with a Bachelor of Science Degree in civil engineering, civil engineering technology, or construction.
- Construction materials technician certified at Level III by the NICET.

The QCM will have full authority to institute any and all actions necessary for the successful implementation of the QC program to ensure compliance with the contract plans and technical specifications. The QCM shall report directly to a responsible officer of the construction contractor. The QCM is assigned to this project full time.

QC Technicians

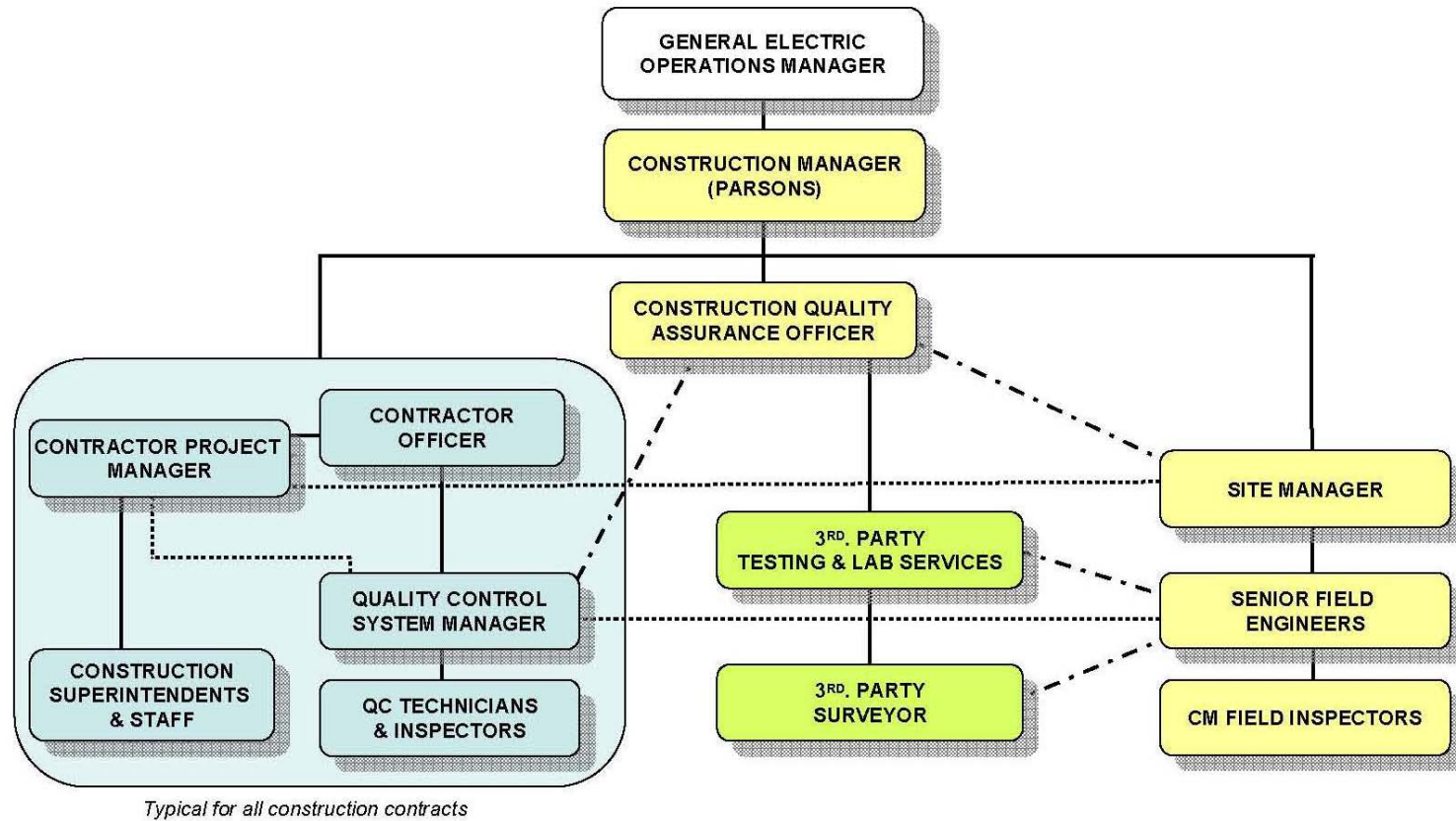
The contractor QC Technicians perform the following functions:

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- Inspect all materials, construction, plant, and equipment for conformance with the technical specifications; and
- Perform all QC tests as required by the technical specifications.

Contractor QC Technicians will be engineers, engineering technicians, or experienced craftsmen with qualifications in the appropriate field equivalent to NICET Level II or higher construction materials technician, and will have a minimum of two years of experience in their area of expertise. For inspection of the NY Route 196 intersection construction, QC inspectors must meet NICET Level II or higher certification in highway construction. Certification at an equivalent level by a state or nationally recognized organization will be acceptable in lieu of NICET certification. Additional experience and training may be substituted for educational requirements, subject to GE's approval.

Figure 2.1
Construction Quality Control/Quality Assurance Organization



LEGEND

- - - - Direct communication and Coordination Related to Construction QC/QA Plan
- Direct communication and Coordination Related to Technical Issues and Contract Conformance
- Administrative & Functional Interface
- CM Organization
- Contractor Organization
- 3rd. Party Surveyor & Testing & Lab Services

SECTION 3

SUBMITTALS

This section describes the procedures for CM processing of submittals from contractors. The CM will administer and control the processing of contractor submittals. After being reviewed for completeness, submittal documents will be transmitted to the relevant project staff for review and verification for compliance with contract requirements. The submittal's disposition will be noted on the submittal, which will be signed, dated and returned to the contractor. If required, the contractor will revise the submittal, incorporating the comments and will resubmit it for review and verification for compliance. Submittals will be logged and copies will be retained in the project files.

3.1 SUBMITTAL SCHEDULE

The contractor will submit and maintain a submittal schedule. The CM will review and after consulting GE will approve the submittal schedule. The schedule will be initially submitted within 14 days after the award of the contract and then monthly with the monthly baseline schedule updates. The CM shall work with the contractor to prioritize and sequence submittals so that the most critical submittals are received and processed first. The submittal schedule will become the baseline against which receipt of all required submittals will be compared. The approved submittal schedule will be forwarded to the Engineer of Record for resource availability planning.

3.2 PROCESS, REVIEW AND ACCEPTANCE

Submittals will be managed as follows:

1. Contractors will number and certify the completeness of all submittals before submitting to the CM;
2. Contractors must also complete submittal transmittal forms and submit six paper copies and one electronic copy of all required submittals to the CM's document manager (the submittal transmittal form will always accompany each submittal package to and from the contractor, the CM and the Engineer of Record);
3. Upon receiving the submittal the CM will log the submittal and provide a review to ascertain whether the package is complete. If the submittal is incomplete the submittal will be returned to the contractor.
4. The original submittal transmittal and all copied attachments will be logged into the document tracking system. The CM will then forward submittals to the appropriate reviewers.

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5. If the CM provides a submittal to the Engineer of Record for review, they will review it for general conformance with contract design documents, will coordinate concurrent discipline reviews within the design team, will coordinate concurrent reviews by owner and other entities, and consolidate responses into a single coordinated action.
6. After reviewing the submittal the Engineer of Record (or other designated reviewer) makes the appropriate notations and action taken on the submitted documents and returns the submittal to the CM.
7. The CM will return a minimum of one copy of the submittal to the contractor with an original stamp of the action required.
8. The six actions that may be taken for each submittal are:
 - Approved – Submittal meets contract requirements. No additional copies will be required of the contractor.
 - Approved As Noted – Submittal meets contract requirements with minor corrections noted. Re-submittal is not required. Contractor must incorporate the required corrections into the work in the field. No additional copies will be required of the contractor.
 - 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 re-submitted for review and approval. No work will begin in the field until the revised submittal has been approved.
 - Rejected – Submittal is inadequate and does not meet contract 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
 - Received, No Action Taken – Receipt of submittal is noted; no further action required.
9. When a submittal is to be revised and resubmitted, the contractor will revise the submittal and indicate this revision by incrementing the revision number. The contractor's submittal process will then be repeated.

The CM is responsible for tracking the submittal package during the entire review process and advising all concerned of any schedule impacts to ensure that the review process timeframe is adhered to. The CM will retain copies of all submittal documents and revisions and ensure that an accurate file is available for ready retrieval during the life of the project. The CM will maintain all submittal files. These files will be filed by numeric sequence. Each submittal file will contain a complete submittal copy of the submittal before and after the review process.

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3.3 STORAGE

The CM will maintain all submittal files via a combination of a secure document filing and storage system, and a computerized document tracking system.

SECTION 4

PERFORMANCE MONITORING REQUIREMENTS

The performance monitoring requirements applicable to Phase 1 FSWC and PEI consist of the Quality of Life Performance Standards (QoLPS) and the Stormwater Pollution Prevention Plan (SWPPP) requirements. The Contract Technical Specifications impose these requirements upon the FSWC and PEI contractors and require specific plans for contractor compliance and related work-area monitoring. The CM will perform QA oversight of contractor compliance and related work-area monitoring pursuant to the submitted plans.

4.1 QUALITY OF LIFE PERFORMANCE STANDARDS

Construction activities will be performed in accordance with the relevant portions of the Phase 1 FDR (BBL, 2006) that address the QoLPS established by EPA for Phase 1 of the Remedial Action in the Upper Hudson River. Those standards address air quality, odor, noise, lighting, and navigation. The portions of the air quality standard relating to polychlorinated biphenyls (PCBs) and to the National Ambient Air Quality Standards (NAAQS) do not apply to the FSWC and PEI activities, although the portion of that standard relating to opacity does.

RAWP #1 includes a QoLPS Field Sampling Plan (FSP) - Phase 1 FSWC, which details the QoLPS compliance monitoring activities that will be undertaken during the FSWC to assess and verify achievement of the applicable QoLPS for the FSWC.

During construction of the processing facility and rail yard, the contractors will comply with the performance and monitoring requirements established by the following Technical Specification Sections:

- 01140 - Work Restrictions
- 02371- Dust, Soil Erosion, and Sediment Control
- 02935 – Lighting from Facility Site Work Construction
- 02930 – Noise from Facility Site Work Construction

RAWP #1 includes contractor work plans for meeting these requirements. Please refer to RAWP #1, the QoLPS FSP, and the referenced specifications for more detail on these requirements, the underlying standards, and the monitoring activities that will be performed to verify compliance.

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4.2 POLLUTION PREVENTION

During construction of the facility site work and rail yard, the contractors will comply with the pollution prevention performance and monitoring requirements established by the technical specifications. These requirements are summarized below.

4.2.1 Stormwater Pollution Prevention and Dust Control

Contractors will comply with the performance and monitoring requirements established by Technical Specification Section 02371 – Dust, Soil Erosion & Sedimentation Control. RAWP #1 and RAWP #2 call for contract-specific SWPPPs in accordance with Specification 01460. Please refer to the referenced RAWPs and Specifications for more detail on these requirements and the underlying standards.

4.3 REPORTING

QoLPS monitoring data obtained by the CM during the FSWC and PEI work will be included in the monthly progress report under the CD, as described in the RAWP #1 QoLPS FSP. Any exceedance will be reported as described in the RAWP #1 QoLPS FSP.

SECTION 5

INSPECTION AND VERIFICATION ACTIVITIES

The contractor QC control, verification, and acceptance testing plans set out the QC inspections and testing for implementation of each technical specification applicable to the contractor's scope of work. The plans will cover the type, test standard, frequency, control requirements, and assigned responsibility for inspections and tests. The CM will review and approve these plans as part of the contractor CQCP submittals.

After being approved by the CM the contractor CQCPs are available upon request for informational purposes only.

Ongoing QA monitoring and oversight of contractor QC inspections and testing will be performed by the CM. In this manner, the inspections and tests required to measure compliance with the relevant portions of the Phase 1 Final Design Report for Contracts 1, 2 and 3A are established and carried out.

5.1 GENERAL CONSTRUCTION INSPECTION AND VERIFICATION REQUIREMENTS

Contractors shall perform the inspections and tests as prescribed in the technical specifications for Contracts 1, 2, and 3A.

QA inspection and testing will be used to verify the adequacy and effectiveness of the contractor QC program. The QA inspection and testing frequency will be at the discretion of the CQAO based on results of QC tests, evaluation of daily reports, audits of the QC program and verification testing conducted by the CM and owner's third party testing firm. Should information become available that indicates a potential problem, the CQAO will review in detail all pertinent information and order additional verification testing if necessary.

Contractor QC control, verification, and acceptance testing plans set out the contractor's specific QC testing and inspection pursuant to Specification 01450 1.03 B and the relevant design specification. Table 5.1 summarizes the content of such an inspection and testing plan applicable to FSWC. Appendices A, B, and C provide supporting detail for Table 5.1. QA oversight of the contractor's QC is also indicated on Table 5.1. Further discussion follows the example. [Note: the example below and Appendices A, B, C are for illustration only and are not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors.]

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Example: Inspection and Testing Plan

Materials qualification testing will be done prior to construction to verify that the materials comply with requirements of the specifications. The contractor will obtain representative samples of the materials designated as the proposed source of the materials. Test samples will be sent by the contractor to the Testing Laboratory. The Testing Laboratory will report all test results for determination of material meeting the acceptance criteria. For soils, sampling and analysis will be performed by the contractor on the onsite borrow material source.

The CQAO or designee will periodically inspect material being used. If determined that the characteristics of the material being used differ from the material initially tested, the CQAO designees will direct the contractor to repeat the qualification testing. If the new material qualification test results meet the criteria of the technical specification as determined by the Engineer of Record, the new materials may be used for the work; otherwise, previously approved materials must be used or other acceptable materials must be sampled and tested as noted above prior to incorporating into the work. Inspection and testing is summarized in Table 5.1

Table 5-1 – Typical Control, Verification and Acceptance Testing Plan

Specifications			Quality Control		Responsibility		Control requirements
Item	Spec. ref.	Item description	Test type	Test standard	Contractor (QC)	CM (QA)	
1	02201, ref. 2.01	Support excavation Wood sheeting & Bracing	Stress Grade, Fiber stress of 1,200 PSI	ASTM A328 with minimum thickness of 3/8" OHSA Subpart P, excavation section 1926.652©	Manufacturer's certification data report.	Verification by Eng. Of record approval	Permissible deviation by Engineer of Record only.
2	02201, ref 2.01-C	General fill material	Each approved source, Density, gradation and moisture density relationship per 1000 cubic yard, stockpile or in- place source.	ASTM D2487, D698, D1556 & D2922	Contractor's testing laboratory	7% - 10% verification test	Permissible deviation by Engineer of Record only.
3	02201, ref. 3.08	Backfilling Compaction & Density Control	Moisture	ASTM D698, Method D	Contractor's testing laboratory	7% - 10% verification test	N/A

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Specifications			Quality Control		Responsibility		Control requirements
Item	Spec. ref.	Item description	Test type	Test standard	Contractor (QC)	CM (QA)	
a	02201, ref. 3.08-2-b ; 02203, ref. 3.01	Backfilling Compaction & Density Control	95% of Max dry density for structure, driveways, roads and sidewalk. 90% for other areas.	Method of ASTM D 1556 or ASTM D2922	Contractor's testing laboratory	7% - 10% verification test	N/A
b	02204, ref. 3.02	Trenching, backfilling & compacting	95% of Max dry density	ASTM D698	Contractor's testing laboratory	7% - 10% verification test	N/A
4	02205, ref. 1.03 & 1.04-6	Select fill/ Non-expansive soils	Satisfactory material with plasticity index equal to or less than 12	ASTM D 4318	Contractor's testing laboratory	7% - 10% verification test	N/A
5	Spec. 02205, ref. 2.01 B	Select fill/Coarse aggregate (Grain-size Distribution)	1 per stockpile and source change	ASTM D 422 or C136, size No. 6	Contractor's testing laboratory	7% - 10% verification test	N/A
6	Spec. 02205, ref. 2.01 B	Select fill/ Fine Aggregate (Grain-Size Distribution)	1 per stockpile and source change	ASTM C136; C33 and as required by NYSDOT Spec. 703.02, size no. 56 or 67	Contractor's testing laboratory	7% - 10% verification test	N/A
7	02207, ref. 1.02 & 3.01	Restoration of surfaces/ Asphalt temporary paving	Asphalt concrete Binder plant mix 2" compacted thick	NYSDOT Maintenance 15.403.2001	Provide Mix design for all material to be incorporated in the restoration	verification plant report	N/A
a	02207, ref. 1.02 & 3.01	Restoration of surfaces/ Asphalt permanent paving	Asphalt concrete Binder plant mix 4" compacted thick	NYSDOT Standard Specifications	Provide Mix design for all material to be incorporated in the restoration	verification plant report	N/A
8	02211, ref. 3.01	Tests of all hydraulic structures non-pressure piping	24-hour test, no visible sign of leakage on the exterior surface and when the water surface does not drop	ASTM C-828	Results of all leakage tests shall submit to CM within 2 working days of test completion.	All tests shall be witnessed by the CM	Refer to the table in section 3.03- D for allowable leakage for non-pressure piping.
a	02211, ref. 3.02-B	Tests on pressure piping	Pressure test 150 PSSI for period of 2 hours.	ASTM C-828	Results of all leakage tests shall submit to CM within 2 working days of test completion.	All tests shall be witnessed by the CM	N/A

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Specifications			Quality Control		Responsibility		Control requirements
Item	Spec. ref.	Item description	Test type	Test standard	Contractor (QC)	CM (QA)	
b	02211, ref. 3.02-C	Leakage test for pressure piping	Rate of leakage has stabilized for 3 consecutive 15 minutes intervals	ASTM C-828	Results of all leakage tests shall submit to CM within 2 working days of test completion.	All tests shall be witnessed by the CM	Refer to the table in section 3.02- 4, 5 & 6 for allowable leakage for non-pressure piping.
c	02211, ref. 3.04	Manhole & catch Basin leakage testing	Leakage does not exceed one gallon per vertical foot of depth 24 hours.	ASTM C-828	Results of all leakage tests shall submit to CM within 2 working days of test completion.	All tests shall be witnessed by the CM	Any leaks detected shall be permanently stopped.

5.1.1 Inspections

The contractor shall establish a program for inspection of activities affecting quality and shall cover all construction site and laboratory operations, including both onsite and offsite operations. Inspections shall be performed to verify compliance with documented instructions, drawings, procedures, and specifications as required by the contract. All inspections shall be documented by the contractor as required by Specification Section 01450 3.05.

A four-phase inspection program shall be followed for each definable feature of the work. The four phases of inspection are:

1. Preparatory Inspection

The contractor and the CM perform preparatory inspections prior to beginning any work on any definable feature of the work.

- Ensure that preparatory inspections include a review of contract requirements.
- Ensure that all materials and /or equipment have been tested, submitted, and approved.
- Ensure that provisions have been made to provide required testing.
- Examine work area to ascertain that all preliminary work has been completed.
- Examine materials, equipment, and samples to ensure that they conform to approved shop drawings or submittal data, that all materials and/or equipment are on hand, and that all monitoring and measuring equipment is properly calibrated and in proper working condition.
- Record preparatory inspections in the contractor's QC documentation as required by Specification 01450 Section 3.05.

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2. Initial Inspection

The contractor and the CM perform an initial inspection as soon as a representative portion of the particular feature of work has been accomplished.

- Examine the quality of workmanship.
- Review control testing for compliance with contract requirements.
- Review dimensional aspects of the work.
- Record initial inspections in the contractor's QC documentation as required by Specification 01450 Section 3.05.

3. Follow-Up Inspection

The contractor and the CM perform follow-up inspections daily.

- Ensure continuing compliance with Contract requirements.
- Ensure continuing compliance with control testing until completion of particular feature of work.
- Contractor CQM records follow-up inspection in daily QC reports.
- The CM inspection staff records follow-up inspections in their daily inspection report.
- Conduct final follow-up inspections and correct test deficiencies prior to the addition of new features of work.

4. Completion Inspection

The contractor and CM perform a completion inspection of the work.

- Develop a "punch list" of items that do not conform to the approved plans and specifications.
- Include the punch list in the construction QC documentation. As required by Specification 01450, Section 3.05, include the estimated date by which the deficiencies will be corrected.
- Perform a second completion inspection after punch list items have been completed and the CM has been notified by the contractor.

The daily inspection reports shall identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective action taken or proposed.

Additional QA inspections may include inspection of third-party lab testing facilities, fabrication facilities, and suppliers. Other inspections outside of the four-phase program described above will be ordered or performed by the CM to verify compliance with building

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code and standards of New York State. These inspections shall be performed and conducted at various points of construction that would typically require code compliance inspections.

When deficiencies are discovered during the four-phase or other inspection processes, focused inspection shall be considered by the CQAO. When material, performed work, or installation is found on the basis of focused inspections to be deficient and/or does not meet the project specifications, the CQAO will assure deficiency correction is implemented, as discussed in Section 6.

5.1.2 QC Testing

As required by the contract specifications, the contractor shall establish a test program to ensure that all required testing is properly identified, planned, documented and performed under controlled and suitable environmental conditions, including cleanliness. Testing shall be performed in accordance with written test procedures in the CQCP. Such test procedures shall incorporate or reference the requirements as contained in the contract technical specifications, codes, and industry standards. Per the CQCP, the contractor shall submit the test procedures to the CQAO for review and acceptance prior to their implementation.

The contractor shall be responsible for establishing a system of daily test reports that will record all QC test results. Test results from each day's work period shall be submitted to the CQAO prior to the start of the next day's work period. When required by the technical specifications, the contractor shall maintain statistical QC charts. The contractor's responsible technician and the QCM shall sign the daily test reports. CQAO will review test results on a daily basis and identify any non-conforming test results for discussion with the contractor regarding potential corrective action.

5.1.3 QA Testing

The CQAO will be responsible for the QA materials sampling and testing program. QA testing is provided for the verification of the adequacy and effectiveness of the contractor's QC testing. QA testing is performed by the CQAO and is independent of and in addition to QC testing performed by contractors. QA testing may be performed on a pre-established schedule or as directed by the CQAO.

QA testing will be performed by or under supervision of the QA staff to validate the contractor's QC sampling and testing. Such testing may be performed by third party testing services. The typical test frequency will be one (1) QA test for every ten (10) to fifteen (15) of the construction contractor's QC tests. More frequent testing during initial startup may be necessary to verify the process is under control and complies with the technical specifications of the construction contracts. In lieu of performing independent tests the CQAO may choose to witness QC testing or conduct tests on split samples from QC testing. When QA and QC test results do not compare or have wide variances, additional testing may be needed to validate the results. Additional tests to be performed by Field Inspectors or the third party testing services will be at the direction of the CQAO. The need for QA testing shall be based on the following considerations:

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- Importance of the item as to its reliability, etc;
- Need to perform quality checks for fabrication sequences not available for inspection at completion; and
- Deficiencies are discovered.

QA testing shall be performed in accordance with the following:

- The CQAO shall develop a weekly quality test and inspection schedule using the construction activity forecast as a guide. The schedule shall:
 - Identify the QA test activities.
 - Identify the hold points
- The weekly quality test schedule shall be distributed to the CM and CM field staff.
- The contractor shall be provided a one-day advance notice of impending hold points.

Field Inspectors conducting the quality tests and inspections shall complete the Daily Construction Report included in Appendix D. The Daily Construction Report shall be distributed to the CQAO, FE, CM Site Manager, GE managers, contractor PM and/or QC Systems Manager. The CQAO will review QA tests and maintain files for all field QA documentation,

5.2 CONSTRUCTION ACCEPTANCE CRITERIA

Construction acceptance criteria for materials qualifications, inspection, and testing are established by technical specifications as illustrated in the example QC tables included in Appendices A (materials qualifications), B (inspection), and C (testing). Criteria for materials and equipment have been set by the Engineer of Record in accordance with the applicable codes and standards, and by manufacturers' recommendations. Contractor submittals are to document conformance with acceptance criteria as detailed in their CQCP (control, verification, and acceptance testing plan).

5.3 CONSTRUCTION AUDITS

The contractor shall establish and document an auditing system to verify their (or their sub contractor's) implementation of and conformance to the CQCP and contract technical specification requirements. The auditing system shall be used to make a determination regarding the effectiveness of the QC system.

The contractor's auditing shall be planned, performed and documented in accordance with written instructions, procedures or checks to be included in the CQCP. The audit scope, frequency and methods shall be defined in the CQCP. Audits shall be performed by qualified and properly trained personnel who are familiar with the QC system, auditing procedures and techniques. Selection of auditors and the conduct of audits shall ensure the objectivity and

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impartiality of the audit process. Auditors shall not audit their own work. The auditing system shall cover all the quality-affecting activities for construction, as well as laboratories and shall be applicable to the onsite and offsite locations, including all subcontractors. The results of the audits shall be documented and reported to the CM. All non-conformance conditions identified during the audit shall be re-audited to verify the corrective actions taken by the appropriate organization were effective.

5.4 COMPLIANCE WITH HANDLING, STORAGE, PACKAGING, PRESERVATION, AND DELIVERY REQUIREMENTS

CM field staff will inspect the construction contractor's activities to ensure technical compliance in identification, handling, storage, packaging, preservation, and delivery of materials, parts, assemblies, and end products. Related quality records and documents will be maintained and controlled in accordance with the procedures provided in Section 7 of this CQAP.

5.5 MATERIAL IDENTIFICATION AND TRACEABILITY

CM field staff will monitor the construction contractor to ensure that identification and traceability requirements are met. Products and materials shall be traced from receipt through all project stages to installation. Documentation such as project control checklists, material receipts, material tracking forms, procedures, sample and test documentation, and reports will ensure that the applicable material item traceability is maintained. Project specifications and/or procedures define product identification and traceability requirements, which generally include the following:

- Materials or equipment intended for use in construction are identified and segregated until inspection confirms that they conform to technical and quality requirements, and
- Materials are traceable to documents attesting to their conformance with technical requirements that are stated in specifications or drawings. Testing of materials will also be conducted as necessary to verify conformance with material specifications.

SECTION 6

CONSTRUCTION DEFICIENCIES

This section provides procedures for tracking construction deficiencies (noncompliance) from identification through acceptable corrective action. It defines the controls and related responsibilities and authorities for dealing with noncompliant products or services.

6.1 DEFICIENCY IDENTIFICATION

Deficiency occurs when a material, performed work, or installation does not meet the plans and/or specifications for the project.

6.2 CONTRACTOR QC DEFICIENCY IDENTIFICATION AND CONTROL

When material, performed work, or installation is found deficient, the CQAO (or designee) shall ensure that the non-conforming material, work, or installation is identified and controlled to prevent unintended use or delivery. The CM will notify the contractor of any noncompliance with any of the foregoing requirements. The contractor shall, after receipt of such notice, immediately take corrective action.

Minor deficiencies noted during test or inspection are verbally reported to the contractor's representative and noted on the Daily Construction Report. Minor deficiencies are items that do not require significant rework or repair work to correct, and will not result in significant deviations from required quality standard if corrected immediately.

Control and disposition of such deficiencies shall be by the originator of the Daily Construction Report and the contractor's supervisor responsible for the work and do not require formal action by the contractor's QC System Manager or the CM. Ideally, such minor deficiencies can be corrected on the spot by agreement with the contractor's supervisor.

Non-conformances are major deviations from the contract requirement and/or accepted standard of quality, which must be formally documented for corrective action by CM field staff or the third party testing group. Failure by a contractor to correct a **minor deficiency** after having been put on notice will also result in a **non-conformance** if it is not corrected within 5 days of notification. Non-conformances shall be formally documented on the example NCR form shown in Appendix D. A log shall be maintained for all NCRs in accordance with the example form shown in Appendix D.

The NCR shall be distributed to the contractor QCM, GE, CM, SM and CQAO.

The CQAO shall follow up on the NCR as required to verify that corrective action has been completed. The CM or a designated FE shall verify and accept the corrected work by actual inspection.

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6.3 NON-CONFORMANCE REPORT

The NCR is a formal notification to the contractor that work does not meet the plans or the specifications for the project. Any item of work found to be deficient - out of conformance with the construction drawings and/or specifications - will be identified by the inspector on the non-conformance report as described in this section. Non-conformance reports will be included on the non-conformance log and tracked through verification that the non-conformance has been corrected.

6.4 CONTRACTOR QC DEFICIENCY CORRECTION

When material, performed work or installation is found to be deficient and/or does not meet the project specifications, the CQAO will assure deficiency correction is implemented. The CQAO designee shall ensure that the non-conforming material, work or installation is identified and controlled to prevent unintended use or delivery. The non-conforming material or item shall be tagged and segregated by the construction contractor, when practical, from conforming material or items to preclude their inadvertent use. If segregation is impractical or impossible because of the physical characteristics of the item or other reasons, the non-conformance tag shall be displayed prominently to preclude inadvertent use. The CQAO is responsible for documenting the non-conformance in a NCR as specified in Section 6.3.

The construction contractor will implement corrective actions to remedy work that is not in accordance with the drawings and specifications. The corrective actions will include removal and replacement of deficient work using methods approved by the CM. Removal must be done in a manner that does not disturb work that meets QC/QA criteria; otherwise, the disturbed material must also be removed and replaced. Replacement must be done in accordance with the corresponding technical specifications. Replacement will be subjected to the same scope of QC/QA inspection and testing as the original work. If the replacement work is not in accordance with the drawings and specifications, the replacement work will be removed, replaced, re-inspected, and re-tested.

6.5 PREVENTIVE ACTIONS

Preventive actions are taken to eliminate the cause of a potential non-conformity. For example, defects that appear on the surface of concrete during construction or within a relatively short time after completion are usually caused by poor quality materials, improper mix design, lack of proper placing and curing procedures, or poor workmanship. The contractor and QC/QA team shall take preventive actions as necessary to eliminate the causes of potential deficiencies so as to prevent their occurrence. Contractor's CQCPs are to include quality improvement practices to continually improve construction practices and address quality problems at their source. The CM and CQAO are to monitor, inspect, and audit processes used to prevent erroneous information or construction products from being passed to the owner. The CM and CQAO have the authority to implement, verify and review the project's preventive and

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corrective action effectiveness. They are empowered to improve the project's work processes to eliminate the causes of potential non-conformities.

SECTION 7

DOCUMENTATION

The Technical Specification 01450 includes documentation and reporting requirements. Contractor's QC documentation must cover all aspects of QC program activities, and includes Daily Inspection Reports and Daily Test Reports. After CQCP approval by the CM, the contractors will document the QC activities pursuant to the CQCP. Ongoing QA oversight will be documented by the CM.

Beyond the data reporting required in Section 4.3 of this document, GE proposes that the results of QC/QA procedures conducted to confirm that construction activities meet applicable design criteria, plans and specifications for the FSWC and PEI will not be included on a routine basis in the monthly progress reports under the CD.

7.1 DAILY RECORD KEEPING

Project documents will be managed through a combination of a secure document filing and storage system and a computerized document tracking system.

Sufficient records shall be prepared and maintained as work is performed to furnish documentary evidence of the quality of construction and laboratory analysis and of activities affecting quality. Each contractor QC technician shall maintain a daily log of all inspections performed for both contractor and subcontractor operations on a form acceptable to the CM.

The Daily Inspection and Daily Test reports shall be signed by the responsible QC technician and the QCM. The CM shall be provided at least one copy of each daily inspection and test report on the work day following the day of record.

7.2 DAILY CONSTRUCTION REPORT

A daily construction report will be prepared and signed by each FE and FI. The report will include a summary of the contractor's daily construction activities. Supporting inspection data sheets will be attached to the daily report where needed. Example forms are provided in Appendix D.

At a minimum, the daily construction report will include the following information:

- Date, project name, location, and other identification
- Description of weather conditions, including temperature, cloud cover, and precipitation
- Reports on any meetings held and their results
- Record of visitors to site

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- Locations of construction underway during that day
- Equipment and personnel working in each activity, including subcontractors
- Descriptions of work being inspected
- Decisions made regarding approval of units of material or of work, and corrective actions to be taken
- Description of problems or delays and resolution
- Communications with contractor staff
- Construction activities completed and/or in progress
- Progress photos, where applicable
- Signature of the report preparer

As described in Section 7.6, the daily construction reports will be routed on a daily basis to the project QC/QA files and will be maintained as part of the permanent project record. These reports are reviewed by the CM and FE, and also distributed to the CQAO and GE

7.3 INSPECTION AND TESTING REPORT FORMS

Report forms will be completed for inspections and tests conducted. The forms vary depending on inspection or test type. Representative forms for several types of inspection and testing reports are included in Appendix D. These forms include:

- Description or title of the inspection activity
- Location of the inspection activity or location from which the sample was obtained
- Recorded observation or test data
- Results of the inspection activity
- Personnel involved in the inspection activity
- Signature of the inspector

7.4 RECORD DRAWINGS

Contractors will submit draft record drawings to the CM for review and prepare final record drawings based on CM comments. The draft record drawings shall be submitted on one set of CD-ROM disks. Record drawings submitted on CD-ROM shall be the latest version of AutoCAD by AutoDesk, Inc.

7.4.1 Responsibilities

The CM working with the contractor will be responsible for assuring that red-line record drawings are maintained daily throughout the construction process. These red-line record

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drawings will be used to update the design drawings to as-built status at the completion of the work.

7.4.2 Preparation of As-Built Drawings

The contractor will be responsible for red-lining construction drawings in the field as preparation for as-built drawings. The as-built drawings will record approved actual field conditions upon completion of the work. The original design drawings will be marked up by the contractor as the project progresses to indicate as-built conditions. Where there was a change to a specified material, dimension, location, or other feature, the as-built drawing will indicate the work performed.

7.4.3 Review of As-Built Drawings

Upon the completion of the as-built red-line drawings, the contractor will submit the red-line mark-up drawings to the CM for review. The CM will provide the mark-ups to the Engineer of Record who will incorporate the mark-ups and issue the final as-built drawings to GE and the CM.

7.5 CONTROL OF QUALITY RECORDS

The CQAO verifies QA record accuracy and maintains copies of all quality-related documentation. This includes, but may not be limited to:

- Daily construction QA logs and records;
- Inspection checklists and reports;
- Surveillance reports;
- Non-conformance reports;
- Material receiving reports; and
- Monitoring and test data.

These records will be stored in files maintained in the project document control files. All original documents pertaining to project information will be maintained in the project file located at the project office in Fort Edward, New York.

The CM and SM have primary responsibility for the centralized document control files for the project and construction documentation.

Pursuant to the contract specifications, the contractor provides an electronic or paper copy (suitable for scanning) of QC documentation associated with the work to document control within three business days of the generation of such documents; and one electronic copy of all required submittals to CM's document manager. All contractors shall maintain a fire-resistant storage facility at the processing facility site. The facility shall contain all inspection reports, test records, contract documents, project, and daily field reports.

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All records shall be available for inspection and audit, at any time, by the CM and GE.

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SECTION 8

EPA APPROVALS

This section addresses EPA approvals associated with construction quality aspects of the Phase 1 FSWC and PEI.

8.1 REQUIRED SUBMITTALS

Submittals required for EPA approval applicable to QC/QA of FSWC and PEI are this CQAP and the Phase 1 Work Completion Report pursuant to CD Paragraph 58 (EPA/GE 2005). EPA approval is not required for FSWC and PEI contractor submittals other than those submitted to EPA as part of the FSWC and PEI RAWPs.

8.1.1 CQAP

GE will submit this CQAP for EPA approval prior to commencement of Phase 1 FSWC. The CQAO is responsible for maintaining this CQAP during the FSWC and PEI process. Revisions to the CQAP will be approved in the same manner as the original.

8.1.2 Phase 1 Work Completion Report

GE will include quality related documents for Phase 1 FSWC and PEI via the Phase 1 Work Completion Report at completion of Phase 1. The quality related documents to be included in the Phase 1 Work Completion Report are further described in Section 10.

8.2 EPA APPROVAL

EPA response to any plan, report, or other item that requires approval is described in the CD (paragraphs 45, 46, and 47). EPA, following a review, may:

- Approve the submission, in whole or in part;
- Approve the submission with specified conditions;
- Modify the submission to cure deficiencies;
- Disapprove the submission; or
- Any combination of these provided that any such modification or direction would not materially expand the SOW.

EPA will not modify a submission without providing at least one notice of deficiency and 21 days to correct the deficiency. Following the correction process, the plan, report, or other item will be resubmitted for approval.

Construction QC/QA Plan

SECTION 9

FIELD CHANGES

Field changes for QC/QA will be limited to CQAP and CQCP changes. Changes to construction processes or design plans and specifications are governed by the RAWPs and design change order procedures.

9.1 CQAP CHANGES

GE, the CM, SM, or CQAO may initiate revisions to this CQAP. The CQAP may be revised when it becomes apparent that the CQAP procedures or controls are inadequate to support work being produced in conformance with the specified quality requirements or are deemed to be more excessive than required to support work being produced in conformance with the specified quality requirements. Changes to QA procedures necessitating modification to this CQAP will be initiated by the CQAO for CM and GE approval. EPA review and approval will then be accomplished as described in Section 8, EPA Approvals. Updates to CQAP staffing will be made by GE notification to EPA as described in Section 2.3 without submission of a fully revised CQAP.

9.2 QC CHANGES

The contractor's CQCP required by Technical Specification 01450 may require revisions as necessary to correct unsatisfactory performance. At any time after approval by the CM, GE and the CM may require the contractor to make changes to the CQCP, including personnel changes, as necessary to obtain the quality specified. Moreover, the contractor may initiate CQCP changes to correct QC process problems, and is required to notify the CM in writing of any desired changes; all changes are subject to GE and CM acceptance. Revisions to the CQCP will not be submitted to EPA for approval.

SECTION 10

FINAL REPORTING

The following quality related documents will be generated during Phase 1 FSWC and PEI and will be submitted to EPA as part of the Phase 1 Work Completion Report:

- record (as-built) drawings;
- operation and maintenance manuals; and
- results of the Start-up and Testing Plan and the Commissioning Plan implemented for each major piece of equipment or system before system turnover, in accordance with Specification 01810.

Construction QC/QA Plan

SECTION 11

REFERENCES

- Blasland, Bouck & Lee, Inc. 2006. *Phase 1 Final Design Report – Hudson River PCBs Superfund Site* (including Contract drawings and specifications). March, 2006
- Parsons. 2005. *GE Response to US EPA Region 2 Consent Order Item 10b Parsons Commercial Technology Group Inc. Quality Management Plan (QMP)*. October 7, 2005.
- Parsons. 2007. *Remedial Action Work Plan for Phase 1 Facility Site Work Construction - Hudson River PCBs Superfund Site*. January, 2007
- United States Environmental Protection Agency. 2002. *Superfund Record of Decision*. February 1, 2002.
- United States Environmental Protection Agency and General Electric Company. 2003. *Administrative Order on Consent for Hudson River Remedial Design and Cost Recovery*. Index No. CERCLA-02-2003- 2027.
- United States Environmental Protection Agency and General Electric Company. 2005. *Consent Decree in United States v. General Electric Company*, Civil Action No. 1:05-cv-1270, lodged in United States District Court for the Northern District of New York October 6, 2005; final judgment entered November 2, 2006.

ATTACHMENT 1
CQAP STAFFING LIST AND RESUMES

Construction QC/QA Plan

CQAP STAFFING LIST

Construction Quality Control/Quality Assurance Plan (CQAP)
Phase 1 Facility Site Work Construction
Hudson River PCB's Superfund Site

Revision: 0, Date: 1-26-07

The following personnel are assigned CQAP functions effective as indicated below. Periodic updates to this chart are to be issued by the Construction Manager.

FUNCTION	NAME	ORGANIZATION
Construction QA Officer	Ziad A. Nabulsi	CM
Field Inspector	(TBD)	CM
Field Inspector	(TBD)	CM
QA Field Inspector	(TBD)	CM

/s/ Larry Hartman
CM Approval

1-26-2007
Date

Firm
Parsons

Years of Experience
24

Education

- University of Alabama, Birmingham, 1983: Bachelor of Science in Civil Engineering
- ISO 9001:2000 Lead Auditor Course Certificate No. 4573341-26429
- Certificate of Quality Assurance and Quality Control in Transit Projects – 2005
- Training Certificate from Corp of Engineers “Construction Quality Management for Contractors 2001
- Training Certificate - “ OSHA update Seminar” 1995
- Training Certificate - “ 100% Fall Management” 1994
- Certificate of Completion “ NUCA Competent Person” 1994: NUCA Confined Space Entry Program
- Courses for Computer (PC), Windows XP, MS Office 2000

Affiliations

- American Society of Civil Engineers

Special Skills

- Fluent in Arabic, English.

ZIAD A. NABULSI

Senior Quality Assurance Engineer

Summary of Relevant Qualifications

Senior Quality Assurance Engineer/Civil Engineer/ construction with over twenty years of experience in construction of commercial, municipal, and transportation works, to include: concrete structures, paving, underground utilities, earthen structures and tunnels. Conducts internal project technical quality audits and presents audit reports to management and the project team. Prepares the audit checklists; conducts the pre-audit meeting; issues findings (when required); prepares and issues the final audit report, recommending opportunities for improvement; and follows up to verify that the appropriate corrective actions have been completed.

Work Experience Selected Projects

Senior Quality Assurance Engineer/QA Manager

PARCOMM & PTG/ South Corridor Light Rail project- Charlotte, NC

Conducting internal project technical quality audits and presents audit reports to management and project team. Responsible for scheduling audits; preparing the audit checklists; conducting the pre-audit meeting; issuing findings (when required); preparing and issuing the final audit report, recommending opportunities for improvement; and following up to verify that the appropriate corrective actions have been completed. Responsibilities include implementation and maintenance of design quality management plan and procedures; auditing of design QA/QC activities to ensure conformance with the project requirements and certifying that all design submittals have been processed in accordance with the project quality management plan.

Senior Quality Assurance Engineer – Responsible for conducting quality assurance audits for the following programs and projects:

- Northrop Grumman Ship Systems - Construction Management - Facility Modernization Gulfport & Pascagoula MS. And New Orleans, LA.
- Evaluation of alternatives for South Effluent Treater (SET) Shell Project - Environmental Remediation Project – Houston, TX.
- EMAAR Development Project, Emirates Hills, Construction Management- Dubai, UAE.
- Wastewater treatment and reuse system at Amgen’s Juncos - Construction Performance Support Services - Puerto Rico biotech plant.

Project Manager/Civil Engineer

Parsons Infrastructure and Technology-TSSC III; Atlanta, GA

Manage the Pre-Bid and Pre-Construction Meetings in conjunction with scheduling engineer availability during the startup of construction, and estimating the cost requirements. Ensures compliance with ISO 9001 procedures by implementing policies and programs through Quality Control. Conduct quality audits of field project/job sites to ensure the Contractor's approach is fully satisfactory and compliant with the contract. Also conduct internal office quality audits.

Civil Engineer

Lockheed-Martin Services; Atlanta, GA

Prime consulting assignment as a civil engineer responsible for evaluating the readiness and condition of Federal Aviation Administration (FAA) facilities implementing newer airway management platforms. Duties included nationwide travel, to numerous airport facilities to evaluate, trouble-shoot, and plan improvements for system repairs, building renovations and new construction.

Field Engineer/ Quality Control Engineer

Parsons Constructors Inc., Newport, IN

Responsible for field oversight of Quality Control procedures for Parsons and subcontractor work force. Reviewed and interpreted design drawings and specifications to ensure current revision level and correct technical execution of work. Provided progress data to Resident Engineer and Construction Manager. Responded to subcontractor RFI's maintained As-Built drawings verified and approved monthly pay applications.

Civil Superintendent/ Quality Control Engineer

PARSONS Communications; Atlanta, GA

Managed construction of civil, structural, and architectural works for \$63 million, AT&T Web Hosting Facility. Managed subcontractor work force. Inspected progress of work for conformance to contract documents. Devised and implemented field corrections to design errors, impact issues, and unforeseen conditions. Responded to subcontractor RFIs, reviewed submittals, maintained As-Built drawings, Quality Control, verified and approved monthly pay applications, evaluated and processed change orders.

Civil and Structural Inspector/Quality Control

Desmear Systems, Inc. and Parsons Brinkerhoff/Tudor

Responsible for monitoring quality activities in accordance with contract documents. Coordinated surveys and material testing of soils, concrete, paving, structural steel, and architectural finishes.

APPENDIX A

SAMPLE QUALIFICATION TEST SCHEDULES

Construction QC/QA Plan

TABLE A-1

Example Qualification Test Schedule

Onsite Borrow Materials

Test Parameter	Test Method	Minimum QC Testing Frequency by contractor	Acceptance Criteria (verified by QA)
Soil Classification	ASTM D2487	1 per 1,000 cubic yard and source change	GW, GP, GM, GC, SW, SP, SM, SC, or ML
Atterberg Limits	ASTM D4318	1 per 1,000 cubic yard and source change	In accordance with Section 02205
Grain- Size Distribution	ASTM D422 or C136	1 per 1,000 cubic yard and source change	In accordance with Section 02205. Article 2.01.I
Moisture Content	ASTM D2216/ D2974	1 per 1,000 cubic yard and source change	In accordance with Section 02201 through 02205 and Section 02911

Notes:

1. Borrow soil must be from approved on-site borrow source with test results provided in Section 02205. Any change in material must be consistent with approved material characteristics as determined by CM. New moisture content curves will need to be plotted for change in material.
2. Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

Construction QC/QA Plan

TABLE A-2

**Example of Qualification Test Schedule
Aggregate Materials**

Test Parameter	Test Method	Minimum QC Testing Frequency by Contractor	Acceptance Criteria (verified by QA)
<i>Coarse Aggregate</i>			
Grain-Size Distribution	ASTM D422 or C136	1 per stockpile and source change	In accordance with table in Article 2.01B in Section 02205
Moisture Content	ASTM D2974	1 per stockpile and source change	As reported for establishing the range of optimum moisture content
Compaction Characteristics	ASTM D1557	1 per stockpile and source change	As reported for establishing the range of optimum compaction
<i>Fine Aggregate</i>			
Grain-Size Distribution	ASTM D422 or C136	1 per stockpile and source change	In accordance with table in Article 2.01 B in Section 02205
Moisture Content	ASTM D2974	1 per stockpile and source change	As reported for establishing the range of optimum moisture content
Compaction Characteristics	ASTM D1557	1 per stockpile and source change	As reported for establishing the range of optimum compaction

Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

TABLE A-3

**Example Qualification Test Schedule
Cementitious Materials**

Test Parameter	Test Method	Minimum QC Testing Frequency by Contractor	Acceptance Criteria (verified by QA)
<i>Portland Cement</i>			
Chemical & Physical Requirements	ASTM C150	Prior to use in concrete mix in absence of material certification	In accordance with tables in ASTM C150 for Type II Low Alkali
<i>Fluidized Bed Ash</i>			
Chemical & Physical Requirements	ASTM C311	Prior to use in concrete mix in absence of material certification	In accordance with tables in ASTM C311 for Class F material, except loss on ignition shall not exceed 4%

Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors.

TABLE A-4

Example Qualification Test Schedule
Stone Aggregate Materials

Test Parameter	Test Method	Minimum QC Testing Frequency by Contractor	Acceptance Criteria (verified by QA)
Sieve Analysis	ASTM C136; C33 and as required by NYSDOT Specification 703.02	Prior to use in concrete mix and whenever character or source is changed	Max coarse aggregate size of No. 57 or 67 gradation per ASTM C33. Fine aggregate shall pass No. 4 sieve, gradation to conform with ASTM C33 and NYSDOT as specified in Article 2.01- C in Section 03001
Organic Impurities	ASTM C40	Prior to use in concrete mix and whenever character or source is changed	Fine aggregate not darker than reference standard color per ASTM C40. Sand exhibiting a color darker than the referenced color shall be rejected.
Soundness	ASTM C33	Prior to use in concrete mix and whenever character or source is changed	Loss resulting after 5 cycles not to exceed 8% for coarse aggregate or 10% for fine aggregate when using sodium sulfate solution or 11% for coarse aggregate or 14% for fine aggregate when using magnesium sulfate per ASTM C33
Abrasion	ASTM C131	Prior to use in concrete mix and whenever character or source is changed	Loss not to exceed 10.5% after 100 revolutions, 42% after 500 revolutions
Deleterious Materials	ASTM C33	Prior to use in concrete mix and whenever character or source is changed	In accordance with tables in ASTM C33

Construction QC/QA Plan

TABLE A-4 (cont.)

Example Qualification Test Schedule Stone Aggregate Materials

Test Parameter	Test Method	Minimum QC Testing Frequency by Contractor	Acceptance Criteria (verified by QA)
Material Finer Than 200 Sieve	ASTM C117	Prior to use in concrete mix and whenever character or source is changed	Not to exceed 1% for gravel or 1.5% for crushed aggregate per ASTM C33
Alkali Reactivity	ASTM C227	Prior to use in concrete mix and whenever character or source is changed	Aggregates considered innocuous in accordance with ASTM C289
Cleanliness and Sand Equivalent	NYSDOT Specification 703.02	Prior to use in concrete mix and whenever character or source is changed	Quality not less than 75 for average of three identical samples nor less than 70 for an individual sample

Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

Construction QC/QA Plan

TABLE A-5

**Qualification Test Schedule
Concrete Mix**

Test Parameter	Test Method	Minimum QC Testing Frequency by Contractor	Acceptance Criteria (verified by QA)
Compressive Strength	ASTM C39	Preliminary testing of mix design; test at 28 days	Min 5000 PSI Min 4000 PSI Min 3000 PSI Min 2500 PSI
Water/Cement Ratio		Preliminary testing of mix design	Limit to 0.35, 0.45, 0.58 and max by weight accordance with section 03001 article 2.05
Slump Test	ASTM C143	1 per batch prior to pouring concrete	All concrete not containing a high range water-reducing admixture (super plasticizer) shall conform to these Max. slump values: Reinforced concrete-general 4", Non-reinforced concrete 3", pavement, sidewalk 3", Slab on grade 3" and Floor toppings 2".

Notes

1. Preliminary testing of the mix design will be performed by Construction Contractor's Independent Testing Laboratory (Third Party lab services).
2. This table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

APPENDIX B
SAMPLE INSPECTION SCHEDULES

Construction QC/QA Plan

TABLE B-1

**EXAMPLE INSPECTION SCHEDULE
ONSITE BORROW MATERIALS**

PLACEMENT

Inspection Parameter	Minimum QC Inspection Frequency by Contractor	Acceptance Criteria (verified by QA)
Soil Texture and Color	Continuous	Similar to approved material
Presence of Foreign Objects and Materials	Continuous	Free of visible contamination, organic material, rubbish, debris, and other unsatisfactory materials
Maximum Clod Size	Continuous	No fragments larger than 3-inch that will not breakdown under hand compression.
Equipment Size and Type	Daily	In accordance with approved Work Plan
Method of Placement	Daily	In accordance with approved Work Plan
Lift Thickness for Earthen Berm	1 per lift	First lift 12-inch max. loose, subsequent lifts 8-inch max. loose, final lift 4-inch max loose, hand placed lifts 3-inch max. loose
Lift Thickness for all other applications	1 per lift	Max. 8-inch loose per lift

Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

Construction QC/QA Plan

TABLE B-2

**EXAMPLE OF INSPECTION SCHEDULE
AGGREGATE PLACEMENT**

Inspection Parameter	Minimum QC Inspection Frequency by Contractor	Acceptance Criteria (verified by QA)
<i>Coarse Aggregate</i>		
Material Characteristic	Continuous	NYSDOT Type 2, may include up to 50% of reclaimed materials
Maximum Size	Continuous	1 ½-inch
Equipment Size and Type	Daily	In accordance with approved Work Plan
Method of Placement	Daily	In accordance with approved Work Plan
Lift Thickness	1 per lift	8-inch loose per lift
<i>Fine Aggregate</i>		
Material Characteristic	Continuous	NYSDOT Type 2, may include up to 50% of reclaimed materials
Maximum Size	Continuous	¾-inch
Equipment Size and Type	Daily	In accordance with approved Work Plan
Method of Aggregate Placement	Daily	In accordance with approved Work Plan
Lift Thickness	1 per lift	Min. 8-inch loose per lift

Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

TABLE B-3

EXAMPLE OF INSPECTION SCHEDULE
STEEL H- PILES (ASTM A 36/ A 36M)

Inspection Parameter	Minimum QC Inspection Frequency by Contractor	Acceptance Criteria (verified by QA)
Material Condition	Upon receipt at Site	Inspect piles for excessive camber and sweep and damage before transporting them from the storage area to driving area. Max permissible camber and / or sweep shall be 2-inch over the length of the pile.
Equipment Size and Type	Daily	In accordance with approved Work Plan, the impact hammers shall be steam, air or diesel-power pile hammers of single-acting, double-acting. The rate driving energy of hammers shall be limited to minimum of 30,000 foot-pounds. The refusal criteria, hard driving in excess of 20 blows per 25mm inch and accordance with Section 02315 Article 3.01.
Alignment	After driving each production pile	A final variation in rotation of the pile about the center line of the web of not more than 7.5 degrees will be permitted. A vertical deviation of not more than 1-inch from the correct cutoff elevation shown will be permitted.
Heave Checks	After driving first pile group and on selected pile groups as directed by CM's Geotechnical Engineer	Max 1-inch heave, otherwise re-drive piles to original elevations
Production Piles	After driving each production pile	Piles damaged or not located properly or exceeding the maximum limits for rotation, lateral and vertical deviation, or variation in alignment shall be pulled and new piles re-drive, or provide additional piles, at a location directed at no additional cost to the Owner.

1. Inspection will be performed by Contractor QC and verified by CM staff & QA staff.
2. This schedule is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors.

TABLE B-4

**EXAMPLE OF INSPECTION SCHEDULE
REINFORCING, FORMWORK AND CAST-IN-PLACE CONCRETE**

Inspection Parameter	Minimum QC Inspection Frequency by Contractor	Acceptance Criteria (verified by QA)
Reinforcing Material Condition	Upon receipt at Site	No visible defects or damage, no unscheduled kinks or bends
Reinforcing Bundle Identification	Upon receipt at Site	Bundled and tagged with information as specified in Section 03200
Reinforcing Material Storage	Daily	In accordance with Manufacturer's recommendations & approved Work Plan
In-Place Reinforcing	Prior to closing forms and continuous during pouring	In accordance with approved Work Plan, free of old mortar, oils, mill scale and other encrustations or coatings
In-Place Formwork	Prior to pouring of concrete	In accordance with approved Work Plan; no excess water, hardened concrete, debris or foreign materials inside of forms, wet wood forms sufficiently to tighten up cracks
Concrete Truck	Upon arrival at Site	Load accompanied by weightmaster bonded certificate, water container full, water added to concrete mixture in accordance with Section 03301
Subgrade Preparation	Prior to pouring of concrete	Fine grade earth and aggregate smooth and level

Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

Construction QC/QA Plan

TABLE B-4 (cont.)

**EXAMPLE OF INSPECTION SCHEDULE
REINFORCING, FORMWORK AND CAST-IN-PLACE CONCRETE**

Inspection Parameter	Minimum QC Inspection Frequency by Contractor	Acceptance Criteria (verified by QA)
Concrete Placement	Continuous during pouring of concrete	In accordance with approved Work Plan, height of concrete drop not to exceed 5 feet, place and compact within 60 minutes after water is first added, do not place after evidence of initial set
Equipment Size and Type	Continuous during pouring of concrete	In accordance with approved Work Plan
Concrete Lift Thickness	Continuous during pouring of concrete	Max. 18 inches per lift in continuous approximately horizontal layers
Maximum Deviation	Continuous during compaction of concrete	1/4-inch from 10-foot straightedge for exposed finishes, no low spots to impound water
Formed Concrete Curing	Daily during curing of concrete	Forms maintained in wet condition until removed, concrete continuously moist for min of 7 days after pouring
Formed Concrete Finishing	After finishing of concrete	Fill holes and patch surfaces in accordance with Section 03301
Slabs and Flatwork Curing	Daily during curing of concrete	Concrete continuously wet for entire curing period

Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

APPENDIX C
SAMPLE TEST SCHEDULES

Construction QC/QA Plan

TABLE C-1

**EXAMPLE OF TESTING SCHEDULE
ONSITE BORROW MATERIAL PLACEMENT**

Test Parameter	Test Method	Minimum QC Testing Frequency by Contractor	Acceptance Criteria (verified by QA)
Compaction for Earthen Berm	ASTM D1557	1 per lift	90% max. dry density in accordance with ASTM D1557
Compaction for all other applications	ASTM D1557	1 per lift	95% max. dry density in accordance with ASTM D1557
In-Place Density	ASTM D2922/ or D1556	1 per compacted lift but not less than 1 per 2,500 SF	In accordance with ASTM 2922
In-Place Moisture Content	ASTM D3017	1 per compacted lift but not less than 1 per 2,500 SF	+/- 2% of optimum moisture content in accordance with Attachments 02200-1 through 02200-4

1. Borrow soil must be from approved on-site borrow source with test results provided in Section 02200. Any change in material must be consistent with the approved material characteristics as determined by the Construction Manager. New moisture content curves will need to be plotted for change in material
2. Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

Construction QC/QA Plan

TABLE C-2

EXAMPLE TESTING SCHEDULE AGGREGATE MATERIAL PLACEMENT

Test Parameter	Test Method	Minimum QC Testing Frequency by Contractor	Acceptance Criteria (verified by QA)
<i>Coarse Aggregate</i>			
Compaction	ASTM D1557	1 per compacted lift	95% max. dry density in accordance with ASTM D1557
In-Place Density	ASTM D2922	1 per compacted lift	In accordance with ASTM D2922
In-Place Moisture Content	ASTM D3017	1 per compacted lift	+/- 1% of optimum moisture content in accordance with ASTM D3017
<i>Fine Aggregate</i>			
Compaction	ASTM D1557	1 per compacted lift	95% max. dry density in accordance with ASTM D1557
In-Place Density	ASTM D2922	1 per compacted lift	In accordance with ASTM D2922
In-Place Moisture Content	ASTM D3017	1 per compacted lift	+/- 1% of optimum moisture content in accordance with ASTM D3017/ D2974

Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

Construction QC/QA Plan

TABLE C-3

**EXAMPLE TESTING SCHEDULE
STEEL H-PILES**

Test Parameter	Test Method	Minimum QC Testing Frequency by Contractor	Acceptance Criteria (verified by QA)
Load Test	ASTM D1143	Prior to driving production piles	A compressive load of 300% of design load shall be applied to each compressive load test pile.

Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

Construction QC/QA Plan

TABLE C-4

**EXAMPLE TESTING SCHEDULE
CONCRETE**

Test Parameter	Test Method	Minimum QC Testing Frequency by Contractor	Acceptance Criteria (verified by QA)
Compressive Strength	ASTM C39	1 per 50 CY or fraction thereof from each day's placing; test at 7 and 28 days	Min 5000 psi Min 4000 psi Min 3000 psi Min 2500 psi
Air Content	ASTM C231 or C172	When compression test cylinders are cast	In accordance with ASTM C231 or C172
Slump Test	ASTM C143	When compression test cylinders are cast	In accordance with ASTM C143. Slump values: Reinforced concrete-general 4 inches, Non-reinforced concrete 3 inches, pavement, sidewalk 3 inches, Slab on grade 3 inches and Floor toppings 2 inches.

Note: this table is for illustration only and is not intended to replace or modify contract specifications that will form the basis of actual CQCP submittals by contractors

APPENDIX D
TYPICAL CONSTRUCTION FORMS

Construction QC/QA Plan

The following typical forms are included in this appendix:

- D-1 Daily Construction Report
- D-2 Quality Inspection Report
- D-3 Receiving Inspection Report (Not Used)
- D-4 Field Inspection Checklist – Earthwork
- D-5 Field Inspection Checklist – Solidification
- D-6 Field Inspection Checklist – Structural Steel Erection
- D-7 Daily Concrete Inspection Report
- D-8 Concrete Placement Checklist
- D-9 Field Inspection Checklist – Placing, Consolidation, Finishing, Curing and Repair of Concrete
- D-10 Field Inspection Checklist – Pre-Cast and Cast-in-Place Concrete Piles
- D-11 Field Inspection Checklist – Critical Piping
- D-12 Electrical Inspection/Test Sheet – Ground Rod Earth Resistance Test
- D-13 Electrical Inspection/Test Sheet – Ground Grid Earth Resistance Test
- D-14 Electrical Inspection/Test Sheet – Light Installation
- D-15 Electrical Inspection/Test Sheet – Combination Starter, PB and Selector Switches Control System Components
- D-16 Electrical Inspection/Test Sheet – Continuity Test of all Fixture Bodies to Ground
- D-17 Electrical Inspection/Test Sheet – Cable Test Procedures
- D-18 Electrical Inspection/Test Sheet – Conduit and Junction/Outlet Boxes Installation
- D-19 Electrical Inspection/Test Sheet – Cable and Cable Accessories/Panelboard/Wiring Devices
- D-20 Electrical Inspection/Test Sheet – Electrical Service and Distribution System
- D-21 Electrical Inspection/Test Sheet – Molded Case Circuit Breaker Test Record

Construction QC/QA Plan

- D-22 Electrical Inspection/Test Sheet – Cable Test Record
- D-23 Electrical Inspection/Test Sheet – Motor Test Record
- D-24 Inspection Notification Form
- D-25 Non-conformance Report
- D-26 Non-conformance Report Log
- D-27 Contractor Non-Conformance Letter (Sample)

The format, layout, content and method used to fill out the forms will be reviewed periodically during the course of construction and modified as required to ensure that the necessary information required for management of the construction contracts and controlling the progress and quality of the work is being obtained.

CONTRACTOR: _____ REPORT NUMBER: _____

TYPE OF INSPECTION: Preparatory Inspection. Initial Inspection. Follow-up Inspection. Completion Inspection.

DESCRIPTION/INTENT OF INSPECTION: _____

COMPONENTS/MATERIALS REVIEWED: _____

CONTRACTOR PERSONNEL CONTACTED: _____

APPLICABLE CONTRACTOR PROCEDURES, CHECK LISTS, INSTRUCTIONS: _____

RESULTS OF INSPECTION: _____

DEFICIENCIES NOTED: _____

RECOMMENDED CORRECTIVE ACTION: _____

NON-CONFORMANCES: _____

QA Inspector Signature:

Date:

PURCHASE ORDER _____ C.O. _____ REPORT NUMBER _____
 SPECIFICATION _____ REV. _____ DRAWING _____ REV. _____
 SUPPLIER _____ ITEM _____ QUANTITY _____

DOCUMENTATION

DOCUMENTS COMPLETE PER CONTRACTUAL REQTS: _____ LEGIBLE: _____
 DOCUMENTS TRACEABLE TO ITEMS REC'D: _____ STAMPED BY SURV. REP: _____
 LIST DOCUMENT PKG. DISCREPANCIES (IF ANY): _____

RESOLUTION: _____

DOCUMENT PKG. ACCEPTABLE: _____ QC SIGNATURE: _____
 DATE: _____

REMARKS: _____

PHYSICAL INSPECTION

CHECK LIST NO: _____ ITEMS PROPERLY TAGGED/MARKED: _____

ENTER SERIAL AND/OR HEAT NO: _____

RESULTS OF INSPECTION: _____

DEFICIENCY NO. (IF ANY): _____ DEFICIENCY RESOLVED: _____

INSPECTION ACCEPTABLE TAG ATTACHED: _____

QC SIGNATURE: _____ DATE: _____

PARSONS		Job Number	Project	Page of
Field Inspection Checklist Earthwork				1/2
CONTRACTOR: _____ CONTRACT NO: _____				
REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____				
ATTRIBUTE			YES	NO
<u>A</u>	<u>GENERAL</u>			
1.	Is area released for work?			
2.	Is equipment adequate?			
3.	Are existing structures and utilities adequately protected?			
4.	Is removed material properly dispositioned?			
5.	Dust and dirt control:			
	a) Haul routes maintained for dust control – by water or chemicals?			
	b) All paved areas kept clean?			
<u>B</u>	<u>EXCAVATION OF TRENCHING</u>			
1.	Does completed depth and configuration comply with drawings and specifications?			
2.	Required shoring and bracing in place?			
3.	Existing utilities protected?			
<u>C</u>	<u>PLACING AND COMPACTING FILL</u>			
1.	Excavation properly compacted and verified by test lab?			
	a) All sleeves, pipe cable, grounding, conduit installed and approved?			
2.	Approved fill material is used?			
3.	Is fill being placed in level lifts within thickness limits?			
4.	Is proper compaction attained and verified by test lab?			
5.	Have contaminated (and spongy) areas been cut out, filled and compacted with approved material?			
<u>D</u>	<u>BEDDING AND BACKFILL OF PIPE AND UTILITY TRENCHES</u>			
1.	Approved bedding and backfill material is used?			
	a) Is bedding fully compacted to support pipe or utility at line, grade, and slope required and verified by inspector?			
<u>E</u>	<u>GRADING</u>			
1.	Approved grading material used?			
	a) Final shaping/compacting and blade and 3-wheel rollers of 8-10 ton?			
2.	Sufficient slope for positive drainage away from structures to drainage system?			

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

ATTRIBUTE		YES	NO	N/A
3.	Is rough grading reasonably even and free of irregularity and allowance made for finish grading?			
4.	Is finished grade: a) Cleaned of all loose and foreign material? b) Smooth and even in profile (= 1" in 10') and not more than 1" from true elevation?			

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

CONTRACTOR: _____ CONTRACT NO: _____
 REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

ATTRIBUTE		YES	NO	N/A
<u>A</u>	<u>GENERAL</u>			
1.	Is area released for work?			
2.	Is equipment adequate?			
3.	Adequate dust control maintained?			
4.	Appropriate mix proportions?			
5.	Appropriate mixing time and speed?			
<u>B</u>	<u>SAMPLING AND TESTING</u>			
1.	Collection, curing and testing in accordance with requirements?			

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

PARSONS		Job Number	Project	Page of
Field Inspection Checklist				1/2
Structural Steel Erection				
CONTRACTOR: _____		CONTRACT NO: _____		
REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____				
ATTRIBUTE		YES	NO	N/A
<u>A</u>	<u>STORAGE</u>			
1.	Storage provided adequate? Drainage provided?			
2.	Steel properly blocked and stacked?			
3.	Evidence of excessive rusting?			
4.	Faying surfaces properly protected?			
5.	High strength bolting segregated from common fasteners?			
<u>B</u>	<u>BOLTING</u>			
1.	Bolts, nuts, washers square with mating surface?			
2.	No paint or foreign material on contact surfaces?			
3.	Correct material and size used on high strength connections?			
4.	Evidence of distorted metal or enlarged bolt holes from improper alignment?			
5.	Evidence of enlarging holes by burning?			
6.	High strength bolts torqued to specification requirements?			
7.	Means provided to indicate which joints/bolts have been torqued? Torque wrench periodically calibrated?			
8.	Status of completed high strength connections recorded on drawings and appropriate records?			
<u>C</u>	<u>ERECTION</u>			
1.	Members accurately shimmed, wedged, plumbed and aligned prior to final connection?			
2.	Shims used are actual shim stock?			
3.	Entry holes through members are authorized by drawing?			
4.	Anchor bolts proper size, setting and location?			
<u>D</u>	<u>WELDING</u>			
1.	Welders, weld procedures qualified to requirements of AWS D1.1, Structural Welding Code, Section 5?			
2.	Qualifications records available – maintained?			
3.	Correct weld wire, size and type, used?			
4.	Correct weld machine settings used?			
5.	Weld joints properly prepared, aligned, free from cracks, scale, grease, etc. prior to welding?			

PARSONS Field Inspection Checklist Structural Steel Erection	Job Number	Project	Page of 2/2
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CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

ATTRIBUTE		YES	NO	N/A
6.	Root opening tolerances not exceeded?			
7.	Pre-heat and interpass temperature requirements complied with?			
8.	Repair of defective welds performed to approved weld procedure requirements?			
9.	Completed welds meet the visual and dimensional requirements?			
10.	Weld filler material returned to storage at close of shift?			
11.	Records for weld inspection prepared and retained?			
	<u>E</u> <u>PAINTING</u>			
1.	Temporary braces, clips, etc. removed prior to painting or field touch-up?			
2.	Weld splatter, slag removed prior to touch up?			
3.	Damaged paint area properly prepared and touched up?			
4.	Correct primer used?			

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

CONTRACTOR: _____

SPECIFIC LOCATION: AREA OR BUILDING _____ LIFT NO: _____

STATION: _____ TO STATION: _____ OFFSET: _____

T/OFFS: _____ ELEVATION: _____ TO ELEV: _____

CONCRETE TYPE: _____ MIX NO: _____ ADDITIVES: _____

TYPE OF DELIVERY: _____

DELIVERY EQUIPMENT IDENTIFICATION/NUMBER: _____

PLACEMENT STARTED: DATE _____ TIME _____ SHIFT _____

PLACEMENT COMPLETED: DATE _____ TIME _____ SHIFT _____

WEATHER CONDITIONS: _____

TOTAL CONCRETE PLACED: _____

TOTAL CONCRETE WASTED: _____ REASON: _____

BATCH TICKET NOS: _____

AVERAGE SLUMP: _____ TEMPERATURE: _____ % AIR CONTENT: _____

TEST CYLINDERS PREPARED: _____

TRUCK IDENT: _____ TOTAL CYLINDERS: _____ CYL IDENT: _____

TYPE CONVEYANCE USED: _____

SURFACE CONDITION PRIOR TO PLACING: _____

MAXIMUM FREE FALL OF CONCRETE: _____ PROPER CONSOLIDATION: _____

AMOUNT VIBRATORS: _____ VIBRATORS IDENT/RPM: _____

DISCHARGE POINTS: NUMBER _____ LOCATION _____

REINFORCING DISTURBED/REPLACED/REPAIRED: _____

TYPE FINISH SPECIFIED: _____

FINISHING STARTED: DATE _____ TIME _____ SHIFT _____

FINISHING COMPLETED: DATE _____ TIME _____ SHIFT _____

CONDITION OF FINISH: _____

TYPE OF CURING: _____

DELAYS (INDICATE TYPE AND REASON: PERSONNEL, EQUIPMENT OR PLANNING): _____

OBSERVATIONS/REMARKS: _____

CONCRETE INSPECTOR: _____ DATE: _____

CONTRACTOR _____

SPECIFIC LOCATION: AREA OR BUILDING _____ LIFT NO. _____ SHIFT _____

STATION _____ TO STA. _____ OFFSET _____

T/OFFS. _____ ELEVATION _____ TO ELEV. _____

CONCRETE TYPE _____ MIX NO. _____ ADDITIVES _____ COMPUTED QTY _____

LOCATION SKETCH – PROVIDE SPECIAL DIRECTIONS, DETAILS, FLOW DIRECTION, ETC.**REPLACEMENT VERIFICATION**

1. ELECTRICAL SUPERVISOR: ITEMS TO BE CHECKED

CABLES/GROUND WIRE CONDUIT BOXES OTHER

COMPLETE/ACCEPTABLE TO DRAWING _____ REV. _____

SIGNATURE _____ DATE _____

2. MECH./PIPING SUPERVISOR: ITEMS TO BE CHECKED

MECHANICAL INSERTS PIPING SLEEVES MECH. FRAMES OTHER

COMPLETE/ACCEPTABLE TO DRAWING _____ REV. _____

SIGNATURE _____ DATE _____

3. CIVIL/STRUCT. SUPERVISOR: ITEMS TO BE CHECKED

ROCK CROSS SECTIONS TAKEN ROCK SURFACES PREPARED SCREEDS SET LINE AND GRADE ESTABLISHED FORMSREINFORCING STEELALIGNMENT BRACING/SHORING CORRECT SIZE/GRADE LOCATION INTERIOR SURFACE RELEASE AGENT LAPS. ADEQ. SECURED LEAN CONSTRUCTION JOINTS PREPARED WATER STOPS WIRE TIES/Form RODS PLACEMENT/CONSOLIDATION EQUIPMENT AVAILABLE/ADEQUATE SAFETY PRECAUTIONS OBSERVED ICE, SNOW, WATER REMOVED FINAL CLEANING ACCEPTABLE

COMPLETE/ACCEPTABLE TO DRAWING _____ REV. _____

SIGNATURE _____ DATE _____

QUALITY CONTROL INSPECTION VERIFICATION

SIGNATURE _____ DATE _____

OBSERVATIONS/REMARKS _____

AUTHORIZATION FOR PLACEMENT _____

CONSTRUCTION MANAGER

DATE

PARSONS		Job Number	Project	Page of
Field Inspection Checklist				1/2
Placing, Consolidation, Finishing, Curing and Repair of Concrete				
CONTRACTOR: _____		CONTRACT NO: _____		
REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____				
ATTRIBUTE		YES	NO	N/A
<u>A</u>	<u>PLACING</u>			
1.	Pre-placement checklist completed? Placement authorized?			
2.	Concreting surfaces cleaned, moistened when required?			
3.	Conveying equipment suitable for placement?			
4.	Conveying equipment clean, properly maintained?			
5.	Vertical drop limits not exceeded?			
6.	Horizontal layers not exceeding two-feet in depth?			
7.	Flow of placement per sketch details?			
<u>B</u>	<u>CONSOLIDATION</u>			
1.	Vibrators previously tested and approved?			
2.	Systematic pattern used during vibration?			
3.	Vibrators:			
	a) Penetrating previous layer?			
	b) Not used for horizontal movement of concrete?			
	c) Withdrawn slowly?			
	d) Not over vibrating?			
<u>C</u>	<u>FINISHING</u>			
1.	Surface top properly screened, when required?			
2.	Finishing tools used for intended purpose?			
3.	Desired finish obtained? Even, smooth and level?			
4.	Joints, edges, corners properly finished?			
<u>D</u>	<u>CURING</u>			
1.	Forms left in place per construction specifications requirements?			
2.	Curing operations started immediately, adequate?			
3.	Curing protection periodically checked and maintained?			
4.	Curing is continuous to specified length of curing process?			
5.	Traffic and loading over surfaces controlled during curing?			

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

ATTRIBUTE		YES	NO	N/A
<u>E</u>	<u>REPAIR</u>			
1.	Surfaces inspected? Serious defects documented?			
2.	Cosmetic repairs made?			
3.	Structural defects repaired in accordance with approved procedures?			

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

PARSONS Field Inspection Checklist Pre-Cast Concrete Piles		Job Number	Project	Page of 1/2
CONTRACTOR: _____		CONTRACT NO: _____		
REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____				
ATTRIBUTE		YES	NO	N/A
1.	Receipt inspection performed including: a) Dimensions? b) Visual? c) Material test reports for cement, concrete, reinforcing steel, shells, mix test reports, etc.? d) Reinforcing steel for spacing, clearance, size, dowel and tendon extensions?			
2.	Piles properly handled, stored, and placed?			
3.	Safety conditions observed?			
4.	Contractors approved procedures complied with?			
5.	Test piles required? Driven? Definition of refusal understood, pre-drilling required? Jetting allowed?			
6.	Proper protection, pre-cautions taken for adjacent structures, utilities?			
7.	Piles properly placed, sequenced according to plan, and plumb?			
8.	Splices properly prepared, completed?			
9.	Piles driven without interruption, driven to required depth to obtain bearing capacity?			
10.	Piles, shells damaged during driving? Mis-aligned? Over-driven? Tops deformed?			
11.	Inside properly cleaned, cross section verified, bottom interior cleaned of loose materials?			
12.	Concrete delivery method approved? (tremie, pump, limited free fall)			
13.	Concrete fill placed in single, uninterrupted operation?			
14.	Top of pile properly consolidated?			
15.	Volume of concrete properly measured and checked?			
16.	Concrete properly cured, protected from freezing and physical damage?			
17.	Piles cut-off to specified elevation? Cut-off level?			
18.	Load test (if required) performed to approved procedures?			
19.	Load test results evaluated, approved?			
20.	Contractor's Daily Report includes: a) Identification of Contractors Supervisory personnel? b) Pile type, length, splices, location, calculated safe load? c) Penetration under last five hammer blows?			

PARSONS Field Inspection Checklist Pre-Cast and Cast-In-Place Concrete Piles	Job Number	Project	Page of
			2/2

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

ATTRIBUTE		YES	NO	N/A
21.	d) Unusual conditions, obstructions, replaced piles, etc.? e) Results of tests, if any? Inspectors records include: a) Make, model of hammer b) Energy source c) Weight of striking parts d) Height of fall of striking parts e) Weight of pile f) Blows per unit of penetration			

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

PARSONS		Job Number	Project	Page of
Field Inspection Checklist				1/2
Critical Piping – Assembly – Inspection – Test				
CONTRACTOR: _____		CONTRACT NO: _____		
REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____				
ATTRIBUTE		YES	NO	N/A
<u>A</u>	<u>STORAGE</u>			
1.	Assemblies, fittings, etc. stored/protected per procedure requirements?			
2.	Pipe caps and plugs taped in place?			
3.	Assemblies properly shored to prevent damage/deterioration?			
4.	Material segregated, when required?			
<u>B</u>	<u>IN-PROCESS</u>			
1.	Welders qualified, certified? Qualification records current?			
2.	Welders using qualified procedure?			
3.	Weld wire control adequate? Correct type and size?			
4.	Welding machine settings within procedure requirements?			
5.	Welders applying individual identification on welded joints?			
6.	Unused weld wire returned to proper storage?			
7.	Weld preps per ANSI B31.1 and procedure requirements?			
8.	Weld root opening within tolerance?			
9.	Weld joint alignment within tolerance?			
10.	Pre-heat applied properly?			
11.	Visual and dimensional inspection performed?			
12.	Heat treatment performed to procedure requirements?			
13.	Weld adequately prepared for nondestructive examination?			
14.	NDE performed, evaluated, documented to procedure requirements?			
15.	NDE operator qualified/certified? Qualification records current?			
16.	Defective welds adequately repaired, retested and records updated?			
17.	Open pipe ends protected during and after installation?			
18.	Valves, valve internals protected during welding?			
<u>C</u>	<u>FINAL</u>			
1.	Bolted flanges:			
	a) Face to face opening consistent?			
	b) Gasket properly compressed?			

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

	ATTRIBUTE	YES	NO	N/A
	c) Bolts/studs correct material?			
	d) Bolts/studs completely engaging nuts?			
2.	Completed weld records properly filed, maintained?			
3.	Authorized Inspector notified of ASME designated hold points?			
4.	System properly prepared and supported for hydrostatic testing?			
5.	ASME Code Data Report completed? Approved by authorized inspector?			
6.	Temporary attachments removed after hydrostatic testing? System restored to normal?			
7.	Completed system cleaned per specification and procedure requirements?			

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

GROUND ROD EARTH RESISTANCE TEST PROCEDURE (FALL OF POTENTIAL METHOD)

1. After ground rods are installed to the correct depth measure the earth resistance of each individual rod.
2. Install and connect reference electrodes and test equipment as per manufacturer's test procedure.
3. Measure earth resistance and record below.
4. Maximum acceptable earth resistance as per Specification Section 19690 is 25 ohms.

GROUND ROD EARTH RESISTANCE TEST RESULTS

SERVICE: _____ LOCATION: _____

EQUIPMENT NO: _____ RFI NO: _____

CONNECTED: _____ DATE: _____

TEST EQUIPMENT USED:

MAKER: _____ AMBIENT TEMP: _____

MODEL NO: _____ HUMIDITY % RH: _____

RANGE: _____ WEATHER: _____

SERIAL NO: _____

TEST RESULTS:

TEST ITEMS	EARTH RESISTANCE	REMARKS

Maximum Earth Resistance for Ground Rod = 25 ohms

QC SIGNATURE: _____ DATE: _____

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

GROUND GRID EARTH RESISTANCE TEST PROCEDURE (FALL OF POTENTIAL METHOD)

1. After ground rods and ground conductors installation is completed and interconnected, measure the earth resistances of the grounding grid.
2. Install and connect reference electrodes and test equipment as per manufacturer's test procedure.
3. Measure earth resistance of ground grid and record below.
4. Maximum acceptable earth resistance as per Specification Section 16960 is 1 ohm.

GROUNDING GRID EARTH RESISTANCE TEST RESULTS

SYSTEM: _____ LOCATION: _____

EQUIPMENT: _____ RFI NO: _____

CONNECTED: _____ DATE: _____

TEST EQUIPMENT USED:

MAKER: _____ AMBIENT TEMP: _____

MODEL NO: _____ HUMIDITY % RH: _____

RANGE: _____ WEATHER: _____

SERIAL NO: _____

TEST RESULTS:

TEST ITEMS	EARTH RESISTANCE	REMARKS

Maximum Earth Resistance for Interconnected Grounding System = 1 ohms

QC SIGNATURE: _____ DATE: _____

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

ATTRIBUTE		YES	NO	N/A
1.	Installed lighting fixtures comply with fixture schedule drawing?			
2.	Lighting fixture location is correct as shown on the design approved shop drawing?			
3.	Lighting fixture and fittings are installed correctly and tightly as specified in the specification?			
4.	Lighting fixture fitted with fuse holder and enclosure cover?			
5.	Cable wire color code is correct and identification tags installed at panel board?			
6.	Continuity and grounding test completed?			
7.	All wire entries are sealed with a non-setting sealant?			
8.	Lighting photo cell control is correctly installed?			

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

ATTRIBUTE		YES	NO	N/A
1.	Equipment/components installed per approved drawings and material submittals?			
2.	Equipment/components installed at correct location and elevation?			
3.	Cable/wire color code correct and tagging identification installed?			
4.	Control wiring connected per approved drawing?			
5.	Auto-off-manual selector operation is correct?			
6.	Panel/door grounding checked?			

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

INSTRUMENT USED: _____ LOCATION: _____

CIRCUIT NO.	FIXTURE NO.	CABLE ROUTE		FIXTURE BODY TO GROUND	REMARKS
		TO	FROM		

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

INSULATION RESISTANCE WITH ABSORPTION INDEX TEST PROCEDURE

1. The test equipment shall be connected properly.
2. The voltage of 500V held for a period of one (1) minute and results recorded below.
3. Each conductor is to be measured to ground and to the three other conductors.
4. The test shall be performed after cable installation and terminations are completed and witnessed by the QA Engineer.
5. The absorption index is calculated as: Absorption Index = 60 sec IR reading / 30 sec IR reading
6. The insulation resistance shall be compared for similar results of the other conductors and feeders.

INSULATION RESISTANCE WITH ABSORPTION INDEX TEST RESULTS

FEEDER NO: _____ CABLE SIZE: _____

CORE	LENGTH (KM)	TIME (SEC)	VOLTAGE (KV)	ABSORPTION INDEX	R1 (G-OHM)	R'1 (G-OHM/KM)
L1 TO GND		30	0.5			
		60	0.5			
L2 TO GND		30	0.5			
		60	0.5			
L3 TO GND		30	0.5			
		60	0.5			
N TO GND		30	0.5			
		60	0.5			
L1 TO L2, L3, N		30	0.5			
		60	0.5			
L2 TO L1, L3, N		30	0.5			
		60	0.5			
L3 TO L1, L2, N		30	0.5			
		60	0.5			
N TO L1, L2, L3		30	0.5			
		60	0.5			

AMBIENT TEMP: _____ HUMIDITY: _____

TEST INSTRUMENT: _____ MANUFACTURER: _____

REMARKS: _____

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

CONDUCTOR PHASING TEST PROCEDURE

1. Conductors are identified color code.
2. Phasing checks are to be performed when the cable installation is completed and before conductors are terminated.
3. Conductors are to be phase checked individually.
4. Confirm the phasing of each conductor with a continuity tester (ohmmeter).
5. Conductors not under test must be clear of ground.
6. Test results will be recorded below.

CONDUCTOR PHASING TEST RESULTS

FEEDER NO: _____ CABLE SIZE: _____ CABLE LENGTH: _____

PHASE CHECKING TO BE CARRIED OUT BEFORE STARTING ANY OTHER TEST:

TEST	PHASE	CONNECTION	RESULT (OK/NOT OK)
1	L1	L1 EARTHED L2 UNEARTHED L3 UNEARTHED N UNEARTHED	
2	L2	L1 UNEARTHED L2 EARTHED L3 UNEARTHED N UNEARTHED	
3	L3	L1 UNEARTHED L2 UNEARTHED L3 EARTHED N UNEARTHED	
4	N	L1 UNEARTHED L2 UNEARTHED L3 UNEARTHED N EARTHED	

TEST INSTRUMENT: _____ MANUFACTURER: _____

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

PARSONS Electrical Inspection / Test Sheet Conduit and Junction / Outlet Boxes Installation	Job Number	Project	Page of 1/1	
CONTRACTOR: _____ CONTRACT NO: _____ REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____				
ATTRIBUTE		YES	NO	N/A
<u>A</u>	<u>SUPPORTS</u>			
1.	Conduit adequately supported?			
2.	Support alignment checked?			
<u>B</u>	<u>CONDUITS</u>			
1.	Installed conduits in accordance with shop drawing in a workman like manner?			
2.	Bends free of damage?			
3.	Oxide inhibitor used on threaded connection?			
4.	Conduit & fittings correct size & type?			
5.	Identification of conduits installed?			
<u>C</u>	<u>JUNCTION / OUTLET BOXES</u>			
1.	Boxes installed are the correct size & type?			
2.	Boxes are properly supported and installed at correct elevation?			
3.	Proper identification on box?			
4.	Pull/splicing box installed at accessible location?			
<u>D</u>	<u>GROUNDING</u>			
1.	Metallic conduit solidly grounded?			
2.	Conduit grounding bushing installed?			
3.	Pull boxes and junction conduit grounded?			
4.	Bonding wire grounding connections completed?			
REMARKS: _____ _____ _____				
QC SIGNATURE: _____		DATE: _____		

PARSONS Electrical Inspection / Test Sheet Cable & Cable Accessories / Panelboard / Wiring Devices	Job Number	Project	Page of 1/1
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CONTRACTOR: _____ CONTRACT NO: _____
 REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

ATTRIBUTE	YES	NO	N/A	
1.	Panelboard installed at proper elevation and circuit breaker accessories provided are per approved drawings and submittals?			
2.		Installed wiring devices and plates with approved material submittals?		
3.		Cable wire correct size and type?		
4.		Low voltage power cable in outlet box and panelboard properly connected?		
5.		Cable size color code is correct and identification tags are installed at panelboard/outlet boxes?		
6.		Installed terminal lugs are correct size and application?		
7.		All conduit and outlet boxes and panelboard properly grounded?		
8.		Continuity and grounding test complete?		
9.		Circuit index directory installed inside panelboard?		

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

CONTRACTOR: _____ CONTRACT NO: _____

REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____

MOLDED CASE CIRCUIT BREAKER RECORD

PANEL BOARD NO: _____ LOCATION: _____

CABLE NO: _____ CABLE SIZE: _____

1.0 CIRCUIT BREAKER DATA:

1.1 MANUFACTURER _____

1.2 TYPE _____ AMPERE

1.3 THERMAL STRIP SETTING _____ AMPERE

1.4 INSTANTANEOUS MAGNETIC TRIP RANGE _____

2.0 CONNECTED LOAD DATA:

2.1 MANUFACTURER _____

2.2 NUMBER OF MOTOR / TRANSFORMERS _____

2.3 TOTAL KVA / KW / HP _____

2.4 VOLTAGE _____ VOLTAGE

2.5 RATED FREQUENCY _____ HZ

2.6 FULL LOAD CURRENT (FLC) _____ AMPERE

3.0 TRIP SETTINGS:

3.1 THERMAL () FIXED

() VARIABLE

3.2 MAGNETIC () % FLC

() AMPERES _____

REMARKS: _____

QC SIGNATURE: _____ DATE: _____

PARSONS		Job Number	Project	Page of 1/1			
Electrical Inspection / Test Sheet							
Molded Case Circuit Breaker Test Record							
CONTRACTOR: _____		CONTRACT NO: _____					
REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____							
EQUIPMENT IDENTIFICATION							
UNIT NO:		EQUIPMENT NO:					
CIRCUIT NO:		EQUIPMENT NAME:					
LOAD RATING:		FULL LOAD AMPS:					
EQUIPMENT NAMEPLATE DATA							
MANUFACTURER NAME:		THERMAL TRIP RATING:					
FRAME TYPE:		MAGNETIC TRIP RATING:					
FRAME SIZE:							
TEST DATA							
SPECIFIED MAGNETIC TRIP SETTING:			MAGNETIC TRIP RATING:				
TEST RESULTS		PHASE A		PHASE B		PHASE C	
		AS FOUND	AS LEFT	AS FOUND	AS LEFT	AS FOUND	AS LEFT
LTD	CURRENT						
	TRIP TIME						
STD	CURRENT						
	TRIP TIME						
MIN. TRIP	CURRENT						
	TRIP TIME						
MEGGER TO FRAME							
MEGGER LINE TO LOAD							
CONTACT RESISTANCE							
ACCESSORIES							
<input type="checkbox"/>	Short Trip	<input type="checkbox"/>	Auxiliary Switch	<input type="checkbox"/>	Mechanical Lock Out	<input type="checkbox"/>	Trip/Close Indicator
<input type="checkbox"/>	UV Release	<input type="checkbox"/>	Mechanical Interlock	<input type="checkbox"/>	Key Lock Out	<input type="checkbox"/>	Trip/Close Lights
<input type="checkbox"/>	Reverse Current Trip	<input type="checkbox"/>	Electrical Interlock	<input type="checkbox"/>	Bell Alarm	<input type="checkbox"/>	Motor Operated Mech
<input type="checkbox"/>	Ground Current Limiter	<input type="checkbox"/>	Electrical Lock Out	<input type="checkbox"/>	Current Limiting Fuses	<input type="checkbox"/>	Field Discharge Contact
REMARKS: _____							

QC SIGNATURE: _____				DATE: _____			

PARSONS Electrical Inspection / Test Sheet Cable Test Record	Job Number	Project	Page of 1/1			
CONTRACTOR: _____ CONTRACT NO: _____ REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____						
EQUIPMENT IDENTIFICATION						
UNIT NO:		EQUIPMENT NO:				
CIRCUIT NO:		EQUIPMENT NAME:				
CABLE DATA						
MANUFACTURER NAME:		TRADE NAME:				
YEAR MANUFACTURED:		YEAR INSTALLED:				
SIZE:	NO. OF COND.:	INSUL. CLASS KV:				
TYPE OF INSULATION: <input type="checkbox"/> RUBBER(LIKE) <input type="checkbox"/> VARNISH/CAMBRIC <input type="checkbox"/> PAPER <input type="checkbox"/> OTHER SPECIFY						
TYPE OF SHEATH OR JACKET:		EST. LENGTH OF RUN:				
SHIELDED <input type="checkbox"/> YES <input type="checkbox"/> NO		TYPE OF DUCT:				
NUMBER OF CABLES PER DUCT:		MOISTURE CONDITIONS IN DUCT:				
NUMBER OF CONDUCTORS:		PER SHEATH	PER PHASE			
TEST DATA						
TEST EQUIPMENT MANUFACTURER AND TYPE:						
TEST VOLTAGE:		KV A.C.	KV D.C.			
		TIME:	MIN.			
WEATHER CONDITIONS:						
TEST TYPE:	<input type="checkbox"/> BEFORE INSTALL. <input type="checkbox"/> AFTER INSTALL. <input type="checkbox"/> ROUTINE					
CURRENT READINGS (MICRO – AMPS D.C. OR AMPS A.C.)						
MINUTES	PH	PH	PH	PH	PH	PH
1/2						
1						
2						
3						
5						
10						
FAILURES	PHASE	KV	CURRENT	TIME		
REMARKS: _____						
QC SIGNATURE: _____ DATE: _____						

PARSONS				Job Number	Project	Page of 1/1
Electrical Inspection / Test Sheet						
Motor Test Record						
CONTRACTOR: _____			CONTRACT NO: _____			
REFERENCES (DRAWING, SPECIFICATION, PROCEDURE): _____						
EQUIPMENT IDENTIFICATION						
UNIT NO:			EQUIPMENT NO:			
CIRCUIT NO:			EQUIPMENT NAME:			
EQUIPMENT NAMEPLATE DATA						
MANUFACTURER NAME:			SERIAL NO.:		FRAME:	
TYPE:		CODE:	DUTY:		MODEL:	
S.F.:	H.P.:		R.P.M.	VOLTS:		AMPS:
INNER BEARING NO.:			OUTER BEARING NO.:			
TEST DATA						
MEGGER		HIGH POTENTIAL			WINDING RESISTANCE	
TEST EQUIPMENT:		TEST EQUIPMENT:			TEST EQUIPMENT:	
TEST VOLTAGE:		TEST VOLTAGE:			WINDING TEMP.:	
WEATHER:		WEATHER:			WEATHER:	
TEST TYPE: <input type="checkbox"/> BEFORE INSTALL.		TEST TYPE: <input type="checkbox"/> BEFORE INSTALL.			TEST TYPE: <input type="checkbox"/> BEFORE INSTALL.	
<input type="checkbox"/> AFTER INSTALL.		<input type="checkbox"/> AFTER INSTALL.			<input type="checkbox"/> AFTER INSTALL.	
<input type="checkbox"/> ROUTINE		<input type="checkbox"/> ROUTINE			<input type="checkbox"/> ROUTINE	
<input type="checkbox"/> WITH CABLES CONNECTED		<input type="checkbox"/> WITH CABLES CONNECTED			<input type="checkbox"/> WITH CABLES CONNECTED	
<input type="checkbox"/> WITHOUT CABLES CONNECTED		<input type="checkbox"/> WITHOUT CABLES CONNECTED			<input type="checkbox"/> WITHOUT CABLES CONNECTED	
TIME (MIN)	MEGOHMS	TIME (SEC)	CURRENT			RESISTANCE (OHMS)
1/2		15			A - B	
1		30				
2		45			B - C	
3		60				
5		90			C - A	
10		120				
POLARITY INDEX 10/1					FIELD	
REMARKS: _____						

QC SIGNATURE: _____			DATE: _____			

CONTRACTOR: _____ DATE: _____

TYPE OF INSPECTION REQUESTED: _____

DATE AND TIME OF INSPECTION REQUESTED: _____

LOCATION OF INSPECTION REQUESTED: _____

OTHER COMMENTS: _____

CONTRACTOR SIGNATURE: _____ DATE: _____

CONTRACTOR

REPORT NO.

DATE

SPECIFICATION/DRAWING NO.

ITEM

PART I – To be completed by the inspector who detects a deviation.

DESCRIPTION OF NON-CONFORMANCE:

RECOMMENDED DISPOSITION:

USE AS IS REWORK REPAIR SCRAP

SIGNED _____

DATE _____

PARSONS FIELD ENGINEER

PART II – To be completed by the contractor who proposed the corrective action.

DESCRIPTION OF PROPOSED CORRECTIVE ACTION:

SIGNED _____

DATE _____

CONSTRUCTION ENGINEER

PART III – To be completed by the Engineer of Record.

RECOMMENDATION AND REMARKS:

Proposed corrective action status:

Approved Rejected

SIGNED _____

DATE _____

ENGINEER OF RECORD

PART IV – QUALITY CONTROL DISPOSITION (To be determined by QC System Manager (Construction Engineer))

DECISION AND DISPOSITION INSTRUCTIONS:

USE AS IS REWORK REPAIR SCRAP

SIGNED _____

DATE _____

PARSONS FIELD ENGINEER

SIGNED _____

DATE _____

PARSONS CONSTRUCTION MANAGER

PART V – ENGINEERING DISPOSITION

METHOD OF APPROVALS:

 TELEPHONE MEMORANDUM TELEX SPEC. CHANGE DRAWING CHANGE

CONVEYED BY

 PROJECT MANAGER

DATE _____

 PROJECT MANAGER

DATE _____

PART VI – DISPOSITION VERIFICATION

 CORRECTIVE ACTION WAS ACCOMPLISHED ON _____

SIGNED _____

DATE _____

PARSONS FIELD ENGINEER

SIGNED _____

DATE _____

PARSONS CONSTRUCTION MANAGER

CONTRACTOR

NCR No.	CONDITION DESCRIPTION	ORIGINATOR	DATE RECORDED	DATE TO CONTRACTOR	PROPOSED CORRECTIVE ACTION BY CONTRACTOR	PROPOSED APPROVED BY ENGINEER	DISPOSITION DATE	DISPOSITION VERIFICATION BY

Construction QC/QA Plan

PARSONS Contractor Non-conformance Letter (Sample)	Job Number	Project	Page of 1/1
<p>Attention: _____</p> <p>Subject: Non-conformance Report No. _____</p> <p>Gentlemen:</p> <p>The attached Non-conformance Report (NCR) details discrepancies on your contract.</p> <p>Please review and take appropriate action to remedy this situation, also changing any procedures, methods and/or personal necessary to preclude similar problems in the future. Your attention is specifically drawn to Item 10, disposition date.</p> <p>We are available to discuss the attached with you.</p> <p>Very truly yours, PARSONS</p> <p>_____</p> <p>Construction Manager</p> <p>cc: Program Manager Project Manager Construction Manager Quality Assurance Department Contract File</p>			