

Utilities Project Construction Quality Plan

FOD-Utilities High Voltage

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New



THE OHIO STATE UNIVERSITY

Utilities Project Construction Quality Plan

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1.0 Purpose for Construction Quality Plan

The electrical distribution system is critical for the ongoing operations of the University. Because of the critical nature of the planned improvements, it is extremely important for the construction contractor to follow and abide by the contract documents and assure construction meets the specifications and the quality requirements for the project.

The purpose of this Construction Quality Plan is to detail the construction quality requirements of the Construction Contractor during the procurement of materials, acceptance of switches and other materials from OSU, during the installation of materials and equipment, and for construction of all improvements. This Construction Quality Plan conveys the OSU Utilities expectations for job quality. It is a minimum set of requirements and as such is not a substitute for the contractor own Quality Program. The Contractor shall conform to the requirements of the plan and put what ever quality procedures in place as are required to assure the timely, orderly, safe and efficient execution their responsibilities under the construction contract.

2.0 Definitions

- **BDS** – Building Design Standards published by OSU.
- **UTHVS** – OSU Utilities High Voltage Shop
- **Critical Tasks** – Activities that are critical by nature of their relationship to electrical service continuity, or the safety of personnel and equipment
- **Field Change** – A modification to the execution of the design as shown on the contract documents necessitated by field conditions, work efficiency or constructability concerns that stay within the contracted scope of work.
- **Scope Change** – A modification to the execution of the design as shown on the contract documents that is intended to add features not included in the project's original scope and the contracted scope of work.
- **Construction Manager** – responsible for overall coordination of inspection, documentation, owner's representative services and field services at the site; Employee or designee of the A/E Associate.

3.0 Roles and Responsibilities

3.1 A/E Associate

The A/E Associate (engineer) is responsible for design of the improvements and providing support during project construction. They are also responsible for other requirements of the consulting contract.

3.2 Contractor

The Contractor is responsible for constructing the improvements in accordance with the Contract Documents. The Contractor is also responsible assuring the overall work meets the quality requirements of the project. For subcontractors the contractor shall be responsible for coordination of work efforts, quality, and scheduling. Each Contractor shall be required to maintain schedules and communicate coordination for all subcontractors with OSU and A/E Associate.



3.3 The Ohio State University

OSU is responsible for enforcement action against the contractor for failure to comply with the Quality Control Plan. OSU sets requirements for quality and is the final authority when determining if quality requirements are being met by the project. Penalties for failure to comply with these guidelines will be outlined in the construction contract and may include work stoppage, or contract termination. OSU establishes policies for quality through various means including, but not limited to, the Service Connection Policy, BDS and the Project Construction Quality Control Plan. OSU determines if quality requirements are being adhered to by Contractor and A/E Associate.

4.0 Construction Planning

4.1 Contractor Qualifications and Personnel

4.1.1 **Dedicated Staff:** The Contractor shall provide a committed, quality staff to complete the work tasks in a quality manner and within the project schedule. The Contractor's site supervisors shall be available at the site to manage the project and provide a quality product to OSU. The key to delivering a quality product to OSU is providing a quality staff dedicated to quality work to complete the scope of the project.

4.1.2 **Certification and Training Requirements:** Copies of personnel certifications as required in the specifications shall be submitted prior to the start of construction at the site.

4.2 Review of Engineering Drawings and Plans

The Contractor shall be required to review engineering drawings, specifications and plans to completely understand the project scope of work. Any questions regarding the drawings, specifications or plans shall be submitted to the A/E Associate for clarification using the Request For Information (RFI) process listed below. It is the Contractor's responsibility to properly construct the project based on the Construction Drawings and Specifications provided.

4.3 Critical Equipment and Long Lead Materials

The Contractor shall be required to order long lead equipment and materials in time to accommodate the construction schedules. Documentation shall be required from suppliers to confirm that material orders have been submitted and delivery dates do not impede the construction schedule.

4.4 Procurement & Execution Plan

Contractor shall have a plan and strategies to execute a quality on time delivery of the project. The plan should include careful consideration of the following items: Plan preparation, staging, work out, Testing and Inspection, Turnover and Close Out.

4.5 Requests for Information (RFI) Process

The Contractor shall be required to submit RFI's in accordance with the Construction Contract. For the Switch and Cable Replacement project the Contractor shall submit RFI's utilizing the A/E Associates' project website when available. The A/E Associate



shall review the RFI and provide a response in a reasonable period of time. The goal for an RFI response shall be maximum seven days.

5.0 Submittals and Documentation

- The Contractor shall be required to provide submittals and documentation per the specific requirements of the Construction Contract.
- The Contractor shall provide accurate and quality submittals that meet specifications and properly identify equipment.
- The Contractor shall respond promptly to comments on submittals from OSU or A/E Associate.

5.1 Schedule and Requirements

5.1.1 Labor Forecasts: The Contractor shall be responsible to provide adequate labor to accommodate the project schedule. The Contractor shall be required to make determination of the labor requirements of each task and staff the project accordingly.

5.1.2 Construction Schedule: The Contractor shall be required to submit a detailed construction schedule. The Contractor is responsible to maintain the schedule throughout the course of construction. The schedule shall comply with the master schedule prepared by the A/E Associate and include critical work tasks including, but not limited to start date, outage dates and task completion per contract requirements.

5.1.3 Outage Coordination: The Contractor shall abide by the outage dates determined by OSU and the A/E Associate. The Contractor shall be required to outline outage durations for each phase of the project and include as an item in Construction Schedules.

5.1.4 Work Task Completion: The Contractor shall verify that the red-lined drawings accurately reflect the work performed at the site. These drawings shall be prepared as work progresses and reviewed upon project completion, or as required in the contract for partial work scope completion.

5.2 Submittal Review Process

The Contractor shall make submittals to the A/E Associate for initial review against contract requirements. The A/E Associate shall then provide copies to OSU for their review from an operations & maintenance standpoint.

5.3 Submittal Retention and Records

Submittals shall be retained by the A/E Associate for the duration of the project. All submittals shall be turned over to OSU as part of the project closeout.

5.4 Shop Drawing Review

Shop drawings shall be submitted to the A/E Associate for review and approval. The A/E Associate shall provide copies of the approved shop drawings to OSU for Final review and Approval.

5.5 Release for Construction

Shop drawings shall be released for construction upon final approval of the submittal by OSU. Copies of the approved drawings shall be maintained at the site for the duration of the project and made available for reference.

5.6 Use and Conformance by Contractor

Contractor shall provide materials and construction time and methods for project based on approved shop drawings. Only approved shop drawings shall be used at the site.

6.0 Material Management

6.1 Material Acceptance

6.1.1 OSU-Provided or 3rd Party Materials: Material received from OSU shall be documented to indicate description, date received, and intended use location.

6.1.2 Contractor Provided Materials: Only correct and accepted materials, parts, and components, including partially fabricated assemblies, shall be used or installed on projects. Material used shall comply with applicable requirements as stated in the contract specifications and drawings.

- Purchase requisitions, purchase orders, drawings, contract specifications, or instructions used to define the requirements of material shall be reviewed and approved prior to contractor procurement.
- All material shall be inspected for material condition and compliance prior to acceptance.
- Document(s) that furnish evidence of compliance shall be maintained by the Contractor
- Damaged or incorrect items shall be returned/exchanged as necessary.
- Used or reconditioned components and materials shall not be installed in permanent locations without the written approval of OSU Utilities (UTHVS)

6.2 Material Storage

6.2.1 OSU Provided Materials: All received material from OSU shall be properly stored and handled to avoid damage. Any materials lost, damaged or noted as unsuitable for use shall be documented and promptly reported to OSU and A/E Associate.

6.2.2 Contractor Provided Materials: All Contractor-received material shall be properly stored and handled to avoid damage. Material shall be inspected prior to installation. Any materials lost, damaged or noted as unsuitable for use, shall be documented.

6.3 Material Records

Material Records shall be prepared for all equipment purchases.

Material Records are to include manufacturer, serial numbers, description, in-service date, and any other information designated by OSU.



The A/E / Associate shall maintain Material Records for the Switch and Cable replacement Program. The Contractor shall maintain up to date material records to assist the A/E / Associate with installation support activities and for their records.

7.0 Configuration Management

- The Contractors shall follow the requirements of, and install in conformance with, the Construction Documents.
- Instruments, Controls, Mechanical and Electrical Equipment and their connections shall be field-labeled consistent with identification provided in the Construction Documents.
- The Contractor shall submit an RFI for any requested changes from the approved plans, drawings and specifications.
- Field initiated changes shall not be installed without prior written authorization by the A/E Associate and the University representative.
- All field changes shall be installed to approved drawings or sketches and incorporated as part of As-Built (redline) drawings.

8.0 Field Inspection and Coordination

8.1 Pre-Construction Inspection

The Contractor shall coordinate a walk-down of the site with OSU and the A/E Associate prior to commencement of new work tasks and the implementation of critical tasks. The pre-construction meeting shall take place as indicated in the Construction Specifications.

8.2 In-Process Inspections and Audits

The Contractor shall conduct Weekly progress meetings with the OSU and A/E Associate. See Section 14.3 of this document for In-Process duct bank inspections. The Project Management shall conduct periodic audits of the Contractor records to verify that the requirements of this manual are being followed. The contractor shall inspect the work product for quality, workmanship and completion prior to surrendering it for pre-energization inspection and testing by Utilities and others.

8.3 Pre-Energization Inspection

Follow UTVHS procedures for pre-energization inspection in the attached University Policy for Medium Voltage Electrical Service checklist.

8.4 Inspection Results

Inspections will be conducted by A/E Associate or OSU UTHVS to verify compliance with plans and specifications and provide a means for identifying and providing closure on non-conforming items.

The contractor shall review inspection results to confirm that required inspections and quality records have been completed; any identified nonconforming items have been identified and resolved; and all items conform to the specified requirements.

Inspection results shall be documented. Documentation shall be of sufficient detail to confirm completion of activities; results of the inspections; and identity of the items inspected. All documentation shall be provided to the A/E Associate.



8.5 Job and Critical Task Briefing

Contractor shall be required to schedule a briefing with Project Management and OSU prior to performing critical tasks at the site. The goal of the meeting will be to discuss job requirements and assure that a quality product will be delivered to OSU in a safe and reliable manner.

9.0 Design Change Control Process

9.1 Design Change Requests

The Contractor shall identify necessary scope changes and request scope changes using the RFI process established by the A/E Associate. RFI's shall be reviewed by the A/E Associate. A/E Associate shall accept change proposed by Contractor or propose other option with recommendation made to OSU for approval.

Design changes initiated by Contractor or A/E Associate shall be performed in compliance with the Quality Plan

9.2 Approval to Proceed

OSU shall issue written approval of Design Change to the Contractor with copy to the A/E Associate. No work shall be installed without this written approval.

10.0 Control Procedures for Nonconforming Conditions

10.1 Immediate Corrective Action

The Contractor shall alert the A/E Associate and OSU regarding any non-conforming conditions at the site. These items may include problems with construction plans, contract drawings, local site conditions, and equipment.

Contractor shall notify the Project Management of any problems with implementation or workmanship along with an assessment of the likely impact on work already performed.

10.2 Defect Reporting

Defects shall be reported in writing to the Project Management by the Contractor with copies to the A/E Associate and OSU.

10.3 Closure

Non-conforming Conditions shall be considered closed after the Contractor has received instructions and authorization to proceed and completed corrective action and the final product has been tested and approved by the A/E Associate and OSU.

11.0 Testing

11.1 Equipment Testing

Equipment testing shall be performed as indicated in the **Construction Specifications for Installation Quality Control Testing, Post Installation Testing, University Acceptance Process (15kV Cables), and Utilities Grounding – Electrical Practices** .



Factory testing for the switchgear shall be completed as indicated in the Construction Specifications for Factory Testing and in ANSI C37.72 and C57.12.28. All test reports shall be submitted to the A/E Associate.

Testing shall be performed by a qualified agency or qualified Contractor personnel and witnessed by OSU representative.

All test reports shall be submitted to the A/E Associate for re-transmittal to Utilities for approval.

11.2 Energization

All testing shall be completed and results approved by OSU and the A/E Associate before energization of the electrical components.

Procedures for energization shall follow the attached University Policy for Medium Voltage Electrical Service Connection. The Contractor is REQUIRED to follow these guidelines before energization shall occur.

All energization and switching to be conducted by OSU.

11.3 Test Record Retention

Test records for all Contractor-provided equipment shall be made readily available by the Contractor for OSU and the A/E Associate reference. The A/E Associate shall maintain Test Records such that they are available for OSU review on an as needed basis. Test Records shall be turned over to OSU at Project Close Out.

12.0 As-Built / Project Record Requirements

12.1 Field-Marked Construction Drawings

An up-to-date marked set of Field-Marked Drawings shall be maintained at the site in a secure location under the control of the Contractor. These mark-ups shall contain all changes to the original design as well as a record of all changes made to the design by the Contractor and all scope changes initiated by the contractor and the A/E Associate per the Contract Specifications related to As-Built (redline) Drawings. The Contractor shall deliver a copy of the Field-Marked drawings to the A/E Associate upon project completion. The original Field-marked Prints shall remain at site and available until a Record Drawing is produced by the A/E Associate and approved by OSU.

The redline drawings will become property of OSU upon project completion.

13.0 Work Acceptance

13.1 Punch List

A Punch List shall be generated by the A/E Associate and shall include any deficiencies identified by OSU as well as the Project Management.

13.2 Final Inspection

Final inspection shall include representatives from OSU, the Contractor and the A/E Associate per the construction contract. Final Inspection shall not be conducted until the A/E Associate has confirmed that all Punch List items have been completed.

14.0 Quality Control for Specific Work Tasks

14.1 Excavations

The Contractor shall design an excavation support and protection system for use in excavation operations per the Construction Specifications. Shop drawings for this system shall be reviewed by the A/E Associate and forwarded to OSU for Final Review and approval. The design shall be reviewed at the pre-installation conference at the project site. The Contractor shall be responsible for planning and installation of excavation support and protection systems. Excavation support systems should be monitored daily. Any evidence of bulges, breakage or movement should be promptly corrected.

The Contractor shall provide evidence that utility locates were requested to OSU per Contract Requirements. Contractor must take extreme care to protect existing utilities during the excavation operations.

Hold points shall be required for OSU inspection prior to cover of any improvements.

14.2 Vault Installation

The Contractor shall confirm correct size of vault and location of conduit penetrations prior to vault installation.

14.3 Duct Bank Installation

Duct bank installations shall be inspected to verify compliance with plans and specifications and approved by OSU UTHVS prior to encasement or cover. The Contractor must also coordinate with the OSU Utility Service Desk three working days (3) prior for GPS Locates prior to cover.

Duct Bank installations shall comply with Construction Plans and Specifications.

14.4 Switchgear Installation

The Contractor shall follow Manufacturer's guidelines for installation.

14.5 Cable Pulling

Cable cutting – The Contractor shall verify with the OSU UTHVS that circuits have been disconnected. The Contractor shall also test to verify that no voltage/current is applied to the cable before beginning any work. The Contractor shall use care to not damage cable that will be re-used.

Cable removal – The Contractor shall verify that cable is disconnected and that no voltage/current is applied to the cable before attempting to remove the cable. The Contractor shall use care when removing cable that the existing duct banks and ducts are not damaged during removal. Extreme methods of cable removal shall not be used. Contact the A/E Associate and OSU if cable is not able to be removed.

Cable Pulling – The Contractor shall use care when pulling in new cable. The Contractor shall follow manufacturer's recommended pulling tension and use pulling lubricant as to not damage the cable or the ducts during installation.



14.6 Terminations and Splices

The Contractor must provide documentation that the cable splicer is certified by the splice material manufacturer to install, splice, and terminate medium-voltage cable.

The Contractor must provide personnel certifications for UTHVS approval per the requirements of the contract.

All materials shall be Underwriter's Laboratories listed. All equipment and materials shall be applied in accordance with this listing.

The Contractor shall perform visual and mechanical inspection and electric tests as required in the Construction Specifications. All testing must be completed prior to energizing the cable.

All work shall be identified and labeled in conformance with the requirements of the contract documents.

Appendices

- A. Requests For Information (RFI) Form
- B. Equipment Installation, Tracking, and Stock-Release Forms
- C. Nonconforming Conditions Report Form
- D. Primary Electrical Service Checklist
- E. University Policy for Medium Voltage Electrical Service Connection