



District Standard Owner		
Position	Printed Name	Date
District Quality Manager	Steve Mahoney	6/17/2022

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POLICY

It is Kiewit Power Constructors' (KPC) policy to meet project requirements as defined by the contract documents and to adhere to corporate quality objectives. Our principal quality objectives are to meet or exceed client's expectations and to eliminate rework by performing our work "right the first time." We monitor our performance against these objectives and require continual improvement.

PURPOSE

The purpose of the Project Quality Plan (PQP) is to provide the project team with the resources and documents needed to execute the project in accordance with the contract requirements and the KPC quality policy. The references contained within this PQP will provide the user with all the supplemental information and documents needed to administer an effective project quality program.

SCOPE

The PQP applies to all work performed on KPC sponsored projects.

RESPONSIBILITIES

KPC's management team is responsible for providing vision, leadership, and direction to assure that all Quality objectives and goals are met. The management team shall provide for the support and maintenance of the Corporate Quality Management System (QMS), Policy, and goals for Continuous Improvement. They shall ensure that specific responsibilities and authorities are defined, assigned, and communicated within the organization. Whenever a reference is made to a department or title, it shall mean the department head or designee.

The Area Manager/Sponsor is responsible for effective oversight and compliance of the QMS on projects they are responsible for. They will:

- Provide leadership and direction to meet the QMS policy, goals, and objectives.
- Identify quality risks that could affect cost, schedule, and product quality
- Support goals for continuous improvement
- Provide leadership in maintaining excellence in customer satisfaction and reputation in the industry.
- Periodically reviews the implementation and effectiveness of the Project Quality Plan and takes corrective action as necessary.

The Corporate Quality Sponsor is responsible for ensuring effective implantation of the QMS in districts and on projects. They will:

- Train and deploy the QMS
- Ensure the field and project engineers are engaged and have the knowledge to inspect their work as quality control leaders
- Support DQMs that are in place and Districts without DQMs to identify and mitigate quality risks
- Sponsor project start-up and streamline creation of Project Quality Plans
- Coordinate quality assurance assessments
- Facilitate continuous improvement
- Provide leadership and direction to meet the QMS policy, goals and objectives and develop our quality culture





The District Quality Manager or Representative (DQM) is responsible for the managing the implementation of the QMS and for reporting to the DM status of adoption and effectiveness as any need for improvement. The DQM's will:

- Ensure promotion and awareness of client expectations and quality concerns throughout the district
- Maintain, update, and distribute standard quality documents
- Assist the Project Manager and Project Quality Manager and in the development of the Project Quality Plan (PQP)
- Provide technical support, procedures, certification documents as needed
- Maintain centralized records, and report to governing bodies as required
- Facilitate resolution of disputes between Project Quality Managers and Project Management with stop work authority when quality is in question
- Support and assist other departments such as Engineering, Kiewit Supply Network, Marketing, Estimating, etc. with quality requirements
- Manage special certifications or jurisdictional requirements

The Project Manager (PM) is responsible for the overall development, management, approval, and implementation of the PQP and ensures that it is communicated to staff and crews. They will:

- Monitor the plan's implementation and effectiveness and ensures that corrective action is taken when required
- Interacts with the client to ensure that quality expectations are being met
- Promote and develop the company quality culture and provide necessary support to the project quality team (PE, FE's, PQM, Inspectors), to ensure quality goals and expectations are maintained.

The Project Quality Manager or Representative (PQM/R) leads the development, implementation and verifies the effectiveness of the PQP and ensures corrective action is taken when required. The PQM/R shall develop and implement a project quality assurance program under the direction of the lead DQM or assigned Corporate Quality Sponsor. The following duties shall be performed or delegated:

- Monitor the implementation and effectiveness of the PQP and has the authority to revise as necessary with the concurrence of the PM and client (when required)
- Provide training to ensure project team understands roles and responsibilities
- Direct the activities of Quality Inspectors
- Ensure that inspections and tests are performed by operations to verify the work
- Ensure materials and plant equipment are in compliance with plans and specifications
- Review documentation of inspections and tests and coordinate distribution and filing
- Ensure that suppliers/subcontractors develop and implement quality plans and procedures as required and witness tests as necessary
- Lead the development of corrective/preventive action plans as required and verify that deficiencies are corrected
- Maintain liaison with the client's quality representative and ensure quality expectations are being met
 - Interface with governing bodies ensuring that requirements are met





The Project Engineer (PE) is responsible to ensure that work is completed per the contract and the applicable drawings, specifications, codes, and standards. They will:

- Ensure that work planning includes the required inspections and tests and time to verify the completeness of the work
- Provide direction to the field engineers to complete the in-process verifications and quality control inspections required prior to claiming quantities
- Ensure the field engineers are trained, supported, and empowered to ensure the work meets the requirements and escalate when it does not

The Field Engineer (FE) is responsible to perform in-process quality checks and verification to ensure work meets drawings, specification, and code requirements prior to claiming quantities. They will:

- Be trained, qualified and thoroughly understand the quality requirements and procedures related to the work they inspect
- Document the quality checks and verification they perform
- Participate in the development of the inspection and test plans (ITP's)
- Verify work packs have up to date information including all quality requirements
- Perform final walk down and closeout of work as it is completed
- Report and record quality issues

The Superintendent is responsible for building high quality work in strict compliance with the contract documents and Project Quality Plan. They will:

- Assist in the development of the Inspection and Test Plans
- Clearly communicate quality requirements and expectations to General Foreman, Foreman and Craftsmen and ensure understanding
- Monitor and inspect the work as it progresses for compliance to project quality requirements
- Coordinate with quality personnel to schedule quality training and final inspections of the work
- Lead continuous improvement efforts and ensure "Lessons Learned" are shared with the entire company
- Develop culture of "Pride in Workmanship"





CONTROL OF THE PQP

The Project Quality Plan is controlled.

Changes to the Tier 1 and 2 documents shall be coordinated through and made only by the DQM.

Changes to the Tier 3 and 4 documents shall be coordinated through and made only by the PQM.

Documents referenced in these sections may also be revised in accordance with the Quality Manual, as needed, to address project requirements, and may be made without revising the PQP in its entirety. The PQM will manage this document and distribute to the Project Management Team via Project Document Control procedures.

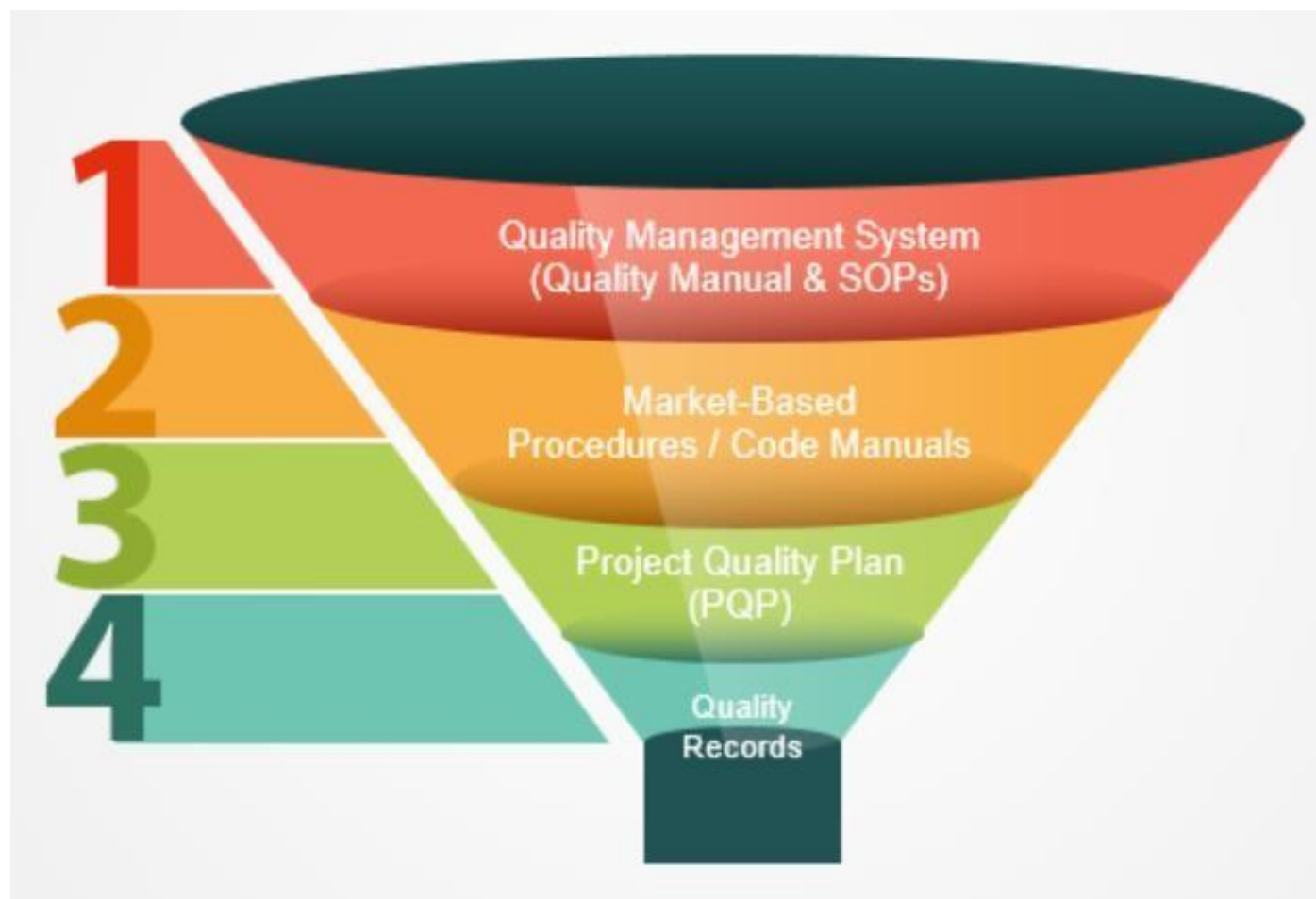


Figure 1. Control of the PQP



PROJECT QUALITY IMPLEMENTATION MODEL

The following diagram identifies the KPC's methodology to Plan, Execute, Assure and Improve the engineering, procurement and construction of our products and services. Each function of the model is described in detail in the following sections.

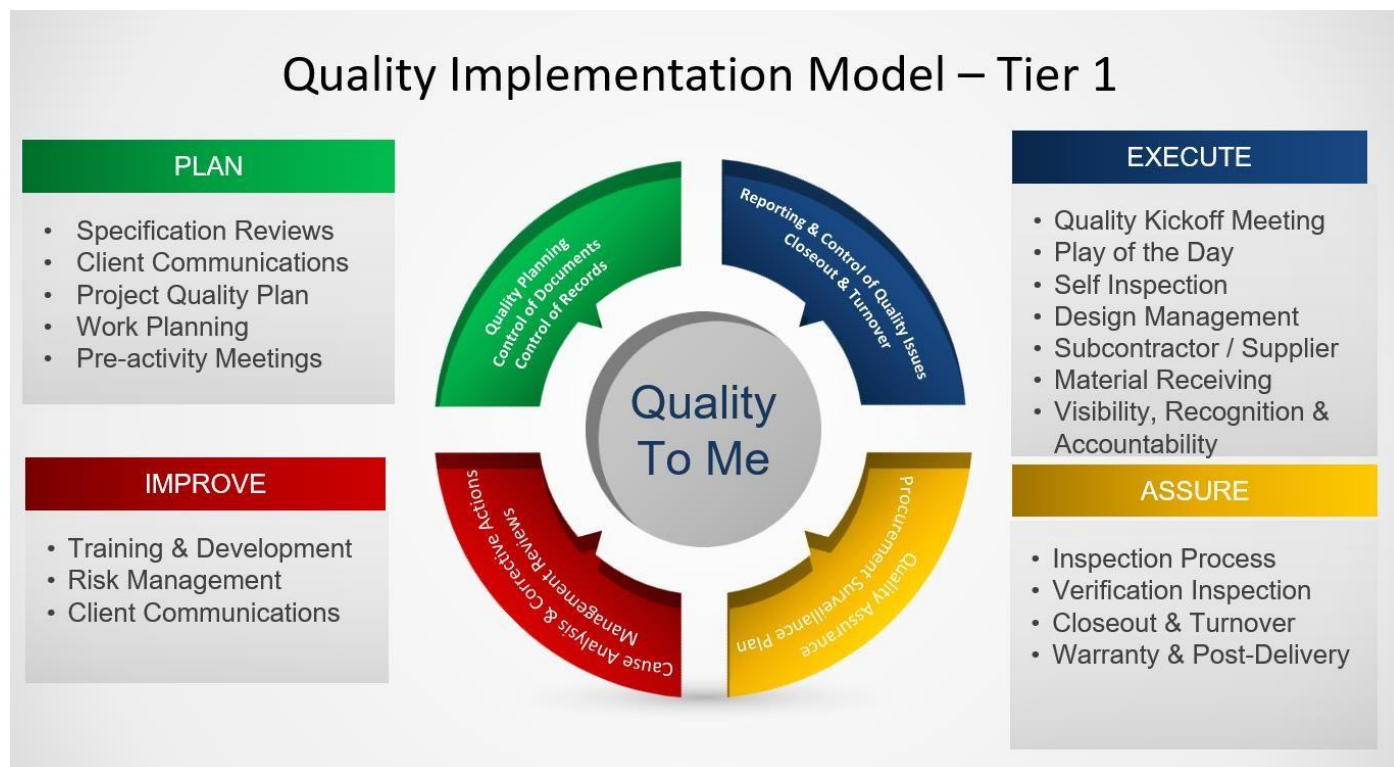


Figure 2. Quality Implementation Model- Tier 1



PLAN

One of the keys to a successful project is a well thought out and properly executed project quality plan. In accordance with SOP-01 Quality Planning & Execution (Tier 1), the planning phase of a project includes the following processes.

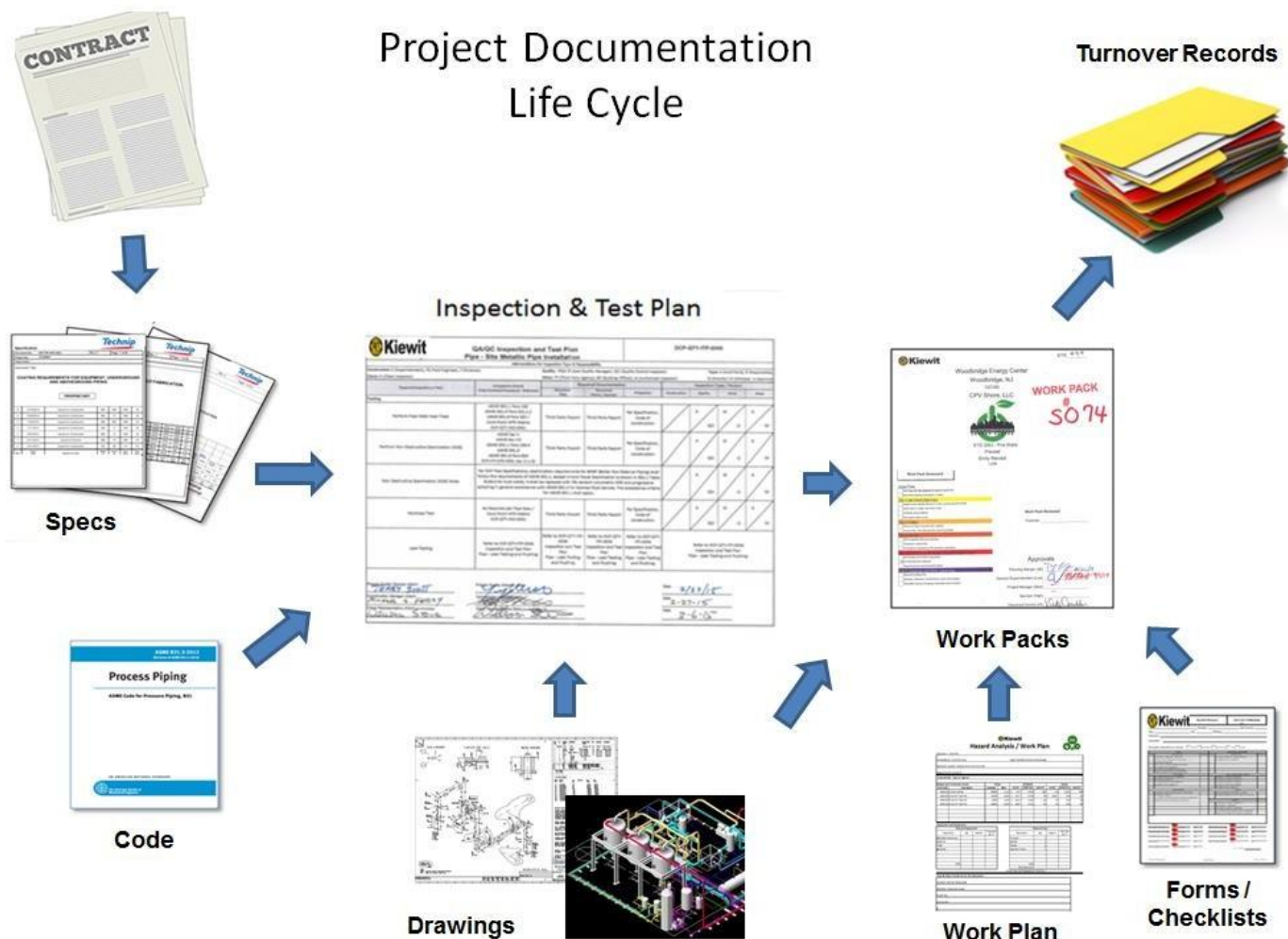


Figure 3. Project Documentation Life Cycle

Contract, Plans, and Specifications Review

A thorough review of contract documents identifies the contractual, statutory and regulatory requirements applicable to a project. The contract, plans and specification reviews facilitate resolution of any differences in contract interpretation between the company and the client prior to beginning work. Records of contract, plans and specification reviews and actions arising from these reviews are maintained in the contract correspondence files, requests for clarification and/or request(s) for information (RFI). During the contract review process, a list of required submittals will be developed.





Project Quality Plan Development

The Project Quality Plan (PQP) has been developed in accordance with SOP-01 Planning and Execution (Tier 1). The PQP is a collection of quality documents to address project specific requirements and includes:

- Quality Management System Manual and SOP's (Tier 1)
- Market-based Documents (Tier 2)
- Discipline or task specific quality assurance procedures (Tier 2)
- Applicable work instructions (Tier 2)
- Inspection and Test Plans (ITP) as needed (Tier 2)
- Inspection at Test forms and checklists as needed (Tier 2)
- Other contract required procedures as needed (Tier 3)

Training is conducted with the project team to ensure clear understanding of all requirements, roles, and responsibilities. Requirements of the PQP are also communicated to the workforce throughout the life of the project during task planning sessions and toolbox meetings.

Client Communication

Throughout the cycle of the project, the management team shall meet with client representatives to identify key quality concerns and expectations. These expectations are reviewed against contract requirements to identify potential and known quality risks and to determine how to address them. Client expectations and methods to mitigate quality risks are documented and incorporated into the project plan and appropriate quality training.

To ensure ongoing management of expectations and risk, clients will be invited to participate as appropriate in the following:

- Quality discussions/meetings (weekly 4-square meetings)
- Project kick-off meetings
- Subcontractor/Supplier kick-off meetings
- Pre-activity meetings
- Quality tours
- Internal audits and assessments
- Review and inspection of the work
- Client interviews

The following procedures are included in the Client Communications program:

- QA-GN-PR-008 – Client Communications (Tier 2)

Work Planning

Quality requirements are planned for each work activity in accordance with SOP-01 Planning and Execution (Tier 1) to invoke necessary verification steps and controls for quality, and to ensure compliance with contract and other associated requirements. The following are examples of some of the elements reflected in work plans with respect to quality:

- Quality requirements, I&TP's, hold points and checklists
- Turnover/handover requirements, if required
- Special tolerances or instructions
- Lessons Learned.

The following procedures are included in the Work Planning program:





- SOP-01 – Planning and Execution (Tier 1)
- PE-WP-PR-001 – Work Pack Planning Process (Tier 2)

Document Control

Proper control of documents is critical to ensure that each project task is performed right the first time. Documents and records are controlled electronically according to SOP-02 Control of Documents (Tier 1) and SOP-03 Control of Records (Tier 1) and include:

- Control of current revision of contract documents
- Latest revision of the design (plans and specifications)
- Quality program documents (project plans, procedures, checklists, and inspection reports)

When revisions are made to project documents, appropriate members of the team are notified of the change and all relevant affected documents are revised.

The following procedures are included in the Document Control program:

- SOP-02 – Control of Documents (Tier 1)
- SOP-03 – Control of Records (Tier 1)
- PE-DC-PR-001 – Field Document Control Plan (Tier 2)

Additional document control processes for procurement and engineering may be implemented per district standards.

Records Management

Quality records provide evidence of conformity to requirements and the effective operation of the quality program. Project records shall be controlled in accordance with SOP-03 Control of Records. This procedure defines the process for the identification, storage, protection, retrieval, retention, and disposition of records. Records shall remain legible, readily identifiable, and retrievable.

The following procedures are included in the Records Management program:

- SOP-03 – Control of Records (Tier 1)
- PE-DC-PR-001 – Field Document Control Plan (Tier 2)

EXECUTE

The execution process applies the PQP into an actual construction activity in accordance with SOP-01 Planning and Execution.

Quality Kickoff Meeting

Once the PQP has been approved by management, relevant elements of the plan are reviewed with key project personnel. Additional review meetings are held when the PQP is revised or when additional personnel are assigned to the project. The project will hold a quality kickoff meeting with the client before beginning operations. Insure understanding of the design specification requirements. Inspection requirements and witness points shall be explained at these meetings. Records of meeting agenda and attendance are maintained.

Design Management Control

When the project is responsible to perform temporary or permanent engineering and design, the project shall develop a project-specific engineering quality execution plan or adhere to their Market-specific Engineering Quality Plan. Those Plans shall include expectations and standard operating procedures for the applicable functions below:

- Contract adherence/client expectations (basis of design)





- Constructability reviews
- Risk assessment
- Design reviews and disposition of review comments
- Verification of design inputs and outputs (calculations, reports, drawings, specifications, and procurement documents etc.)
- Control and distribution of design documents
- Software validation
- Management of design changes
- Design deliverables schedule

Procurement

The project shall ensure that purchased items conform to specified purchase requirements. The type and extent of control applied to product, subcontractor or supplier shall be dependent upon the contract requirements, risk, project needs and the effect of the purchased product/service on the final product.

The project shall evaluate and select suppliers based on their ability to supply items in accordance with contract requirements and project needs per SOP-04 Material & Equipment Suppliers Quality Management. Results of evaluations and any necessary actions arising from the evaluation shall be maintained.

Procurement documents shall include the following minimum quality requirements:

- Product or service quality requirements
- Quality Management System requirements
- Required submittals and approval process
- Requirements for approval of items, service, or equipment
- Required quality documents to verify completion of work

Procurement documents and quality requirements for specialty items and outsourced services such as engineering, nondestructive testing services, 3rd party inspection or validations services shall be reviewed by project quality personnel.

The following procedures are included in the Procurement program:

- SOP-04 – Material & Equipment Suppliers Quality Management (Tier 1)
- Kiewit Supply Network (KSN) Manual and Procedures (Tier 2)

Subcontractor / Supplier Quality Management

The project team is responsible to manage the quality of work performed by subcontractors and suppliers. Project management shall assign appropriate personnel to manage the quality supplier or subcontractor.

Quality requirements shall be reviewed during the selection of major subcontractors and suppliers by district or project quality personnel. A final quality review shall be performed to ensure all requirements and deliverables have been satisfied prior to release of retention and final contract close out.

The following procedures are included in the Subcontractor / Supplier Quality Management program:

- SOP-04 – Material & Equipment Suppliers Quality Management (Tier 1)
- QA-SB-PR-001 – Subcontractor Quality Administration Procedure (Tier 2)
- Kiewit Supply Network (KSN) Manual and Procedures (Tier 2)





Material and Equipment Suppliers

A list of inspections and tests required to verify the quality of a product or service shall be developed based on the risk of the product or service provided. Inspections and tests, when required, are performed at the point of origin, at supplier's facility, or according to the project specific requirements. Performing surveillances early and throughout the manufacturing or fabrication process help identify quality issues with permanent materials before delivery or installation.

Monitoring of inspections and witnessing of tests shall be performed by personnel that are appropriately trained and knowledgeable of materials, tests and methods being utilized. Development of the supplier inspection and test plan shall follow the requirements of SOP-04 Material & Equipment Suppliers Quality Management.

The following procedures are included in the Material and Equipment Supplier Management program:

- SOP-04 – Material & Equipment Suppliers Quality Management (Tier 1)
- Kiewit Supply Network (KSN) Manual and Procedures (Tier 2)

Material Receiving, Handling, and Storage

Individuals responsible for generating procurement documents shall provide copies with all pertinent specifications, drawings, and quantities to the person(s) performing the receipt inspection. This will permit them to properly receive, inspect, and verify the item meets specified requirements and as well as properly store and maintain the items. The PQM (or designee) shall assist in receiving inspection as required.

Responsible personnel will follow standardized procedures and instructions outlined in the PQP, and manufacturer's information for the safe handling, storage, preservation, identification, traceability, delivery of all materials, equipment, and instrumentation to the project.

The following procedures are included in the Material Receiving, Handling, and Storage program:

- SOP-04 – Material & Equipment Suppliers Quality Management (Tier 1)
- QA-GN-PR-018 – Care and Maintenance Procedure (Tier 2)
- Kiewit Supply Network (KSN) Manual and Procedures (Tier 2)

ASSURE

Inspection & Testing

Project supervision, including craft supervision and quality personnel, will develop Inspection and Test Plans (ITP's) for specific areas of work and will monitor subcontractor conducted inspections and tests. Results of inspections and tests will be recorded on forms and checklists as required by the PQP and contract. Project personnel will provide notification of upcoming Witness and Hold points established by the client or jurisdictional authority. Work will stop when a hold point has been reached unless specifically waived by appropriate authority.

All testing, examination and inspection data will be reviewed by the PQM (or designee) to verify that results are within the acceptable range and meet project requirements. The PQM will also ensure appropriate inspection and testing techniques are used.

Final acceptance inspection and testing requirements will be reviewed with the client and will be defined and documented by both parties. Final acceptance inspection and performance testing, subject to the project requirements, will be monitored or witnessed by quality personnel and others as directed by the PM in conjunction with the client representative when required and available.





Personnel performing critical inspections, as defined in the SOP - Terms and Definitions, shall be trained, qualified, and/or certified as required for the specific inspections to be performed. The applicable qualification and/or certification records shall be maintained. These records shall be made available for quality assurance audits/assessments.

The following procedures are included in the Inspection and Test Planning program:

- QA-GN-PR-009 – Inspection and Test Planning (Tier 2)

Verification Inspections

Quality requirements are identified and documented for each work activity to ensure necessary procedures, checks, inspections, or verifications are in place to meet contract requirements. Project management will plan the inspections and verification requirements for specific areas of work and will monitor subcontractor conducted verifications. Results of inspections and verifications will be recorded on forms and checklists identified in the quality plan.

Personnel (i.e., Field Engineers, Foreman, Superintendents) building the work and performing verification inspections shall be trained and qualified to perform the associated inspection. This shall include inspections to verify completion of the work prior to claiming quantities.

The following procedures are included in the Verification Inspections program:

- QA-GN-PR-009 – Inspection and Test Planning (Tier 2)

Measuring & Test Equipment (M&TE)

When inspection and testing is required by contract or code, the market specific Measuring & Test Equipment procedure shall be implemented to address the measurement and test equipment calibration/certification used by the project or its subcontractors for final acceptance testing or measurements.

The following procedures are included in the Measuring & Test Equipment program:

- QA-GN-PR-002 – Measurement and Test Equipment (Tier 2)
- PE-DC-PR-001 – Field Document Control Plan (Tier 2)

Quality Assurance

Internal quality audits and assessments verify the quality program is effectively implemented and maintained and identify where improvement can be made. The company conducts internal quality audits and assessments at planned intervals according to SOP-08 Quality Assurance.

External quality audits for subcontractors / suppliers will be conducted as prescribed in procurement documents. Results of the audits shall be used as a basis to evaluate subcontractor / supplier products or services to determine the amount of inspection, surveillance and further audits needed to maintain subcontractor/supplier quality.

Project personnel performing Audits/Assessments and sampling shall be trained and qualified per SOP-08 Quality Assurance.

The following procedures are included in the Quality Assurance program:

- SOP-08 – Quality Assurance (Tier 1)
- QA-GN-PR-007 – Audits and Assessments Procedures (Tier 2)





Reporting & Control of Quality Issues

A quality issue (unplanned event) is defined as a condition of any system, structure, or component in which one or more of its characteristics do not conform to the requirements. Work in process that does not yet conform to the requirements does not require a quality issue to be generated. All quality issues will be documented, tracked, and closed out.

If the proposed disposition to the quality issue is Remove and Replace, or Rework to Specification, the project management team and client if required, may approve the disposition and work may proceed to correct the deficiency.

Each quality issue will be investigated to determine if it will be classified as a nonconformance (NCR). A quality issue is recorded as an NCR when the issue is found to meet the definition above and requires client, engineer of record, and/or jurisdictional authority acceptance to Use As-Is or Repair to an Acceptable Standard or as contract requirements dictate. Additionally, an NCR shall be created if a hold point is missed, and work cannot be inspected to determine if it is acceptable.

SOP-05 Reporting and Control of Quality Issues defines the controls and related responsibilities and authorities for dealing with a nonconformance.

The following procedures are included in the Reporting & Control of Quality Issues program:

- SOP-05 – Reporting and Control of Quality Issues (Tier 1)
- QA-GN-PR-001 – Condition Reporting (Tier 2)

Cause Analysis & Corrective Actions

Cause analysis and corrective actions are performed to reduce or eliminate the possibility of repetitive quality issues, nonconforming work, or rework. Cause analysis is a study of what actions and conditions caused the incident to determine how to eliminate future recurrence.

Corrective actions are the outcome of a cause analysis investigation. Corrective actions will be appropriate to the severity of the nonconformity encountered.

The process for performing cause analysis and implementing subsequent corrective action is described in SOP-06 Cause Analysis & Corrective Action.

The following procedures are included in the Cause Analysis & Corrective Actions program:

- SOP-06 – Cause Analysis & Corrective Action (Tier 1)
- QA-GN-PR-001 – Condition Reporting (Tier 2)
- QA-GN-PR-006 – Causal Analysis (Tier 2)

Project Closeout & Turnover

Successful project closeout and turnover starts with defining client expectations for final acceptance early in the project. SOP-07 Closeout & Turnover describes the timeline and process for project closeout and turnover, including the requirements, for creating a project closeout plan.

The level of complexity for project closeout and turnover are project specific. Effective project closeout shall contain at a minimum:

- Records closeout
- Completion of the work or punch list
- Resolving and closing out nonconformances
- Commissioning and turnover to the client
- Demobilization





Formal “Turnover Packages” will be developed per contract requirements and submitted in a format approved by the client. Solar projects are fast paced and require “progressive turnover” at defined milestones.

The following procedures are included in the Records Management program:

- SOP-03 – Control of Records (Tier 1)
- PE-DC-PR-001 – Field Document Control (Tier 2)
- PE-GN-PR-005 – Turnover Management Procedure (Tier 2)

Warranty & Post-Delivery

The company follows the contract requirements that govern warranty and post-delivery services.

The following procedures are included in the Warranty program:

- WA-GN-PR-001 – District Warranty Administration Procedure (Tier 2)
- WA-GN-PR-002 – Project Warranty Administration Procedure (Tier 2)

IMPROVE

Continuous improvement is sought in all aspects of the work and involves all employees, our subcontractors and client representatives. The company recognizes that a team effort most often provides the best ideas to achieve continuous improvement in work quality, safety, and cost. Management will conduct periodic reviews to validate and improve the QMS.

Training & Development

The project shall employ competent, skilled, and experienced personnel having the necessary qualifications (or ability to receive training to achieve the necessary qualifications) to perform the duties and responsibilities assigned to them.

All personnel will receive orientation on the Project Quality expectations upon hiring / project assignment. This orientation will include general and project specific quality requirements with an emphasis on the importance of meeting the requirements, needs, and quality expectations of the Client and other stakeholders. Information, documents, and certificates of all training, evaluations, education, and experience shall be maintained.

Risk Management

Quality risks are inherent to the engineering and construction industry and include:

- Personnel
- Environmental conditions
- Acceptability of the final product
- Product performance
- Product failures from self-performed and subcontracted activities

Quality related data is collected and analyzed to demonstrate the suitability and effectiveness of the quality program to evaluate where continuous improvement can be made. The company continually reviews and, where applicable, measures appropriate quality program processes. These reviews determine the ability of our processes to achieve planned results. When planned results are not achieved, corrective action is taken, as appropriate.

Risk analysis from the following sources provides the information necessary to manage the risks associated with our services:

- Frequency of nonconformance





- Severity of rework
- Results of audits and assessments
- Results of inspections and tests
- Subcontractor and supplier performance
- Client feedback

In all cases, actions to address risk are proportional to the risk within the final product. Results of quality risk analysis are periodically reported to District and Project Management.

Client Feedback

Formal feedback from the client and project stakeholders shall be established. To evaluate client satisfaction of our performance and adherence to our quality program, a system for obtaining client feedback shall be implemented. The results of the client feedback shall be reviewed by management to ensure we are meeting project goals and client expectations.

PROJECT QUALITY PLAN

The documents below may also be supplemented by “Construction Operations” procedures, which go into further details on means and methods, but are not governed by this Plan.

Manuals, procedures, ITPs, forms etc. expected to be provided by a Vendor / Subcontractor may be identified below and added as they are received, reviewed, and approved by project personnel.

Civil / Survey

The Civil / Survey procedures prescribe the standard quality requirements for civil construction operations on the project including clearing & grubbing, stripping, rough grade, excavation, backfill, compaction, final grade, dewatering, asphalt paving, driven concrete pile installation, cast-in-place pier installation, and driven steel pile installation.

The following documents are included in the Civil / Survey Procedures:

- QA-CI-PR-001 – Civil Quality Assurance (Tier 2)

The following documents may be included as part of the Earthworks ITP:

- QA-CI-FM-005 – Civil Test Lab Inspection
- QA-CI-FM-008 – Construction Period – Road Inspection
- QA-CI-FM-011 – Storm Drainage Installation Checklist
- QA-CI-FM-013 – Backfill Checklist
- QA-CI-FM-016 – Seeding Inspection
- QA-CI-FM-021 – Public Road Restoration Checklist
- 3rd Party Test Reports (Compaction Reports / Proctors)

Collection Installation

The Electrical Procedures prescribe the standard quality requirements for electrical operations on the project including conduit, duct bank, cable tray, switchgear, bus duct, transformers, switches, breakers, motor starters, motors, motor control centers, cable pulling, terminations, modules, collections, and testing.

The following documents may be included as part of the Collections ITP (QA-EL-IP-009):

- QA-EL-FM-033 – Underground Grounding Installation Checklist
- QA-EL-FM-034 – Grounding Installation Test Sheet
- QA-EL-FM-041 – Plow and Cable Checklist
- QA-EL-FM-044 – Cable and Trenching Installation Checklist
- QA-EL-FM-045 – Cable Receiving Checklist





- QA-EL-FM-046 – Collection Bore Record
- QA-EL-FM-047 – Collection Cable Splice and Termination Checklist
- QA-EL-FM-048 – Junction Box Installation Checklist
- Marker Ball Location file
- KMZ File
- 3rd Party Testing Reports – Partial Discharge Testing(PDT) / Megger Testing / Very Low Frequency(VLF)Testing

Where applicable, OEM recommended checklists from their installation manuals may be used to replace the Kiewit standards above.

Post Installation

The Civil / Survey procedures prescribe the standard quality requirements for civil construction operations on the project including clearing & grubbing, stripping, rough grade, excavation, backfill, compaction, final grade, dewatering, asphalt paving, driven concrete pile installation, cast-in-place pier installation, and driven steel pile installation.

The following documents may be included as part of the Solar Driven Post ITP (QA-CI-IP-012) & Solar Helical Pier ITP(QA-CI-IP-013):

- QA-GN-FM-010 – Material Receiving Report
- QA-CI-FM-022 – Post Installation Record
- QA-CI-FM-023 – Solar Pull Test Report
- QA-CI-FM-024 – Driven Post Installation Checklist
- QA-CI-FM-025 – Driven Post Alignment Remediation Form
- QA-CI-FM-026 – Driven Post Elevation Remediation Form
- QA-CI-FM-027 – Driven Post Refusal Record
- QA-CI-FM-028 – OJJO Pier Daily Installation Log
- QA-CI-FM-029 – OJJO Pier to Racking Installation Checklist
- QA-CI-FM-030 – OJJO Pier Installation Record
- QA-CI-FM-031 – Helical Pier Proof Load Test Report
- As-Builts File

Where applicable, OEM recommended checklists from their installation manuals may be used to replace the Kiewit standards above.

Racking Installation

The Structural Steel procedures prescribe the standard quality requirements for structural steel operations on the project including structural steel fabrication, structural steel erection, bolted connections, fastener storage and installation, inspection and documentation, pre-assembled steel structure installation, & structural welding.

The following documents may be included as part of the Solar Racking ITP (QA-SS-IP-006):

- QA-GN-FM-010 – Material Receiving Report
- QA-SS-FM-024 – Torque Tube Installation and Detail Checklist
- QA-SS-FM-025 – Motor and Driveline Checklist
- QA-SS-FM-026 – Racking Torque Verification Sheet
- QA-SS-FM-027 – Damper and Locking Mechanism Installation Checklist
- QA-CI-FM-029 – OJJO Pier to Racking Installation Checklist

Where applicable, OEM recommended checklists from their installation manuals may be used to replace the Kiewit standards above.





Module Installation

The Electrical Procedures prescribe the standard quality requirements for electrical operations on the project including conduit, duct bank, cable tray, switchgear, bus duct, transformers, switches, breakers, motor starters, motors, motor control centers, cable pulling, terminations, modules, collections, and testing.

The following documents may be included as part of the Solar Module ITPs (QA-EL-IP-010):

- QA-GN-FM-010 – Material Receiving Report
- QA-EL-FM-049 – Module Installation Checklist
- CSV As-Built File
- ATI Pre-Commissioning Checklist
- ATI Mechanical Installation Checklist
- Module Quarantine Log

Where applicable, OEM recommended checklists from their installation manuals may be used to replace the Kiewit standards above.

Electrical

The Electrical Procedures prescribe the standard quality requirements for electrical operations on the project including conduit, duct bank, cable tray, switchgear, bus duct, transformers, switches, breakers, motor starters, motors, motor control centers, cable pulling, terminations, collections, and testing.

The following documents are included in the Electrical Procedures:

- QA-EL-PR-001 – Electrical Quality Assurance (Tier 2)

The following documents may be included as part of the U/G Electrical ITP (QA-EL-IP-010) and A/G Electrical ITP (QA-EL-IP-011):

- QA-GN-FM-010 – Material Receiving Report
- QA-EL-FM-014 – DC Hi-Pot Test Report
- QA-EL-FM-024 – Insulation Resistance Report
- QA-EL-FM-047 – Collection Cable Splice and Termination Checklist
- QA-EL-FM-048 – Junction Box Installation Checklist
- QA-EL-FM-050 – Met Station & Albedometer Installation Checklist
- QA-EL-FM-051 – UG Conduit & Direct Buried Cable Checklist
- QA-EL-FM-052 – String Wire & AG Grounding Installation
- QA-EL-FM-053 – Sectionalizer Cabinet Installation Checklist
- QA-EL-FM-054 – Inverter Skid Installation Checklist
- I-V Curve Trace Report
- Marker Balls Location File
- KMZ File

Structures

The Structures procedures prescribe the standard quality requirements for structures operations on the project including formwork, reinforcing steel, embeds, anchor bolts, concrete placement, hot & cold weather concrete, concrete finishes, patching, structural masonry, and grout placement.

The following documents are included in the Structures Procedures:

- QA-ST-PR-001 – Concrete Quality Assurance (Tier 2)





The following documents may be included as part of the Structures ITPs (QA-ST-IP-010):

- QA-ST-FM-002 – Batch Plant Inspection
- QA-ST-FM-003 – Concrete Pre-Placement Checklist
- QA-ST-FM-004 – Concrete Placement Form
- QA-ST-FM-005 – Concrete Foundation Release
- QA-ST-FM-018 – Concrete Placement Log

Offload

The Offload procedures prescribe the standard quality requirements for solar operations on the project.

The following documents may be included as part of the Offloading ITP (QA-SS-IP-004):

- MMR Report
- OSND&E Report
- Material Quarantine Log

Where applicable, OEM recommended checklists from their installation manuals may be used to replace the Kiewit Standards above.

Substation and A/G Structures

The Substation and A/G Structures Procedures standard quality requirements for wind turbine installation operations on the project including ground, duct banks and cable trench, equipment installation, cable installation, and stringing/sagging cable.

The following documents may be included in the Substation and Structures ITP:

- QA-EL-FM-002 – Conduit and Cable Tray Installation Checklist
- QA-EL-FM-003 – Concrete Pre-Placement Ductbank Checklist
- QA-EL-FM-014 – DC Hi-Pot Test Report
- QA-EL-FM-021 – Cable Pre-pull Checklist
- QA-EL-FM-024 – Cable Insulation Resistance Test Report
- QA-EL-FM-026 – Termination Installation Checklist
- QA-EL-FM-027 – Visual Lighting Checklist
- QA-EL-FM-029 – Electrical Bolt Torque Report
- QA-EL-FM-033 – Grounding Checklist
- QA-EL-FM-034 – Ground Rod Resistance Report
- QA-EL-FM-037 – Underground / Embed Conduit Checklist
- QA-SS-FM-003 – Structural Steel Pre-Installation Checklist
- QA-SS-FM-008 – Structural Steel Installation Checklist
- QA-TD-FM-001-PD – Wire Pull Preparation & Operation Form
- QA-TD-FM-002-PD – Conductor & Shield Wire Sag Report
- QA-TD-FM-003-PD – Monopole Direct Embed Report
- QA-TD-FM-004-PD – H Frame Direct Embed Report
- QA-TD-FM-005-PD – Structure Assembly Report
- QA-TD-FM-006-PD – Structure Framing Report
- QA-TD-FM-009-PD – Guy Anchor Proof Test Report

Where applicable, OEM recommended checklists from their installation manuals may be used to replace the Kiewit Standards above.



		Solar Driven Post Inspection & Test Plan				REV #1 Date: 05/19/2022 Solar Driven Post ITP QA-CI-IP-012									
Project Name:		Abbreviations for Inspection Type & Responsibility Construction: S (Superintendent) FE (Field Engineer) F (Foreman) Quality: PQM (Project Quality Manager) QCI (Quality Control Inspector) Client: CI (Client Inspector) Other: TP (Third Party) AI (Authorized Inspector) Type: H (Hold Point) V (Verify) A (Approve) R (Responsible) M (Monitor) W (Witness)													
Project Number:		H - Hold Point - Requires Physical inspection of a completed work step prior to progressing to the next work step. A - Approve - No inspection required, however approval is documented by initials or signature. Signatures required however compliance must be shown either with a daily log or report. V - Verify - Requires a physical inspection of the work after the work is complete. M - Monitor - Used to identify oversight / supervisory roles and to outline inspector expectations. No completed and documented properly. W - Witness - Requires a physical inspection of the work while it is in progress. R - Responsible - Identifies who is responsible for ensuring the line item is													
Activity Description	Spec/Code	Inspection and Testing Requirements	Documentation			Inspection Type / Person									
			Document Name / Tag # / Visual	Turnover / Record / RIP	Frequency	Const.	Quality	Client	Other						
Material Receiving															
Post - Material Certification	Material Receiving Procedure	MTR's submitted by supplier; Verify correct material, Pile Length, Correct Size, and quantity.	MTR	Turnover	All Posts	FE	A								
Receiving Inspection	Material Receiving Procedure	Visual inspection for Physical damage, damaged coating, bent, defective posts. Damaged post will be evaluated to determine if useable or rejection. If pile coating is damaged, but deemed useable, apply Cold Galv to cover the area. Posts will be selected at random.	Material Receiving Report QA-GN-FM-010	Turnover	Each Delivery	FE	R	QCI	M						
Post Installation															
Post Installation	Mechanical Layout Drawing Kiewit Specification for Steel Driven Piles Sect. 3.4	Install piles without exceeding the following tolerances: Spacing from adjacent posts +/- 1" from plan spacing. Additionally, driving equipment will track locations of installed piles. Elevation +/- 25mm or 1" from plan cut-off elevation. Plumb - Typical Posts: +/- 1 Degrees Plumb - Drive Posts: +/- 1 Degrees Rotational - Typical Posts: +/- 3 Degrees Rotational - Drive Posts: +/- 1 Degrees	Driven Post Remediation Forms Elevation / Alignment QA-CI-FM-025 QA-CI-FM-026	Turnover (Attach to Post Installation Checklist)	1 Per Block / 1 Per Release	FE / V	QCI / M								
			PD10 As-Built File	Turnover	1 Per Block										
			Driven Post Installation Checklist QA-CI-FM-024	Turnover	1 Per Block / 1 Per Release										
Post Installation - Refusal	Mechanical Layout Drawing Kiewit Specification for Steel Driven Piles Sect. 3.4	Coordination with Engineering team and System Manufacturer to evaluate alternative options, whether post is to be remediated or removed. This remediation plan includes, if the post passes the pull test parameters, the post will be cut and holes will be punched per plans. If the post fails, consultations will begin to evaluate the best solution.	Driven Post Refusal Record QA-CI-FM-027	Turnover	EA Refusal	FE	V			R	E				
Testing															
Pull Test	Mechanical Layout Drawing Kiewit Specification for Steel Driven Piles Sect. 3.4 Solar Market Pull Test Work Instructions QA-ST-WI-xxx	Pull Test shall occur at least 2-3 days after post installation. Ensure equipment used during pull test is rated per the EOR calculated design load rating. Axial Load Test - Design Load 3000 lbs Increase load to 1500 lbs and hold for 30 seconds Increase load to 3000 lbs and hold for 2 minutes acceptable if movement is less than 1" during the 2 minute hold Test - Design Load - 2000 lbs Increase Load to 1000 lbs and hold for 30 seconds Increase Load to 2000 lbs and hold for 2 minutes	Test is Lateral Load Pull Test Report QA-ST-FM-023	Turnover	10 EA Per Block	FE	V	PQM	A						
Prepare		Review		Approve											
Lead Field Engineer (Print / Sign) Date		Gen. Superintendent (Print / Sign) Date		Project Manager (Print / Sign) Date											
Quality Engineer (Print / Sign) Date		Construction Manager (Print / Sign) Date		Project Quality Manager (Print / Sign) Date											
Other (Print / Sign) Date		Project Engineer (Print / Sign) Date		Client Representative (Print / Sign if applicable) Date											
Other (Print / Sign) Date		Sponsor / Area Manager (Print / Sign) Date		District Quality Manager (Print / Sign) Date											
All items above have been reviewed and approved prior to implementation of this plan.															



Material Receiving Report (MRR)
QA-GN-FM-010

MRR #: _____ **Date Received:** _____ **Page** _____ **of** _____

Supplier/ Vendor: _____ **Purchase Order No.:** _____

Material Received: _____

Packing List or Invoice No.: _____ **Storage Location:** _____

Verify the following items and indicate acceptance with initial and date: Note: Any items not accepted are to be explained in the remarks section.	Accept/ Initial	Date
Shipping Damage Examination: Item(s) do not exhibit signs of fire, excessive exposure, rough handling, tie down failure, or environmental damage		
Documentation Review: Required documentation provided for the received material meets requirements (e.g. MTRS, C of C, etc.)		
Identification and Marking: Heat, lot or mark numbers on containers or material and corresponds to supporting documentation.		
Material Examination: Spot-check to shop drawings and purchase order requirements. Material is properly protected and has no physical damage.		
Other Items to Verify:		
1.		
2.		
3.		
4.		

Remarks: (Identify documentation used to verify acceptance, problems or deficiencies noted, hold tags applied, etc.)

Examiner: _____ **Signature:** _____

(Print name)



Project Name:
Project Location:

Pile Information						Testing Equipment			
(Pile ID) Description:						Gauge #1:			
Pile Number/Location:						Gauge #2:			
Pile Type:						Gauge #3:			
Reveal Height:						Gauge #4:			
Twist °:						Dynamometer:			
Plumb N/S						Other:			
Plumb E/W									
Install Date and Time:									
Testing Date and Time:									
TENSION TEST SCHEDULE									
Design Load, DL (lb):				Height of Load Application:					
Max Allowable Deflection:				Height of Measurement:					
Step	Hold Time (min)	Target Load (lb)	Actual Load (lb)	Deflection Gauge # (in)	Deflection Gauge # (in)	Average Deflection (in)			
Initial	1	0.0	0			0.00000			
50% DL	2	0.5	0			0.00000			
DL	3	2.0	0			0.00000			
Final	4	0.0	0			0.00000			
LATERAL TEST SCHEDULE									
Design Load, DL (lb):				Height of Load Application:					
Max Allowable Deflection at Groundline:				Height of Measurement GL:					
Max Allowable Deflection Top of Pile:				Height of Measurement TOP:					
Step	Hold Time (min)	Target Load (lb)	Actual Load (lb)	Groundline Measurement (GL)			Top of Pile Measurement (TOP)		
				Deflection Gauge # (in)	Deflection Gauge # (in)	Average Deflection (in)	Deflection Gauge # (in)	Deflection Gauge # (in)	Average Deflection (in)
Initial	1	0.0	0			0.00000			0.00000
50% DL	2	0.5	0			0.00000			0.00000
DL	3	2.0	0			0.00000			0.00000
Final	4	0.0	0			0.00000			0.00000
Does Pile Meet Acceptance Criteria?								YES	NO
Comments / Observations									

Testing Rep Signature and Date: _____

Quality Rep Signature and Date: _____



For Information Only

Project Name: _____ Project #: _____

Drawing #: _____ Array / Block #: _____

Description: _____

INSTALLATION CHECKLIST		
TASK	INSTRUCTION	RESPONSE
1	Partial / Full Release of Block	Partial / Full
2	If Partial, Section # / Row #	Free Text
3	Post Height is within Tolerance of Install Plane (+/- 7/8")	Yes / No
4	Post to Post Spacing (East / West) is Within Tolerance (+/- 5/8")	Yes / No
5	Post to Post Spacing (North / South) is Within Tolerance (+/- 1 3/8")	Yes / No
6	Drive Posts are Plumb Within Tolerance (+/- 1°)	Yes / No
7	Typical Posts are Plumb Within Tolerance (+/- 1°)	Yes / No
8	Drive Post Rotational Twist Within Tolerance (<= 1°)	Yes / No
9	Typical Post Rotational Twist Within Tolerance (<= 3°)	Yes / No
10	Attach Elevation Remediation Form	Attachment
11	Attach Alignment Remediation Form	Attachment
13	All Deficiencies Remediated	Yes / No
14	All Pull Tests Complete	Yes / No
15	Posts are Released for Racking	Yes / No
COMMENTS		

FIELD ENGINEER (SIGN) _____ DATE _____ QUALITY ASSURANCE (SIGN IF APPLICABLE) _____ DATE _____

QUALITY CONTROL INSPECTOR (SIGN IF APPLICABLE) _____ DATE _____ CLIENT REPRESENTATIVE (SIGN IF APPLICABLE) _____ DATE _____



Project Name:				Project #						
Date:										
Circuit:				Block:						
Row #										
	Within Spec?	Alignment 5/8"			(Initial # - Final #)			Date of Correction	Verified by	Material Repair?
		Plumb	Twist	Reveal Height						
Post A		W	E							
Post B		W	E							
Post C		W	E							
Post D		W	E							
Post E		W	E							
Post F		W	E							
Post G		W	E							
Post H		W	E							
Post I		W	E							
Post J		W	E							
Post K		W	E							
Post L		W	E							
Post M		W	E							
Post N		W	E							
Post O		W	E							
Post P		W	E							
Post Q		W	E							
Post R		W	E							
Post S		W	E							
D.E.		W	E							
C.A.B		W	E							
Row #										
	Within Spec?	Alignment 5/8"			(Initial # - Final #)			Date of Correction	Verified by	Material Repair?
		Plumb	Twist	Reveal Height						
Post A		W	E							
Post B		W	E							
Post C		W	E							
Post D		W	E							
Post E		W	E							
Post F		W	E							
Post G		W	E							
Post H		W	E							
Post I		W	E							
Post J		W	E							
Post K		W	E							
Post L		W	E							
Post M		W	E							
Post N		W	E							
Post O		W	E							
Post P		W	E							
Post Q		W	E							
Post R		W	E							
Post S		W	E							
D.E.		W	E							
C.A.B		W	E							



Row #										
	Within Spec?	Alignment 5/8"			Plumb	(Initial # - Final #)		Date of Correction	Verified by	Material Repair?
		W	E			Twist	Reveal Height			
Post A		W	E							
Post B		W	E							
Post C		W	E							
Post D		W	E							
Post E		W	E							
Post F		W	E							
Post G		W	E							
Post H		W	E							
Post I		W	E							
Post J		W	E							
Post K		W	E							
Post L		W	E							
Post M		W	E							
Post N		W	E							
Post O		W	E							
Post P		W	E							
Post Q		W	E							
Post R		W	E							
Post S		W	E							
D.E.		W	E							
C.A.B		W	E							

Row #										
	Within Spec?	Alignment 5/8"			Plumb	(Initial # - Final #)		Date of Correction	Verified by	Material Repair?
		W	E			Twist	Reveal Height			
Post A		W	E							
Post B		W	E							
Post C		W	E							
Post D		W	E							
Post E		W	E							
Post F		W	E							
Post G		W	E							
Post H		W	E							
Post I		W	E							
Post J		W	E							
Post K		W	E							
Post L		W	E							
Post M		W	E							
Post N		W	E							
Post O		W	E							
Post P		W	E							
Post Q		W	E							
Post R		W	E							
Post S		W	E							
D.E.		W	E							
C.A.B		W	E							



Project Name: _____ Project # _____
Date: _____
Circuit: _____ Block: _____

Row #						
	Elevation 7/8"			Post Replaced?	Pull Test Required?	Date of Correction
Post A	↑	↓				
Post B	↑	↓				
Post C	↑	↓				
Post D	↑	↓				
Post E	↑	↓				
Post F	↑	↓				
Post G	↑	↓				
Post H	↑	↓				
Post I	↑	↓				
Post J	↑	↓				
Post K	↑	↓				
Post L	↑	↓				
Post M	↑	↓				
Post N	↑	↓				
Post O	↑	↓				
Post P	↑	↓				
Post Q	↑	↓				
Post R	↑	↓				
Post S	↑	↓				
Dead End	↑	↓				
Combiner	↑	↓				

Row #						
	Elevation 7/8"			Post Replaced?	Pull Test Required?	Date of Correction
Post A	↑	↓				
Post B	↑	↓				
Post C	↑	↓				
Post D	↑	↓				
Post E	↑	↓				
Post F	↑	↓				
Post G	↑	↓				
Post H	↑	↓				
Post I	↑	↓				
Post J	↑	↓				
Post K	↑	↓				
Post L	↑	↓				
Post M	↑	↓				
Post N	↑	↓				
Post O	↑	↓				
Post P	↑	↓				
Post Q	↑	↓				
Post R	↑	↓				
Post S	↑	↓				
Dead End	↑	↓				
Combiner	↑	↓				



Row #							
	Elevation 7/8"			Post Replaced?	Pull Test Required?	Date of Correction	Verified By
Post A	↑	↓					
Post B	↑	↓					
Post C	↑	↓					
Post D	↑	↓					
Post E	↑	↓					
Post F	↑	↓					
Post G	↑	↓					
Post H	↑	↓					
Post I	↑	↓					
Post J	↑	↓					
Post K	↑	↓					
Post L	↑	↓					
Post M	↑	↓					
Post N	↑	↓					
Post O	↑	↓					
Post P	↑	↓					
Post Q	↑	↓					
Post R	↑	↓					
Post S	↑	↓					
Dead End	↑	↓					
Combiner	↑	↓					

For Information Only

Row #							
	Elevation 7/8"			Post Replaced?	Pull Test Required?	Date of Correction	Verified By
Post A	↑	↓					
Post B	↑	↓					
Post C	↑	↓					
Post D	↑	↓					
Post E	↑	↓					
Post F	↑	↓					
Post G	↑	↓					
Post H	↑	↓					
Post I	↑	↓					
Post J	↑	↓					
Post K	↑	↓					
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Post M	↑	↓					
Post N	↑	↓					
Post O	↑	↓					
Post P	↑	↓					
Post Q	↑	↓					
Post R	↑	↓					
Post S	↑	↓					
Dead End	↑	↓					
Combiner	↑	↓					