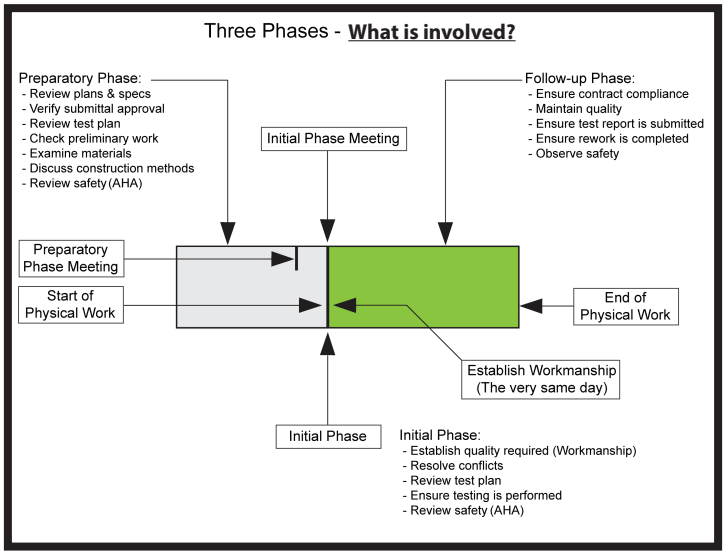
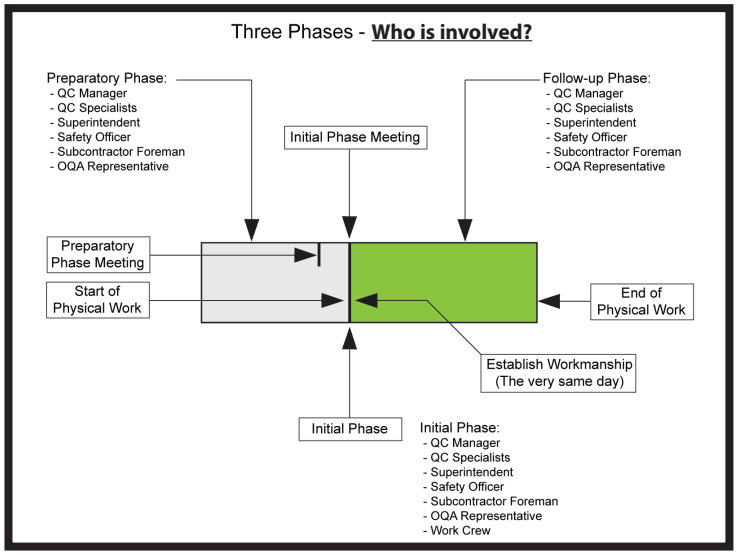
Student Study Guide

November 2024

Construction Quality Management For Contractors

Control # 784, Class Notes Updated NOV 2024





CQM = QC + QA

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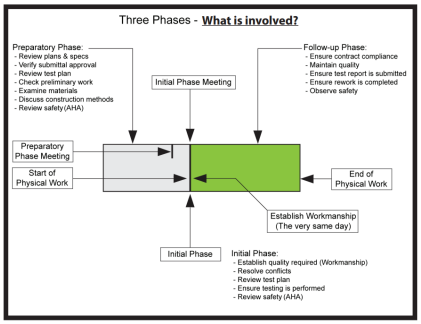
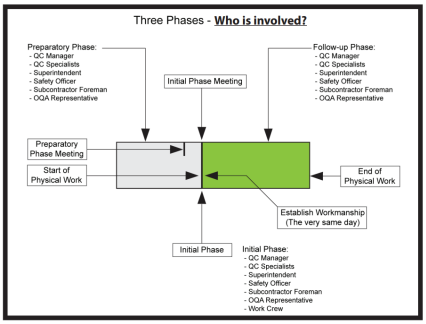
Road Map

Construction Quality Management for Contractors (CQM)





CQM = QC + QA

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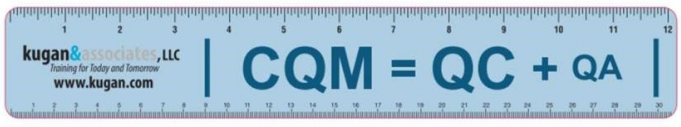
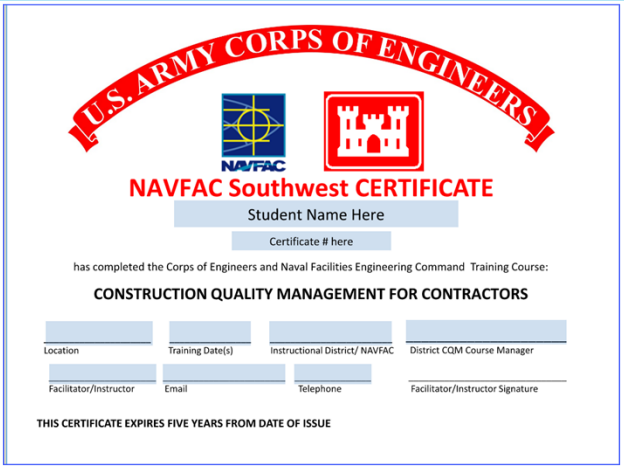
Primary Facilitator

- Kugan Panchadsaram, PE, PMP
- Email: kugan@kugan.com
- Telephone (USA): (1) 858-212-2941
- www.kugan.com/cqm



Sample Certificate of Completion
Hybrid (On-Demand and Live) Training



U.S. ARMY CORPS OF ENGINEERS

NAVFAC

NAVFAC Southwest CERTIFICATE

Student Name Here

Certificate # here

has completed the Corps of Engineers and Naval Facilities Engineering Command Training Course:

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

Location | Training Date(s) | Instructional District/ NAVFAC | District CQM Course Manager

Facilitator/Instructor | Email | Telephone | Facilitator/Instructor Signature

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

I have been given Contractor Instruction Compliance Memorandum by NAVFAC SOUTHWEST to present the training. POC: Greg Lewis; gregory.j.lewis41.civ@us.navy.mil

Traditional Training Delivery Method
Prior to COVID-19 Era

- In Class Training
  Course No: CQM-784

Current Delivery Methods

- In Class Training
- Online
  - 100 % Virtual (Via Zoom)
  - Hybrid (On-Demand and (Virtual-Via Zoom) Instructor-led online)

Course No: KA-CQM-784, Notes NOV 2024

Construction Quality Management (CQM) for Contractors Online

World Map of Completed Online Students as of November 2024

6 CONTINENTS | 46 COUNTRIES | 50 STATES

For more information visit our website, https://www.kugan.com/portfolio/cqm-online/

Construction Quality Management (CQM) for Contractors Online

World Map of Remote Location Online Students

1. Reykjavik, Iceland
2. Praia da Vitória, Portugal
3. Saint Helena, Ascension and Tristan da Cunha
4. Musiri, India
5. Mangilao, Guam

For more information visit our website, https://www.kugan.com/portfolio/cqm-online/

Training Material Layout

- OnDemand Portion Training
- Virtual (Zoom) Training – Instructor Led

Training Material Layout (OnDemand Portion)

- Cover Page
- Road Map (Document Navigation)
- Course Introduction
- Pre-Test (40 Questions: 40 Min)
- General Information (Jumpstart) (Mod 00A)
- Achieving Quality in Construction (Mod 00B)
- Course Objectives (Table of Content)

Training Material Layout (OnDemand Portion)

- Introduction - Construction Quality Management (Mod 01)
- Contractor's Review (Mod 02)
- Quality Management Planning (Mod 03)
- Quality Control Plan Review (Mod 03A)
- Preconstruction Conference & Coordination Meeting (Mod 04)
- Submittals (Mod 05)

Training Material Layout (Virtual – Via Zoom)

- Review (from OnDemand Training)
- Course Introduction for Zoom Session
- Review DFOWs
- Review Three- Phase(s) Control System
- Quality Management for Construction Projects(Mod 06)
- Making the System Work (Mod 07)
- Resident Management System (Mod 08)
- NAVFAC's Electronic Construction Management System (eCMS) (Mod 09)

Training Material Layout (Virtual – Zoom)

- Study Time – Thirty Minutes
  - Sample Questions and Review Study Guide
- Course Evaluation
- Final Exam
- Digital Copy of the Certificate (Emailed to the student within two business days)

Training Methodology (Contd.)

- Course Evaluation
- Final Exam (40 Questions) - Sixty Minutes Time Limit
  - Multiple Choice questions – One right answer
  - One attempt (Additional assignments need to be completed before the second attempt)
  - **70%** Passing Grade
- Digital Certificate will be emailed to you **two business days**
- Certificate is valid for **five years** from the date of issuance

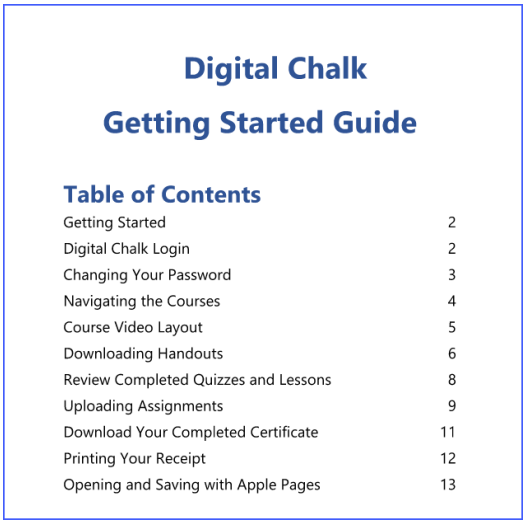
Training Methodology

- Download the handouts
- Pay attention to the Multimedia Presentation
  - Watch out for the **Pop-Up Quiz**
- Take the quiz for each section
  - Multiple Choice Questions
  - Passing Grade of **70%** required
  - Maximum of **two attempts** allowed
  - Reset Videos and the Quiz within Two to Eight Hours
- DFOW Exercise
- QC Plan Review

Training Methodology (Contd.)

- Complete the OnDemand Portion of the training **Tuesday before** the Friday Zoom Session
- Send out **Zoom Invite** Wednesday (2:00 PM) before the Friday Zoom training
- **Zoom Test**: https://zoom.us/test
- Camera during the Zoom Training
- Attend the full day (Ten - hour) Zoom training session (6:00 AM to 3:00 PM California Time)
  - Check-in and Audio/Video Check: 6:00 AM to 6:20 AM
  - Lunch Break: 10:30 to 11:00 AM
  - Coffee Break/Snack Break – Ten Minutes: Every Sixty Minutes

Digital Chalk Navigation



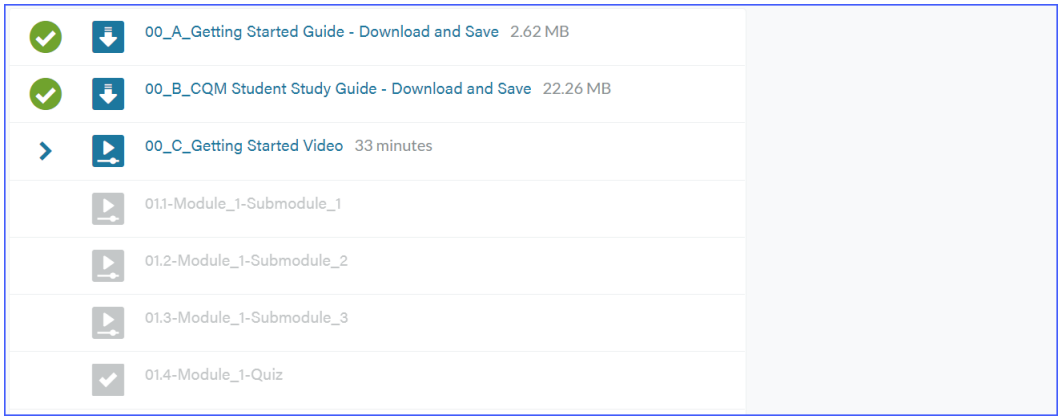
Digital Chalk

Getting Started Guide

Table of Contents

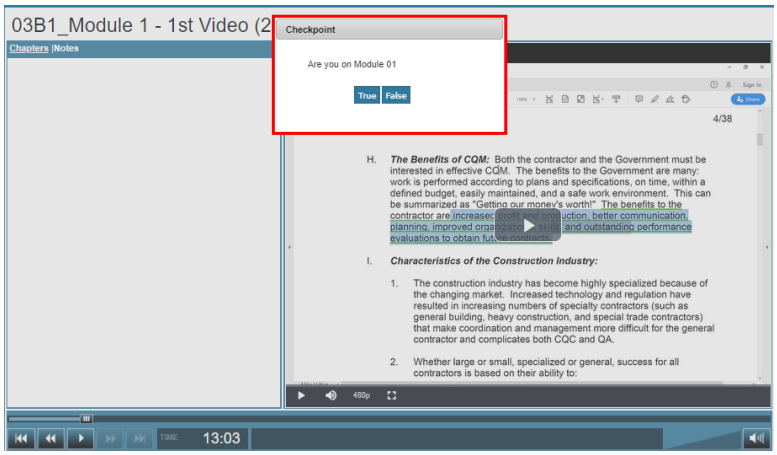
Digital Chalk Navigation (Contd.)

- Module descriptions and file names are conveniently chosen



Digital Chalk Navigation (Contd.)

- Popup quizzes are set in place to ensure student attention



System Requirement for each Participant

- Desktop / Laptop (**Cannot** use Smartphone or Tablet)
- Webcam (Built-in or Detachable)
- Headset (Not built into the desktop/laptop)
- Internet browser
  - Edge
  - Google Chrome
- Highspeed Internet
- Zoom Meeting application

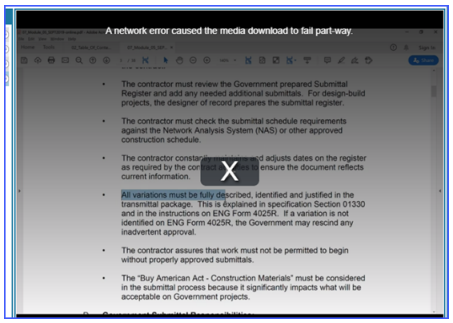
YOU WILL NOT BE ABLE TO DOWNLOAD MULTIMEDIA PRESENTATIONS

Liability Disclaimer

- Every effort has been made to ensure the accuracy and completeness of the electronic documents and resources provided for this Training Program. However, Kugan & Associates, Inc. makes no warranties, expressed or implied, regarding errors or omissions; that the content is accurate or correct; that the training program will be uninterrupted or secure; that any content or service is free of viruses; and assumes no legal liability or responsibility for loss or damage resulting from the use of information contained within. The use of, or access to the website and training program is solely at your own risk.

Prevent Common Issue – Network Error

- **Do not** open multiple browsers
- Limit the number of browser tabs open
- **Do not** have multiple applications open and running
- Continuously stopping/starting the training material
- **Do not** have multiple DigitalChalk portals open



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Prevent Common Issues – Video

- Recommended to use **two monitors**
  - One for the video and one for the Study Guide.
- If you do not have a second monitor, consider **printing** the CQM Student Study Guide

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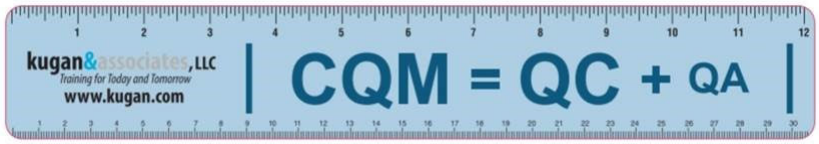
Student Files

- **Download and save** the training files on your computer for **easy access**
  - Documents
  - Desktop
  - Downloads

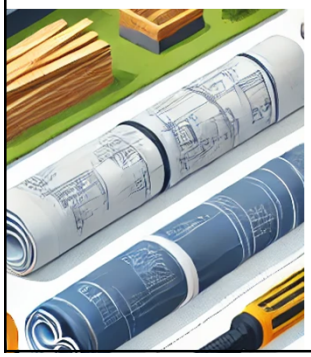
YOU WILL NOT BE ABLE TO DOWNLOAD MULTIMEDIA PRESENTATIONS

Next Step!

- Enjoy the training!!



Module 00A
General Information
(Jumpstart)



Module 00A General Information

- #1 Who is the Quality Control Manager?
- #2 Construction Safety
- #3 Field Offices
- #4 Contract Clauses

Module 00A
Sub Module 01

Who is the Quality Control Manager?

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Who is the Quality Control Manager?

- What Does a Quality Control (QC) Manager Do?
- **Skills and Experience** You Need as a QC Manager
- Potential Problems **Without** Experience
- **Benefits** of Construction Knowledge and Experience
- Minimum **Requirements** for a QC Manager

What Does a Quality Control (QC) Manager Do?

- **Ensure Quality:** Make sure work meets contract specifications and standards.
- **Plan and Inspect:** Prepare for inspections and verify work meets expectations.
- **Document Everything:** Keep detailed records of inspections, tests, and any issues.
- **Solve Problems:** Quickly address and fix quality issues.
- **Coordinate:** Work with contractors, subcontractors, and government inspectors.

Skills and Experience You Need as a QC Manager

- **Construction Knowledge:** Understand how buildings are constructed and why quality matters.
- **Reading Construction Drawings:** Interpret plans and specifications accurately.
- **Inspection Techniques:** Know how to assess work for compliance with standards.
- **Organizational Skills:** Manage tasks, records, and timelines effectively.
- **Clear Communication:** Explain quality concerns and solutions to the team and stakeholders.

Potential Problems Without Experience

- **Errors in Construction:** Misinterpreting plans or specs leading to costly mistakes.
- **Missed Inspections:** Overlooking issues that affect quality and safety.
- **Poor Communication:** Difficulty explaining quality concerns or requirements.
- **Rework and Delays:** Issues going unnoticed until later, causing project delays.
- **Safety Risks:** Failing to spot safety hazards, leading to potential accidents.

Benefits of Construction Knowledge and Experience

- **Accurate Interpretation:** Understand drawings and prevent errors during construction.
- **Effective Inspections:** Proactively spot issues and ensure high-quality work.
- **Problem-Solving:** Resolve challenges quickly and confidently.
- **Better Communication:** Clearly explain technical details to the team and inspectors.
- **Fewer Delays and Rework:** Minimize mistakes, keeping projects on track and within budget.
- **Stronger Leadership:** Lead quality efforts with authority and credibility.

Minimum Requirements for a QC Manager (10,000 Sq. Ft. Office Building)

- **Education:**
  - *Required:* High School Diploma
  - *Preferred:* Associate's or Bachelor's Degree in Construction Management, Civil Engineering, or related field.
- **Experience:**
  - *Construction Field:* 3–5 years of experience in commercial construction projects.
  - *Quality Control:* 1–2 years in a quality control or inspection role.
  - *Technical Knowledge:* Familiarity with building codes, safety regulations, and standards.
- **Certifications:**
  - *Required:* Construction Quality Management (CQM) certification by USACE/NAVFAC.
  - *Preferred:* OSHA 30-Hour / EM 385-1-1 Certifications or other relevant credentials.

Inspection vs Quality Control

- **Inspection: Reactive**
- Checks completed work for compliance.
- Focused on identifying defects or non-compliance.
- Happens ***after*** the work is done.

- **Quality Control: Proactive**
- Ensures work is done right the first time.
- Involves planning, monitoring, and verifying work.
- Happens ***before and during*** construction.

Why Quality Control is Essential

- Prevents defects **before** they occur.
- Saves time and money by **reducing rework**.
- **Ensures compliance** with project specifications and regulations.
- **Maintains** consistent construction **quality**.
- Builds **credibility** and **trust** with clients and agencies.

Impact of Relying Only on Inspections

- **Delayed Issue Detection:** Problems found after work is completed, requiring rework.
- **Increased Costs:** Fixing errors after the fact adds labor and material expenses.
- **Project Delays:** Rework disrupts the schedule.
- **Risk of Non-Compliance:** Missed quality standards can lead to penalties or rejection.
- **Reputation Damage:** Repeat defects harm the contractor's credibility.

Examples – Inspection Vs Quality Control

- **Inspection-Only Approach:**
- Concrete inspected after placement shows incorrect mix; must be removed and redone.

- **Quality Control Approach:**
- Mix design reviewed and tested before placement; issue prevented, saving time and cost.

Examples – Inspection Vs Quality Control (Contd.)

- **Inspection:**
- Focuses on catching problems ***after*** they occur.

- **Quality Control:**
- Prevents problems ***before*** they happen.

- A project with ***both*** systems ensures fewer defects, better quality, and greater efficiency.

Inspection VS Quality Control

- Inspection
  https://en.wikipedia.org/wiki/Inspection

- Quality Control
  https://en.wikipedia.org/wiki/Quality_control

Quality Assurance Vs Quality Control Function

- Quality Assurance:
  - QA Representative
  - Owner Organization
- Quality Control:
  - QC Manager
  - Contractor Organization

ISO 9000 Family

- https://www.iso.org/iso-9001-quality-management.html

Federal Acquisition Regulations

- FAR 52.236-5 Material and Workmanship
- FAR 52.246-12 Inspection of Construction

Check Your Knowledge!

1. What are the Benefits of Inspection?

2. What are the Benefits of Quality Control?

This Slide is Intentionally Left Blank.

Module 00A
Sub Module 02
Safety Enforcement

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Safety Enforcement

- Contractor Responsibility
- SSHO - Site Safety and Health Officer
- Qualified Person
- Competent Person
- Accident Prevention Plan
- Activity Hazard Analysis
- Safety Meeting
- Safety Inspection and Safety Deficiency List

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Contractor Safety Responsibility

- OSHA Requirements
- FAR 52.236 -13 -- Accident Prevention
  - 29 CFR 1926, 29CFR 1910
- Unified Facilities Guide Specifications: UFGS 01 35 26
- EM 385 -1-1, US Army Corps of Engineers Safety and Health Requirement Manual, Nov 2014 / March 2024
  - Safety Officer: Site Safety and Heath Officer [SSHO]
  - Quality Control Manager – Safety Inspection

OSHA Requirements: https://www.osha.gov/laws-regs

FAR: 52.236-13 - Accident Prevention

prev | next

52.236-13 Accident Prevention.

As prescribed in 36.513, insert the following clause:

Accident Prevention (NOV 1991)

(a) The Contractor shall provide and maintain work environments and procedures which will (1) safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to Contractor operations and activities; (2) avoid interruptions of Government operations and delays in project completion dates; and (3) control costs in the performance of this contract.

(b) For these purposes on contracts for construction or dismantling, demolition, or removal of improvements, the Contractor shall—

(1) Provide appropriate safety barricades, signs, and signal lights;

(2) Comply with the standards issued by the Secretary of Labor at 29 CFR part 1926 and 29 CFR part 1910; and

(3) Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for the purposes are taken.

(c) If this contract is for construction or dismantling, demolition or removal of improvements with any Department of Defense agency or component, the Contractor shall comply with all pertinent provisions of the latest version of U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, in effect on the date of the solicitation.

FAR: 52.236-13 - Accident Prevention

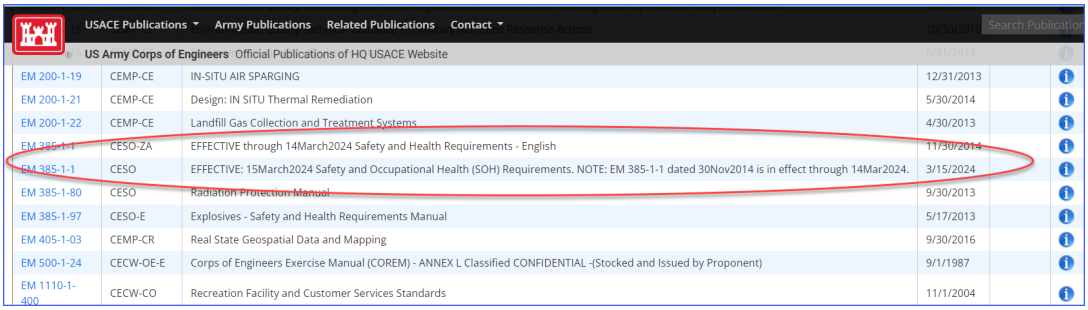
(d) Whenever the Contracting Officer becomes aware of any noncompliance with these requirements or any condition which poses a serious or imminent danger to the health or safety of the public or Government personnel, the Contracting Officer shall notify the Contractor orally, with written confirmation, and request immediate initiation of corrective action. This notice, when delivered to the Contractor or the Contractor's representative at the work site, shall be deemed sufficient notice of the noncompliance and that corrective action is required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.

(e) The Contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontracts.

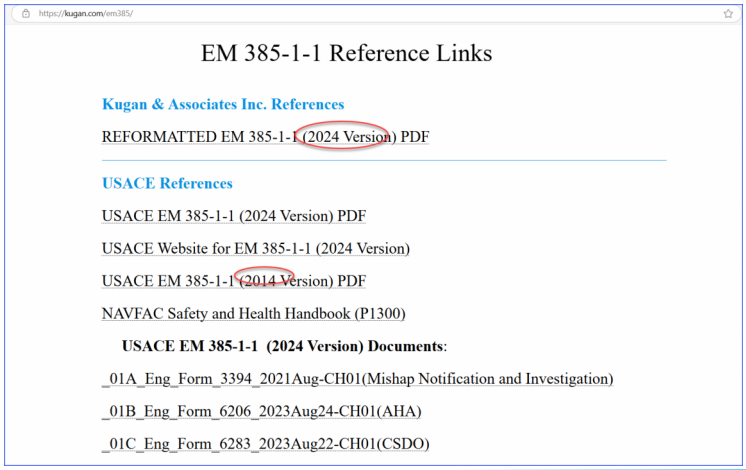
(End of clause)

EM 385-1-1 Reference Material

https://www.publications.usace.army.mil/usace-publications/engineer-manuals/



EM 385-1-1 Reference Material
http://www.kugan.com/em385/



Accident Prevention Plan

- Project Specific
- Specification: UFGS 01 35 26, Governmental Safety Requirements
- EM 385 -1-1 (2014 Edition), Section 01 and Appendix A
- EM 385 -1-1 (2024 Edition), Minimum Plan Requirements (Section 7 of each chapter)
- Prepared by Qualified Person
- Reviewed by Qualified Person

Activity Hazard Analysis

- Job Hazardous Analysis, OSHA 3071
- EM 385-1-1(2014 Edition) Section 01
- EM 385-1-1 (2024 Edition) Section 6 of each Chapter
- Prepared by:
  - Subcontractor doing the work -Crew Chief [Foreman]
  - General Contractor doing the work – Superintendent
- Preparatory Phase [Supervisors]
- Initial Phase [Work Crew]

Safety Meeting

- Monthly With Supervisors at the Job Site
- Weekly with workers
  - Not the tailgate meeting

Safety Inspection and Safety Deficiency List

- Daily Safety Inspection (SSHO, QCM, SUPT, Etc)
- Tracking deficiency – Deficiency List

Check Your Knowledge!

1. Have you completed the 30-hour OSHA Training?

2. Do you have a digital copy of 29 CFR 1910? What is the title?

Check Your Knowledge!

3. Do you have a digital copy of 29 CFR 1926? What is the title?

4. Where do you get a digital copy of EM 385-1-1?

Module 00A
Sub Module 03

US Army Corps of Engineers®

Field Offices

NAVFAC
Naval Facilities Engineering Systems Command

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Objectives

- USACE / NAVFAC
- ROICC/FEAD/REICC Organization

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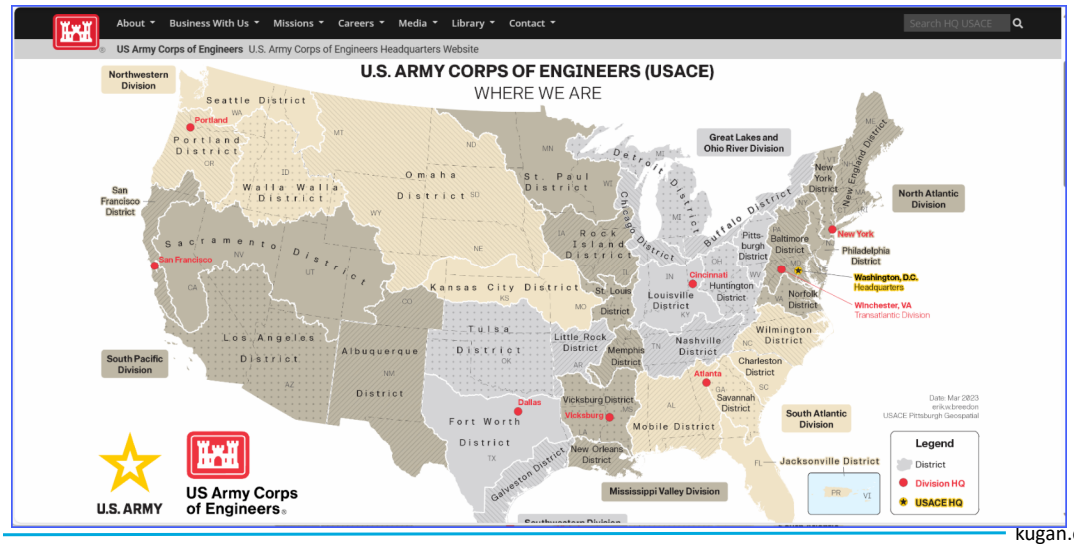
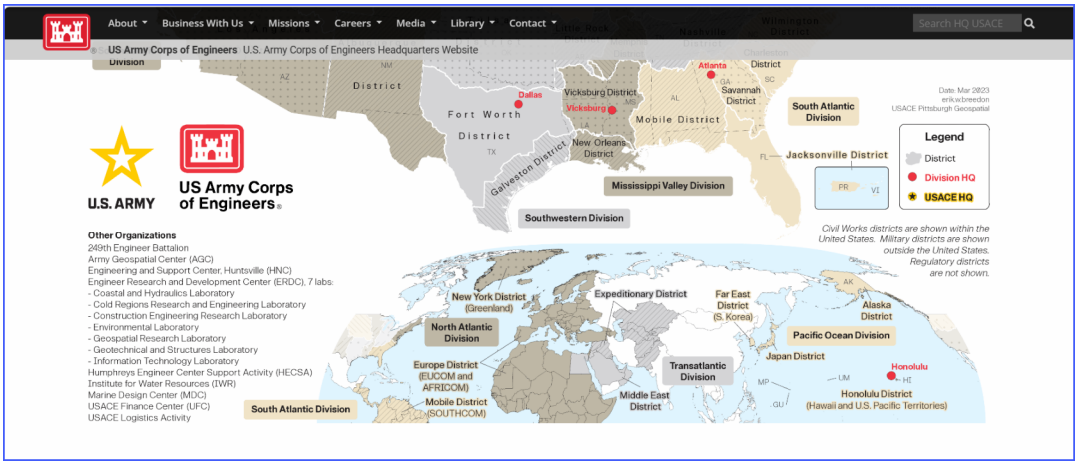
NAVFAC / USACE

- NAVFAC –Naval Facilities Engineering Command
  - https://www.navfac.navy.mil/
  - https://en.wikipedia.org/wiki/Naval_Facilities_Engineering_Command*
    *Note: For historical information only
- USACE - United States Army Corps of Engineers
  - https://www.usace.army.mil/
  - https://en.wikipedia.org/wiki/United_States_Army_Corps_of_Engineers*
    *Note: For historical information only

USACE Locations



USACE Locations



NAVFAC Locations

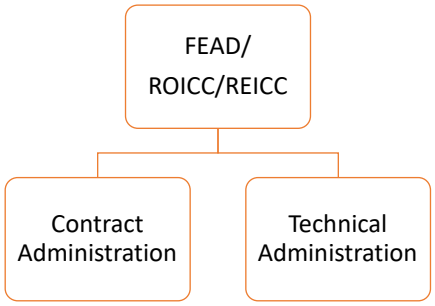
FIND YOUR NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND

Use the interactive map or navigate through the list below to find more information for specific NAVFAC locations worldwide.

HEADQUARTERS	NAVFAC ATLANTIC	NAVFAC PACIFIC	SPECIALTY CENTERS
Asset Management	NAVFAC Europe Africa Central	NAVFAC Far East	Naval Facilities Engineering and Expeditionary Warfare Center
Design and Construction	NAVFAC Mid-Atlantic	NAVFAC Hawaii	Navy Crane Center
Contingency Engineering	NAVFAC Southeast	NAVFAC Marianas	
Environment	NAVFAC Washington	NAVFAC Northwest	
Public Works		NAVFAC Southwest	
Expeditionary		OICC China Lake	
Small Business		OICC Marine Corps Marianas	
Safety			

NAVFAC /USACE Field Office Organization

- Facility Engineering & Acquisition Division [FEAD]
- Resident Officer in Charge of Construction [ROICC]
- Resident Engineer in Charge of Construction [REICC]



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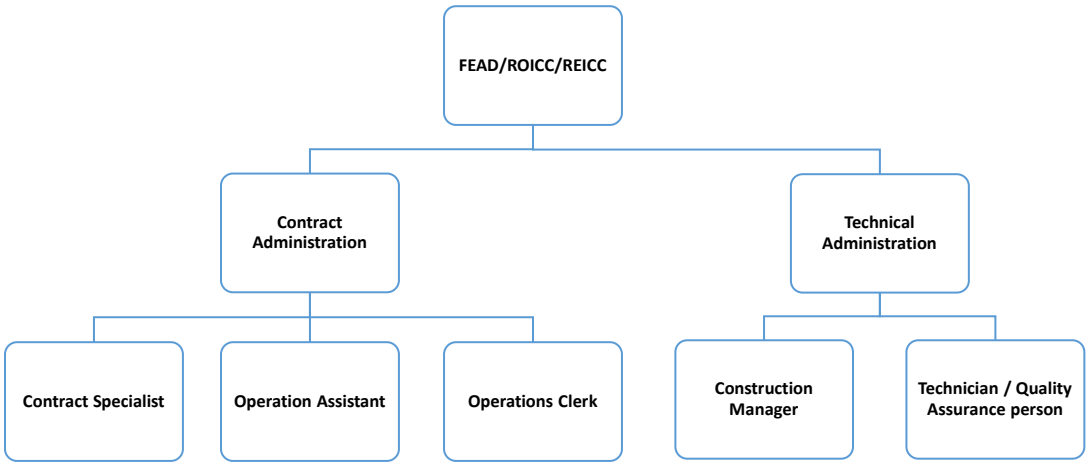
NAVFAC/USACE Field Office Organization



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Common Terms

• AROICC	Assistant Resident Officer in Charge of Construction
• CM	Construction Manager
• CO [KO]	Contracting Officer
• COR	Contracting Officer's Representative
• ET	Engineering Technician
• FEAD	Facility Engineering & Acquisition Division
• GDA	Government Designated Authority
• KTR	Construction Contractor

Common Terms

• NAVFAC	Naval Facilities Engineering Command
• QA	Quality Assurance
• QA REP	Quality Assurance Representative
• RE	Resident Engineer
• REICC	Resident Engineer in Charge of Construction
• ROICC	Resident Officer in Charge of Construction
• USACE	U.S. Army Corps of Engineers

Contract Administration

- Contracting Officer (KO/CO)
  - Contract Enforcement
    - Labor Law
    - Contract Clause
  - Contract Modification

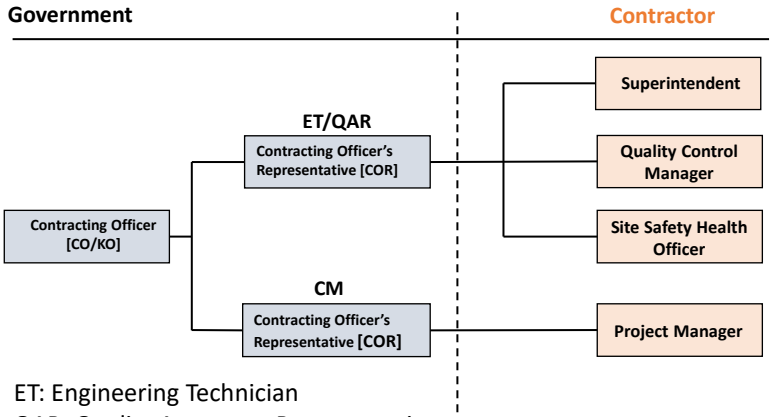
Technical Administration

- FEAD/ ROICC / REICC Construction Manager [CM]
  - Overall Responsibility for Technical , Safety, and Quality aspect

Technical Administration

- Quality Assurance Representative [QA REP /ET/CONREP]
  - Quality Assurance
  - Safety
  - Coordination with Base Activities

Government/Contractor Communication Path



ET: Engineering Technician
QAR: Quality Assurance Representative
CM: Construction Manager

Contractor and FEAD/ROICC/REICC Interface

- Your Project Manager
  - FEAD / ROICC /REICC Construction Manager [CM]
- Your Superintendent
  - Quality Assurance Representative (QAR)
- Your Foremen
  - Do not interface with FEAD / ROICC / REICC

Contractor and FEAD/ROICC/REICC Interface

- Your Safety Officer /Safety Engineer
  - Quality Assurance Representative [QAR]
- Your Quality Control Manager [QCM]
  - Quality Assurance Representative [QAR]

Check Your Knowledge!

1. Who is your first point of contact for Quality Control Related Items from the GOVT side?

2. Who is authorized to differ from construction drawings and specification from the GOVT side?

Check Your Knowledge!

- 3. Who is authorized to negotiate change order work from the GOVT side?

Module 00A
Sub Module 04

Contract Clauses
[Federal Acquisition Regulation (FAR)]

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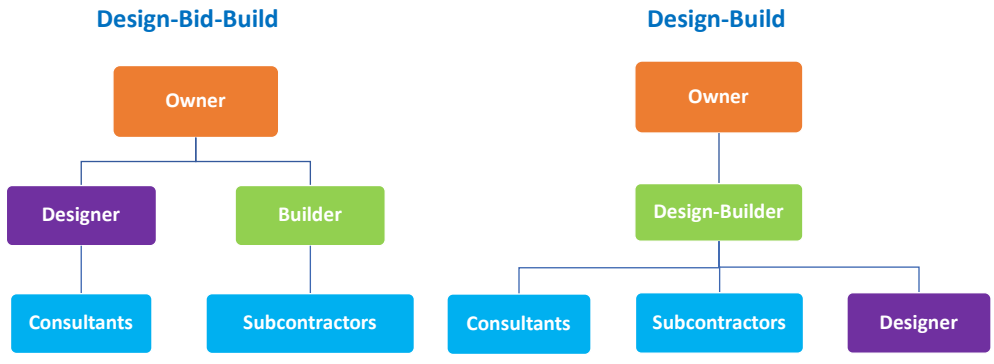
Design-Bid-Build Project Vs Design-Build Project



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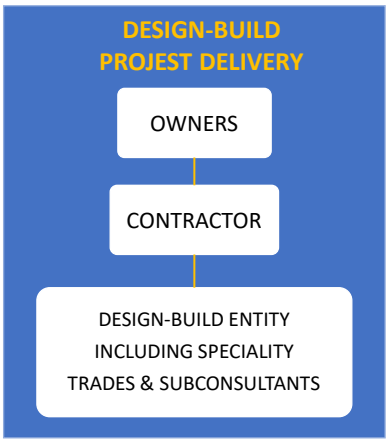
Design-Bid-Build Project Vs Design-Build Project



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Design-Bid-Build Project Vs Design-Build Project

Key Comparison

Aspect	Design-Bid-Build (DBB)	Design-Build (DB)
Responsibility	Separate designer and contractor	Single entity responsible
Timeline	Sequential (longer)	Overlapping phases (faster)
Cost Certainty	Determined after design completion	Established earlier in the process
Owner Involvement	High involvement during design phase	Reduced involvement during construction
Risk	Owner bears coordination risks	Design-Builder assumes most risks

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Federal Acquisition Regulation (FAR)

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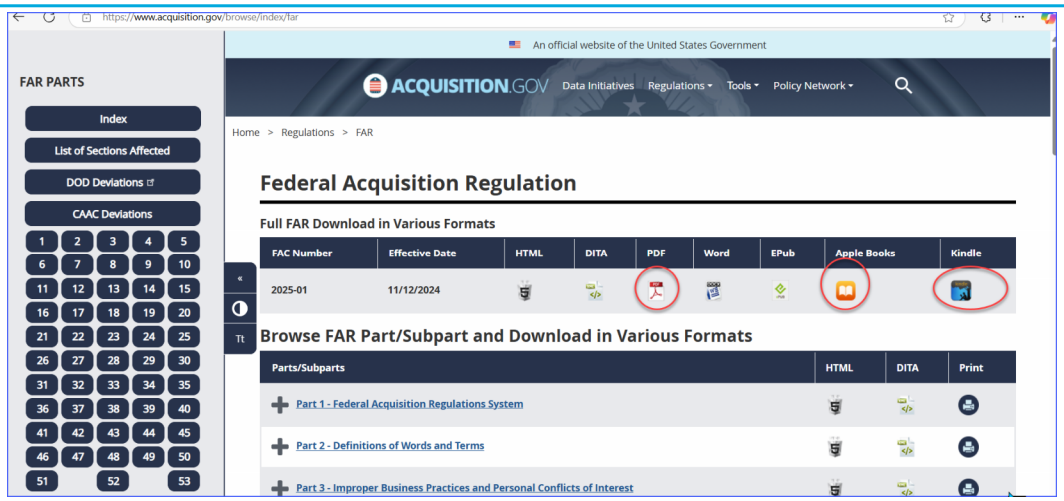
Federal Acquisition Regulation (FAR)



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General Contract Clauses
Federal Acquisition Regulation (FAR)

- 52.236-1 -- Performance of work by Contractor
- 52.236-13 -- Accident Prevention
- 52.246-1 -- Contractor Inspection Requirements
- 52.236-5 -- Material and Workmanship
- 52.236-6 -- Superintendence by the Contractor
- 52.236-26 -- Preconstruction Conference
- 52.236-12 -- Cleaning Up

Performance of work by Contractor – FAR:52.236-1

52.236-1 Performance of Work by the Contractor.

As prescribed in 36.501(b), insert the following clause: [*Complete the clause by inserting the appropriate percentage consistent with the complexity and magnitude of the work and customary or necessary specialty subcontracting (see 36.501(a))*.]

PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least _____ [*insert the appropriate number in words followed by numerals in parentheses*] percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

(End of clause)

FAR: 52.236-13 - Accident Prevention

prev | next

52.236-13 Accident Prevention.

As prescribed in 36.513, insert the following clause:

Accident Prevention (NOV 1991)

(a) The Contractor shall provide and maintain work environments and procedures which will (1) safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to Contractor operations and activities; (2) avoid interruptions of Government operations and delays in project completion dates; and (3) control costs in the performance of this contract.

(b) For these purposes on contracts for construction or dismantling, demolition, or removal of improvements, the Contractor shall—

(1) Provide appropriate safety barricades, signs, and signal lights;

(2) Comply with the standards issued by the Secretary of Labor at 29 CFR part 1926 and 29 CFR part 1910; and

(3) Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for the purposes are taken.

(c) If this contract is for construction or dismantling, demolition or removal of improvements with any Department of Defense agency or component, the Contractor shall comply with all pertinent provisions of the latest version of U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, in effect on the date of the solicitation.

FAR: 52.236-13 - Accident Prevention

(d) Whenever the Contracting Officer becomes aware of any noncompliance with these requirements or any condition which poses a serious or imminent danger to the health or safety of the public or Government personnel, the Contracting Officer shall notify the Contractor orally, with written confirmation, and request immediate initiation of corrective action. This notice, when delivered to the Contractor or the Contractor's representative at the work site, shall be deemed sufficient notice of the noncompliance and that corrective action is required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to promptly take corrective action, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any stop work order issued under this clause.

(e) The Contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontracts.

(End of clause)

FAR: 52.246-1 - Contractor Inspection Requirements

- The Contractor is responsible for performing or having performed all inspections and tests necessary to substantiate that the supplies or services furnished under this contract conform to contract requirements, including any applicable technical requirements for specified manufacturers' parts.
- This clause takes precedence over any Government inspection and testing required in the contract's specifications, except for specialized inspections or tests specified to be performed solely by the Government.
- Contractor Quality Control System

FAR 52.236-5 - Material and Workmanship

- (a) All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

FAR 52.236-5 - Material and Workmanship

- (b) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

FAR 52.236-5 - Material and Workmanship

- (c) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.

FAR 52.236-6 - Superintendence by the Contractor

- At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the worksite a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.

FAR- 52.236-26 Preconstruction Conference

- If the Contracting Officer decides to conduct a preconstruction conference, the successful offeror will be notified and will be required to attend. The Contracting Officer's notification will include specific details regarding the date, time, and location of the conference, any need for attendance by subcontractors, and information regarding the items to be discussed.

FAR 52.236-12: Cleaning UP

- The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Government. Upon completing the work, the Contractor shall leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer.

Check Your Knowledge!

1. Which FAR Clause refers to the Safety Enforcement?

2. Which FAR Clause refers to Material and Workmanship?

Check Your Knowledge!

- 3. Which FAR Clause Refers to Contractor Inspection Requirements?

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Achieving Quality Construction

Definable Feature of Work (DFOW) and Subtasks
And Three Phases of Control

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Training for Today and Tomorrow

Achieving Quality Construction

- Definable Feature of Work (DFOW) and Subtasks
- Three Phases of Control

Sample Construction Project

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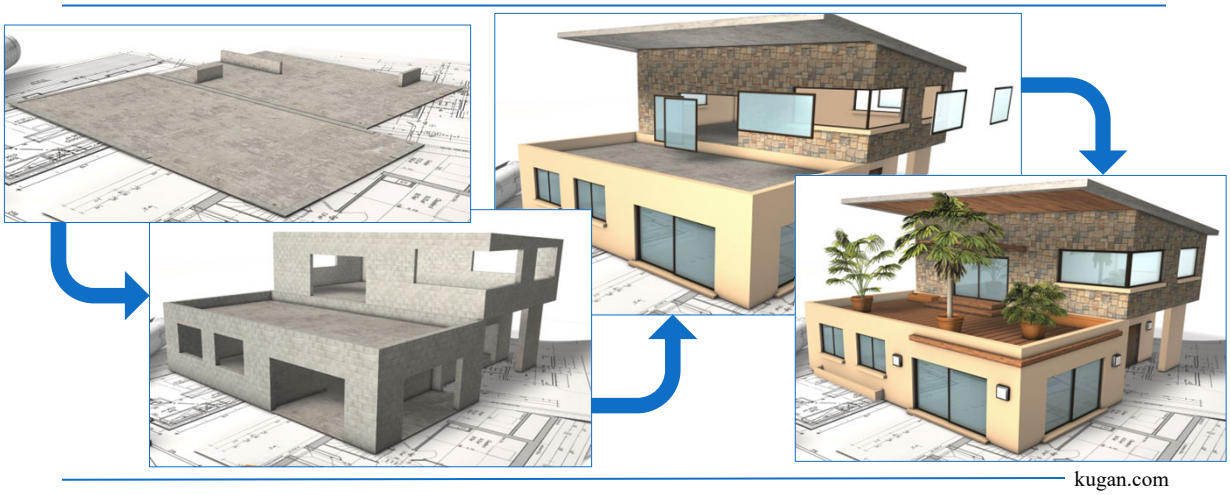
Achieving Quality Construction Project Visualization



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Achieving Quality Construction
Project Visualization

- Visualization helps break down a construction project into logical components, making it easier to identify the Primary Construction Tasks [Definable Features of Work (DFOW)].
- By imagining the finished structure and its components, teams can systematically organize tasks and ensure nothing is overlooked.

Achieving Quality Construction

- Primary Construction Task (Definable Feature of Work)
  - Foundation, Slab on Grade, CMU Wall, Door, Window
- Subtasks

Foundation DFOW:	Interior Hollow Metal Door DFOW:
- Subtasks:	- Subtasks:
1. Excavation	1. Rough Opening Preparation
2. Formwork Installation	2. Door Frame Installation
3. Rebar Placement	3. Door Hanging
4. Concrete Placement(Pouring)	4. Hardware Installation
5. Curing	

Why Subtasks?

- Subtasks ensure proper planning, material selection, and execution.
- Provide a clear roadmap for achieving quality at every stage.
- Quality construction is built step-by-step through well-defined subtasks.

Key Elements of Subtasks for Quality Construction Each Subtask Ensures:

1. Material Identification:
   - Ensure the correct materials are specified and available.
2. Technical Submittals:
   - Verify materials and methods meet project specifications.
3. Installation Procedures:
   - Provide clear, step-by-step guidance for correct installation.

Key Elements of Subtasks for Quality Construction Each Subtask Ensures: (Contd.)

4. Inspection Requirements:
   - Define checkpoints to confirm quality at each stage.
5. Testing Requirements:
   - Confirm material and system performance through tests (e.g., slump tests for concrete).
6. Safety Measures:
   - Implement safety protocols to reduce risks for each task

USACE /NAVFAC DFOW Definition

LIST OF DEFINABLE FEATURES: A Definable Feature of Work (DFOW) is a task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. A DFOW is identified by different trades or disciplines and is an item or activity on the construction schedule. The list of DFOWs shall include, but not be limited to, all critical path activities on the NAS. Include all activities for which this specification requires QC Specialists or specialty inspection personnel.

Not so Good and Good Definable Feature of Work [DFOW] [Primary Construction Task]

- Combining unrelated tasks into a single DFOW can create confusion and complicate quality control.
- Grouping tasks like doors and windows or carpet and floor tiles into the same DFOW overlooks their distinct requirements and processes.
- Improperly aligned DFOWs can obscure accountability and result in overlooked quality checkpoints, ultimately affecting the project's overall quality.

Definable Feature of Work [DFOW] [Primary Construction Task]

Not so Good Task	Good Task
Doors and Windows	Doors Windows
Specialties	Metal Toilet Partition Toilet Accessories Fire Extinguisher Cabinet

Definable Feature of Work [DFOW] [Primary Construction Task]

Not so Good DFOW	Good DFOW
U/G Exterior Utility	U/G Sewer U/G Storm Drain U/G Water U/G Gas U/G Electrical
Concrete	Foundation Slab on Grade Sidewalk

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Definable Feature of Work [DFOW] [Primary Construction Task]

Not so Good Task	Good Task
Mechanical	Plumbing Gas
Electrical	Electrical Power Lighting
Interior Finish	Carpet Ceramic Tiles VCT

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DFOW – Task /Subtask

- Foundation DFOW:

- Subtasks:

1. Excavation
2. Formwork Installation
3. Rebar Placement
4. Concrete Placement (Pouring)
5. Curing

- Interior Hollow Metal Door DFOW:

- Subtasks:

1. Rough Opening Preparation
2. Door Frame Installation
3. Door Hanging
4. Hardware Installation

DFOW – Task /Subtask

- DFOW: Exterior Water Line

- Subtasks:

1. Trenching and excavation.
2. Pipe bedding preparation.
3. Pipe installation.
4. Backflow preventer or valve installation.
5. Pressure testing and flushing.
6. Backfilling and compaction.

- DFOW: Exterior Sewer Line

- Subtasks:

1. Trenching and excavation.
2. Pipe bedding preparation.
3. Pipe installation at the required slope.
4. Manhole installation and connections.
5. Testing for watertightness (air or water).
6. Backfilling and compaction.

DFOW – Task /Subtask

Index # Preparatory	Index # Initial	QCM Report #	DFOW /Task	Sub Task [Sub Activity]	Task ID /Activity ID	AHA # /JHA
1			**Grading**			
1	1A			Survey/Staking		
1	1B			Utility Safe-Off		
1	1A			Clear & Grub		
1	1B			Grading		
1	1A			Pad Certification		
2			**U/G Sewer**			
2	2A			Survey Staking/Layout		
2	2A			Excavate Trench & Manholes		
2	2A			Set New Manholes		
2	2A			Lay New Sewer Piping		
2	2A			Backfill & Compact Trench		
2	2A			Test New Sewer System		
2	2A			Sewer Shut Down of (E) System		
2	2B			Tie-In New Service to (E) System		
2	2C			Remove (E) Piping & Manholes		

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DFOW – Task /Activity List

Index # Preparatory	Index # Initial	QCM Report #	DFOW /Task	Sub Task [Sub Activity]	Task ID /Activity ID	AHA # /JHA
5			**Foundations**			
5	5A			Foundation Layout/Staking		
5	5A			Excavate Footings		
5	5A			Form		
5	5B			Reinforcing Steel		
5	5B			Embeds & Templates		
5	5C			Concrete		
5	5C			Strip Form		
6			**Slab-on-Grade**			
6	6A			Fine Grade		
6	6A			Underslab MEP		
6	6A			Sand & Vapor Barrier		
6	6B			Rebar SOG		
6	6C			Cast In Place SOG		
6	6C			Cure SOG		

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Three Phases of Control

- Preparatory Phase - Each DFOW
- Initial Phase – Each Subtask
- Follow-up Phase– Each Subtask

Preparatory Phase Meeting (One Meeting for All Subtasks)

Purpose:

- Address all subtasks within a DFOW in one meeting.

- Align all subcontractors and QC personnel on expectations and requirements.

Preparatory Phase Meeting (Key Topics)

1. Review approved submittals (e.g., drawings, specifications, material approvals).
2. Verify materials are on-site and meet specifications.
3. Discuss methodologies for all subtasks.
4. Define inspection and testing requirements.
5. Discuss safety concerns for each Subtask

Example #1: Foundation DFOW (with All Subcontractors)

Preparatory Phase Meeting:

- Review submittals for rebar, concrete mix, and formwork.
- Verify materials (e.g., approved rebar, form panels) are on-site.
- Discuss methodologies for:
  1. Excavation (depth, width, and compaction).
  2. Formwork (alignment and bracing).
  3. Rebar Placement (spacing and tying).
  4. Concrete Pouring (mixing, placement, and vibration).
- Define testing criteria (e.g., soil compaction tests, rebar checks, concrete slump tests).
- Address safety risks across all subtasks.

Example #2: Interior Hollow Metal Door DFOW (All Subcontractors)

Preparatory Phase Meeting:

- Review submittals for doors, frames, and hardware.
- Verify materials (e.g., doors, frames, hardware) are on-site.
- Discuss methodologies for:
  1. Rough Opening Preparation (dimensions, alignment).
  2. Door Frame Installation (anchoring, alignment).
  3. Door Hanging (hinges, swing checks).
  4. Hardware Installation (locks, handles).
- Define testing criteria (e.g., frame plumpness, door operation).
- Discuss safety concerns (e.g., sharp edges, heavy lifting).

Initial Phase Meeting (One For Each Subtask)

Purpose:

- Focus on the detailed execution of each subtask.

- Ensure workers understand specific requirements, inspection criteria, and safety measures.

Initial Phase Meeting (For Each Subtask)

Steps:

1. Meet with subcontractor foremen and workers.
2. Review methodology, inspection criteria, and safety measures for the subtask.
3. Perform a small portion of the subtask.
4. Inspect trial work to confirm the quality before proceeding.
5. Workmanship Approval Before Proceeding

Initial Phase Meeting (For Each Subtask)

- A critical principle is that no subtask can proceed until the workmanship of the preceding subtask has been inspected and approved.
- This ensures that defects are identified and corrected early, and that subsequent work is not negatively impacted by earlier mistakes.

Example #1: Foundation DFOW (cont.)

Initial Phase Meetings:

1. **Excavation Initial Meeting:**
   - Review trench depth and width requirements with workers.
   - Perform a trial section and inspect for compliance.
2. **Formwork Initial Meeting:**
   - Confirm alignment and bracing with workers.
   - Install and inspect a small section of formwork.
3. **Rebar Initial Meeting:**
   - Verify spacing, alignment, and tying methods.
   - Install rebar for one section and inspect placement.
4. **Concrete Pouring Initial Meeting:**
   - Review slump, placement techniques, and vibration methods.
   - Pour and finish a small section for QC approval.

Example #2: Interior Hollow Metal Door (cont.)

Initial Phase Meetings:

1. **Rough Opening Initial Meeting:**
   - Verify opening dimensions and alignment with workers.
   - Prepare one opening, and QC inspects for compliance.
2. **Door Frame Installation Initial Meeting:**
   - Confirm alignment and anchoring with workers.
   - Install one frame, and QC inspects stability and plumbness.
3. **Door Hanging Initial Meeting:**
   - Review hinge installation and swing alignment.
   - Hang one door, and QC verifies smooth operation.
4. **Hardware Installation Initial Meeting:**
   - Review lock, handle, and closer installation.
   - Install hardware on one door, and QC tests functionality.

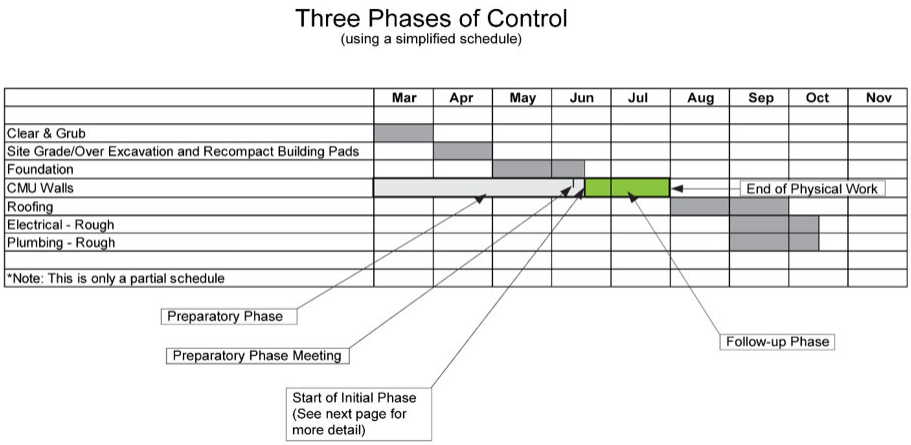
Follow-Up Phase

- The Follow-Up Phase is essential to the quality control process for Definable Features of Work (DFOWs).
- This phase ensures that all work continues to meet the quality standards set during the Preparatory and Initial Phases.
- It focuses on monitoring and verifying that tasks are completed as planned, correcting deviations, and maintaining accountability throughout the project.

Follow-Up Phase

- Ongoing Daily Inspection: Ensures consistent adherence to the quality standards established at the Initial Phase Meeting
- Timely Corrections: Identifies and addresses deficiencies before they impact subsequent work.
- Keeps subcontractors and workers responsible for maintaining quality throughout the subtask.

Three Phases of Control



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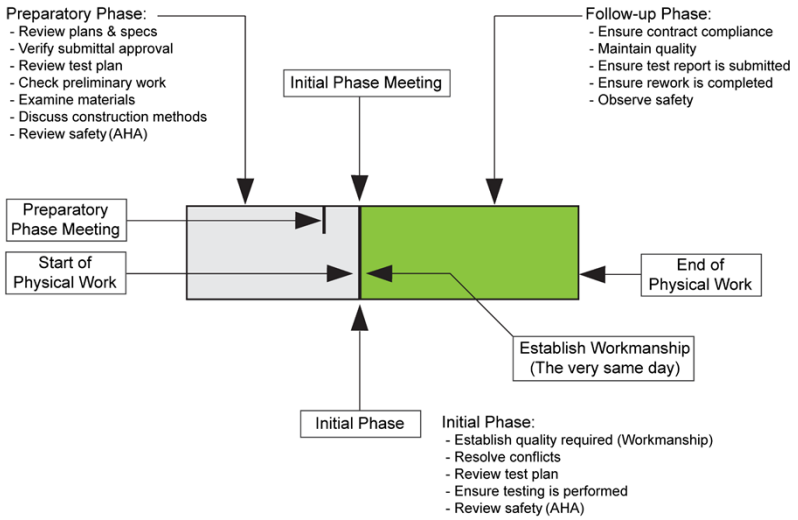
Three Phases – What is Involved?



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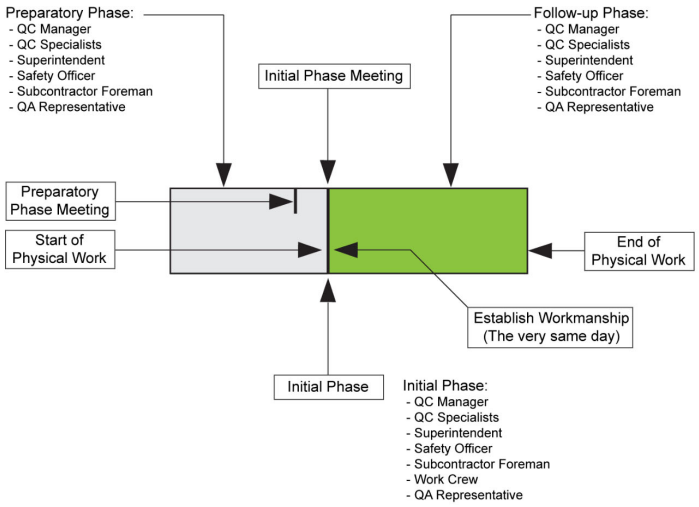
Three Phases – Who is Involved?



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Check Your Knowledge !

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Course Objective

This dynamic course is designed to empower participants with the skills and confidence to lead construction quality management efforts that meet and exceed USACE and NAVFAC standards. Through real-world examples, hands-on exercises, and in-depth discussions, participants will master the essential tools of the trade, including the Three-Phase Control System, creating and executing quality control plans, and navigating the submittal process. By the end of the training, attendees will be fully equipped to step into the critical role of Quality Control Manager, driving collaboration and ensuring exceptional results on government construction projects.

Course Objective - 2nd Version

The objective of this course is to equip participants with the knowledge and tools necessary to implement and manage construction quality control processes in alignment with USACE and NAVFAC standards. Participants will gain a comprehensive understanding of the Three-Phase Control System, quality control plans, submittal processes, and other essential elements critical to ensuring compliance with government construction requirements. By the end of the course, attendees will be prepared to serve as Quality Control Managers on USACE projects, effectively communicating and collaborating with stakeholders to deliver high-quality construction outcomes.

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS
STUDENT STUDY GUIDE
TABLE OF CONTENTS

Page

This manual is a basic guide to USACE/NAVFAC Construction Quality Management. Contract requirements take precedence over any guidance contained within this manual or stated by the instructor(s).

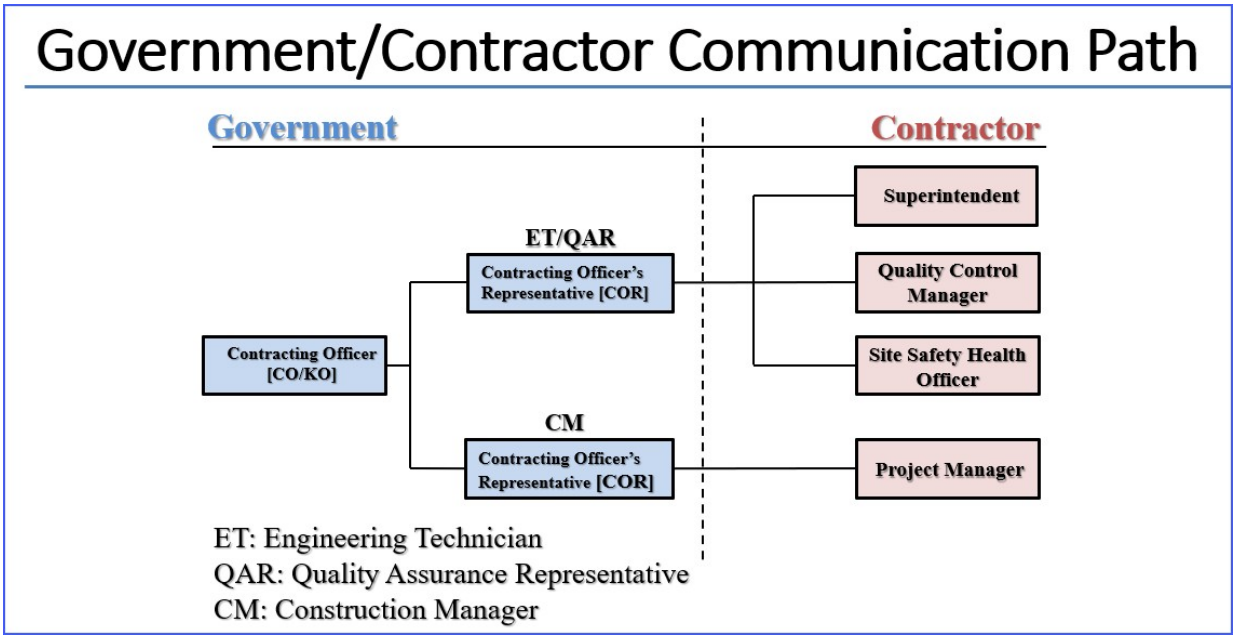
Unless otherwise noted, the words, “he, him, or his” refer to both men and women.

ABC	Associated Builders and Contractors
ACO	Administering Contracting Officer (NAVFAC)
AE	Area Engineer
A-E	Architect-Engineer
AGC	Associated General Contractors
AHA	Activity Hazard Analysis
ALNO	Activity Liaison Officer (NAVFAC)
APP	Accident Prevention Plan
AQC	Alternate Quality Control Manager
AREICC	Assistant Resident Engineer in Charge of Construction (NAVFAC)
AROICC	Assistant Resident Officer in Charge of Construction (NAVFAC)
CA	**Commissioning Agent /Authority**
CADD	Computer-Aided Drafting and Design
CC	Contract Clauses
CCNCN	Construction Contract Non-Compliance Notice
CEFMS	Corps of Engineers Financial Management System
CO [KO]	**Contracting Officer**
COAR	Contracting Officer's Authorized Representative (NAVFAC)
COR	**Contracting Officer's Representative**
COTR	Contracting Officer's Technical Representative (NAVFAC)
CPM	Critical Path Method [Schedule]
CQC	**Contractor Quality Control**
CQM	**Construction Quality Management**
CSI	Construction Specifications Institute

Cx	**Commissioning**
DACA	Department of the Army Construction Army
DACW	Department of the Army Civil Works
DALTS	Duct Air Leakage Tests
DFOW	**Definable Feature of Work**
DoD	Department of Defense
DQCM	**Design Quality Control Manager**
DOR	**Designer of Record**
EFA	Engineering Field Activity (NAVFAC)
EFD	Engineering Field Division (NAVFAC)
ENG	Form Engineer Form
EM	Engineer Manual
EP	Engineer Pamphlet
ER	Engineer Regulation
FAR	Federal Acquisition Regulations
FEAD	**Facility Engineering & Acquisition Division**
FIO	For Information Only
FOIA	Freedom of Information Act
GA	Government Approved
GDA	**Government Designated Authority**
HQUSACE	Headquarters U.S. Army Corps of Engineers
HVAC	Heating, Ventilating, and Air Conditioning
IAQ	Indoor Air Quality
ISO	International Organization for Standardization
ITR	Independent Technical Review

JHA	Job Hazard Analysis
KTR	**Construction Contractor**
LEED	Leadership in Energy & Environmental Design
NAS	Network Analysis System [CPM Schedule]
NAVFAC	**Naval Facilities Engineering Command (NAVFAC)**
OICC	Officer in Charge of Construction (NAVFAC)
O&M	Operations and Maintenance
OMSI	Operation and Maintenance Support Information
PCO	Procuring Contracting Officer (NAVFAC)
PL P	Project Leader (NAVFAC)
PM	Project Manager
PWC	Public Works Center (NAVFAC)
PWD	Public Works Department (NAVFAC)
PWO	Public Works Officer (NAVFAC)
PVT	Performance Verification Test
QA	**Quality Assurance**
QA REP	**Quality Assurance Representative**
QAR	Quality Assurance Report
QC	Quality Control
QCM	Quality Control Manager
QCS	Quality Control System
RE	Resident Engineer
REICC	**Resident Engineer in Charge of Construction**
RFI	Request for Information
RMS	Resident Management System

ROICC	**Resident Officer in Charge of Construction (ROICC)**
SCS	Supervisory Contract Specialist (NAVFAC)
SD	Submittal (Description) Identification
SDEF	Standard Data Exchange
SGE	Supervisory General Engineer (NAVFAC)
SOHO	Safety and Occupational Health Office
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
TABS	Testing, Adjusting, and Balancing System
UFGS	**Unified Facilities Guide Specifications**
USACE	**U.S. Army corps of Engineers**
VE	Value Engineering
VECP	Value Engineering Change Proposal



PREPARATORY PHASE CHECKLIST 81/338

(CONTINUED ON SECOND PAGE)

SPEC SECTION	DATE

CONTRACT NO	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #

PERSONNEL PRESENT

GOVERNMENT REP NOTIFIED _____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/GOVERNMENT

SUBMITTALS

REVIEW SUBMITTALS AND/OR SUBMITTAL REGISTER. HAVE ALL SUBMITTALS BEEN APPROVED? YES ☐ NO ☐

IF NO, WHAT ITEMS HAVE NOT BEEN SUBMITTED?

ARE ALL MATERIALS ON HAND? YES ☐ NO ☐

IF NO, WHAT ITEMS ARE MISSING?

CHECK APPROVED SUBMITTALS AGAINST DELIVERED MATERIAL. (THIS SHOULD BE DONE AS MATERIAL ARRIVES.)

COMMENTS:

MATERIAL STORAGE

ARE MATERIALS STORED PROPERLY? YES ☐ NO ☐

IF NO, WHAT ACTION IS TAKEN?

SPECIFICATIONS

REVIEW EACH PARAGRAPH OF SPECIFICATIONS.

DISCUSS PROCEDURE FOR ACCOMPLISHING THE WORK.

CLARIFY ANY DIFFERENCES.

PRELIMINARY WORK & PERMITS

ENSURE PRELIMINARY WORK IS CORRECT AND PERMITS ARE ON FILE.

IF NOT, WHAT ACTION IS TAKEN?

PREPARATORY PHASE CHECKLIST (CONTINUED FROM FIRST PAGE)		SPEC SECTION	DATE
CONTRACT NO	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #

TESTING

IDENTIFY TEST TO BE PERFORMED, FREQUENCY, AND BY WHOM.

WHEN REQUIRED?

WHERE REQUIRED?

REVIEW TESTING PLAN.

HAS TEST FACILITIES BEEN APPROVED?

SAFETY

ACTIVITY HAZARD ANALYSIS APPROVED? YES ☐ NO ☐

REVIEW APPLICABLE PORTION OF EM 385-1-1.

MEETING COMMENTS

NAVY/ROICC COMMENTS DURING MEETING.

OTHER ITEMS OR REMARKS

OTHER ITEMS OR REMARKS:

QC MANAGER DATE

INITIAL PHASE CHECKLIST

SPEC SECTION	DATE

CONTRACT NO	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #

PERSONNEL PRESENT

GOVERNMENT REP NOTIFIED _____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/GOVERNMENT

PROCEDURE COMPLIANCE

IDENTIFIY FULL COMPLIANCE WITH PROCEDURES IDENTIFIED AT PREPARATORY. COORDINATE PLANS, SPECIFICATIONS, AND SUBMITTALS.

COMMENTS:

PRELIMINARY WORK

ENSURE PRELIMINARY WORK IS COMPLETE AND CORRECT. IF NOT, WHAT ACTION IS TAKEN?

WORKMANSHIP

ESTABLISH LEVEL OF WORKMANSHIP.

WHERE IS WORK LOCATED?

IS SAMPLE PANEL REQUIRED? YES ☐ NO ☐

WILL THE INIITAL WORK BE CONSIDERED AS A SAMPLE? YES ☐ NO ☐

(IF YES, MAINTAIN IN PRESENT CONDITION AS LONG AS POSSIBLE AND DESCRIBE LOCATION OF SAMPLE)

RESOLUTION

RESOLVE ANY DIFFERENCES.

COMMENTS:

CHECK SAFETY

REVIEW JOB CONDITIONS USING EM 385-1-1 AND JOB HAZARD ANALYSIS

COMMENTS:

OTHER

OTHER ITEMS OR REMARKS

QC MANAGER DATE

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CONTRACTOR QUALITY CONTROL REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE

REPORT NO

PHASE | CONTRACT NO | CONTRACT TITLE

PREPARATORY

WAS PREPARATORY PHASE WORK PREFORMED TODAY? YES ☐ NO ☐

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL PREPARATORY PHASE CHECKLIST.

Schedule Activity No.	Definable Feature of Work	Index #

INITIAL

WAS INITIAL PHASE WORK PREFORMED TODAY? YES ☐ NO ☐

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL INITIAL PHASE CHECKLIST.

Schedule Activity No.	Definable Feature of Work	Index #

FOLLOW-UP

WORK COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE? YES ☐ NO ☐

WORK COMPLIES WITH SAFETY REQUIREMENTS? YES ☐ NO ☐

Schedule Activity No.	Description of Work, Testing Performed & By Whom, Definable Feature of Work, Specification Section, Location and List of Personnel Present

REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)

Schedule Activity No.	Description

REWORK ITEMS CORRECTED TODAY (FROM REWORK ITEMS LIST)

Schedule Activity No.	Description

REMARKS (Also Explain Any Follow-Up Phase Checklist Item From Above That Was Answered "NO"), Manuf. Rep On-Site, etc.

Schedule Activity No.	Description

On behalf of the contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge except as noted in this report.

AUTHORIZED QC MANAGER AT SITE DATE

GOVERNMENT QUALITY ASSURANCE REPORT

DATE

QUALITY ASSURANCE REPRESENTATIVE'S REMARKS AND/OR EXCEPTIONS TO THE REPORT

Schedule Activity No.	Description

GOVERNMENT QUALITY ASSURANCE MANAGER DATE

CONTRACTOR QUALITY CONTROL REPORT

(CONTINUATION SHEET)
(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE

REPORT NO.

PHASE	CONTRACT NO	CONTRACT TITLE

FOLLOW-UP

WORK COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE? YES ☐ NO ☐

WORK COMPLIES WITH SAFETY REQUIREMENTS? YES ☐ NO ☐

Schedule Activity No.	Description of Work, Testing Performed & By Whom, Definable Feature of Work, Specification Section, Location and List of Personnel Present

REMARKS (Also Explain Any Checklist Item From Above That Was Answered "NO"), Manuf. Rep. On-Site, etc.

Schedule Activity No.	Description

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CONTRACTOR PRODUCTION REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE

CONTRACT NO	TITLE AND LOCATION	REPORT NO

CONTRACTOR	SUPERINTENDENT

AM WEATHER	PM WEATHER	MAX TEMP (F)	MIN TEMP (F)

WORK PERFORMED TODAY

Schedule Activity No.	WORK LOCATION AND DESCRIPTION	EMPLOYER	NUMBER	TRADE	HRS

JOB SAFETY

WAS A JOB SAFETY MEETING HELD THIS DATE? (If YES attach copy of the meeting minutes)	☐ YES	☐ NO	TOTAL WORK HOURS ON JOB SITE, THIS DATE, INCL CON'T SHEETS
WERE THERE ANY LOST TIME ACCIDENTS THIS DATE? (If YES attach copy of completed OSHA report)	☐ YES	☐ NO	CUMULATIVE TOTAL OF WORK HOURS FROM PREVIOUS REPORT
WAS CRANE/MANLIFT/TRENCHING/SCAFFOLD/HV ELEC/HIGH WORK/ HAZMAT WORK DONE? (If YES attach statement or checklist showing inspection performed.)	☐ YES	☐ NO	
WAS HAZARDOUS MATERIAL/WASTE RELEASED INTO THE ENVIRONMENT? (If YES attach description of incident and proposed action.)	☐ YES	☐ NO	TOTAL WORK HOURS FROM START OF CONSTRUCTION

Schedule Activity No.	LIST SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED	☐ SAFETY REQUIREMENTS HAVE BEEN MET.

EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB (INDICATE SCHEDULE ACTIVITY NUMBER)

Schedule Activity No.	Submittal #	Description of Equipment/Material Received

CONSTRUCTION AND PLANT EQUIPMENT ON JOB SITE TODAY. INDICATE HOURS USED AND SCHEDULE ACTIVITY NUMBER.

Schedule Activity No.	Owner	Description of Construction Equipment Used Today (incl Make and Model)	Hours Used

Schedule Activity No.	REMARKS

CONTRACTOR/SUPERINTENDENT DATE

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CONTRACTOR PRODUCTION REPORT
(CONTINUATION SHEET)

DATE

CONTRACT NO

TITLE AND LOCATION

REPORT NO

WORK PERFORMED TODAY

Schedule Activity No.	WORK LOCATION AND DESCRIPTION	EMPLOYER	NUMBER	TRADE	HRS

Schedule Activity No.	LIST SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED

EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB (INDICATE SCHEDULE ACTIVITY NUMBER)

Schedule Activity No.	Submittal #	Description of Equipment/Material Received

CONSTRUCTION AND PLANT EQUIPMENT ON JOB SITE TODAY. INDICATE HOURS USED AND SCHEDULE ACTIVITY NUMBER.

Schedule Activity No.	Owner	Description of Construction Equipment Used Today (incl Make and Model)	Hours Used

Schedule Activity No.	REMARKS

INCLUDE ALL PERSONNEL WORK HOURS IN THE WORK PERFORMED SECTION ON THIS SHEET
INTO THE FRONT CONTRACTOR PRODUCTION REPORT

TESTING PLAN AND LOG

CONTRACT NUMBER			PROJECT TITLE AND LOCATION							CONTRACTOR	
SPECIFICATION SECTION AND PARAGRAPH NUMBER	SCHEDULE ACTIVITY ID	TEST REQUIRED	ACCREDITED/ APPROVED LAB		SAMPLED BY	TESTED BY	LOCATION OF TEST		DATE COMPLETED	DATE FORWARDED TO CONTR. OFF.	REMARKS
			YES	NO			ON SITE	OFF SITE			

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REWORK ITEMS LIST

Contract No. and Title: _____

Contractor: _____

NUMBER	DATE IDENTIFIED	DESCRIPTION	CONTRACT REQUIREMENT (Spec. Section and Par. No., Drawing No. and Detail No., etc.)	ACTION TAKEN BY QC MANAGER	RESOLUTION	DATE COMPLETED

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	03 30 00 Cast-in-Place Concrete			
Item No	**Description**	Preparatory	Initial	Follow-Up
1	Formwork approval obtained			
2	Rebar approval obtained			
3	Verify mix design			
4	Notify testing laboratory of pour			
5	Arrange site test personnel			
6	Arrange offsite test personnel			
7	Areas to receive concrete are cleaned, wetted, or otherwise prepared			
8	Pour area is free of frost and excessive water			
9	Previously placed concrete is properly prepared to receive new			
10	All embed items are properly located and installed (door closers, ledgers, bolts, anchors, studs, etc)			
11	Proper tools and equipment are available			
12	Tools and equipment are in working condition			
13	Identify proximity of standby tools and equipment			
14	Conveying and depositing equipment is capable of reaching all areas of placement without segregation, loss of ingredients, formation of air pockets, or cold joints			
15	Adequate manpower is available for timely placemen			
16	Temporary form openings in place, as reqâ€™d			
17	Tremies on hand if needed			
18	Form pockets, if any, are vented entrapment			
19	Subgrade and capillary fills are compacted			
20	Subgrade membrane installation is tight			
21	Arrangements made for proper curing			
22	Arrangements made for sawed joints			
23	Arrangements made for protection of adjacent items			
24	Inspectors have all required testing equipment			
25	Identify person with authority to add water to mix			
26	Concrete delivery schedule and sequence is scheduled for continuous placement to prevent cold joints			
27	Verify age of concrete is within mix time limit			
28	Check delivery tickets for mix number and proportions			
29	Is modified grout required such as at rebar congestion			
30	Pour lift layers are kept approximately horizontal			
31	Pour lift layers do not exceed required lift height			
32	Complete pour record for each pour			
33	Check grades, elevations, alignment, form adjustment, and supports during placement			

	03 30 00 Cast-in-Place Concrete			
Item No	**Description**	Preparatory	Initial	Follow-Up
34	Define test sample storage location			
35	Test sample storage location is away from weather extremes and movement			
36	Vibration performed properly			
37	Watering and drainage methods determined			
38	Finishes are as specified (smooth, broomed, nonslip, exposed aggregate)			
39	Troweling is not performed while bleed water is on surface			
40	Over-troweling is avoided			
41	Curing methods are started as soon as possible			
42	Curing compounds are as required			
43	Curing compound is compatible with subsequent finishes			
44	Finishing method provides evenness, smoothness, and levelness of surfaces within tolerance indicated			
45	Slopes are provided as required			
46	Marks left by finishing tools are removed			
47	Joints, edges, and corners are carefully finished			
48	Curing method is adequately performed			
49	Post-pour protection is installed			
50	Protection covers are applied with sufficient lap and sealing during curing period (colored surfaces may require special covers to avoid staining, etc.)			
51	Monitor loading and traffic over new surfaces			
52	Architectural repairs/sacking are performed timely (form ties,, honeycomb pockets, tool marks)			

Student Name:_____ Date:_____

Contract No.:	
Project Title:	
Contractor:	
Superintendent:	QC Manager:
SSHO:	Alternate QC Manager:

Item No.	Item	Yes	No	N/A	Comments
Quality Control Specifications Section					
1	Was the QC plan submitted in accordance with QC specification?				
a.	● In a 3 ring binder				
b.	● Includes a table of contents				
c.	● Major sections identified with tabs				
d.	● Pages numbered sequentially				
QC Organization					
2	Is there a chart showing the Contractor's QC organization structure?				
3	Does the chart show the relationship of QC orginization to other elements of the prime contractor's company? The chart needs to show the relationship of the QC Manager to company officer(s), to the QC staff, to outside organizations, to the project superintendent.				
4	Does the chart show the relationship of the QC organization to subcontractors, suppliers, outside				
Names and Qualifications					
5	Contains the names and qualifications for each person in the QC organization, in resume format?				
6	Are the current CQM for Contractor training certificates in the QC plan?				
7	Do the qualifications and past experiences of the following QC staff meet the contract specification requirements?				
a.	● QC Manager				
b.	● Alternate QC Manager				
c.	● QC Specialist(s)				
d.	● Submittal Reviewer(s)				
e.	● Registered Fire Protection Engineer				

Item No.	Item	Yes	No	N/A	Comments
Duties, Responsibility and Authority of QC Personnel					
8	Are the duties, area of responsibilities and authority of each person in the QC organization stated in detail in the QC Plan, in particular the QC Manager and the Alternate QC manager?				
Outside Organizations					
9	Is there a listing of outside organizations, such as architectural and consulting engineering firms, that will be used by the Prime Contractor?				
10	Does this listing contain a description of the work and services to be performed?				
Appointment Letters					
11	Are there appointment letters, signed by an officer of the firm, appointing the QC Manager and the Alternate QC Manager and including the following:				
a.	● Outlining their duties, responsibilities and authority for implementing and managing the QC program?				
b.	● Responsibility to manage and implement the three phases of control?				
c.	● The authority to stop any work not complying with the Contract, and the removal and replacement of any defective work?				
12	Are there letters of direction to the Assistant QC Manager and all QC specialists outlining their duties, authorities, and responsibilities?				
Submittal Procedures and Initial Submittal Register					
13	Are there procedures for reviewing, approving, and managing submittals?				
14	Is there a list of name(s) of people in the QC Organization authorized to review and certify submittals?				
15	Is the initial Submittal Register as specified included in the QC Plan?				

Item No.	Item	Yes	No	N/A	Comments
Testing Laboratory Information					
16	Is there a list of construction material testing laboratories to be used for this Contract?				
17	Is there a description of the service(s) these testing laboratories will provide?				
18	Is the Contractor using accredited testing laboratories and are there current copies of the Certificate of Accreditation and Scope of Accreditation for the testing laboratories listed?				
19	Do the testing laboratory's scope of accreditation include the appropriate ASTM standards listed in the technical specification sections?				
Testing Plan and Log					
20	Is there a Testing Plan and Log that includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test.				
List of Definable Features					
21	A Definable Feature of Work (DFOW) is a task that is separate and distinct from other tasks and has control requirements and works crews unique to that task. Is there a list of DFOWs in the QC Plan?				
22	As a minimum, is the list of DFOWs cross referenced to the Contractor's project schedule and the specification sections?				
23	Does the list include, but not limited to, all critical path activities?				
24	Does this list include all activities which require QC specialists or specialty inspection personnel?				
25	(DB) Does each design development stage and submittal package have separate DFOWs?				

Item No.	Item	Yes	No	N/A	Comments
Procedures for Performing the Three Phases of Control					
26	Does the Plan contain procedures to use to ensure the three phases of control are used to manage the quality on this contract?				
Personnel Matrix					
27	If required, does the matrix show for each specification section:				
a	● Who will review and approve submittals?				
b	● Who will perform and document the three phases of control?				
c	● Who will perform and document the testing?				
Procedures for Completion Inspection					
28	If required, does the procedure identify the responsible party for punch out inspection, prefinal inspection, and final acceptance inspection?				
Training Procedures and Training Log					
29	If required, are there procedures for coordinating and documenting the training of personnel as required by the Contract?				
30	If required, has a sample record of training been included in the QC Plan which reports what systems, who provides the training, when and where the training is to be performed and who attended?				

Item	Comment
Comments (By Item No.):	

Item	Comment
Comments (By Item No.):	

SECTION 01 45 00.00 20

QUALITY CONTROL
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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 52.2	(2012) Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

ASTM INTERNATIONAL (ASTM)

ASTM C1077	(2017) Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM D3666	(2016) Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D3740	(2019) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM D6245	(2012) Using Indoor Carbon Dioxide Concentrations to Evaluate Indoor Air Quality and Ventilation
ASTM D6345	(2010) Standard Guide for Selection of Methods for Active, Integrative Sampling of Volatile Organic Compounds in Air
ASTM E329	(2018) Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
ASTM E543	(2015) Standard Practice for Agencies Performing Non-Destructive Testing

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

ANSI/SMACNA 008	(2007) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety and Health Requirements Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES

SD-01 Preconstruction Submittals

Construction Quality Control (QC) Plan; G

Submit a Construction QC Plan prior to start of construction.

Indoor Air Quality (IAQ) Management Plan; G

Basis of Design and Design Intent

SD-05 Design Data

Design Review

Contract Document Review

SD-07 Certificates

CA Resume

1.3 INFORMATION FOR THE CONTRACTING OFFICER

Prior to commencing work on construction, the Contractor can obtain a single copy set of the current report forms from the Contracting Officer. The report forms will consist of the Contractor Production Report, Contractor Production Report (Continuation Sheet), Contractor Quality Control (CQC) Report, CQC Report (Continuation Sheet), Preparatory Phase Checklist, Initial Phase Checklist, Rework Items List, and Testing Plan and Log.

Deliver the following to the Contracting Officer during Construction:

a. CQC Report: Submit the report electronically by 10:00 a.m. the next working day after each day that work is performed and for every 7 consecutive calendar days of no-work.

b. Contractor Production Report: Submit the report electronically by 10:00 a.m. the next working day after each day that work is performed and for every 7 consecutive calendar days of no-work.

c. Preparatory Phase Checklist: Submit the report electronically in the same manner as the CQC Report for each Preparatory Phase held. Original attached to the original CQC Report and one copy attached to each QC Report copy.

d. Initial Phase Checklist: Submit the report electronically in the same manner as the CQC Report for each Initial Phase held. Original

attached to the original CQC Report and one copy attached to each QC Report copy.

e. QC Specialist Reports: Submit the report electronically by 10:00 a.m. the next working day after each day that work is performed.

f. Field Test Reports: Within 2 working days after the test is performed, submit the report as an electronic attachment to the CQC Report.

g. Monthly Summary Report of Tests: Submit the report as an electronic attachment to the CQC Report at the end of each month.

h. Testing Plan and Log: Submit the report as an electronic attachment to the CQC Report, at the end of each month. Provide a copy of the final Testing Plan and Log to the preparer of the Operation & Maintenance (O&M) documentation.

i. Rework Items List: Submit lists containing new entries daily, in the same manner as the CQC Report.

j. CQC Meeting Minutes: Within 2 working days after the meeting is held, submit the report as an electronic attachment to the CQC Report.

k. QC Certifications: As required by the paragraph entitled "QC Certifications."

l. Special Inspection Report: Submit the Special Inspection reports, in the same manner as the CQC Report.

1.4 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program as described in this section. This QC program is a key element in meeting the objectives of NAVFAC Commissioning. The QC program consists of a QC Organization, QC Plan, QC Plan Meeting(s), a Coordination and Mutual Understanding Meeting, QC meetings, three phases of control, submittal review and approval, testing, completion inspections, QC certifications, independent Special Inspections in accordance with Section 01 45 35 SPECIAL INSPECTIONS, and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract. The QC program must cover on-site and off-site work and be keyed to the work sequence. No construction work or testing may be performed unless the QC Manager is on the work site. The QC Manager must report to an officer of the firm and not be subordinate to the Project Superintendent or the Project Manager. The QC Manager, Project Superintendent and Project Manager must work together effectively. Although the QC Manager is the primary individual responsible for quality control, all individuals will be held responsible for the quality of work on the job.

1.4.1 Commissioning

Commissioning (Cx) is a systematic process of ensuring that all building systems meet the requirements and perform interactively according to the Contract. The QC Program is a key to this process by coordinating, verifying and documenting measures to achieve the following objectives:

a. Verify and document that the applicable equipment and systems are

installed in accordance with the design intent as expressed through the Contract and according to the manufacturer's recommendations and industry accepted minimum standards.

b. Verify and document that equipment and systems receive complete operational checkout by the installing contractors.

c. Verify and document proper performance of equipment and systems.

d. Verify that Operation and Maintenance (O&M) documentation is complete.

e. Verify the Training Plan and training materials are accurate and provide correct instruction and documentation on the critical elements of the products, materials, and systems in the constructed facility. Verify that all identified Government operating personnel are trained.

f. Verify and document that all contract requirements for LEED fundamental commissioning are met.

1.4.2 Acceptance of the Construction Quality Control (QC) Plan

Acceptance of the QC Plan is required prior to the start of construction. The Contracting Officer reserves the right to require changes in the QC Plan and operations as necessary, including removal of personnel, to ensure the specified quality of work. The Contracting Officer reserves the right to interview any member of the QC organization at any time in order to verify the submitted qualifications. All QC organization personnel are subject to acceptance by the Contracting Officer. The Contracting Officer may require the removal of any individual for non-compliance with quality requirements specified in the Contract.

1.4.3 Preliminary Construction Work Authorized Prior to Acceptance

The only construction work that is authorized to proceed prior to the acceptance of the QC Plan is mobilization of storage and office trailers, temporary utilities, and surveying.

1.4.4 Notification of Changes

Notify the Contracting Officer, in writing, of any proposed changes in the QC Plan or changes to the QC organization personnel, a minimum of 10 work days prior to a proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

1.4.5 Special Inspections

Perform all required Special Inspections per Section 01 45 35 SPECIAL INSPECTIONS, the statement of Special Inspections and the Schedule of Special Inspections.

1.5 QC ORGANIZATION

1.5.1 QC Manager

1.5.1.1 Duties

Provide a QC Manager at the work site to implement and manage the QC program. The only duties and responsibilities of the QC Manager are to implement the QC program of this contract.

Manager is required to attend the partnering meetings, QC Plan Meetings, Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform the three phases of control except for those phases of control designated to be performed by QC Specialists, perform submittal review and approval, ensure testing is performed and provide QC certifications and documentation required in this Contract. The QC Manager is responsible for managing and coordinating the three phases of control and documentation performed by the QC Specialists, testing laboratory personnel and any other inspection and testing personnel required by this Contract. The QC Manager is the manager of all QC activities. The QC manager is responsible for notifying the Special Inspector of Record of activities which require their review. The QC manager is responsible for coordinating the Special Inspection activities, see paragraph QUALITY CONTROL MANAGER, in Section 01 45 35 SPECIAL INSPECTIONS.

1.5.1.2 Qualifications

An individual with minimum of ten years combined experience in the following position: Project Superintendent, QC Manager, Project Manager, Project Engineer or Construction Manager on similar size and type construction contracts which included the major trades that are part of this Contract. The individual must have at least 2 years' experience as a QC Manager. The individual must be familiar with the requirements of EM 385-1-1, and have experience in the areas of hazard identification, safety compliance, and sustainability.

1.5.2 Commissioning Authority

1.5.2.1 Duties

Provide a Commissioning Authority (CA) as key person for the Cx and documentation thereof, who is subordinate to the QC Manager. The Contractor's CxA during construction is also referred to as the Contractor's Lead Commissioning Specialist (CxC) in Section 01 91 00.15 TOTAL BUILDING COMMISSIONING. Section 01 91 00.15 TOTAL BUILDING COMMISSIONING also designates two additional Contractor Commissioning Specialists: Electrical Technical Commissioning Specialist (CxE) and Mechanical Systems Technical Commissioning Specialist (CxM). The CA directs and coordinates Cx activities and submits Cx reports to the Contracting Officer to meet the submittal and reporting requirements of Commissioning and develops the commissioning plan. The CA coordinates the actions of the QC Specialists, Testing Laboratory personnel, and other inspection and testing personnel required by this Contract for building Cx.

1.5.2.2 Qualifications

The CA must be certified as a commissioning professional by the Associated Air Balance Council (AABC) Commissioning Group (ACG), the Association of Energy Engineers (AEE), the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), the Commissioning Process Management Professional (CPMP), the Building Commissioning Association (BCA), the National Environmental Balancing Bureau (NEBB), or the University of Wisconsin - Madison (UWM). CA resume is required, providing education, experience and management capabilities on at least two similar size and type contracts. The CA may not have been involved with the project design, construction management, or supervision, and must be with

a third-party firm that is not on the design team.

1.5.3 Construction Quality Management Training

In addition to the above experience and education requirements, the QC Manager must have completed the course entitled "Construction Quality Management (CQM) for Contractors." If the QC Manager does not have a current certification, they must obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Command and the Army Corps of Engineers. Contact the Contracting Officer for information on the next scheduled class.

1.5.4 Alternate QC Manager Duties and Qualifications

Designate an alternate for the QC Manager at the work site to serve in the event of the designated QC Manager's absence. The period of absence may not exceed 2 weeks at one time, and not more than 30 workdays during a calendar year. The qualification requirements for the Alternate QC Manager must be the same as for the QC Manager.

1.5.5 Special Inspector of Record

The Special Inspector of Record (SIOR) must be an independent third party hired directly by the Prime Contractor. The SIOR must not be a company employee of the Contractor or any Subcontractor performing the work to be inspected. The qualifications of the SIOR are defined in Section 01 45 35 SPECIAL INSPECTION.

1.5.6 Registered Fire Protection Engineer

The U.S. Registered Fire Protection Engineer (FPE) must be an independent third party hired directly by the Prime Contractor as an integral part of the Prime Contractor's Quality Control Organization. This FPE must have no business relationships (owner, partner, operating officer, distributor, salesman, or technical representative) with any subcontractors involved with this project, or with any fire protection equipment device manufacturers, suppliers or installers for any such equipment provided as part of this project. This FPE is responsible for review, approval, and coordination of all fire protection system material submittals, calculations, shop drawings, etc.

1.5.7 Submittal Reviewers Duties and Qualifications

Provide a Submittal Reviewer, other than the QC Manager or CA, qualified in the discipline being reviewed, to review and certify that the submittals meet the requirements of this Contract prior to certification or approval by the QC Manager.

Each submittal must be reviewed by an individual with 10 years of construction experience or a registered architect or professional engineer.

1.6 QUALITY CONTROL (QC) PLAN

1.6.1 Construction Quality Control (QC) Plan

1.6.1.1 Requirements

Provide, for acceptance by the Contracting Officer, a Construction QC Plan

submitted in a three-ring binder that includes a table of contents, with major sections identified with tabs, with pages numbered sequentially, and that documents the proposed methods and responsibilities for accomplishing quality control commissioning activities during the construction of the project:

a. QC ORGANIZATION: A chart showing the QC organizational structure.

b. NAMES AND QUALIFICATIONS: Names and qualifications, in resume format, for each person in the QC organization. Include the CQM for Contractors course certifications for the QC Manager and Alternate QC Manager as required by the paragraphs entitled "Construction Quality Management Training" and "Alternate QC Manager Duties and Qualifications".

c. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONNEL: Duties, responsibilities, and authorities of each person in the QC organization.

d. OUTSIDE ORGANIZATIONS: A listing of outside organizations, such as architectural and consulting engineering firms, that will be employed by the Contractor and a description of the services these firms will provide.

e. APPOINTMENT LETTERS: Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager and stating that they are responsible for implementing and managing the QC program as described in this Contract. Include in this letter the responsibility of the QC Manager and Alternate QC Manager to implement and manage the three phases of control, and their authority to stop work which is not in compliance with the Contract. Letters of direction are to be issued by the QC Manager to all other QC Specialists outlining their duties, authorities, and responsibilities. Include copies of the letters in the QC Plan.

f. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER: Procedures for reviewing, approving, and managing submittals. Provide the name(s) of the person(s) in the QC organization authorized to review and certify submittals prior to approval. Provide the initial submittal of the Submittal Register as specified in Section 01 33 00 SUBMITTAL PROCEDURES.

g. TESTING LABORATORY INFORMATION: Testing laboratory information required by the paragraphs entitled "Accreditation Requirements", as applicable.

h. TESTING PLAN AND LOG: A Testing Plan and Log that includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test.

i. PROCEDURES TO COMPLETE REWORK ITEMS: Procedures to identify, record, track, and complete rework items.

j. LIST OF DEFINABLE FEATURES: A Definable Feature of Work (DFOW) is a task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. A DFOW is identified by different trades or disciplines and is an item or activity on the construction schedule. Include in the list of DFOWs, but not be limited to, all critical path activities on the NAS. Include all

activities for which this specification requires QC Specialists or specialty inspection personnel. Provide separate DFOWs in the Network Analysis Schedule for each submittal package.

k. PROCEDURES FOR PERFORMING THE THREE PHASES OF CONTROL: Identify procedures used to ensure the three phases of control to manage the quality on this project. For each DFOW, a Preparatory and Initial phase checklist will be filled out during the Preparatory and Initial phase meetings. Conduct the Preparatory and Initial Phases and meetings with a view towards obtaining quality construction by planning ahead and identifying potential problems for each DFOW.

l. PERSONNEL MATRIX: Not Applicable.

m. PROCEDURES FOR COMPLETION INSPECTION:

n. TRAINING PROCEDURES AND TRAINING LOG: Procedures for coordinating and documenting the training of personnel required by the Contract.

o. ORGANIZATION AND PERSONNEL CERTIFICATIONS LOG: Procedures for coordinating, tracking and documenting all certifications on subcontractors, testing laboratories, suppliers, personnel, etc. QC Manager will ensure that certifications are current, appropriate for the work being performed, and will not lapse during any period of the contract that the work is being performed.

1.7 COORDINATION AND MUTUAL UNDERSTANDING MEETING

After submission of the QC Plan, and prior to Government approval and the start of construction, the QC Manager will meet with the Contracting Officer to present the QC program required by this Contract. When a new QC Manager is appointed, the coordination and mutual understanding meeting must be repeated.

1.7.1 Purpose

The purpose of this meeting is to develop a mutual understanding of the QC details, including documentation, administration for on-site and off-site work, design intent, Cx, environmental requirements and procedures, coordination of activities to be performed, Special Inspections, and the coordination of the Contractor's management, production, and QC personnel. At the meeting, the Contractor will be required to explain in detail how three phases of control will be implemented for each DFOW, as well as how each DFOW will be affected by each management plan or requirement as listed below:

a. Waste Management Plan.

b. IAQ Management Plan.

c. Procedures for noise and acoustics management.

d. Environmental Protection Plan.

e. Environmental regulatory requirements.

f. Cx Plan.

g. Special Inspections.

1.7.2 Coordination of Activities

Coordinate activities included in various sections to assure efficient and orderly installation of each component. Coordinate operations included under different sections that are dependent on each other for proper installation and operation. Schedule construction operations with consideration for indoor air quality as specified in the IAQ Management Plan. Coordinate prefunctional tests and startup testing with Cx. Coordinate special inspections.

1.7.3 Attendees

As a minimum, the Contractor's personnel required to attend include an officer of the firm, the Project Manager, Project Superintendent, QC Manager, Alternate QC Manager, Special Inspector of Record, CA, Environmental Manager, and subcontractor representatives. Each subcontractor who will be assigned QC responsibilities must have a principal of the firm at the meeting. Minutes of the meeting will be prepared by the QC Manager and signed by the Contractor and the Contracting Officer. Provide a copy of the signed minutes to all attendees and include in the QC Plan.

1.8 QC MEETINGS

After the start of construction, conduct QC meetings once every two weeks by the QC Manager at the work site with the Project Superintendent, the Special Inspector of Record, the CA, and the foremen who are performing the work of the DFOWs. The QC Manager is to prepare the minutes of the meeting and provide a copy to the Contracting Officer within 2 working days after the meeting. The Contracting Officer may attend these meetings. As a minimum, accomplish the following at each meeting:

a. Review the minutes of the previous meeting.

b. Review the schedule and the status of work and rework.

c. Review the status of submittals.

d. Review the work to be accomplished in the next 2 weeks and documentation required.

e. Resolve QC and production problems (RFI, etc.).

f. Address items that may require revising the QC Plan.

g. Review Accident Prevention Plan (APP).

h. Review environmental requirements and procedures.

i. Review Waste Management Plan.

j. Review IAQ Management Plan.

k. Review Environmental Management Plan.

l. Review the status of training completion.

m. Review Cx Plan and progress.

1.9 DESIGN REVIEW AND DOCUMENTATION

1.9.1 Basis of Design and Design Intent

The CA must review the basis of design received from the Contracting Officer and the design intent. The Basis of Design is not part of the contract documents, but will be provided by the Contracting Officer upon request. Document the Basis of Design review in the Design Review report required below.

1.9.2 Design Review

The CA must review design documents to verify that each commissioned system meets the design intent relative to functionality, energy performance, water performance, maintainability, sustainability, system cost, indoor environmental quality, and local environmental impacts. Fully document design review in written report.

1.9.3 Contract Document Review

The CA must review the Contract documents to verify that Cx is adequately specified, and that each commissioned system is likely to meet the design intent relative to functionality, energy performance, water performance, maintainability, sustainability, system cost, indoor environmental quality, and local environmental impacts. Fully document contract document review in written report.

1.10 THREE PHASES OF CONTROL

Adequately cover both on-site and off-site work with the Three Phases of Control and include the following for each DFOW.

1.10.1 Preparatory Phase

Notify the Contracting Officer at least two work days in advance of each preparatory phase meeting. The meeting will be conducted by the QC Manager and attended by the Project Superintendent, the CA, the Special Inspector of Record, and the foreman responsible for the DFOW. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman must attend the preparatory phase meeting. Document the results of the preparatory phase actions in the daily Contractor Quality Control Report and in the Preparatory Phase Checklist. Perform the following prior to beginning work on each DFOW:

a. Review each paragraph of the applicable specification sections.

b. Review the Contract drawings.

c. Verify that field measurements are as indicated on construction and/or shop drawings before confirming product orders, in order to minimize waste due to excessive materials.

d. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required.

e. Review the testing plan and ensure that provisions have been made to provide the required QC testing.

f. Review special inspections required by Section 01 45 35 SPECIAL INSPECTION, the statement of special inspections and the schedule of special inspections.

g. Examine the work area to ensure that the required preliminary work has been completed.

h. Coordinate the schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

i. Arrange for the return of shipping/packaging materials, such as wood pallets, where economically feasible.

j. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data and are properly stored.

k. Discuss specific controls used and construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW.

l. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Safety Data Sheets (SDS) are submitted.

m. Review the Cx Plan and ensure all preliminary work items have been completed and documented.

1.10.2 Initial Phase

Notify the Contracting Officer at least two work days in advance of each initial phase. When construction crews are ready to start work on a DFOW, conduct the initial phase with the Project Superintendent, the Special Inspector of Record, and the foreman responsible for that DFOW. Observe the initial segment of the DFOW to ensure that the work complies with Contract requirements. Document the results of the initial phase in the daily CQC Report and in the Initial Phase Checklist. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. Perform the following for each DFOW:

a. Establish level of workmanship and verify that it meets the minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

b. Resolve any workmanship issues.

c. Ensure that testing is performed by the approved laboratory.

d. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

e. Review project specific work plans (i.e., Cx, HAZMAT Abatement, Stormwater Management) to ensure all preparatory work items have been completed and documented.

f. Coordinate scheduled work with special inspections required by Section

01 45 35 SPECIAL INSPECTIONS, the statement of special inspections and the schedule of special inspections.

1.10.3 Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOW and document in the daily CQC Report:

a. Ensure the work is in compliance with Contract requirements.

b. Maintain the quality of workmanship required.

c. Ensure that testing is performed by the approved laboratory.

d. Ensure that rework items are being corrected.

e. Assure manufacturer's representatives have performed necessary inspections if required and perform safety inspections.

f. Review the Cx Plan and ensure all work items, testing, and documentation has been completed.

g. Coordinate scheduled work with special inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the statement of special inspections and the schedule of special inspections.

1.10.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW is resumed after substantial period of inactivity, or if other problems develop.

1.10.5 Notification of Three Phases of Control for Off-Site Work

Notify the Contracting Officer at least two weeks prior to the start of the preparatory and initial phases.

1.11 SUBMITTAL REVIEW AND APPROVAL

Procedures for submission, review and approval of submittals are described in Section 01 33 00 SUBMITTAL PROCEDURES.

1.12 TESTING

Except as stated otherwise in the specification sections, perform sampling and testing required under this Contract.

1.12.1 Accreditation Requirements

Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (ASTM E329, ASTM C1077, ASTM D3666, ASTM D3740, ASTM E543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing must meet the requirements of OSHA

and EPA. The policy applies to the specific laboratory performing the actual testing, not just the Corporate Office.

1.12.2 Laboratory Accreditation Authorities

Laboratory Accreditation Authorities include the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology at https://www.nist.gov/nvlap, the American Association of State Highway and Transportation Officials (AASHTO) Accreditation Program at http://www.aashtoresource.org/aap/overview, International Accreditation Services, Inc. (IAS) at http://www.iasonline.org, U.S. Army Corps of Engineers Materials Testing Center (MTC) at http://www.erdc.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/9254/Article/476661/materials-testing-center.aspx, the American Association for Laboratory Accreditation (A2LA) program at http://www.a2la.org/, the Washington Association of Building Officials (WABO) at http://www.wabo.org/ (Approval authority for WABO is limited to projects within Washington State), and the Washington Area Council of Engineering Laboratories (WACEL) at https://www.wacel.org/lab-accreditation-and-inspection-agency-audit-programs/laboratory-accreditation-program/ (Approval authority by WACEL is limited to projects within Facilities Engineering Command (FEC) Washington geographical area).

1.12.3 Capability Check

The Contracting Officer retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this Contract.

1.12.4 Test Results

Cite applicable Contract requirements, tests or analytical procedures used. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify the Contracting Officer immediately. Conspicuously stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results must be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the Contracting Officer via the QC Manager. Furnish a summary report of field tests at the end of each month, in accordance with paragraph INFORMATION FOR THE CONTRACTING OFFICER.

1.12.5 Test Reports and Monthly Summary Report of Tests

Furnish the signed reports, certifications, and a summary report of field tests at the end of each month to the Contracting Officer. Attach a copy of the summary report to the last daily Contractor Quality Control Report of each month. Provide a copy of the signed test reports and certifications to the OMSI preparer for inclusion into the OMSI documentation.

1.13 QC CERTIFICATIONS

1.13.1 CQC Report Certification

Contain the following statement within the CQC Report: "On behalf of the Contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge, except as noted in this report."

1.13.2 Invoice Certification

Furnish a certificate to the Contracting Officer with each payment request, signed by the QC Manager, attesting that as-built drawings are current, coordinated and attesting that the work for which payment is requested, including stored material, is in compliance with Contract requirements.

1.13.3 Completion Certification

Upon completion of work under this Contract, the QC Manager must furnish a certificate to the Contracting Officer attesting that "the work has been completed, inspected, tested and is in compliance with the Contract." Provide a copy of this final QC Certification for completion to the preparer of the Operation & Maintenance (O&M) documentation.

1.14 COMPLETION INSPECTIONS

1.14.1 Punch-Out Inspection

Near the completion of all work or any increment thereof, established by a completion time stated in the Contract Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the QC Manager and the CA must conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings, specifications and Contract. Include in the punch list any remaining items on the "Rework Items List", which were not corrected prior to the Punch-Out Inspection. Include within the punch list the estimated date by which the deficiencies will be corrected. Provide a copy of the punch list to the Contracting Officer. The QC Manager, or staff, must make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Government that the facility is ready for the Government "Pre-Final Inspection".

1.14.2 Pre-Final Inspection

The Government and QC Manager will perform this inspection to verify that the facility is complete and ready to be occupied. A Government "Pre-Final Punch List" will be documented by the QC Manager as a result of this inspection. The QC Manager will ensure that all items on this list are corrected prior to notifying the Government that a "Final" inspection with the Client can be scheduled. Any items noted on the "Pre-Final" inspection must be corrected in a timely manner and be accomplished before the contract completion date for the work, or any particular increment thereof, if the project is divided into increments by separate completion dates.

1.14.3 Final Acceptance Inspection

Notify the Contracting Officer at least 14 calendar days prior to the date a final acceptance inspection can be held. State within the notice that all items previously identified on the pre-final punch list will be corrected and acceptable, along with any other unfinished Contract work, by the date of the final acceptance inspection. The Contractor must be represented by the QC Manager, the Project Superintendent, the CA, and others deemed necessary. Attendees for the Government will include the Contracting Officer, other FEAD/ROICC personnel, and personnel representing the Client. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the Contract Clause entitled "Inspection of Construction."

1.15 DOCUMENTATION

Maintain current and complete records of on-site and off-site QC program operations and activities.

1.15.1 Construction Documentation

Reports are required for each day that work is performed and must be attached to the Contractor Quality Control Report prepared for the same day. Maintain current and complete records of on-site and off-site QC program operations and activities. The forms identified under the paragraph "INFORMATION FOR THE CONTRACTING OFFICER" will be used. Reports are required for each day work is performed. Account for each calendar day throughout the life of the Contract. Every space on the forms must be filled in. Use N/A if nothing can be reported in one of the spaces. The Project Superintendent and the QC Manager must prepare and sign the Contractor Production and CQC Reports, respectively. The reporting of work must be identified by terminology consistent with the construction schedule. In the "remarks" sections of the reports, enter pertinent information including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered and a record of visitors to the work site, quality control problem areas, deviations from the QC Plan, construction deficiencies encountered, meetings held. For each entry in the report(s), identify the Schedule Activity No. that is associated with the entered remark.

1.15.2 Quality Control Validation

Establish and maintain the following in a series of three ring binders. Binders must be divided and tabbed as shown below. These binders must be readily available to the Contracting Officer during all business hours.

a. All completed Preparatory and Initial Phase Checklists, arranged by specification section.

b. All milestone inspections, arranged by Activity Number.

c. An up-to-date copy of the Testing Plan and Log with supporting field test reports, arranged by specification section.

d. Copies of all contract modifications, arranged in numerical order.

Also include documentation that modified work was accomplished.

e. An up-to-date copy of the Rework Items List.

f. Maintain up-to-date copies of all punch lists issued by the QC staff to the Contractor and Sub-Contractors and all punch lists issued by the Government.

g. Commissioning documentation including Cx checklists, schedules, tests, and reports.

h. Special inspection reports.

1.15.3 Testing Plan and Log

As tests are performed, the CA and the QC Manager will record on the "Testing Plan and Log" the date the test was performed and the date the test results were forwarded to the Contracting Officer. Attach a copy of the updated "Testing Plan and Log" to the last daily CQC Report of each month, per the paragraph "INFORMATION FOR THE CONTRACTING OFFICER". Provide a copy of the final "Testing Plan and Log" to the preparer of the Operation & Maintenance (O&M) documentation.

1.15.4 Rework Items List

The QC Manager must maintain a list of work that does not comply with the Contract, identifying what items need to be reworked, the date the item was originally discovered, the date the item will be corrected by, and the date the item was corrected. There is no requirement to report a rework item that is corrected the same day it is discovered. Attach a copy of the "Rework Items List" to the last daily CQC Report of each month. The Contractor is responsible for including those items identified by the Contracting Officer.

1.15.5 As-Built Drawings

The QC Manager is required to ensure the as-built drawings, required by Section 01 78 00 CLOSEOUT SUBMITTALS are kept current on a daily basis and marked to show deviations which have been made from the Contract drawings. Ensure each deviation has been identified with the appropriate modifying documentation (e.g., PC No., Modification No., Request for Information No., etc.). The QC Manager or QC Specialist assigned to an area of responsibility must initial each revision. Upon completion of work, the QC Manager will furnish a certificate attesting to the accuracy of the as-built drawings prior to submission to the Contracting Officer.

1.16 NOTIFICATION ON NON-COMPLIANCE

The Contracting Officer will notify the Contractor of any detected non-compliance with the Contract. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, is deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of claim for extension of time for excess costs or damages by the Contractor.

1.17 CONSTRUCTION INDOOR AIR QUALITY (IAQ) MANAGEMENT PLAN

Submit an IAQ Management Plan within 15 days after notice to proceed and not less than 10 days before the preconstruction meeting. Revise and resubmit Plan as required by the Contracting Officer. Make copies of the final plan available to all workers on site. Include provisions in the Plan to meet the requirements specified below and to ensure safe, healthy air for construction workers and building occupants.

1.17.1 Requirements During Construction

Provide for evaluation of indoor Carbon Dioxide concentrations in accordance with ASTM D6245. Provide for evaluation of volatile organic compounds (VOCs) in indoor air in accordance with ASTM D6345. Use filters with a Minimum Efficiency Reporting Value (MERV) of 8 in permanently installed air handlers during construction.

1.17.1.1 Control Measures

Meet or exceed the requirements of ANSI/SMACNA 008, Chapter 3, to help minimize contamination of the building from construction activities. The five requirements of this manual which must be adhered to are described below:

a. HVAC protection: Isolate return side of HVAC system from surrounding environment to prevent construction dust and debris from entering the duct work and spaces.

b. Source control: Use low emitting paints and other finishes, sealants, adhesives, and other materials as specified. When available, cleaning products must have a low VOC content and be non-toxic to minimize building contamination. Utilize cleaning techniques that minimize dust generation. Cycle equipment off when not needed. Prohibit idling motor vehicles where emissions could be drawn into building. Designate receiving/storage areas for incoming material that minimize IAQ impacts.

c. Pathway interruption: When pollutants are generated use strategies such as 100 percent outside air ventilation or erection of physical barriers between work and non-work areas to prevent contamination.

d. Housekeeping: Clean frequently to remove construction dust and debris. Promptly clean up spills. Remove accumulated water and keep work areas dry to discourage the growth of mold and bacteria. Take extra measures when hazardous materials are involved.

e. Scheduling: Control the sequence of construction to minimize the absorption of VOCs by other building materials.

1.17.1.2 Moisture Contamination

a. Remove accumulated water and keep work dry.

b. Use dehumidification to remove moist, humid air from a work area.

c. Do not use combustion heaters or generators inside the building.

d. Protect porous materials from exposure to moisture.

e. Remove and replace items which remain damp for more than a few hours.

1.17.2 Requirements after Construction

After construction ends and prior to occupancy, conduct a building flush-out or test the indoor air contaminant levels. Flush-out must be a minimum two-weeks with MERV-13 filtration media as determined by ASHRAE 52.2at 100 percent outside air. Air contamination testing must be consistent with EPA's current Compendium of Methods for the Determination of Air Pollutants in Indoor Air. After building flush-out or testing and prior to occupancy, replace filtration media. Filtration media must have a MERV of 13 as determined by ASHRAE 52.2.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

Designate receiving/storage areas for incoming material to be delivered according to installation schedule and to be placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. Store and handle materials in a manner as to prevent loss from weather and other damage. Keep materials, products, and accessories covered and off the ground, and store in a dry, secure area. Prevent contact with material that may cause corrosion, discoloration, or staining. Protect all materials and installations from damage by the activities of other trades.

-- End of Section --

Table-1.1-1

Components of CQC

Specification Sections

- 01 30 00 Administrative Requirements
- 01 33 00 Submittal Procedures
- 01 35 26 Governmental Safety Requirements
- 01 45 00.00 10 Quality Control
- 01 45 00.00 20 Quality Control
- 01 45 00.15 10 Resident Management System Contractor Mode (RMS-CM)
- 01 45 35 Special Inspections
- 01 78 00 Closeout Submittals
- 01 78 23 Operation and Maintenance Data

****Specialized contracts may include the following Specification Sections**

- 01 33 16.00 10 Design Data (Design After Award)
- 01 33 23.33 Aviation Fuel System Specific Submittal Requirements
- 01 35 29.13 Health, Safety, and Emergency Response Procedures for Contaminated Sites
- 01 45 00.10 20 Quality Control for Minor Construction
- 01 78 23.33 Operation and Maintenance Manuals for Aviation Fuel Systems
- 01 78 24.00 10 Facility Data Requirements
- 01 78 24.00 20 Facility Electronic Operation and Maintenance Support Information (eOMSI)
- 01 83 00.07 40 Reliability Centered Acceptance for Facility Shells
- 01 83 13.07 40 Reliability Centered Acceptance for Superstructure Performance Requirements
- 01 86 26.07 40 Reliability Centered Acceptance for Electrical Systems
- 01 91 00.15 10 Total Building Commissioning
- 01 91 00.15 Total Building Commissioning

Quality Control (QC) Plan

List of Definable Features of Work (DFOW)

Preconstruction Conference

Preconstruction Safety Conference

Project Schedule

List of Definable Features of Work (DFOW)

QC Plan Meeting

QC/QA Coordination Meeting or Mutual Understanding Meeting

Three Phases of Control System

- Preparatory Control Phase and report
- Initial Control Phase and report
- Follow-up Control Phase

Safety

- Conduct and document daily safety inspections
- Activity Hazard Analysis (AHA)

Quality Control (QC) Documents

- Contractor Quality Control Daily Report
- Contractor Production Report
- Preparatory Phase Checklist
- Initial Phase Checklist
- Deficiency/Rework Items List
- Testing Plan and Log
- Submittal Register
- Contractor's Submittal Transmittal Form

Submittals

- List of Definable Features of Work (DFOW)
- Quality Control Plan
- Environmental Protection Plan
- Base Access Plan
- Accident Prevention Plan

Offsite Fabrication, Testing and Inspection

Material Receipt and Check-Out

Deficiency/Rework Items Tracking and correcting

Non-compliance notice

Request for information (RFI)

Control Testing and recording/reporting

System Testing

Training of Government personnel in operation and maintenance of equipment

Commissioning

Punch-out Inspection

Pre-final Inspection

Final Acceptance Inspection

As-built drawings

Operation and Maintenance (O&M) Manuals

- O&M System Instructions (OMSI)
- Electronic O&M System Instructions (eOMSI)
- O&M Training

Warranties

- Warranty Inspections

Turnover of keys and spare materials

kugan&associates, Inc.
Training for Today and Tomorrow

Contractor Quality Control (CQC) Plan

My Repair Garage My City, USA

Contract # xxxxxx-xx-x-xxxx

I certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with Contract Number XXXXXX-XX-X-XXXX, is in compliance with the plans and specifications and will fit the allocated spaces, and is submitted for approval.

Certified By

Submittal Reviewer: _____ Date:_____
(Signature when applicable)

Certified by

CQ Manager: _____ Date:_____

ABC Construction
9663 Tierra Grande Street
San Diego, CA 92126
(858) 592 6681

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Contents

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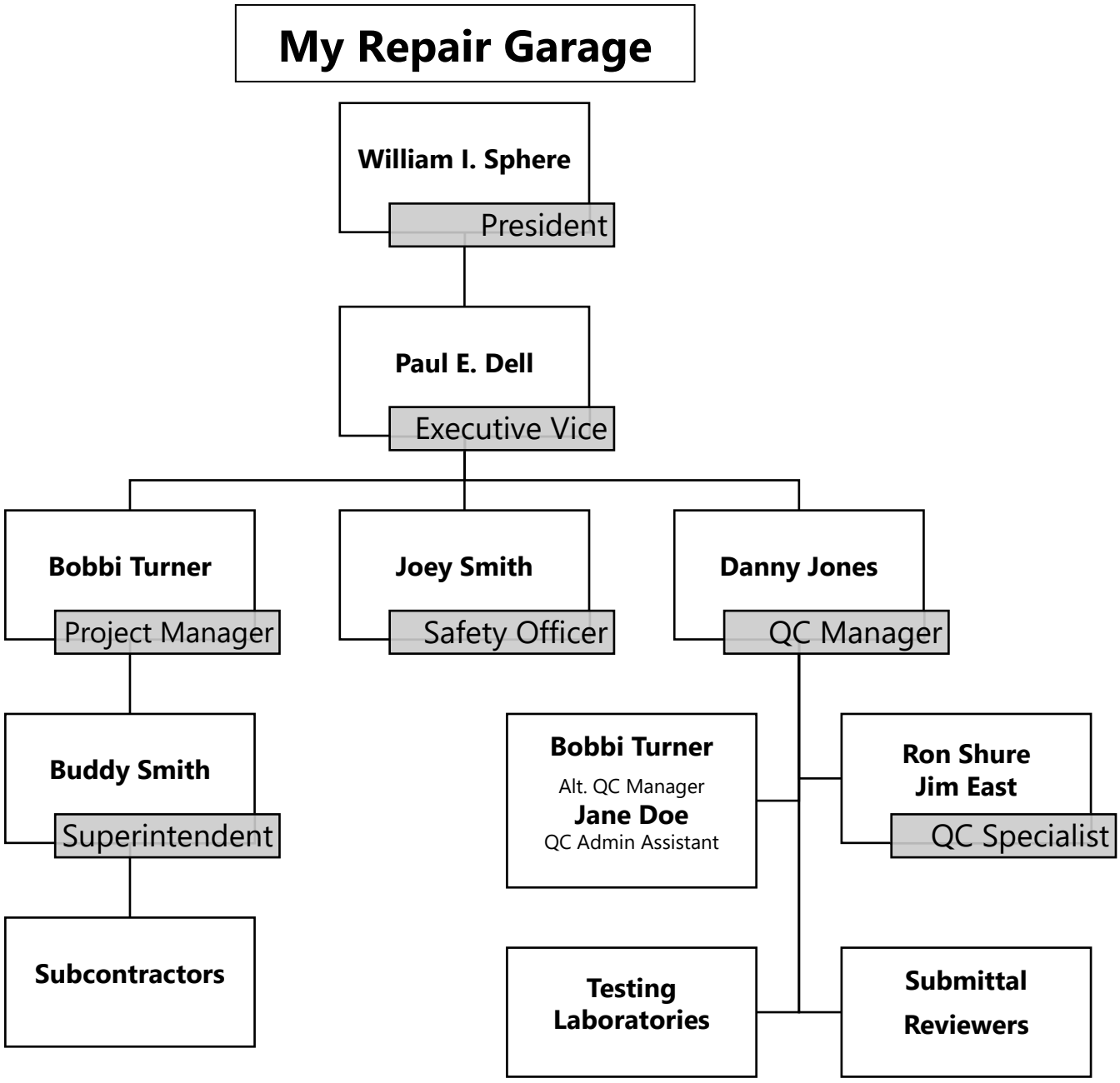
a. CQC ORGANIZATION CHART & SCOPE OF WORK

Quality Control Organization Chart



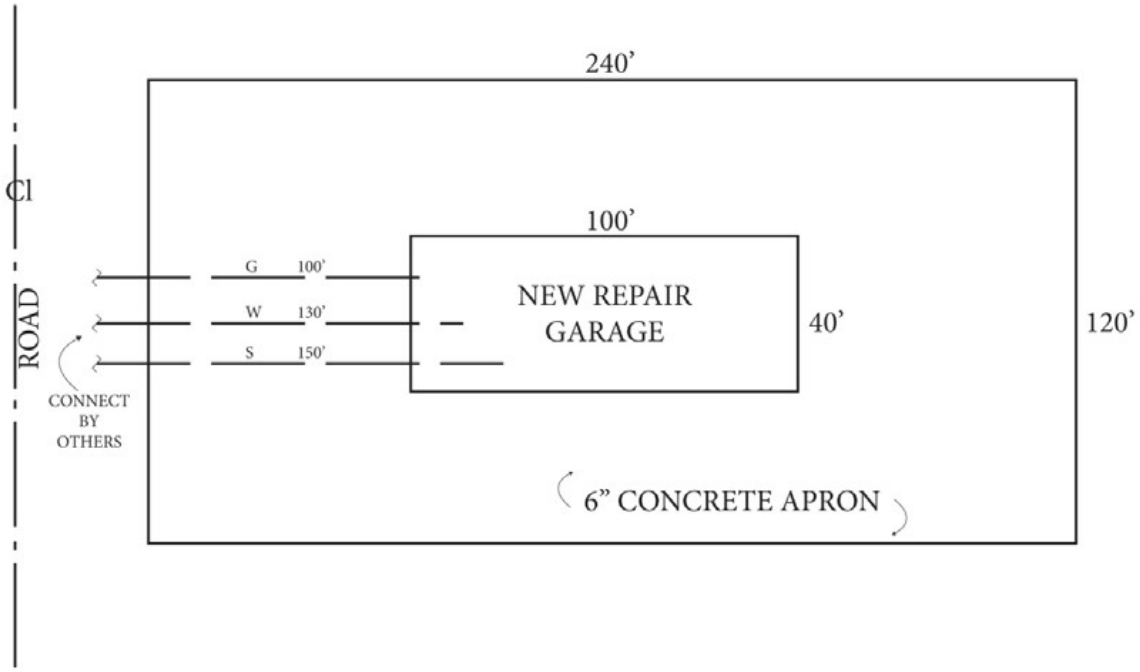
MY REPAIR GARAGE

Your instructor will provide instruction for this assignment.

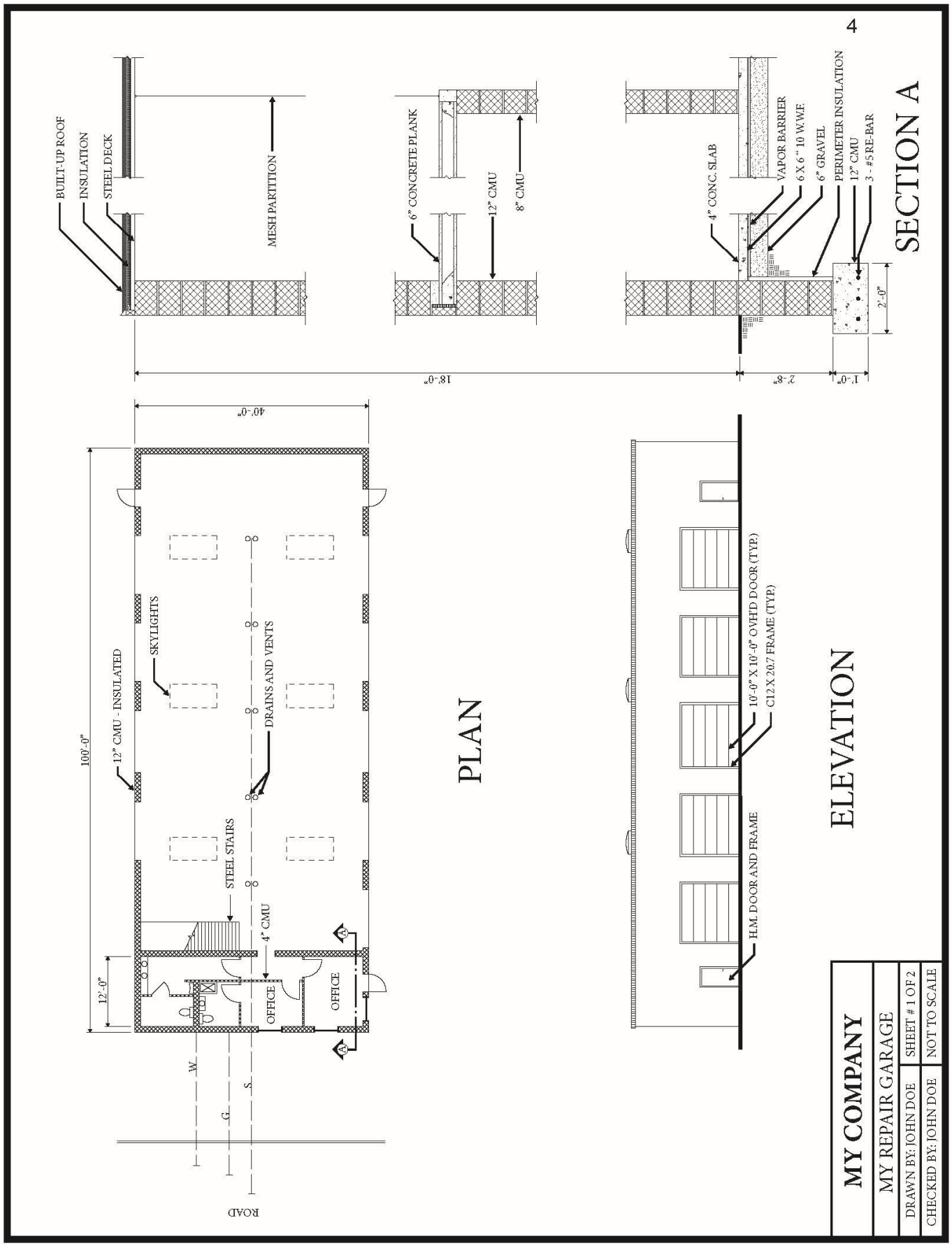
The client needs a facility to house and maintain its small fleet of vehicled (cars, pick-up trucks, and delivery vans). Currently the Company is using limited leased space about 3 miles from the plant. The garage will be built in a remote corner of a very large, paved parking area.

Site access is excellent. There is plenty of storage and movement area available on the site.

Following is a simple drawing of the Repair Garage. On the following pages you will find worksheets complete with the work description and quantities necessary to complete the work.



Existing 3" asphalt parking
Cut all 4 sides



Project Summary

The object of this contract is to construct a vehicle repair and maintenance facility to allow the client to maintain a fleet of cars, pickup trucks, and delivery vans.

The project consists of constructing a CMU single story facility of 4,000 square feet with an interior height of 18 feet. An area of 480 square feet will be set aside for offices and restrooms and a mezzanine of the same size will be used for parts and equipment storage. On the South side of the building there will be two man doors and five 10 foot x 10 foot overhead equipment doors equally spaced. On the North side of the building there will be one man door and four 10 foot x 10 foot overhead equipment doors. The doors on the North side will be in line with the doors on the South side except for the one equipment door on the South side furthest to the West. Natural light in the maintenance bays will be provided by six 4 foot x 8 foot skylights and for the offices by windows.

Utilities to the building consist of natural gas, water, sewer, and electricity. Compressors will provide for compressed air to each of the eight work bays.

Around the completed facility will be a 6 inch concrete parking apron of 24,800 square foot surrounding the building on all four sides.

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b. NAMES AND QUALIFICATIONS

Names and Qualifications

ABC Construction proposes that the following individuals be approved as the Quality Control Organization members for this project. Their resumes have been included for your review and approval.

Danny Jones, QC Manager

Bobbi Turner, Alternate QC Manager

Danny Jones

QC Manager

Work History:

11/23 – Present, QC Manger, Renovation of Navy Family Housing, 119 units, MCB Camp Pendleton Phase 3, San Diego, CA. Work included: demolition and reconstruction of building exterior façade, interior finishes, underground utilities, asbestos and lead abatement, and site finishes. (ABC Construction, San Diego, CA)

6/21 – 11/23, Assistant QC Manager, 120 Unit Barracks Renovation, MCAS Miramar, San Diego, CA.
Work included: demolition and reconstruction of building exterior finishes, interior walls, floors, and toiletries, underground utilities and site finishes. (ABC Construction, San Diego, CA)

6/19– 6/21, Assistant QC Manager, Repairs to Hangar 8, MCAS Miramar, San Diego, CA. Work included construction of a mezzanine, new hangar doors, new roof, new AFFF system in hangar area, new HVFC system, new apron utility islands, and miscellaneous other construction. (DEF Construction Company, San Diego, CA)

8/15 – 6/19 Assistant Store Manager. (Vons Grocery Store, San Diego, CA) In charge of scheduling employees and supervising cashiers.

Education/Qualifications

- Construction Quality Management for Contractors (CQM), Kugan & Associates, LLC San Diego, Certificate, Sept 2019 and renewal of certificate at same place on Nov 2024.
- AS in Building Construction Technology, Mesa Community College, San Diego, June 2005
- AS in Business Management, San Diego City College, San Diego, CA, 2002
- Additional courses in Project Management, Construction Management and Safety classes.

Bobbi Turner

Alternate QC Manager

History:

8/22 to Present — ABC Construction, San Diego, CA
Construction Quality Control Manager (QC Manager)
Renovation of BEQ, MCB Camp Pendleton, Oceanside, CA

Under this contract eight (8) BEQ buildings were renovated in series. As one building was completed, Marines would occupy the building and vacate their present building. Work started in the vacated building. Work included installation of all new utilities, renovation of all bathrooms, addition of community rooms with pool tables, addition of balconies, installation of new roofs, construction of new basketball courts and picnic areas, and other miscellaneous work.

7/20 – 8/22 — Assistant Project Manager
Renovation of 33 buildings containing 119 housing units, MCAGCC 29 Palms, CA. Responsible for cost control, purchasing, and contract administration.
Re-Construction of 117 townhouse units at the MCRD San Diego, CA. Work included demolition and reconstruction.

9/17- 7/20 — McDonald Restaurant, San Diego, CA
Assistant Manager
Supervised night shift employees. Ordered supplies for day shift.

Education/Qualifications

- AS in Building Construction Technology, Mesa Community College, San Diego, CA, June 1991
- AS in Business Management, San Diego City College, San Diego, CA, June 1993
- Additional Studies: Project Management Classes
- Construction Quality Management for Contractors (CQM), Kugan & Associates, LLC San Diego, Certificate, Jun 2023

CQM Training Certification on file

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c. DUTIES, RESPONSIBILITIES & AUTHORITIES OF CQC PERSONNEL

Duties, Responsibilities and Authorities of QC Personnel

Project Manager – Bobbi Turner

Responsible for project completion, pay estimate requests, and updates. Will also direct the procurement of subcontractors, materials, and submittals. The PM will work closely with the QC Manager in obtaining submittals and correcting any non-conforming submitted items.

Superintendent – Buddy Smith

Responsible for day-to-day scheduling, supervising work force and subcontractors. The superintendent is responsible to conform and comply with project plans and specifications and to alert quality control personnel of any possible non-compliance, to correct as needed or as directed by the QC Manager. The superintendent is also responsible to review the plans for dimensional discrepancies and to assist in resolving such items. In addition, the superintendent will also be responsible for enforcing the project safety plan and all applicable environmental provisions.

QC Manager and Alternate QC Manager – Danny Jones / Bobbi Turner

The duty of the QC Manager, for on-site, and off-site work, is to implement and manage the QC program. The only duties and responsibilities of the QC Manager are to manage and implement the QC program on this Contract. The QC Manager is required to attend the partnering meetings, QC Plan Meetings, Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform the three phases of control except for those phases of control designated to be performed by QC Specialists, perform submittal review and approval, ensure testing is performed and provide QC certifications and documentation required in this Contract. The QC Manager is responsible for managing and coordinating the three phases of control and documentation performed by the QC Specialists, testing laboratory personnel, and any other inspection and testing personnel required by this Contract. The QC Manager is the manager of all QC activities. The duties and responsibilities of the Alternate QC Manager are the same as for the QC Manager whenever the Alternate QC Manager is taking the place of the QC Manager.

- Responsible to inspect and certify that all materials and equipment delivered to the job site comply with approved submittals.
- Ensure that all test and/or inspections required or necessary are performed, and report the results in the Contractor Quality Control (QC) Report.

- File certified daily reports on the forms provided by the owner's representative. These reports will cover all work and tests performed, inspections completed, all material and equipment received at the job site on that particular day, all rework items identified and completed this day.
- Maintain as-built drawings at the job site marked to show any deviations which have been made from the contract drawings, including buried and/or concealed construction and utility features which are revealed during the course of construction.
- Report any deviation from plans and specifications.
- Report corrective actions.
- Recommend removal of any individual from the project who consistently fails to perform his or her work properly.
- Report to the Project Superintendent any subcontractor who consistently does not conform to the contract plans and specifications.
- Keep a copy of the approved QC Plan, with up-to-date approved revisions, on file at the job site.
- Review and approve all shop drawings and submittal data for conformance to the contract requirements. A status log is to be maintained up to date and record copies of QC approved submittals are to be forwarded to the owner's representative. Submittals that require owner's approval are to be forwarded to the owner's representative for appropriate action after the QC Manager certification has been noted.
- Inspect the work performed on a daily basis for compliance with current plans and specifications.

QC Administrative Assistant – Jane Doe

The QC Administrative Assistant will work directly for the QC Manager and will assist the QC Manager in processing and maintaining files for submittals, preparing and publishing reports and meeting minutes. Prepare documents and keep a complete file of these in the project site office. The Administrative Assistant will remain at the work site until the work has been accepted.

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d. OUTSIDE ORGANIZATIONS

Outside Organizations

TRADE	COMPANY NAME	ADDRESS	CITY	STATE
Welding Inspection	Professional Welding Inspectors, Inc. LLC	100 Steel Lane, Suite 102	National City	CA
Commissioning	XYZ Commissioning, Inc.	100 Ridgeway Road	San Diego	CA
Soil Testing	Soils Testing, Inc.	100 Compaction Lane	Chula Vista	CA
Civil Engineering	WFB Engineering Services	56 Blueprint Avenue	San Diego	CA
Architecture	AIA Architects & Associates	198 Velum Place	San Diego	CA
Mechanical Engineering	Mech Eng. & Associates	696 Gear Crescent Court	San Diego	CA

Duties to be performed by listed outside organizations

Professional Welding Inspectors, Inc. LLC – Will perform all inspections of on and off-side welding to be done on this project; i.e. steel stairs, mesh partition for mezzanine, steel decking, and service doors and frames.

XYZ Commissioning, Inc. – Will perform all commissioning functions for the HVAC system, the steam boiler, the compressed air system, and the building envelop.

Soil Testing, Inc. – Will perform all foundation and building pad compaction tests, all concrete tests, all concrete masonry units, mortar, and grout tests, and all asphalt tests.

WFB Engineering Services – Will perform submittal reviews of all civil engineering related submittals.

AIA Architects & Associates – Will perform submittal reviews of all building envelop related submittals.

Mech Eng. & Associates – Will perform submittal reviews of boiler and compressed air systems.

e. APPOINTMENT LETTERS

November 1, 2024

Attention: Danny Jones, QC Manager Subject:

Contract #: XXXXXX-XX-X-XXXX
Child Dev. Center
Los Angeles, CA, USA

Appointment: Contractors Quality Control Manager (QC Manager)

Dear Mr. Jones:

You are hereby appointed as the QC Manager for ABC Construction during the terms of the subject contract.

You are directed to follow the Inspection Procedures, Instructions, and Report in strict compliance with the contract specifications and drawings and any approved modifications thereto. As a direct representative of the company, you are authorized and directed to perform the following duties.

1. Review all shop drawings and submittal data for compliance with the contract as outlined within the specifications. A status log is to be kept up to date, and record copies of the QC Manager approved submittals are to be forwarded to the owner's representative. Submittals that require owner's approval are to be forwarded to the owner's representative for appropriate action after QC Manager certification has been noted on the submittal.
2. Inspect the work performed on a daily basis for compliance with current plans and specifications. You have the authority to issue "**STOP WORK ORDERS"** on any item of work feature, particularly if the work is to be enclosed, support further construction, or will be inaccessible if further work proceeds. Pending proper corrective action being completed, inspected, and proven to be in compliance, the work may proceed.
3. Perform, supervise, and /or coordinate as required, the inspection and tests to be made by ABC and its subcontractor network.
4. Inspect and certify that all materials and equipment delivered to the job site complies with approved submittals.
5. Ensure that all tests and inspections required, or deemed necessary, are performed and report all results in the QC Report.

6. Ensure that the Three Phases of Control procedures are performed and documented.

   Subject: Contract #: XXXXXX-XX-X-XXXX
   Child Dev. Center
   Los Angeles, CA, USA

7. Prepare and file Certified Daily Quality Control (QC) Reports on the form provided, with the owner's representative. These reports will cover all tests and inspections completed, all materials and equipment received at the job site on that particular day.

8. Prepare and file Certified Daily QC Reports on the form provided, with the owner's representative. These reports will cover all tests and inspections completed, all materials and equipment received at the job site on that particular day.

9. Maintain at the job site a set of full-size contract drawings marked "AS BUILT DRAWINGS". The as- built drawings will show any deviations, which have been made from contract documents, including, buried and/or concealed construction and utility features which are found during the course of construction

10. Report any and all deviations from the plans and specifications. Report all subsequent corrective action taken.

11. Recommend removal of any individual from the project that fails to perform his or her work in compliance with the contract documents.

12. Direct the removal and replacement of defective work.

13. Report to the undersigned any subcontractor who consistently fails to conform with his work to the contract plans and specifications.

14. Close coordination between QC Staff and Government Personnel is a prerequisite to good quality.

15. Certify at completion of project that all work was done per plans and specifications or approved deviations.

Sincerely,

William I. Sphere

William I. Sphere
William I. Sphere
President
ABC Construction

November 1, 2024

Attention: Bobbi Turner, AQC Manager

Subject: Contract # XXXXXX-XX-X-XXXX
Child Dev. Center
Los Angeles, CA, USA

Appointment: Alternate Quality Control Manager (AQC Manager)

Dear Ms. Turner:

You are hereby appointed as the AQC Manager for ABC Construction during the terms of the subject contract. As per contract, you will assume the position of QC Manager anytime Mr. Danny Jones is absent from the project site. Your duties as QC Manager are limited to 10 workdays at any one time and a total of 30 workdays in one calendar year.

You are directed to follow the Inspection Procedures, Instructions, and Report in strict compliance with the contract specifications and drawings and any approved modifications thereto. As a direct representative of the company, you are authorized and directed to perform the following duties.

1. Review all shop drawings and submittal data for compliance with the contract as outlined within the specifications. A status log is to be kept up to date, and record copies of the QC Manager approved submittals are to be forwarded to the owner's representative. Submittals that require owner's approval are to be forwarded to the owner's representative for appropriate action after QC Manager certification has been noted on the submittal.
2. Inspect the work performed on a daily basis for compliance with current plans and specifications. You have the authority to issue "**STOP WORK ORDERS"** on any item of work feature, particularly if the work is to be enclosed, support further construction, or will be inaccessible if further work proceeds. Pending proper corrective action being completed, inspected, and proven to be in compliance, the work may proceed.
3. Perform, supervise, and /or coordinate as required, the inspection and tests to be made by ABC and its subcontractor network.
4. Inspect and certify that all materials and equipment delivered to the job site complies with approved submittals.

5. Ensure that all tests and inspections required, or deemed necessary, are performed and report all results in the QC Report.
6. Ensure that the Three Phases of Control procedures are performed and documented.

Subject: Contract #: XXXXXX-XX-X-XXXX
Child Dev. Center
Los Angeles, CA, USA

7. Prepare and file Certified Daily Quality Control (QC) Reports on the form provided, with the owner's representative. These reports will cover all tests and inspections completed, all materials and equipment received at the job site on that particular day.
8. Prepare and file Certified Daily QC Reports on the form provided, with the owner's representative. These reports will cover all tests and inspections completed, all materials and equipment received at the job site on that particular day.
9. Maintain at the job site a set of full-size contract drawings marked "AS BUILT DRAWINGS". The as- built drawings will show any deviations, which have been made from contract documents, including, buried and/or concealed construction and utility features which are found during the course of construction
10. Report any and all deviations from the plans and specifications. Report all subsequent corrective action taken.
11. Recommend removal of any individual from the project that fails to perform his or her work in compliance with the contract documents.
12. Direct the removal and replacement of defective work.
13. Report to the undersigned any subcontractor who consistently fails to conform with his work to the contract plans and specifications.
14. Close coordination between QC Staff and Government Personnel is a prerequisite to good quality.
15. Certify at completion of project that all work was done per plans and specifications or approved deviations.

Sincerely,
William I. Sphere

William I. Sphere
William I. Sphere
President
ABC Construction

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f. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER

Submittal Procedures

The Project Manager or Superintendent will prepare the submittals initiated by ABC Construction. All submittals will be reviewed in detail by the Contractor's Project Manager to assure contract compliance prior to approval and certification. Variations will be noted and explained.

The Contractor's QC Manager shall ensure that all submittals required by the specifications under the paragraph typically titled "SUBMITTALS" have been listed in the submittal status log. When the words "APPROVED" appear in the specifications they shall mean approved by the Contractor's QC Manager. Submittals shall be prepared and assembled as required by Section 01330, Submittal Procedures. The QC Manager shall complete the Contractor's Submittal Transmittal form as required by the Contract. Procedural plans shall be checked for conformance to reference standards and that all specific requirements are shown. Catalog and manufacturer data shall be checked for general consistency to specifications. Samples shall be taken by the approved testing lab where required, prepared and submitted as required by Contract. Certificates of Conformance or Compliance shall be checked to meet all requirements. Certified test reports shall be checked to meet all of the requirements.

When the approving authority is the owner, the QC organization will certify submittals and forward to the owner's representative with the following certifying statement:

"I hereby certify that the above item(s) shown and marked in this submittal is that proposed to be incorporated with Contract Number XXXXXX-XX-X-XXXX, is in compliance with the Contract drawings and specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by Submittal Reviewer_____, Date _____
(Signature when applicable)

Certified by QC Manager_____, Date _____"

When the approving authority is the QC Manager, the QC Manager will use the following approval statement when returning submittals to the Contractor as "Approved" or "Approved as Noted.

"I hereby certify that the above item(s) shown and marked in this submittal and proposed to be incorporated with Contract Number XXXXXX-XX-X-XXXX is in compliance with the contract drawings and specifications, can be installed in the allocated spaces, and is approved for use.

Certified by Submittal Reviewer_____, Date _____
(Signature when applicable)

Approved by QC Manager_____, Date _____"
(Signature)

PARTIAL SAMPLE SUBMITTAL REGISTER

CONTRACT NO. :

TITLE AND LOCATION

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPECIFICATION SECTION		DESCRIPTION OF ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	CONTRACTOR SCHEDULED DATES: SUBMIT	CONTRACTOR SCHEDULED DATES: APP REQUIRED	CONTRACTOR SCHEDULED DATES: MATERIAL NEEDED BY	CONTRACTOR ACTION: ACTION CODE	CONTRACTOR ACTION: DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY: DATE FWD TO OTHER REVIEWER	APPROVING AUTHORITY: DATE RCD FROM OTHER REVIEWER	APPROVING AUTHORITY: ACTION CODE	APPROVING AUTHORITY: DATE OF ACTION	MAILED TO CONT / DATE OF RCD FROM APPR AUTH	REMARKS
(a)	(b)	(c)		(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 30 00		***ADMINISTRATIVE REQUIREMENTS***														
				SD-01 Preconstruction Submittals														
	1			List of Contact Personnel	1.3	G												
		01 32 16		***NETWORK ANALYSIS SCHEDULE (NAS)***														
				SD-01 Preconstruction Submittals														
	1			Qualifications	1.5	G												
	2			Standard Activity ID Dictionary	1.6.2.2	G												
	3			Construction Network Analysis Schedule	1.3	G												
	4			Baseline Network Analysis Schedule	1.3	G												
				SD-07 Certificates														
	5			Monthly Network Analysis Updates	1.7.1	G												
				SD-11 Closeout Submittals														
	6			As-Built Schedule	1.7.6	G												
		01 33 00		***SUBMITTAL PROCEDURES***														
				SD-01 Preconstruction Submittals														
	1			Submittal Register	1.4	G												
		01 35 26		***GOVERNMENTAL SAFETY REQUIREMENTS***														
				SD-01 Preconstruction Submittals														
	1			Accident Prevention Plan (APP)	1.7	G												
	2			Activity Hazard Analysis (AHA)	1.8	G												
	3			Crane Critical Lift Plan	1.7.1.d	G												
	4			Proof of Qualification for Crane Operators	1.7.1.d	G												
				SD-06 Test Reports														
	5			Reports	1.12	FIO												
	6			Accident Reports	1.12.1	FIO												
	7			Monthly Exposure Reports	1.12.3	FIO												
	8			Crane Reports	1.12.4	FIO												
	9			Gas Protection	1.13	FIO												
				SD-07 Certificates														
	10			Confined Space Entry Permit	1.7.1.c	FIO												
	11			Hot Work Permit	1.13	FIO												
	12			License Certificates	1.7	FIO												
	13			Contractor Safety Self-Evaluation Checklist	1.4	G												
	14			Certificate of Compliance (Crane)	1.7.1.d	FIO												
		01 45 00.00 20		***QUALITY CONTROL***														

PARTIAL SAMPLE SUBMITTAL REGISTER

CONTRACT NO. :

TITLE AND LOCATION

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPECIFICATION SECTION		DESCRIPTION OF ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	CONTRACTOR SCHEDULED DATES: SUBMIT	CONTRACTOR SCHEDULED DATES: APP NEEDED BY	CONTRACTOR SCHEDULED DATES: MATERIAL NEEDED BY	CONTRACTOR ACTION: ACTION CODE	CONTRACTOR ACTION: DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY: DATE FWD TO OTHER REVIEWER	APPROVING AUTHORITY: DATE RCD FROM OTHER REVIEWER	APPROVING AUTHORITY: ACTION CODE	APPROVING AUTHORITY: DATE OF ACTION	MAILED TO CONT / DATE OF RCD FROM APPR AUTH	REMARKS
(a)	(b)	(c)		(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
				SD-18 Records														
	1			Quality Control (QC) Plan	1.6	G												
		01 50 00		***TEMPORARY FACILITIES AND CONTROLS***														
				SD-01 Preconstruction Submittals														
	1			Traffic Control Plan	3.1.1.4	G												
				SD-03 Product Data														
	2			Backflow Preventers	2.1	FIO												
				SD-06 Test Reports														
	3			Backflow Preventer Test Report	3.3	FIO												
				SD-07 Certificates														
	4			Backflow Tester Certification	1.5	FIO												
	5			Backflow Preventers Certificate of Full Approval	1.3	FIO												
		01560		***ENVIRONMENTAL GENERAL REQUIREMENTS***														
				SD-01 Preconstruction Submittals														
	1			Landfill, Recycling Facility & Transporter Information	3.2.2.1	FIO												
	2			Weight Receipts for Solid Waste Disposed and	3.2.2.2	FIO												
				Materials Recycled														
	3			Contractor Information Sheet/s	3.3.2.1	FIO												
	4			Materials Safety Data Sheets (MSDS)	3.3.2.2	FIO												
	5			Substantiating Documentation for Use of	3.3.2.3	FIO												
				Specific HAZMAT														
	6			HAZMAT Usage Log	3.3.2.4	FIO												
	7			Contractor's Field Location Sketch	3.3.2.5	FIO												
	8			Site Specific Storm Water Pollution Prevention Plan	3.4.3.1.1	G												
	9			Notice of Intent (NOI)	3.4.3.1.2	FIO												
	10			Initial Fee	3.4.3.1.3	FIO												
	11			Annual Compliance Status Report	3.4.3.1.4	FIO												
	12			Notice of Termination (NOT)	3.4.3.1.5	FIO												
	13			Certification of Compliance	3.7.3	G												
	14			Request for Hazardous Waste Treatment	3.8.5	G												
	15			Notification of Temporary Satellite Accumulation Pt.	3.8.8	G												
	16			Certification of Training	3.8.2.3	FIO												
	17			Hazardous Waste Manifests, Non-Hazardous Waste Data	3.8.2.4	G												
				Forms, Land Disposal Restrictions, Waste Profiles,														
				Laboratory Analyses, and MSDS														
				SD-07 Certificates														
	18			Applicator Certification	3.11.4	FIO												
		01 74 19		***CONSTRUCTION & DEMOLITION WASTE MANAGEMENT***														
				SD-01 Preconstruction Submittals														
	1			Waste Management Plan	1.3	FIO												

PARTIAL SAMPLE SUBMITTAL REGISTER

CONTRACT NO. :

TITLE AND LOCATION

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPECIFICATION SECTION		DESCRIPTION OF ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	CONTRACTOR SCHEDULED DATES: SUBMIT	CONTRACTOR SCHEDULED DATES: APPROVAL NEEDED	CONTRACTOR SCHEDULED DATES: MATERIAL NEEDED BY	CONTRACTOR ACTION: ACTION CODE	CONTRACTOR ACTION: DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY: DATE FWD TO OTHER REVIEWER	APPROVING AUTHORITY: DATE RCD FROM OTHER REVIEWER	APPROVING AUTHORITY: ACTION CODE	APPROVING AUTHORITY: DATE OF ACTION	MAILED TO CONT / DATE OF RCD FROM APPR AUTH	REMARKS
(a)	(b)	(c)		(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02722		***AGGREGATE AND/OR GRADE-CRUSHED***														
				AGGREGATE BASE COURSE														
				SD-03 Product Data														
	1			Equipment and Tools	1.4.1	FIO												
	2			Waybills and Delivery Tickets	1.4.2	FIO												
		02741		***HOT-MIX ASPHALT (HMA) FOR ROADS***														
				SD-03 Product Data														
	1			Job Mix Formula	2.3	FIO												
				SD-06 Test Reports														
	2			Aggregate Test Reports	2.1	FIO												
	3			Certified Asphalt Cement Binder Test Data	2.2	FIO												
				SD-07 Certificates														
	4			Certificate of Conformance for Laboratory Testing and Plant Scale Calibration	1.3	FIO												
		02751		***PORTLAND CEMENT CONCRETE PAVEMENT***														
				SD-05 Design Data														
	1			Mix Design	1.2	FIO												
				SD-07 Certificates														
	2			Materials Certificate	1.2	FIO												
		03300		***CAST-IN-PLACE CONCRETE***														
				SD-03 Product Data														
	1			Manufactured Material	2.1	FIO												
				SD-05 Design Data														
	2			Mix Design	2.2	FIO												
				SD-02 Shop Drawings														
	3			Steel Reinforcement	1.2	G												
				SD-07 Certificates														
	4			Material Certificates	3.7.2.2	FIO												
				SD-06 Test Reports														
	5			Field Test Reports	3.6	FIO												

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g. TESTING LABORATORY INFORMATION

Professional Welding Inspectors

Professional Welding Inspectors will perform all structural steel welding inspections and will provide reports to the QC Manager. PWI's letter of accreditation and certifications for all individuals who are anticipated to perform such inspection on this project is attached.

XYZ Commissioning, Inc.

XYZ Commissioning, Inc. will be providing Commissioning services for this project. XYZ, Inc's certifications and credentials are attached.

Soils Testing, Inc.

Soils Testing, Inc. will perform all soil compaction testing. STI will also perform asphalt testing and concrete testing on this project. All reports will be submitted to the QC Manager upon completion of each test. STI's letter of accreditation and certifications for all individuals who are anticipated to perform work on this project is attached.

Certification and Scope of Accreditation is on file. STI is accredited by the American Association of State Highway and Transportation Officials (AASHTO). Their scope of accreditation includes soil sampling and testing, concrete sampling and testing, asphalt sampling and testing, and concrete masonry units, grout, and mortar sampling and testing.

Testing Laboratories Certifications are on file

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h. TESTING PLAN AND LOG

TESTING PLAN AND LOG

CONTRACTOR			PROJECT TITLE AND LOCATION										CONTRACT NUMBER
SCHEDULE ID	DFOW AND SUBTASK	SPECIFICATION SECTION AND PARAGRAPH NUMBER	TEST REQUIRED	ACCREDITED/ APPROVED LAB YES	ACCREDITED/ APPROVED LAB NO	SAMPLED BY	TESTED BY	LOCATION OF TEST ON SITE	LOCATION OF TEST OFF SITE	DATE COMPLETED	DATE FORWARDED TO OWNER	REMARKS	
	Excavate Footings	02 32 00	Compaction										
		07 27 26	Water Resistance										
		07 27 26	Water Vapour Transmission										
	Place Conc SOG	01 45 29	Compressive Strength										
		01 45 29	Slump Test										
		01 45 29	Air Content										
		01 45 29	Floor Tolerance										
		03 30 00	Load Test										
		03 30 00	Control Test										
	CMU	04 06 00	Mortar Test										
		04 07 00	Grout										
		04 22 00	Masonry Unit Test										
	U/G Water Pipe	33 10 00	Hydrostatic Test										
		33 10 00	Valve Test										
		22 13 00	Air Test										
		22 13 00	Leak Test										
		23 05 93	Air Balance										

4296/4 9/98

SHEET OF

i. PROCEDURES TO COMPLETE REWORK ITEMS (Construction Deficiencies)

Procedures to Complete Rework Items

The QC Manager will conduct daily inspections during the Follow-up phase to ensure compliance of the work with the contract. Any work that does not comply with the contract will be noted on the Rework Items List. The Rework Items List will identify the items that require rework and the date that the item was originally discovered. This list of deficiencies will be included in the quality control documentation, as required, and will include the estimated date by which the deficiencies will be corrected. Once the rework items have been corrected, the QC Manager will make a second inspection to ensure that all deficiencies have been corrected.

The QC Manager and the subcontractor's foreman will inspect the work activity while the work is in progress and again upon its completion.

This Rework Items List will be filed by the QC Manager. This list will state the deficient item, the date it was found, the corrective action necessary, the date the work was corrected, and the name of the person verifying that the work has been satisfactorily completed.

Follow-up actions on those discrepancies that cannot be corrected at the time of discovery will be the responsibility of the QC Manager. These types of discrepancies may be contributed to faulty equipment, weather, or time restrictions.

The Rework Items List will be maintained by the QC Manager and discussed at each QC meeting. The QC Manager and superintendent will agree on a reasonable time line for correction.

Deficiencies that have been identified since the last meeting will be discussed and proposed correction dates will be established.

The QC Manager shall be responsible for listing items needing rework, including those identified by the owner's representative. The results of all quality control inspections, including those deficiencies noted and corrected on the spot, will be recorded by the QC Manager.

A copy of this report, with results and corrective actions taken, will be forwarded to the owner's representative. The original report will be filed at the job site trailer and will be made available as required.

Attached is the sample Rework Items List (Deficiency Log).

REWORK ITEMS LIST (SAMPLE)

Contract No. and Title: Enter Contract # and Title Here

Contractor: Enter Contractor's Company Name Here

NUMBER	DATE IDENTIFIED	DESCRIPTION	CONTRACT REQUIREMENT (Spec. Section and Par. No., Drawing No. and Detail No., etc.)	ACTION TAKEN BY QC MANAGER	RESOLUTION	DATE COMPLETED
1	8/1/21	Water main trench compaction was 80%. Specification requires minimum 90%.	02350 3.2.1	Notified Foreman/Supt.	Added more water and recompacted the trench to 92%.	8/1/21
2	8/3/21	South wall in mechanical room was framed with 4" studs. Drawing calls for 6" studs.	A2.1 detail 4	Notified Foreman/Supt.	Subcontractor removed wall and reframed it with 6" studs.	8/3/21
3	8/6/21	Acoustical ceiling wires are the wrong thickness.	A3.3 detail 2	Notified Foreman/Supt.	Subcontractor removed and replaced with 12 ga wires.	8/6/21
4	8/7/21	Hydrostatic test failure of main water line from gate valve to bldg.	15400 3.3.2	Notified Foreman/Supt.	Subcontractor replaced leaky valve and retested. Re-test passed.	8/7/21
5	8/10/21	Ceiling joist spacing in mechanical room is 16" O.C. in lieu of 12".	A5.1 detail 3	Notified Foreman/Supt.	Subcontractor moved framing and added joists.	8/10/21

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j. LIST OF DEFINABLE FEATURES OF WORK (DFOW)

Sample DFOW and Task List

DFOW	Subtask
Mobilization	
	Temp Fencing
	Temp Water Meter/Backflow
	Temp Power
	Mobilize Job Trailer
	Temp Construction Signs
	Utility Locates
Demolition	
	Survey Lines for Saw Cutting
	Saw Cut Existing AC Pavement
	Grind and Pile Existing AC
	Export AC Grindings
Earthwork	
	Survey/Construction Stakes Building Pad
	Removal (3') (5' Envelope)
	Finish Grade Building Pad
	Backfill Building & Foundation
Sanitary Sewer	
	Survey Construction Staking Sanitary Line
	Excavate POC
	Trench & Install Lateral (5' from Building)
	Backfill Lateral
	Test & Certify
Water	
	Survey Construction Staking Domestic Waterline
	Excavate POC
	Trench & Install Lateral (5' from Building)
	Backfill Lateral
	Test & Certify
Gas	
	Survey Construction Staking Natural Gas Line
	Excavate POC
	Trench & Install Lateral (5' from Building)
	Backfill Gas Line

	Test & Certify Gas
UG Electrical	
	Survey Construction Staking Site Electrical
	Trench
	Install Duct Bank
	Backfill Duct Bank
	Rope & Mandrel Conduit
Storm Drain System	
	Survey Layout UG/Storm Drain
	Excavate & Install UG/Storm Drain Piping
	Inspection for UG/Storm Drain
	Backfill & Compact UG/Storm Drain Trench
Foundation	
	Layout
	Excavate Footings
	Place Rebar
	Form & Pour
	Stack CMU (-2.8′ to 0)
	Place Steel
	Grout
	Perimeter Insulation & Waterproofing
	Backfill Foundation
Slab on Grade	
	Prep SOG Sub Grade
	Set Edge Forms
	Place 6″ Gravel
	Place Vapor Barrier
	Place 6 X 6 Mesh
	Place & Finish Ready Mix SOG
	Strip Forms
	Cure
Masonry	
	Set HM Door Frames
	Set HM Window Frames
	Stack Block 1st Lift (4′)
	Place Steel 1st Lift
	Concealed EMP 1st Lift
	Grout 1st Lift

	Set Up Scaffolding
	Stack Block 2nd Lift (4’ to 8’)
	Place Steel 2nd Lift
	Concealed EMP 2nd Lift
	Grout 2nd Lift
	Stack Block 3rd Lift (8’ to 12’)
	Place Steel 3rd Lift
	Concealed EMP 3rd Lift
	Stack Block 4th Lift (12’ to 18’)
	Place Steel
	Concealed EMP 4th Lift
	Seal CMU Block
Metal	
	Stack Decking Material
	Construct Metal Decking
	Construct Steel Stairs
	Set Metal Fascia
Roofing	
	Set Insulation
	Install Built Up Roofing on Insulation
	Install Skylights
	Caulk & Seal Openings
Doors	
	Install Exterior Doors & Hardware
	Install Interior HM Doors & Hardware
Partitions	
	Install Mesh Partition Hardware
	Install Mesh Partition Fabric
Plumbing	
	Rough Plumbing
	Install Fixtures
	Finish & Adjust
Electrical	
	Rough Electrical
	Install Fixtures
	Cabling
	Finish & Adjust
	Test & Certify

HVAC	
	Rough HVAC
	Install HVAC
	Finish & Adjust
	Test & Balance
Insulation	
	BAT Insulation Fiber Blankets
	Fire Stopping
Drywall	
	Receive Drywall Material
	Stack Material in Rooms
	Set Gypsum Board
	Tape & Texture
Ceiling	
	Receive Acoustical Celling System
	Set Frame & Hangers
	Set Boards
	Finish & Adjust
Paint & Seal	
	Paint Exterior
	Paint Interior
Flooring	
	Prep Garage Floor
	Seal Garage Floor
	Install Base
	Prep Bathroom Floor
	Install Tile
	Prep Office & Hallway Floor
	Carpet Tile
Casework	
	Install Backing
	Install Cabinets
	Install Solid Surface

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k. PROCEDURES FOR PERFORMING THE THREE PHASES OF CONTROL

The QC Manager is responsible to apply the Three Phases of Control process to all Definable Features of Work (DFOW). The Three Phases of Control process is composed of the Preparatory Phase, the Initial Phase, and the Follow-up Phase. These three phases, when applied as per specifications, will assure that a DFOW is done but once; the work produced will meet contract requirements and the contractor will not be faced with any re-work due to defects and/or deficiencies. The Three Phases of Control need to be applied to both on-site and off-site work.

Preparatory Phase

Before holding a preparatory phase meeting, notify the owner's representative at least two work days in advance to give the owner's representative an opportunity to attend. The meeting will be conducted by the QC Manager and attended by the QC Specialist(s), the Project Superintendent, the Commissioning Authority (CA), and the foreman responsible for the DFOW. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman shall attend the preparatory phase meeting. Document the results of the preparatory phase actions in the daily Contractor Quality Control Report and in the Preparatory Phase Checklist.

Perform the following prior to beginning work on each DFOW:

a. Review each paragraph of the applicable specification sections.

b. Review the contract drawings.

c. Verify that field measurements are as indicated on construction and/or shop drawings before confirming product orders, in order to minimize waste due to excessive materials.

d. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required.

e. Review the testing plan and ensure that provisions have been made to provide the required QC testing.

f. Examine the work area to ensure that the required preliminary work has been completed.

g. Coordinate the schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

h. Arrange for the return of shipping/packaging materials, such as wood pallets,

where economically feasible.

i. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data.

j. Discuss specific controls used and construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW.

k. Review the Safety Plan and appropriate Job Hazard Analysis (JHA) to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDS) are submitted.

l. Review the Commissioning (Cx) Plan and ensure all preliminary work items have been completed and documented.

Initial Phase

Before holding an initial phase meeting, notify the owner's representative at least two work days in advance to give the owner's representative an opportunity to attend. When construction crews are ready to start work on a DFOW, conduct the initial phase with the QC Specialists, the Project Superintendent, and the foreman responsible for that DFOW. Observe the initial segment of the DFOW to ensure that the work complies with Contract requirements. Document the results of the initial phase in the daily QC Report and in the Initial Phase Checklist. Repeat the initial phase for each new crew to work on- site, or when acceptable levels of specified quality are not being met.

Perform the following for each DFOW:

a. Establish the quality of workmanship required.

b. Resolve conflicts.

c. Ensure that testing is performed by the approved laboratory.

d. Check work procedures for compliance with the Safety Plan and the appropriate JHA to ensure that applicable safety requirements are met.

e. Review the Cx Plan and ensure all preparatory work items have been completed and documented.

Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOW and document in the daily QC Report:

Perform the following for each DFOW:

a. Ensure the work is in compliance with Contract requirements.

b. Maintain the quality of workmanship required.

c. Ensure that testing is performed by the approved laboratory.

d. Ensure that rework items are being corrected.

e. Assure manufacturer's representatives have performed necessary inspections if required and perform safety inspections.

f. Review the Cx Plan and ensure all work items, testing, and documentation has been completed.

Additional Preparatory and Initial Phases

The QC Manager shall conduct additional preparatory and initial phases on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW is resumed after substantial period of inactivity, or if other problems develop.

Notification of Three Phases of Control for Off-Site Work

Notify the owner's representative at least two weeks prior to the start of the preparatory and initial phases on off-site work to give the owner's representative an opportunity to attend.

	03 30 00 Cast-in-Place Concrete			
Item No	**Description**	Preparatory	Initial	Follow-Up
1	Formwork approval obtained			
2	Rebar approval obtained			
3	Verify mix design			
4	Notify testing laboratory of placement			
5	Arrange site test personnel			
6	Arrange offsite test personnel			
7	Areas to receive concrete are cleaned, wetted, or otherwise prepared			
8	Placement area is free of frost and excessive water			
9	Previously placed concrete is properly prepared to receive new			
10	All embed items are properly located and installed (door closers, ledgers, bolts, anchors, studs, etc)			
11	Proper tools and equipment are available			
12	Tools and equipment are in working condition			
13	Identify proximity of standby tools and equipment			
14	Conveying and depositing equipment is capable of reaching all areas of placement without segregation, loss of ingredients, formation of air pockets, or cold joints			
15	Adequate manpower is available for timely placemen			
16	Temporary form openings in place, as required			
17	Tremies on hand if needed			
18	Form pockets, if any, are vented entrapment			
19	Subgrade and capillary fills are compacted			
20	Subgrade membrane installation is tight			
21	Arrangements made for proper curing			
22	Arrangements made for sawed joints			
23	Arrangements made for protection of adjacent items			
24	Inspectors have all required testing equipment			
25	Identify person with authority to add water to mix			
26	Concrete delivery schedule and sequence is scheduled for continuous placement to prevent cold joints			
27	Verify age of concrete is within mix time limit			
28	Check delivery tickets for mix number and proportions			
29	Is modified grout required such as at rebar congestion			
30	placement lift layers are kept approximately horizontal			
31	placement lift layers do not exceed required lift height			
32	Complete placement record for each placement			
33	Check grades, elevations, alignment, form adjustment, and supports during placement			

	03 30 00 Cast-in-Place Concrete			
Item No	**Description**	Preparatory	Initial	Follow-Up
34	Define test sample storage location			
35	Test sample storage location is away from weather extremes and movement			
36	Vibration performed properly			
37	Watering and drainage methods determined			
38	Finishes are as specified (smooth, broomed, nonslip, exposed aggregate)			
39	Troweling is not performed while bleed water is on surface			
40	Over-troweling is avoided			
41	Curing methods are started as soon as possible			
42	Curing compounds are as required			
43	Curing compound is compatible with subsequent finishes			
44	Finishing method provides evenness, smoothness, and levelness of surfaces within tolerance indicated			
45	Slopes are provided as required			
46	Marks left by finishing tools are removed			
47	Joints, edges, and corners are carefully finished			
48	Curing method is adequately performed			
49	Post-placement protection is installed			
50	Protection covers are applied with sufficient lap and sealing during curing period (colored surfaces may require special covers to avoid staining, etc.)			
51	Monitor loading and traffic over new surfaces			
52	Architectural repairs/sacking are performed timely (form ties,, honeycomb pockets, tool marks)			

I. PERSONNEL MATRIX

TBD

m. PROCEDURES FOR COMPLETION INSPECTION

Punch-Out Inspection

Near the completion of all work, or any increment thereof, established by a completion time stated in the contract, the QC Manager and the CA must conduct an inspection of the work and develop a punch list of items which do not conform to the approved drawings, specifications, and contract. Include in the punch list any remaining items on the Rework Items List, which were not corrected prior to the Punch-Out Inspection. Include within the punch list the estimated date by which the deficiencies will be corrected. Provide a copy of the punch list to the owner's representative. The QC Manager, or staff, must make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the owner's representative that the facility is ready for the owner's Pre-Final Inspection.

Pre-Final Inspection

The owner's representative and QC Manager will perform this inspection to verify that the facility is complete and ready to be occupied. An owner's Pre-Final Punch List will be documented by the QC Manager as a result of this inspection. The QC Manager will ensure that all items on this list are corrected prior to notifying the owner's representative that a Final inspection with the owner can be scheduled. Any items noted on the Pre-Final inspection must be corrected in a timely manner and be accomplished before the contract completion date for the work, or any particular increment thereof, if the project is divided into increments by separate completion dates.

Final Acceptance Inspection

Notify the owner's representative at least 14 calendar days prior to the date a final acceptance inspection can be held. State within the notice that all items previously identified on the pre-final punch list will be corrected and acceptable, along with any other unfinished contract work, by the date of the final acceptance inspection. The contractor must be represented by the QC Manager, the Project Superintendent, the CA, and others deemed necessary. Attendees for the owner will include the owner's representative, other owner's personnel, and personnel from the operations and maintenance department. Failure of the contractor to have all contract work acceptably complete for this inspection will be cause for the owner's representative to bill the contractor for the owner's additional inspection costs in accordance with the contract.

Testing of completed systems

Testing of completed systems will be performed as required in the technical specifications of the contract

n. TRAINING PROCEDURES AND TRAINING LOG

Training for Operations and Maintenance Personnel

Prior to acceptance of the facility by the owner's representative for beneficial occupancy, the QC Manager must provide a comprehensive project specific operation and maintenance personnel training program for the systems and equipment of the facility specified in the technical sections of the specifications of this contract. The trainees must include the owner's representative, facilities manager, maintenance staff, and facilities occupants. The contractor is responsible for coordinating, scheduling, and ensuring that training is completed. Instructors shall be well versed in the particular systems that they are presenting. Provide instruction time on site at a location approved by the owner's representative.

Training Plan

Submit a written training plan to the owner's representative and CA for review and approval prior to training. Coordinate and schedule the training with the owner's representative. Include within the plan the following elements:

a. Equipment included in training.
b. Intended audience.
c. Location of training.
d. Objectives.
e. Subjects covered including description.
f. Duration of training on each subject.
g. Methods; i.e. classroom lecture, video, site walk, actual operations, written handouts, etc.
h. Instructor and instructor qualifications for each subject.

Content

Stress and enhance the importance of system interactions, troubleshooting, and long-term preventive maintenance and operation. The core of this training will be based on manufacturer's recommendations and the operation and maintenance information provided as a part of this contract. A review of environmentally related aspects of the Operations and Maintenance Manuals shall be included. The course shall provide a brief summary of Part I, Facility Information and a more detailed presentation of Part II, Primary Systems Information from the Operations and Maintenance Manuals required by the applicable part of the specification. Include the following for each commissioned system:

a. Design intent.

b. Use of O&M Manuals.

c. Review of control drawings and schematics.

d. Start-up, normal operation, shutdown, unoccupied operation, seasonal changeover, manual operation, controls set-up and programming, troubleshooting, and alarms.

e. Interactions with other systems.

f. Adjustments and optimizing methods for energy conservation.

g. Relevant health and safety issues.

h. Special maintenance and replacement sources.

i. Tenant interaction issues.

j. Discussion of how the feature or system is environmentally responsive.

Training Outline

The QC Manager is responsible for overseeing and approving the content and adequacy of the training. The QC Manager must interview the owner's representative and facility's manager to determine the special needs and areas where training will be most valuable. The owner's representative must decide how rigorous the training should be for each piece of equipment. The QC Manager is to communicate the results to the contractor, who will provide each trainee in the course a written course outline, listing the major and minor topics to be discussed by the instructor on each day of the course.

Video Recording

Provide to the owner's representative two copies of the training course in DVD format, and add to the O&M Manual data. Capture within the recording, in video and audio, all instructor's training presentations including question and answer periods with the trainees. Videotaping of the training sessions shall be provided by the contractor.

Unresolved Questions from Trainees

If, at the end of the training course, there are questions from trainees that remain unresolved, the instructor will send the answers, in writing, to the owner's representative for transmittal to the trainees, and the training video should be modified to include the appropriate clarifications.

Validation of Training Completion

Develop criteria for determining that the training was satisfactorily completed, including attending some of the training, and upon fulfillment of the criteria, validate training completion. The QC Manager will then recommend approval of the training to the owner's representative using a standard form and the owner's representative will sign the approval form. Provide completed and signed validation of training forms as provided in the QC Plan for all training sessions accomplished. Provide two copies of the signed training validation forms to the owner's representative and one copy to the O&M Manual preparer for inclusion into the O&M documentation.

Training Log

The QC Manager shall develop a suitable form to be used as a training log. Provide a blank copy of the training log form in the QC Plan.

Attach Personnel Training Log prepared by the Project Manager and/or Superintendent

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o. ORGANIZATION AND PERSONNEL CERTIFICATION LOG

Organization and Personnel Certifications Log:

Procedures for coordinating, tracking and documenting all certifications on subcontractors, testing laboratories, suppliers, personnel, etc. QC Manager will ensure that certifications are current, appropriate for the work being performed, and will not lapse during any period of the contract that the work is being performed.

The QC Manager shall develop an appropriate log for this requirement and keep it up to date as a minimum every 30 calendar days. Include a copy of the certification log in the QC Plan. The QC Manager will not allow any person, subcontractor, or supplier to perform quality control functions, in an area requiring certification, if such certification is expired.

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

Student Study Guide

US Army Corps of Engineers®

NAVFAC Naval Facilities Engineering Command

Revised 2020

Includes Updated Table of Contents and Added Training Material
Revised 2022 by Kugan & Associates, Inc.

Table of Contents

This manual is a basic guide to USACE/NAVFAC Construction Quality Management. Contract requirements take precedence over any guidance contained within this manual or stated by the instructor(s).

Module 1: INTRODUCTION

Submodule 1.1: What is Construction Quality Management (CQM)?

"PROACTIVE PREVENTION vs. REACTIVE INSPECTION"

Objectives: After completing this submodule, you will be able to:

- State the purpose of Construction Quality Management.
- Discuss the reasoning behind the USACE/NAVFAC policy on CQM.
- Discuss various characteristics that are specific to the construction industry.
- Define Contractor Quality Control (CQC).
- Define Government Quality Assurance (QA).

A. Introduction and Instructional Procedures: This training is presented as a result of partnering efforts with the Associated Builders and Contractors (ABC), Associated General Contractors (AGC), the U.S. Army Corps of Engineers (USACE), and the Naval Facilities Engineering Command (NAVFAC). This is appropriate as Construction Quality Management is a partnering effort between the Government and the contractor. The purpose of this training is to familiarize all quality control personnel, and other contractor management personnel, with CQM policies, requirements, and procedures. In addition to the slideshow portions, this training package includes this Study Guide and pertinent classroom exercises provided by your Facilitator. As we proceed through the training, the broader and more general portions of the information will be presented on power point slides. At the end of each segment (module or submodule), the Facilitator will stop the slideshow and give you any necessary detailed information. Then, you should read the text for that submodule and proceed to the related discussions and exercises.

B. Instructional Content: The content of this training package will include, in Module 1, an introduction covering the broad aspects of CQM, including its definition; discussions of quality control procedures and benefits; the characteristics of the construction industry and the responsibilities of the Government and the contractor. In Modules 2 through 6, the various reviews, plans, conferences, reports, and management requirements are described. In Module 7, the information in the first six modules will be integrated into a discussion of the ways and means of making the CQM system work effectively so that the level of quality required in the USACE' and NAVFAC's worldwide construction program is achieved. Module 8, is an overview of the Resident Management System (RMS)..to be presented at USACE sponsored courses. Module 9, covers NAVFAC's Electronic Construction and Facility Support Contract Management System (eCMS), and will be presented at NAVFAC

sponsored courses.

C. History of Construction Quality Management: In 1961 a new clause containing but two sentences began appearing in Department of Defense (DoD) solicitations. These same two sentences can still be found today in the Contract Clause entitled “Inspection of Construction” [subparagraph (b)]. These sentences require a contractor to be responsible for achieving and documenting contract quality. By 1968 the Construction Quality Management system had grown into a loose structured process varying from field office to field office in which more paragraphs were placed into the contract defining specific items that were to be accomplished to better manage the task. Most often, in these early years, there were a wide variety of responses on how to manage quality into the job. USACE and NAVFAC were faced with something of a balancing act. The contractor was either given great latitude in organizing the effort to get quality or given specific expectations and processes. Over the years, USACE and NAVFAC have tried many variations and made some very specific choices. With the involvement of industry representatives, including the AGC, it was recognized that the relatively structured method used today was the preferred contract method. The system has some very specific processes, these include the three-phases of control system, formal deficiency /rework items tracking systems, and well-defined submittals. On many jobs, the USACE and NAVFAC specify the contractor’s manpower quantity and qualifications. And, of course, this training for contractor personnel is now a contract requirement. Keep in mind that these choices are not free -- there is a cost for them and by putting them into the job, the USACE and NAVFAC have made a choice from a spectrum of possibilities. By entering a USACE or NAVFAC contract, the contractor has agreed to follow the chosen methods.

D. Construction Quality Management: CQM is the performance of tasks, which ensure that construction is performed according to plans and specifications, on time, within a defined budget, and a safe work environment. For purposes of this training, quality is defined as conformance to properly developed requirements. For a construction project, quality begins with requirements carefully developed, reviewed for adherence to existing guidance, and ultimately reflected in criteria and design documents which accurately address these needs. Therefore, the designer establishes the quality standards and the contractor, in building to the quality standards in the plans and specifications, controls the quality of the work. The purpose of CQM is the Government’s efforts, separate from, but in coordination and cooperation with the contractor, assure that the quality set by the plans and specifications is achieved. CQM is the combined effort of the contractor and the Government. The contractor has primary responsibility for producing construction through compliance with plans, specifications, and accepted standards of the industry. CQM, if used as outlined in this course, enables contractor and Government personnel to be proactive and, thereby, prevent mishaps and deficiencies from occurring. Continuing to work in a

reactive mode and relying on inspection to achieve required quality of product means that CQM is either not understood or that the philosophy has not been adopted.

E. Contractor Quality Control: The primary function of contractor quality control (CQC) is to assure that the completed project meets all quality requirements of the contract. To guide the contractor in this task, a CQC plan must be prepared to ensure that the required standards of quality construction are met. In the CQC plan, the contractor defines the procedures to manage and control not only the prime contractor's, but also all subcontractors' and suppliers', activities so that the completed project complies with contract requirements. A list of the Components of CQC has been provided in Appendix A.

F. Government Quality Assurance: Quality Assurance (QA) involves the means by which the Government protects its interests. Through reviews, inspections, and tests, the Government assures that CQC is working effectively, and that the product complies with the quality established by the contract.

G. USACE and NAVFAC's CQM System: (Engineer Regulation) ER1180-1-6 and NAVFAC's P-445, and other references provide guidance to USACE and NAVFAC personnel in performing effective CQM in the field. While these regulations provide minimum requirements, each project must be tailored to suit its specific conditions and requirements. These references are readily available on-line.

H. The Benefits of CQM: Both the contractor and the Government must be interested in effective CQM. The benefits to the Government are many: work is performed according to plans and specifications, on time, within a defined budget, easily maintained, and a safe work environment. This can be summarized as "Getting our money's worth!" The benefits to the contractor are increased profit and production, better communication, planning, improved organizational skills, and outstanding performance evaluations to obtain future contracts.

I. Characteristics of the Construction Industry: The construction industry has become highly specialized because of the changing market. Increased technology and regulation have resulted in increasing numbers of specialty contractors (such as general building, heavy construction, and special trade contractors) that make coordination and management more difficult for the general contractor and complicates both CQC and QA.

Whether large or small, specialized or general, success for all contractors is based on their ability to:

- Manage personnel
- Control costs
- Finance work
- Estimate jobs
- Schedule the work
- Manage cash flow
- Manage an effective safety program
- Maintain an effective quality control system

$1.29 trillion was spent in the U.S. on construction in 2019. Over 80% of all construction companies are small firms that gross less than $500,000 annually. For every 1,000 firms in operation, 110 to 130 firms enter the field each year. A similar number leave the field each year. It is a fact that the rates of entry and failure are among the highest of all industries. Good quality management supports a better business result for contractors and stakeholders.

Construction projects are difficult to manage because:

- Construction projects are unique by nature, making standardization difficult
- Construction operations involve many skills that are nonrepetitive and do not lend themselves to an assembly line approach
- Construction projects are, to a large degree, dependent upon environmental conditions which are beyond the contractor's control
- Subject to varied regulations from numerous government agencies

For the contractor, adequate technical performance is not enough to ensure profit. There simply is too much competition and too little profit. Construction contracting is a very high risk, volatile business. To run a successful and profitable business, contractors must employ effective management.

J. Current Trends: New government regulations will impose more restrictive requirements, especially in the areas of environmental concerns, occupational health and safety, and employment.

There will be a greater degree of influence from the client/customer, to include their involvement in project design and construction, and the requirement to assure full documentation and timely response to all comments from them.

Electronic management tools such as the Resident Management System (RMS) and NAVFAC’s eCMS system will continue to advance. Additionally, Building Information Systems (BIM) and automated project management/Construction Management systems will become highly integrated with construction schedules and workflows.

Partnering and risk management, involving all stakeholders, are established tools for doing business.

K. Conclusion: The construction industry will continue to be presented with complex, difficult challenges. To face the increasing challenges, we must have the best tools and properly utilize them. Even with a sound system structure, CQM requires the combined efforts of QC personnel and QA personnel to achieve our shared goals – a safe work environment, quality construction, built on time and within budget. The traditional, adversarial roles of Government versus contractor must be abandoned in favor of success through joint implementation of an effective construction quality management system. The CQM system presented here will, with our joint efforts, always be successful in providing desired quality.

EXERCISE 1.1

1. In construction, what establishes the quality requirements?

2. What is the purpose of CQM?

3. Define CQM.

4. What are the two principal areas of CQM activity? Define each.

5. What are the benefits of CQM to the contractor? To the Government?

6. What two factors have caused the construction industry to become highly specialized?

7. Why are construction projects difficult to manage?

8. What factors will influence both the Government and the construction industry in the future?

Submodule 1.2: Contractor Quality Control

Objectives: After completing this submodule, you will be able to:

- Differentiate between "inspection" and "control."
- Describe, in general, the contractor's and the Government's responsibilities in CQM.
- Describe the benefits of CQC to the contractor, the Government, and the client/customer.

A. Control Versus Inspection: The contractor has the contractual responsibilities to control construction quality and inspect the work. These are two distinct processes. Control is a continual system of planning future activities. Inspection is the process by which ongoing and completed work is examined. Inspection is ongoing or "after-the-fact" while control is "preventive." The objectives of control are to ensure that the contractor is adequately prepared to begin a phase of work, to eliminate deficiencies, and to follow through in accomplishing the work in accordance with the contract. The objective of inspection is to ensure that the work was accomplished in accordance with contract provisions. The control process is sometimes neglected. This course will emphasize the control aspects of the contractor’s management system.

B. Responsibilities: By the contract, the responsibility for quality control is vested in the contractor. Historically, the construction industry accepted a system of control in which the contracting agency or owner continually advised the contractor on what was correct, what was wrong, and what remained to be done to comply with the contract. This not only restricted contractors and burdened contracting agencies and owners, but it placed the responsibility for control of construction quality with the contracting agency or owner. Under the Construction Quality Management system, QC responsibility now belongs with the contractor. Government QA personnel are responsible for periodically verifying that the contractor's system of quality control is working effectively, and that construction complies with contract requirements. In doing this, USACE and NAVFAC are performing quality assurance, not assuming responsibility for quality control.

C. Benefits to the Contractor: Effective CQC will greatly reduce the largest unnecessary cost to the contractor--the tear out and replacement cost stemming from deficient workmanship and materials. An effective CQC program causes work to be done correctly the first time. The contractor benefits from earlier completion, reduced field overhead costs, and the ability to do a greater volume of business. Reduced costs result in greater profits for the contractor. High quality performance improves the reputation and image of the contractor leading to possible future contracts. Since safety is an integral part of CQC, the

contractor benefits by experiencing less lost-time and fewer insurance claims, which result in greater profit. Contractor personnel take pride in delivery of a quality product. While this benefit cannot be measured quantitatively, it is a real and very important benefit. Effective CQC may, at times, warrant an above satisfactory CPARS evaluation allowing the contractor to have a more competitive position when bidding on future government contracts.

D. Benefits to the Government. Manpower is more effectively used, which helps the contract administration offices to maintain effective operations in a time of limited resources. Effective CQC results in fewer deficiencies and corrective efforts, which may lead to an earlier completion since there is a reduction in corrective work by contractor forces. Public relations and client/customer satisfaction are improved when projects are completed on time. As with contractor personnel, Government personnel take pride in the delivery of a quality product. Cost and time growth are minimized.

E. Benefits to the Stakeholder: Effective CQC can be simply stated--a quality product delivered safely, on time, and within the budget.

F. Presenting the Program: It is the responsibility of both the Government and the contractor to develop and promote the CQC program. This effort in "partnering" will be a much more pleasant experience than the traditional use of enforcement to ensure that a quality product is delivered.

EXERCISE 1.2

1. What is the difference between INSPECTION and CONTROL?

2. Who has contractual responsibility for quality control?

3. Is the following statement TRUE or FALSE: "CQC is principally concerned with inspection?" Explain.

4. How does the contractor benefit from effective CQC?

5. Name the benefits of effective CQC that accrue to the Government.

Submodule 1.3: Contractor and Government Responsibilities

Objectives: After completing this submodule, you will be able to:

- Discuss the specific responsibilities of:
  - Contractor personnel engaged in CQC.
  - Government personnel engaged in QA.
- Discuss how the responsibilities of contractor and Government personnel interrelate and are mutually supportive.
- Discuss partnering relationships.

A. Quality Control Personnel: As stated previously, CQC is a contractor responsibility. The role and responsibilities of the contractor in CQC are clearly specified in the contract documents. The contractor is required to place a competent representative, the QC Manager, on the site to oversee the CQC system. The QC Manager must have full written authority to act for the contractor on all CQC matters.
QC Manager's responsibilities per the specification include but are not limited to:

- Controlling the quality specified in the plans and specifications,
- developing and maintaining an effective CQC system,
- stopping work,
- performance of all control activities and tests, and
- preparation of acceptable documentation of CQC activities.

Contractor personnel must remember that **only the Contracting Officer has the authority to change the contract**. Therefore, all communication concerning contract changes must be with the Contracting Officer and/or an authorized representative of the Contracting Officer. No directions concerning the project work can be accepted from a third party, including representatives of the facility user or of the base, or post.

B. The Government: The role and responsibilities of the contractor in CQC are clearly specified in the contract documents. The roles and responsibilities of Government QA personnel are distinct. They are required to assure that the specified standard of workmanship with the specified materials and within the limits of the contract are provided. Further, they must require the contractor to maintain the quality specified in the plans and specifications from the very beginning. Another responsibility of QA personnel is to conduct onsite business only with the contractor's QC Manager/superintendent. They should not deal directly with subcontractors and individual craftspeople but should coordinate through the prime contractor.

QA personnel are trained to observe all activities of the CQC staff and to recommend to the Contracting Officer required changes in the CQC organization and/or system, if the contract requirements are not being met.

C. Communications: Most contractors want to build a quality product within the terms of the contract, as they perceive them. However, it is critical that the contractor and the Government interpret the plans and specifications in the same way. This requires clear and effective communication between Government and contractor. This is the very heart of the Construction Quality Management program and is dependent on cooperation. QA personnel must maintain an honest, candid, professional attitude; the contractor must respond in the same manner.

D. Partnering: Partnering is a long-term commitment between two or more organizations for the purpose of achieving specific business objectives by maximizing the effectiveness of each participant's resources. Partnering relationships are based upon trust, dedication to common goals, understanding and assistance to reach each other's individual expectations and values. Partnering is not a legally binding relationship. Rather it is a commitment and agreement between the parties to:

- Remove organizational impediments to open communication within the team.
- Provide open and complete access to information (except information specifically excluded by law, regulation, or ethical requirements).
- Empower the working level staff to resolve as many issues as possible.
- Reach decisions by consensus as much as possible and when consensus is not possible, achieve resolution in a timely manner using an agreed upon process for resolving disagreements.
- Take joint responsibility for maintaining and nurturing the partnering relationship.

Partnering should not be interpreted to open the door to the compromise of contract requirements established in the plans and specifications. The quality of the project is established by those requirements and the contractor is bound to provide the level of quality specified. Partnering is entered into either formally or informally. A formally partnered job (also referred to as facilitated partnering) requires a trained, independent facilitator. Informally partnered jobs (also referred to as team partnering) are those where there is no independent facilitator, but the parties meet using a team approach with a mutually determined agenda and the team reaches agreement on goals and procedures. In either case, a written partnering charter is developed and signed by all stakeholders. The result is the development of trust and effective communications.

E. Summary: Effective Construction Quality Management requires the complete cooperation of the contractor and the Government. When this partnership works effectively, the project will run smoothly and efficiently. The contractor improves the organization's profit margin and the product will satisfy the client/customer.

EXERCISE 1.3

1. What is the role and responsibilities of the contractor in CQC?

2. What are the responsibilities of the contractor's QC Manager?

3. What are the QA responsibilities of the Government?

4. Name the items upon which partnering relationships are based.

Module 2: CONTRACTOR'S REVIEW

Objectives: After completing this module, you will be able to:

- State the contractor's responsibilities for reviewing contract plans and specifications.
- Describe the benefit of proper layout drawings.
- State the importance of requesting clarifications from the Government.
- Discuss the need for review of design extensions, designs for design- build projects, and designs for value engineering change proposals.
- Understand the process for requesting clarifications from the contractor's design team on design-build projects.

A. Review Contract Plans and Specifications: Contract clause, FAR 52.236-21 Specifications and Drawings for Construction, requires the contractor to review the contract plans and specifications and request clarification where necessary. The term "Request for Information (RFI)", is typically used to ask for clarification of the contract. The Navy term "Request for Variance (RFV)" is typically used to ask for a variance from a contract requirement. Examples of items to be reviewed include, but are not limited to:

- Site conditions and restraints: Check for proper utility interface with existing facilities. Verify location of utilities in the facility, waste disposal, site location, site survey control point, etc.
- Proper allowance for maintenance space and access: The contractor is required, by the contract, to prepare layout drawings of equipment to assure that adequate maintenance access has been provided. The importance of the CQC participation and assurance of compliance with this requirement is critical to proper coordination. This will avoid many potentially costly conflicts.
- Conflicts and discrepancies between plans and specifications.
- Conflicts and discrepancies between disciplines (architectural, structural, mechanical, electrical and plumbing).
- Permitting and code requirements.
- Extensions of Design: Many contracts contain requirements for the contractor to provide designs such as pre-engineered metal buildings, fire alarm and protection systems, cathodic protection, etc. It becomes critical that the contractor designs are coordinated with all other aspects of the project so that proper interfaces are maintained.
- Coordination drawing review is essential to assure alignment of subcontractor scopes and responsibilities

These examples are not meant to be all inclusive but merely to point out the type of situations that can lead to added costs to both the contractor and the government if proper reviews are not performed by CQC personnel.

B. Review Design-Build Plans and Specifications: For Design-Build contracts the QC manager in association with the Design Quality Control Manager (DQCM) is responsible for the review of products produced by the contractor's designer of record. In this type of contract, the contractor's QC efforts must include design quality control. The QC plan must include details of reviews to be implemented to ensure that the design will comply with the criteria provided as well as the quality defined in the Government's Request For Proposal (RFP). The DQCM is not the same person as the QC Manager. Refer to the specifications for details. Refer to module 1 for requirements of the DQCM. Refer to module 5 for Design-Build submittal types.

The QC Manager must be in place for the design phase of design-build contracts and must take an active role in the review and coordination of the design, to include, but not be limited to constructability, operability, environmental, and sustainability review of all drawings and specifications, coordination between the different disciplines and trades to prevent any interferences between different components, coordination with suppliers, selection of materials and equipment to assure utilities connectivity and physically fitting into provided spaces, etc. The QC Manager is not the same person as the DQCM. Refer to specifications for the details. Refer to module 5 for Design-Build submittal types.

Specification 01 45 00.00 Contractor Quality Control includes specific requirements for a design quality control plan (DQCP) which will be a part of the overall Quality Control Plan. Key elements of the DQCP include:

- Independent Technical Review of all design documents
- Design schedule integrated with master project schedule to include review and coordination periods
- Design Quality Control Manager who is a competent engineer/architect (and reports to contractor's quality control site manager (CQCSM))
- Government acceptance of DQCP is required prior to commencement of design

C. Extension of Design: Where extensions of the design are required from subcontractors (structural steel details, concrete reinforcement drawings, etc.) subcontractors, or suppliers they must be coordinated with other activities. This coordination review is performed with other contractually required submittal reviews.

D. RFI Process: The contractor should include procedures in the QC plan for an RFI process between the contractor and the government. Submit RFIs thru the

Government's construction management system (RMS for USACE or eCMS for Navy) The questions should be specific and clearly presented. An effective RFI process will include the following factors:

- Review of all applicable contract documents.
- Coordination with affected sub-contractors and suppliers.
- Clear and succinct problem statement.
- Suggested solution;
- Timeframe that a response is required in order to minimize cost and/or schedule impacts.

When a subcontractor or supplier submits an RFI, the prime contractor must review the request and coordinate it among their offices and with other firms. Under no circumstance should the RFI be passed to the Government without this coordination being accomplished.

E. Design Variation Clarification Request (DVCR) Process: For design-build contracts the contractor's designer of record (DOR) must answer design related questions or clarifications. In this way the DOR provides an enhanced understanding of the designer's intent to ensure the project is constructed in accordance with the design. These internal communications between the contractor and the prime design firm and are typically referred to as DVCRs or a similar term. The DCVRs will be coordinated thru the Design Quality Control Manager. If the DVCR identifies the need for information from the government then an RFI (as discussed in paragraph C. above) should be submitted

F. Value Engineering Change Proposal (VECP): The Government's value engineering program is based on a partnering philosophy. It recognizes that the Government and the contractor share common goals and that, by working together in a spirit of cooperation, we can produce a quality facility while saving the taxpayer money. The QC Manager should review any VECP to assure proper coordination with all affected elements of the project prior to submission to the government. If the government accepts the VECP, the QC Manager must ensure that changes are discussed in the control meetings for all other applicable work to assure full benefit of the savings is achieved. Refer to EP 11-1-4 for additional information on VECPs.

EXERCISE 2

1. Name three instances of contractor extensions of designs.

2. Name some possible areas that must be addressed during the contractor's coordination review of the contract plans and specifications in a design-bid-build contract.

3. What are the responsibilities of the QC Manager during the design phase of a design-build project and what must the Design Quality Control Plan include?

4. In a design-build contract when should an RFI be used, when should a DVCR be used?

5. What are the key elements of an effective RFI?

6. What are the key elements of an effective RFV?

7. Review RFI examples 1 thru 4 to determine which RFIs fall into the following categories.
   a) Contractor asks the question in a professional manner and includes recommendations for the government
   b) Government does not answer well
   c) Contractor has not clearly asked the question and needs to resubmit it in greater detail in order to get the actual issue across
   d) Contractor asks a nonsensical question

RFI Example 1

Date Received: October 15, 2018 **Date Answered:** October 25, 2018

RFI SUBJECT: Secure Area Sprinkler Pipe Hanger Clarification

Information Requested: Per original fire sprinkler design, the sprinkler mains and branch lines are both routed high within the structural bar joist space. All the sprinkler main piping and branch line piping within the secure area ‘must’ be hung and braced off the top chord of the structural bar joists. Per Design Drawings, sheets A-410 and A-500 (attached) show two layers of 5/8” GWB being attached to furring at the roof level, covering the top chord of the structural

bar joists. Per sprinkler design drawings, Top Beam Clamps with retaining straps will be used for sprinkler pipe hangers, and Tolco Fig. 828 Universal Sway Brace Attachment will be utilized to brace the main piping. Please acknowledge that this is acceptable, and/or provide additional clarification as to how the sprinkler pipe is to be hung and braced within the secure area.

Government Response to Contractor:

Since this is a design-build contract the designer of record should be addressing and providing a recommended solution for this question. Have the designer of record review and respond to this RFI, then resubmit if there is additional guidance or clarification needed from the Government.

The following is presented for your consideration:

Regarding piping above the false ceiling, everyone agreed that if only structural steel was above the "false ceiling" the walls and ceiling could be sealed so the false lid was acceptable. With the introduction of the fire suppression transiting the space above, inspection hatches/access panels will have to be installed on the secured side in each SA room (with the hard lid). Motion sensors may also be required. Please be advised EVERYONE prefers no piping/nothing be installed above the ceiling.

For any penetrations through sound walls in the secure areas, these will need to be acoustically treated."

RFI Example 2

Date Received: April 17, 2020 **Date Answered:** April 30, 2020

RFI SUBJECT: Mechanical Identification and Valve Tagging

Information Requested: Please see the attached RFI from the Plumbing and Heating subcontractor for direction on mechanical identification and valve tagging.

Contractor Attachments: RFI-0284, RFI-027 and letter from subcontractor

Government Response to Contractor:

The current installation does not meet contract documents.

22 00 00 Plumbing, General Purpose

3.6.2 Pipe Color Code Marking, "Color code marking of piping shall be as specified in Section 09 90 00 Paints and Coatings."

23 57 10.00 10 Forced Hot Water Heating Systems Using Water and Steam Heat Exchangers (Glycol System)

3.3 Color Code Marking and Field Painting, "Color code marking, field painting of exposed pipe, and field painting of factory primed equipment shall be as specified in Section 09 90 00 Paints and coatings."

09 90 00 Paints and Coatings

3.8 Piping Identification, "Piping Identification shall be as specified in Division 22 and Division 23."

09 90 00 Submittal Item 1, Piping Identification was never submitted on nor was an RFI written about

23 00 00 Air Supply, Distribution, Ventilation, and Exhaust Systems

1.2.2 Service Labeling, "Label and arrow piping in accordance with the following:

a. Each point of entry and exit of pipe passing through walls.

b. Each Change in direction, i.e., elbows, tees.

c. In congested or hidden areas and at all access panels at each point required to clarify service or indicated hazard.

d. In long straight runs, locate labels at distances within eyesight of each other not to exceed 75 feet. All labels shall be visible and legible from

the primary service and operating area.

GRAPH FOR LETTERING SIZE PER PIPE DIAMETER

1.2.3 Color Coding

Color coding of all piping systems shall be in accordance with MIL-STD-101.

Although 23 00 00 is Air Supply, Distribution, Ventilation, and Exhaust Systems, it covers the piping that services HVAC related equipment.

The RFP Pg. 908, Contains 2.5 Mechanical Narrative, 2.5.1 References, Eielson Air Force Base Design Guides

Installation Design Guide HVAC

21. Piping

21.1. Standard color-coded labels (ANSI A13.1) shall be used for all piping at 10’ intervals.

21.2. Colored pipe labels shall be printed to indicate the type of fluid carried in the pipe and direction of fluid flow (arrows).

Drawing G-102, Other References

ASME/ANSI A13.1-Scheme for the Identification of Piping Systems

All jobs constructed on installation have required pipe labels/identification.

This information is provided as a clarification under FAR 52.236-21, Specifications and Drawings for Construction, rather than as a change under FAR 52.243-4, Changes. It shall not result in an increase in contract price or duration. If you do not agree, please provide written notice including information to establish and support your position in accordance with FAR 52.243-4, and do not proceed with this work without further direction from the Government.

RFI Example 3

Date Received: December 7, 2018 **Date Answered:** December 17, 2018

SUBJECT OF RFI: Fire Hydrant Access

Information Requested: UFC 3-600-01 allows a maximum of 1,250 g.p.m. to be used from any single hydrant. The "Minimum Fire Flow" demands to the site are approximately 1,500 g.p.m. for an unsprinklered building, and UFC 3-600-01 requires the fire hydrants to be within 350’ of all exterior points of the building. Due to the new construction in the surrounding areas, we are looking to confirm there will be access to at least 2 (two) fire hydrants within 350 feet of our building that can provide a combined 1500 g.p.m. minimum.

Government Response to Contractor:

COR/ACO has not approved this government response

There will be at least 2 fire hydrants within 350' of EIE389. Flow tests have not been completed yet and is expected to be complete in July 2019.

One on remodeled Manhole LP-22 and 24 by EIE406 and EIE376.

One on new Manhole LP-35 by EIE379 on the other side of the security fence from EIE389.

This information is provided as a clarification under FAR 52.236-21, Specifications and Drawings for Construction, rather than as a change under FAR 52.243-4, Changes. It shall not result in an increase in contract price or duration. If you do not agree, please provide written notice including information to establish and support your position in accordance with FAR 52.243-4, and do not proceed with this work without further direction from the Government.

RFI Example 4

Date Received: January 21, 2020 **Date Answered:** January 29, 2020

SUBJECT OF RFI: Visual Display / TV Clarification

Information Requested:

EIE 389 Award Vol. 2 Tech. Package 01 10 00 2.7.3 G.3 Digital Display System States "All active equipment, routers, workstations and displays are provided by the Government." This covers the 4 displays adjacent to the serving line. The 2 displays in vestibule 100 and 101 are betterments proposed by the KTR. With the limited space Alcan Builders and Salcha Electric suggest 30" displays mounted at approximately 72" to conceal outlets in vestibule 100 and 101.

(1) Please confirm the type of Digital Display Inputs needed for the CFCI displays.

(2) Does the Gov. concur with this size and mounting height?

Also, the cable tv and power outlets are provided for a wall mounted TV in the office 105 per E-121 in the IFC drawings. The actual TV is not required per the RFP or the Accepted Proposal so it is assumed that this will be GFGI.

(3) Please confirm this assumption.

Backing will be provided below outlets for future mounting purposes in Office 105.

Government Response to Contractor:

To answer the questions of the RFI:

1. The digital inputs should be the same as the 4 GFGI TV's above the serving line (HDMI).

2. The size and height are acceptable.

3. Your assumption is correct; the office TV is GFGI.

However, the Air Force has reviewed this RFI and determined that the preferred path forward would be to delete these two vestibule CFCI TV's and any associated labor or materials that has not been completed at the time of contract modification execution.

This is not a notice to proceed. This matter will be the subject of future RFP.

Module 3: QUALITY MANAGEMENT PLANNING

Submodule 3.1: Purpose and Components

Objectives: After completing this submodule, you will be able to:

- Identify the components of a Quality Assurance (QA) Plan.
- Define the Quality Control (QC) Plan.
- Identify the components of the QC Plan.

A. The Quality Assurance Plan: The QA Plan is a Government document used as a management tool at all levels of the organization with increasing specificity as it moves from the program to project level. It is required by ER 1180-1-6 and EP-445 by. It is not a contract requirement. The components of a QA Plan are:

- Government staffing requirements.
- Functions of each QA team member.
- Government training requirements.
- Government pre-award activities.
- Definable Features of Work (DFOW) list.
- Government surveillance and testing activities.

The QA Plan ensures that all team members are following the same plan and achieves better coordination of the government's QA activities. Just as important, the contractor will be receiving consistent guidance and will be able to respond to requirements in a more effective manner. For construction quality management to be effective, quality control and quality assurance must be coordinated and complement one another.

Area/resident engineers and Resident Officer in Charge of Construction (ROICC) require QA personnel to become fully aware of the QA Plan as well as the CQC requirements. The DFOW list in the QA Plan will later align with the QC Plan, the schedule and the submittal register. Based upon this knowledge, the groundwork is established for **Government/ contractor partnership.**

B. The Quality Control Plan: The Contractor's QC Plan is the foundation upon which quality work is based. It is an outline of the planned quality control procedures and is vital to the quality control system. The plan must be comprehensive, detailed, and logical if the contractor's quality control system is to be effective. While experience and knowledge of the construction industry are necessary in developing a good QC Plan, the contractor must consider fully the

specific contract requirements and special factors particular to a project as well. It is pertinent that the QC Manager is the author or co-author of the QC Plan to assure that all quality requirements contained in the contract are included and that the QC Manager is thoroughly familiar with the plan. The contractual requirements for a QC Plan are in specification Section 01 45 00.00 10 (Army) Contractor Quality Control or 01 45 00.00 20 (Navy) Quality Control.

The QC Plan must be received, reviewed, and formally accepted by the Contracting Officer or their representatives before any construction work can begin. In some cases, this requirement can be met by an interim plan. If an interim plan is provided by the contractor, it must include, as a minimum, a general plan for quality control, plus the specifics for the work that is about to begin. A final acceptable plan must be received within the time specified in the contract.

USACE's Resident Management System (RMS) and NAVFAC'S Web-based Construction Management (eCMS) System are data management systems that provide powerful mechanisms to organize and report on all the quality management activities. These activities support the execution of the QC Plan based on the extent of contractor input. For example, RMS includes the capability to produce, manage and store: Definable Features of Work (DFOW); daily reports; activity hazard analyses; deficiencies; and 3-phase inspection checklists. RMS and eCMS are discussed in Modules 8 and 9 respectively.

C. Quality Control Plan Components. There are differences between USACE and NAVFAC requirements for structuring the QC Plan. For details of the content and format see:

- Army: Specification section 01 45 00.00 10 Quality Control, paragraph 3.2 CONTRACTOR QUALITY CONTROL (CQC) PLAN
- Navy: 01 45 00.00 20 Quality Control paragraph 1.6 QUALITY CONTROL (QC) PLAN

The required contents of the QC Plan are shown below based on the Army specification. Refer to the Navy specifications for additional requirements such as Personnel Matrix, Completion Inspections and Training.

1. **Organization:**
    a. The QC organization must be identified, including a chart showing the organizational structure and lines of authority. The QC System Manager and their QC organization will report to the Project Superintendent. The contractor must provide enough quality control personnel to satisfy all contract requirements. The contractor's quality control staff may vary in size, depending on the work being performed at a point in time. The personnel of this staff are required to be fully qualified by experience and technical

training as required in the specifications to perform their assigned duties. In any case, the contractor must indicate how they intend the staff to meet all requirements. This assures that the contractor has identified needs in advance, is planning to satisfy those needs, and is not overlooking or underestimating requirements.

b. Outside Organizations – Provide a listing of outside organizations such as architectural and consulting engineering firms that will be employed by the contractor and a description of their services.

2. **Names, Qualifications, Duties, Responsibilities and Authorities:**
   a. Names and Qualifications – The names, qualifications, and classification of each member of the contractor's quality control team must be provided. The QC Manager and the Alternate QC Manager must be employees of the prime contractor. This information may be provided in phases, as work progresses; however, the Government must receive and approve the information before an individual begins work. This includes subcontractors and supplier personnel assigned QC duties. Include the CQM course certification for the QC Manager and the Alternate QC Manager as required by the specifications.
   b. Duties, Responsibilities and Authorities of QC Personnel – Provide a listing of assigned quality control activities for performance by the prime contractor, subcontractors, offsite fabricators, and suppliers. If the contractor delegates quality control duties, the plan must indicate how they will assure the effectiveness of the quality control efforts. Include a list of duties, responsibilities and authorities of each person in the QC organization.
3. **Appointment Letters:**
   a. Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager and stating that they are responsible for implementing and managing the QC program as QC Manager and Alternate QC Manager to implement and manage the three phases of control and their authority to stop work which is not in compliance with the contract. The QC Manager (Assistant QC Manager – on NAVFAC contracts) is responsible for issuing letters of direction to the other QC specialists outlining their duties, authorities, and responsibilities. Include copies of all appointment letters in the QC Plan.
4. **Submittals:**
   a. Submittal Procedures and Initial Submittal Register – A listing of procedures for scheduling and managing submittals, including those of designers of record, consultants, architect-engineers, subcontractors, offsite fabricators, suppliers, and purchasing agents. Include a listing of procedures for reviewing, approving and managing submittals. Provide the name(s) of the person(s) in the QC organization authorized to review and certify submittals prior to

approval.

5. **Testing:**
    a. Testing Plan and Log – A testing plan and log that includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test. The specifications require giving advance notice to the Government of the times when tests will be conducted.
    b. Testing Laboratory Information – Performance of control testing is to be included in the QC Plan. If a commercial laboratory is to be used, the plan must indicate both the laboratory to be used and the test methods to be employed. Provide testing laboratory information required by the paragraphs entitled “Accreditation Requirements” or “Construction Materials Testing Laboratory Requirements”, as applicable (for NAVFAC contracts). If technicians employed by the contractor will be performing the tests, the plan must indicate who will perform specific tests and their qualifications. Specifics relative to test report submissions are to be addressed, including format, content, and consistency of all documentation
6. **Tracking of Control Phase Inspections, control tests and documentation:**
    a. Procedures for Performing the Three Phases of Control - The Three Phases of Control are the core of the Construction Quality Management system. The QC Plan is the means by which the contractor assures themselves that their construction, to include their subcontractors and suppliers, complies with the requirements of the contract plans and specifications. If the project is design-build, the plan also assures compliance with the RFP. Ensure controls are adequate to cover all construction operations, including both onsite and offsite fabrication, and will be keyed to the construction schedule. The three phases are as follows:
        i. Preparatory Phase. Perform this phase **prior to beginning** work on each definable feature of work. Use the preparatory phase checklist when conducting this phase meeting. Safety is a consideration.
        ii. Initial Phase. This phase must be accomplished **at the beginning** of a definable feature of work. Use the initial phase checklist when conducting this phase meeting. Safety is a consideration.
        iii. Follow-Up Phase. Perform daily checks to assure continuing compliance with contract requirements. Safety is a consideration.
7. **Tracking Deficiencies / Rework:**
    a. Procedures to Complete Construction Deficiencies/Rework Items – A listing of the procedures to identify, record, and track construction

deficiencies/rework items from identification through corrective action. It is noted that this plan must also include design deficiencies/rework items if the contract is a design-build contract

8. **Reporting Procedures:**
    a. Documentation Procedures – Documentation procedures including proposed report formats.
9. **Definable Features of Work (DFOW):**
    a. List of Definable Features of Work. A DFOW is a task which is separate and distinct from other tasks. The following criteria will help define DFOW:
        i. Separate quality control requirements.
        ii. Trades, work crews, or disciplines unique to the task
        iii. Critical path activity
        iv. Monitored by a QC specialist or special inspection personnel
        v. As a minimum, each section of the specifications can be considered as a DFOW. However, there are several conditions that should be considered: 1) more than one definable feature under a section of the specifications; e.g. concrete formwork; rebar placement; and concrete placement, finishing and curing could each be a DFOW yet all or some may fall under a “Cast-in-Place Concrete” specification. 2) Another example is where a DFOW may require discussion across multiple specification sections for example concrete as a DFOW will have embedded items such as conduit and miscellaneous steel fabrications.
10. **Coordination of Special Inspections:**
    a. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.
11. **Completion Inspection:**
    a. Procedures for Completion Inspection - Provisions for the QC Manager to conduct completion inspections of the work and develop a “punch list” of items which do not conform to the contract requirements. Make a second completion inspection to ascertain that all "punch list" items have been corrected and so notify the government. The completion inspections and any "punch list" item corrections will be accomplished within the time stated for completion of the work. The plan must include project completion turnover procedures. These may include:
        i. Warranty information
        ii. O&M manuals
        iii. System operation and sequence verification
        iv. Final system testing
        v. Instruction and training procedures
        vi. Contractor punch-out

vii. “Punch list” correction and verification
viii. Pre-final inspection to include the Government
ix. Final inspection to include the client/customer "punch list"
x. Turnover of extra materials and spare parts
xi. Turnover of keys
xii. Completed as-built drawings

12. **Additional Requirements for Design Quality Control plan:**
    a. Independent Technical Review - As a minimum, all design documents must be technically reviewed by competent, independent reviewers identified in the DQC Plan. The same element that produced the product may not perform the independent technical review (ITR). Correct errors and deficiencies in the design documents prior to submitting them to the Government.
    b. Integrate design schedule into master project schedule - Include the design schedule in the master project schedule, showing the sequence of events involved in carrying out the project design tasks within the specific Contract period. This should be at a detailed level of scheduling enough to identify all major design tasks, including those that control the flow of work. Include review and correction periods associated with each item.
    c. Implement the DQC plan by a Design Quality Control Manager who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated. This individual must be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect.

D. References: Specific QC requirements are found in the construction contract. Although not part of the construction contract, primary references on the QC Plans are (Engineer Pamphlet) EP 715-1-2, "A Guide to Effective Contractor Quality Control." and Naval Facilities Engineering Command’s “Effective Quality Control” pamphlet. These pamphlets are an excellent source of information. They are concise and to the point, indicating the areas to be addressed in developing an effective, well-planned contractor quality control system. They are a valuable aid for both Government and contractor personnel in understanding quality control.

EXERCISE 3.1

1. Define the Quality Assurance Plan.

2. Define a Quality Control Plan.

3. Name the components that must be addressed by the Quality Control Plan.

4. Name the actions that must be accomplished relative to the QC Plan before construction can begin.

5. Name the phases of the "Three-Phase Control," and indicate when each is implemented.

Submodule 3.2: Review and Acceptance

Objectives: After completing this submodule, you will be able to:

- Describe the process used to review the contractor's Quality Control (QC) Plan by comparing it to the requirements of the contract provisions and determining its feasibility.
- State the basic concepts which the government uses to accept or return a QC Plan.

A. Quality Control Plan Review Participants: There are three individuals who are normally involved in the review of the QC Plan; they are the area/ resident engineer or ROICC/SGE, the project engineer or AROICC/ AREICC, and the onsite QA personnel. One of these individuals is typically designated as the Contracting Officer's Representative (COR)

B. Two Major Steps in the Review Process:

- Examination of the QC Plan considering the requirements of the specifications.
- Determination of the QC Plan's feasibility. This requires the reviewers to have a good working knowledge of contract requirements.

If problems are discovered, it is necessary to identify those points in the plan that need change or clarification.

C. Assure Minimum Requirements Are Met:

- Determine that the plan provides adequate control of the DFOWs.
- Examine the proposed QC staffing and organization to ascertain if it complies with contract specifications. Determine if the contractor has provided the names and qualifications (in resume format) of the individual(s) responsible for QC of each DFOW, tests, submittal controls, and reports.
- Check that the level of authority and responsibility delegated to the contractor's QC Manager is clearly defined.
- Assure that the QC Plan:
    - clearly assigns individual control and test duties,
    - defines the capacity in which individuals will be working, and
    - indicates what tests will be used.
- Determine that the plan addresses the procedures for processing submittals.
- Check that the plan specifies which contractor (prime, subcontractor, offsite fabricator, or supplier) will be performing what portions of QC.

- Assure that report forms include required features and reporting items.

D. Acceptance of the QC Plan: If the initial review reveals that changes are necessary; the changes must be made by the contractor before the plan can be accepted. Acceptance of the plan is contingent on satisfactory QC performance once construction is underway. The Government/COR always reserves the right to require necessary changes in the QC Plan and in contractor operations to obtain the specified quality. After the plan has been accepted, if some part of the plan isn't working, the Government may require changes to be made.

E. Commencement of Construction: Until an interim or final QC Plan is accepted, construction cannot begin.

F. Changes to the QC Plan: If the contractor wants to make changes in the QC Plan during construction, the Government must be notified in writing. The contractor cannot implement any change until the Government has formally accepted the changes in writing. If deficiencies are occurring, the plan needs to be studied to see if the problem is non-adherence or if revisions should be made to correct shortcomings in the QC Plan.

G. Distribution: After the QC Plan has been reviewed, changed as necessary, and accepted, copies are distributed to all personnel involved in QC activities. The Government provides copies to onsite QA personnel.

EXERCISE 3.2

Appendix B contains an example of a QC Plan, but it is not complete. Review this plan and comment on how it could be improved to meet the contract requirements.

NOTE: Navy Students - Example of Navy QC Plan is in the Navy Forms Section of the Reference/Glossary.

Module 4: POST-AWARD ORIENTATION (PRECONSTRUCTION CONFERENCES AND THE COORDINATION MEETING (MUTUAL UNDERSTANDING MEETING)

Objectives: After completing this module, you will be able to:

- State the objective of the Post-Award Orientation/Preconstruction Conference.
- State the purposes of the Coordination Meeting or the Mutual Understanding Meeting

A. General: There are three, and possibly four, conferences/meetings held prior to the commencement of physical work. The first covers all aspects of the contract and is called the Post-award Orientation Conference/ Preconstruction Conference. The Preconstruction Conference is required by FAR 52.236-26. The second is the Preconstruction Safety Conference required by FAR 52.236-13. The third covers Construction Quality Management and is called the Coordination Meeting or the Mutual Understanding Meeting. These meetings are a specific contract requirement. Additional potential meetings may include the QC Plan meeting to clarify requirements for the development of the QC Plan or a schedule meeting focused on development of the project schedule.

B. The Post-Award Orientation Conference/Preconstruction Conference: The Post-award Orientation Conference/Preconstruction Conference is conducted as soon as possible after contract award and prior to the commencement of any physical work. The objective of the Post-award Orientation
Conference/Preconstruction Conference is to review various contract clauses to include, administrative requirements, personnel requirements, safety requirements and procedural matters. The contractor should be oriented with respect to Government procedures and lines of authority for contractual, administrative and construction matters. When possible, the contract Notice to Proceed (NTP) date should be aligned to occur on the date of the conference so as to clearly denote start of the contract's period of performance. This conference is very important because it establishes the ground rules for administering the contract. Sample Preconstruction Meeting Agenda is included in Appendix C.

Contractor quality control and accident prevention while mentioned are not normally discussed in detail at this conference. The subjects are so important they deserve special attention and the personnel attending the Post-award Orientation Conference/Preconstruction Conference may not be involved in the day-to-day on-site activities. The degrees of accident prevention and quality

control-related discussion depend largely on the scope and magnitude of the contract and on the individuals from each organization that are present.

This meeting is scheduled, convened and conducted by the Government (Area/Resident Engineer for USACE or ROICC/REICC for Navy). It is a Government responsibility to take detailed minutes of the conference and provide copies to all participants.

C. The Preconstruction Safety Conference: This meeting is held to review and discuss the contractor's safety program. It should be held after the initial receipt of the contractor's Accident Prevention Plan (APP). To achieve a mutual understanding with the contractor related to their submitted and approved APP.

D. The Coordination Meeting or the Mutual Understanding Meeting: This meeting is scheduled, convened and conducted by the Government. Normally, this is the area, resident, project engineer or the SGE, ROICC/REICC and QA Representative. As with the Preconstruction Conference, this meeting must be held before any physical work begins.

The purposes of the Coordination Meeting or the Mutual Understanding Meeting are:

- To achieve a mutual understanding with the contractor of their role in quality control.
- To review the QC Plan with the contractor. The Government must receive and have time to review the QC Plan before the meeting. Acceptance of the plan can be accomplished after the meeting.
- To establish a good working relationship between the Government and the contractor.
- To verify that the contractor fully understands the Quality Control/Assurance contractual Lines of Authority and the processes, policies and procedures for proper communication and documentation.

Personnel, both Government and contractor, who will be directly involved in construction quality management should be present. They will be working together on a day-to-day basis on the quality management aspects of the project, and they need to come to mutual understandings before the project begins. If subcontractors are to be involved in quality control, their responsible personnel should also attend, so that they can receive the information they need "first-hand".

The Coordination Meeting or the Mutual Understanding Meeting will normally include a full spectrum of CQM requirements. During the meeting, a mutual understanding of the quality control system details must be developed, including the forms for recording the CQC operations, design activities, control activities,

testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. A Sample Coordination Meeting or the Mutual Understanding Meeting Agenda is included in Appendix D.

It is the Government’s responsibility to take detailed minutes of the meeting and provide copies to all participants. It is vital that everything of importance is included in these minutes, since verbal understandings tend to be remembered differently by different individuals. If any disagreement occurs between the government and the contractor, the minutes will prove invaluable. These minutes must be signed by both the contractor and the government.

NOTE: NAVFAC - QC Manager's responsibility to take meeting minutes.

E. QC Plan Meeting (Navy): The purpose of the QC Plan meeting is to develop a mutual understanding of the QC Plan requirements prior to plan development and submission.

EXERCISE 4

1. What is the objective of the Post-award Orientation Conference/Preconstruction Conference?

2. Why is the Post-award Orientation Conference/Preconstruction Conference important?

3. Who schedules, convenes, and conducts the Coordination Meeting or the Mutual Understanding Meeting?

4. What are the primary purposes of the Coordination Meeting or the Mutual Understanding Meeting?

5. Who attends the Coordination Meeting or the Mutual Understanding Meeting?

6. What are the most important topics of the Coordination Meeting or the Mutual Understanding Meeting and how should the CQC Manager prepare for this meeting?

Module 5: SUBMITTALS

Objectives: After completing this module, you will be able to:

- State the purpose of submittal procedures.
- Describe Government responsibilities for submittal review and/or approval.
- Describe contractor responsibilities for the scheduling and control of submittals.
- Understand that the Submittal Register is a tool to regulate the timely flow of materials, or equipment, coming to the job site.
- List the information the contractor must furnish on the submittal control document (ENG Form 4288-R - Submittal Register).
- List the information the contractor must furnish on the transmittal form (ENG Form 4025-R).

A. Purpose. Submittals are required by the contract in order to regulate the timely flow of materials to be incorporated into work. They are necessary to demonstrate that the proposed materials are compliant with the contract. All required submittals must be provided by the contractor in time to allow for the review, approval, procurement, delivery, and performance of the preparatory phase inspection. Submittals are indispensable in assuring and controlling construction quality and must be given the attention required.

B. General. The Submittal Register, ENG Form 4288-R, identifies required submittals and the required approval authority for each. Approval authorities will vary depending upon the type of contract; i.e. Design-Bid-Build (DBB) or Design-Build (DB). Contract Clause FAR 52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION and Specification Sections 01 33 00 SUBMITTAL PROCEDURES and 01 33 16.00 10 DESIGN DATA (DESIGN AFTER AWARD) include specific definitions and procedures.

A sample ENG Form 4288-R and one that is filled in (extracted from Resident Management System – Contractor Mode) are provided in the sample section of this module.

C. Submittal Classifications:

Submittal Classifications for Design-Bid-Build Method of Delivery:

- *Government Approved (GA) Submittals.* Government approval is required for submittals that are critical to ensure that the government receives the quality specified in the contract. Submittals which will normally require Government approval are: extensions of design, critical materials, variations, Government

required plans, Schedules, O&M Manuals, As-Built Drawings or those involving equipment whose compatibility with the entire system must be checked.

- *For Information Only (FIO) Submittals.* All submittals that do not require Government approval are classified as "For Information Only". Examples of FIO submittals include catalog cuts, shop drawings that are not extension of designs, shop drawings that do not contain variations from the contract, material samples for non-critical materials such as sheet metal accessories, or equipment such as small motors.

Submittal Classifications for Design-Build Method of Delivery:

- *Designer of Record Approved (DA) Submittals.* In D-B contracts, the contractor is responsible for design integrity accomplished through the contractor's DOR. DOR approval is required for all extensions of design; critical materials; any deviations from the solicitation, the accepted proposal, or the completed design; equipment that must be checked for its required compatibility with the entire system; and other items designated by the Contracting Officer to require Designer of Record approval.

- *Conformance Review (CR) Submittals.* The Government will review DOR design submittals for conformance with the technical requirements of the Request for Proposal (RFP) and the accepted contractor proposal which together form the contract.

- *Government Approved (GA) Submittals.* The Government will identify all GA designated submittals in the RFP. Government approved submittals should be limited to those items specifically identified as "GA" in the RFP.

- *Designer of Record Approval and Conformance Review (DACR) Submittals.* Submittals that propose a variation from the accepted design, but not to the contract, require both DOR approval (DA) and completion of a Government conformance review (CR). The required review sequence is that the DOR approval of DA/CR submittals must be accomplished first, followed by completion of a Government conformance review (CR).

- *Designer of Record and Government Approval (DA/GA) Submittals.* All submittals that propose a variation from the accepted design that also represents a deviation from the contract (RFP and accepted proposal) first require the DOR approval (DA) followed by Government approval (GA).

- *For Information Only (FIO) Submittals.* All submittals not requiring DOR approval (DA) or Government approval (GA) will be classified as "For Information Only" (FIO).

D. Use of ENG Form 4025-R: The contractor must use ENG Form 4025-R, “Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer’s Certificates of Compliance,” for transmitting submittals. The Contractor has ability to create the ENG Form 4025-R transmittal in RMS. A completed ENG Form 4025-R is provided in the sample section of this module. Instructions for use are contained on the back of the form.

Typical submittals are categorized into the following submittal identifications (SD):

SD-01 Preconstruction Submittals

SD-02 Shop Drawings

SD-03 Product Data

SD-04 Samples

SD-05 Design Data

SD-06 Test Reports

SD-07 Certificates

SD-08 Manufacturer’s Instructions

SD-09 Manufacturer’s Field Reports

SD-10 Operation and Maintenance Data

SD-11 Closeout Submittals

The primary responsibility for overall management and control of submittals lies with the contractor. It is imperative that the contractor’s QC Manager reviews all submittals to ensure that all submittals comply with the contract, including FIO submittals.

E. Contractor Submittal Responsibilities: The contractor must integrate the submittal process into their QC Plan. The contractor must delegate submittal responsibilities to the proper individuals on their staff. Submittals are considered by the Government to be crucial to obtain quality construction. The contractor must assure that onsite management and, for design-build, the designer of record always remains attentive to submittal procedures. QC personnel and designer of record for D-B contracts are responsible for ensuring, through detailed review, that all submittals are in full compliance with the contract.

For Design-Bid-Build contracts the contractor must review the Government prepared Submittal Register and add any needed submittals or subtract unnecessary or repetitive submittals.

For design-build projects, the contractor must review the Government prepared Submittal Register and add any needed submittals or subtract unnecessary or repetitive submittals. The designer of record also adds to the submittal register during the design phase.

The contractor must check the submittal schedule requirements against the Network Analysis Schedule (NAS) or other approved construction schedule. The contractor constantly maintains and adjusts dates on the register as required by the contract activities to ensure the document reflects current information. The contractor assures that neither the Preparatory Inspection Meeting, nor any work on site, are permitted to begin without properly approved submittals.

The “Buy American Act - Construction Materials” must be considered in the submittal process because it significantly impacts what will be acceptable on Government projects.

F. Variations: Variations from contract requirements require Contracting Officer approval pursuant to contract Clause FAR 52.236-21 Specifications and Drawings for Construction and will be considered where advantageous to the Government. If the variation is approved, a contract modification will be required prior to proceeding with the work.

Deliver written requests for variation to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to the Government. Include the DOR's written analysis (for D-B contracts) and approval. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variations, include the submittals required for the item. All variations must be fully described, identified and justified in the transmittal package. This is explained in specification Section 01 33 00 and in the instructions on ENG Form 4025-R. If a variation is not identified on the ENG Form 4025-R, the Government may rescind any inadvertent approval.

Note: The variation approval process for DB contracts includes:

- DOR approval
- Government conformance review and approval
- Design, material and equipment submittals prior to or after Government acceptance of the design

G. Government Submittal Responsibilities: The Government will prepare a list of required submittals. This list will be prepared on a draft submittal register (ENG Form 4288-R) and incorporated into the contract. For design-build contracts, the

Government will prepare a draft submittal register (incorporated into the RFP) that will be later completed by the contractor's DOR as the design progresses.

The Government will only perform cursory checks on FIO submittals, and this will vary dependent upon the type, phase and complexity of the work. As a minimum, the Government will typically perform random QA reviews of approximately 10% of the FIO submittals. More focus will occur with early submittals in order to assure the contractor is achieving a successful start to the work. On some projects the Government may review up to 100% of these submittals. Government QA emphasis will also focus on ensuring the contractor's QC process is effective for FIO submittals at the start of work on each major definable feature of the work. If a Government review of an FIO submittal finds that the submittal does not meet the contract requirements, the Government may disapprove or otherwise require re-submittal, as applicable. If systemic weaknesses are found in the contractor's QC process for FIO submittals, corrective action must be pursued promptly and will warrant additional review of FIO submittals by the Government. The Government will review and approve submittals that are required to be GA. For design-build contracts, the Government will review submittals as listed above, for conformance with the contract which includes the solicitation requirements and the contractor's accepted proposal.

An important aspect of the Government's quality assurance role is to enforce submittal requirements. In the course of the project, if it is determined that the contractor's quality control personnel are not properly satisfying submittal requirements, corrective action will be taken which may include the removal CQC system manager or a claim against the contractor for additional submittal review costs.

H. Controlling and Scheduling: Incorporate submittal activities into the construction schedule in order that submittal progress can be tracked in conjunction with overall progress. Care must be taken that the schedule accurately reflects the status on the ENG Form 4288-R.

The Resident Management System (RMS), as discussed in Module 8, provides comprehensive tools to automate submittal processing and tracking, particularly when a network analysis schedule (NAS) is used.

- Single entry - once data for a submittal item, links(s) to a schedule activity, procurement period and Government review time, etc. is entered into the system, it never needs to be re-described.
- Automatic updates - When submittals are linked to the project schedule RMS will update submittal dates after each monthly schedule update process.

- Simplified procurement - RMS output documents make procurement, submittal tracking and material control easy for QC personnel.
- Reporting – After each schedule progress update (usually monthly), the contractor can generate an updated Submittal Register that accurately portrays when a particular material, or equipment needs to be submitted to the Government; when approval is needed by; and when material, or equipment, is needed on-site. This report will help regulate the timely flow of materials on-site.

The NAS activity code is used only when a network schedule is required and for those submittals that have been included as activities. Regardless of the type of schedule specified, ENG Form 4288-R, “Submittal Register”, is used for submittal control and scheduling. (A sample ENG Form 4288-R is provided in the sample section of this module.) Generally, the information required is self-explanatory. However, several items warrant clarification.

- Item Number is to be completed by the contractor.
- The Contractor Schedule Dates Columns should project when submittals will be submitted, when approval is needed, and when the material is needed. This information should be updated every 30 days as required by the specification.
- USACE’s RMS will be used for the processing of submittals.
- NAVFAC’s eCMS will be used for the processing of submittals.

Design-Bid-Build contracts contain a Designer of Record developed preliminary Submittal Register which includes a list of submittals based on the contract specifications. The Designer of Record for Design-Build contracts is responsible for developing the preliminary Submittal Register. For both contract types, the preliminary list will not be all inclusive and additional submittals will be required by other parts of the contract. Use and expand upon the preliminary ENG Form 4288-R to complete the required contract Submittal Register and submit it for approval to the Contracting Officer within the specified number of days after contract Notice to Proceed.

EXERCISE 5

1. What is the purpose of submittals?

2. What is the process the contractor must use to request a variation?

3. What are the contractor's submittal responsibilities?

4. What are the Government's submittal responsibilities?

5. What information must the contractor provide in their submittal control document (ENG Form 4288R - Submittal Register)?

SUBMITTAL REGISTER

(ER 415 1-10)

TITLE AND LOCATION	CONTRACTOR	CONTRACT NO.
		SPECIFICATION SECTION

					TYPE OF SUBMITTAL										CLASSIFICATION			CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
ACTIVITY NO	TRANS-MITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	O&M MANUALS	INFORMATION ONLY	GOVERNMENT APPROVED	REVIEWER	SUBMIT	APPROVAL NEEDED BY	MATER-IAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN-MENT	CODE	DATE	REMARKS
a.	b.	c.	d.	c.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q	r.	s.	t.	u.	v.	w.	x.	y.	z.	aa.
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ENG FORM 4288-R, JAN 1997 EDITION OF MAR 95 IS OBSOLETE. PAGE ____ OF ____ PAGES (Proponent: CEMP-CE) PE v1.00

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

For use of this form, see ER 415-1-10; the proponent agency is CECW-CE.

DATE	TRANSMITTAL NO.

SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (*This section will be initiated by the contractor*)

TO:

FROM:

CONTRACT NO.

CHECK ONE:
- ☐ THIS IS A NEW TRANSMITTAL
- ☐ THIS IS A RESUBMITTAL OF TRANSMITTAL _____

SPECIFICATION SEC. NO. (*Cover only one section with each transmittal*)

PROJECT TITLE AND LOCATION

THIS TRANSMITTAL IS FOR: (*Check one*) ☐ FIO ☐ GA ☐ DA ☐ CR ☐ DA/CR ☐ DA/GA

ITEM NO. (See Note 3) a.	DESCRIPTION OF SUBMITTAL ITEM (*Type size, model number/etc.*) b.	SUBMITTAL TYPE CODE (See Note 8) c.	NO. OF COPIES d.	CONTRACT DOCUMENT REFERENCE		CONTRACTOR REVIEW CODE g.	VARIATION Enter "Y" if requesting a variation (See Note 6) h.	USACE ACTION CODE (Note 9) i.
				SPEC. PARA. NO. e.	DRAWING SHEET NO. f.			

REMARKS

I certify that the above submitted items had been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.

NAME OF CONTRACTOR

SIGNATURE OF CONTRACTOR

SECTION II - APPROVAL ACTION

ENCLOSURES RETURNED (*List by item No.*)

NAME AND TITLE OF APPROVING AUTHORITY

SIGNATURE OF APPROVING AUTHORITY

DATE

ENG FORM 4025-R, MAR 2012 REPLACES EDITION OF MAR 95, WHICH IS OBSOLETE. Page 1 of 2

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.

2. Each Transmittal shall be numbered consecutively. The Transmittal Number typically includes two parts separated by a dash (-). The first part is the specification section number. The second part is a sequential number for the submittals under that spec section. If the Transmittal is a resubmittal, then add a decimal point to the end of the original Transmittal Number and begin numbering the resubmittal packages sequentially after the decimal.

3. The "Item No." for each entry on this form will be the same "Item No." as indicated on ENG FORM 4288-R.

4. Submittals requiring expeditious handling will be submitted on a separate ENG Form 4025-R.

5. Items transmitted on each transmittal form will be from the same specification section. Do not combine submittal information from different specification sections in a single transmittal.

6. If the data submitted are intentionally in variance with the contract requirements, indicate a variation in column h, and enter a statement in the Remarks block describing he detailed reason for the variation.

7. ENG Form 4025-R is self-transmitting - a letter of transmittal is not required.

8. When submittal items are transmitted, indicate the "Submittal Type" (*SD-01 through SD-11*) in column c of Section I.
   Submittal types are the following:
   SD-01 - Preconstruction SD-02 - Shop Drawings SD-03 - Product Data SD-04 - Samples SD-05 - Design Data SD-06 - Test Reports
   SD-07 - Certificates SD-08 - Manufacturer's Instructions SD-09 - Manufacturer's Field Reports SD-10 - O&M Data SD-11 - Closeout

9. For each submittal item, the Contractor will assign Submittal Action Codes in column g of Section I. The U.S. Army Corps of Engineers approving authority will assign Submittal Action Codes in column i of Section I. The Submittal Action Codes are:

   A -- Approved as submitted.
   B -- Approved, except as noted on drawings. Resubmission not required.
   C -- Approved, except as noted on drawings. Refer to attached comments. Resubmission required.
   D -- Will be returned by separate correspondence.
   E -- Disapproved. Refer to attached comments.
   F -- Receipt acknowledged.
   X -- Receipt acknowledged, does not comply with contract requirements, as noted.
   G -- Other action required *(Specify)*
   K -- Government concurs with intermediate design. (*For D-B contracts*)
   R -- Design submittal is acceptable for release for construction. (*For D-B contracts*)

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract.

SUBMITTAL REGISTER (ER 415-1-10)

TITLE AND LOCATION: Training contract 08-Camp Arifjan, Kuwait

DATE: 10/21/2020

CONTRACTOR: Al Sahraa General Transport & Clearance

CONTRACT NUMBER: W912ER-04-D-9999 0007

Activity No.	TRANS MITTAL No.	ITEM No.	SPEC PARAGRAPH No.	DESCRIPTION OF SUBMITTAL	TYPE OF SUBMITTAL	CLASSIFI CATION	REVIEWER	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION		GOVERNMENT ACTION	
						FIO, GA, DA, CR, OR S	OFFICE / NAME	SUBMIT NEEDED BY	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	CORPS RECEIVED DATE	CODE	CORPS RETURNED DATE
Section 01012 Submittal Procedure for Design-Build							PO							
	1.2	1	01012 3.4	Project Schedule	SCHEDULES	GA					A	01 Oct 07	F	18 Oct 07
EN-DOCVG02	2.1	2	01012 3.2.1	Submittal Register (Construction)	SUBMITTAL REG	FIO	JABAITI, WAEL F.	06 Jun 07	21 Jun 07	21 Jun 07	A	09 Mar 30	F	09 Aug 07
GN-MB00G06	3	3	01012	Mobilization Plan	WORK PLAN	DA/GA	PO	24 May 07	08 Jun 07	08 Jun 07	A	12 Jun 07	F	18 Jun 07
CO-SSCVG02	3	4	01012	Site Plan	DRAWINGS	GA	PO	22 May 07	06 Jun 07	06 Jun 07	A	12 Jun 07	F	18 Jun 07
CO-SSCVG01	4	5	01012 3.8.e	Demolition Plan/Hazard Analysis	DEMO PLAN	FIO	PO	18 May 07	02 Jun 07	02 Jun 07	A	16 Jun 07	F	17 Jun 07
GN-GC00G07	5	6	01012	Activity Resources Matrix/SCH	SCHEDULES	FIO	PO	16 Nov 07	16 Dec 07	16 Dec 07	A	26 Dec 07	F	26 Dec 07
GN-GC00G07	6	7	01012	Final Project Schedule Update	SCHEDULES	FIO		01 Dec 07	16 Dec 07	16 Dec 07	A	30 Dec 07	F	30 Dec 07
		8	01012			GA	PO							
Section 01015 Technical Requirements - Ref. RFP-Para. No.														
CO-SSCVG04	11.2	1	01015 1.28.1	Accident Prevention Plan	SAFETY PLAN	GA	PO	20 Jun 07	05 Jul 07	05 Jul 07	A	01 Oct 07	F	18 Oct 07
CO-SSCVG01	2.1	2	01015 3.1	Boring Test Reports	TEST REPORTS	FIO		18 May 07	02 Jun 07	02 Jun 07	A	01 Oct 07	F	18 Oct 07
CO-SSCVG05	3	3	01015 5.12.2.2	Concrete Mix Design	MIX DESIGN	GA		29 Jun 07	14 Jul 07	14 Jul 07	A	14 Jun 07	B	17 Jun 07
CO-SSCVG05	4	4	01015	Rebar Certification	DATA	FIO		20 Jun 07	05 Jul 07	05 Jul 07	A	14 Jun 07	F	17 Jun 07
CO-SSCVG02	5.1	5	01015	Test Reports for Borings	TEST REPORTS	GA	PO	22 May 07	06 Jun 07	06 Jun 07	A	01 Oct 07	F	18 Oct 07
EN-MSMEG13	6.1	6	01015 9	Medical Equipment List-Appendix-A-RFP	PRODUCT DATA	FIO		03 Jul 07	18 Jul 07	18 Jul 07	A	01 Oct 07	F	17 Oct 07
CO-SUFNG05	7.1	7	01015 4.4.10.8.1	Accoustical Ceiling Panel Samples/Grid	SAMPLES	FIO		31 Aug 07	15 Sep 07	15 Sep 07	A	29 Sep 07	F	30 Sep 07
CO-SUFNG05	7.1	8	01015 4.4.10.2.4	Acoustic Ceiling Data	PRODUCT DATA	FIO	PO	31 Aug 07	15 Sep 07	15 Sep 07	A	29 Sep 07	F	30 Sep 07
CO-SUFNG03	8	9	01015 4.4.10.2.3	Gypsum Board Data	PRODUCT DATA	FIO		12 Aug 07	27 Aug 07	27 Aug 07	A	05 Aug 07	F	09 Aug 07
CO-SUFNG03	9.1	11	01015 4.4.10.2.3	Metal Studs for Interior Walls-Sample	SAMPLES	FIO	JABAITI, WAEL F.	12 Aug 07	27 Aug 07	01 Sep 07	A	26 Aug 07	F	01 Sep 07
CO-SUFNG03	9.1	12	01015 4.4.10.2.3	Metal Studs (Data)	PRODUCT DATA	FIO	JABAITI, WAEL F.	09 Aug 07	24 Aug 07	29 Aug 07	A	26 Aug 07	F	01 Sep 07
CO-SUFNG03	10	13	01015 4.4.10.2.4	Base Board/Skirting - Samples	SAMPLES	FIO		11 Aug 07	26 Aug 07	29 Aug 07	A	04 Aug 07	F	13 Sep 07
CO-SUFNG05	11.1	14	01015 4.4.10.2.4	Gypsum Ceiling Tile - Sample	SAMPLES	FIO	JABAITI, WAEL F.	30 Aug 07	14 Sep 07	17 Sep 07	A	18 Jan 13	F	18 Jan 13
CO-SUFNG05	11.1	15	01015 4.4.10.2.4	Gypsum Ceiling Tile Data	PRODUCT DATA	FIO	JABAITI, WAEL F.	30 Aug 07	14 Sep 07	17 Sep 07	A	18 Jan 13	F	18 Jan 13
CO-SUFNG03	12	16	01015 4.4.10.2.3	Gypsum Board (Samples)	SAMPLES	FIO		12 Aug 07	27 Aug 07	27 Aug 07	A	26 Aug 07	F	26 Aug 07
EN-MSFNG03	16	16.10	01015 N/A	Comments for 100% Design Review	DESIGN DATA	FIO		30 Jul 07	14 Aug 07	15 Aug 07	A	24 Sep 07	F	26 Sep 07
CO-SUELG06	13	17	01015 4.4.10.2.5.	Interior Paint	PRODUCT DATA	FIO		28 Sep 07	13 Oct 07	13 Oct 07	B	26 Aug 07	F	17 Sep 07

All

Main Register
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Sorted by Section & Item

Module 6: QUALITY MANAGEMENT FOR CONSTRUCTION PROJECTS

Submodule 6.1: Introduction

Objectives: After completing this submodule, you will be able to:

- Define the function and importance of Construction Quality Assurance.
- Define the function and importance of Contractor Quality Control
  - for design-bid-build contracts
  - for design-build contracts
- Understand how QA and QC work together to achieve overall quality management.

A. Quality Assurance: The primary function of quality assurance is to obtain completed construction that meets all contract requirements. Assurance is defined as a degree of certainty. Quality assurance personnel continually assure--or make certain--that the contractor's work complies with contract requirements.

B. Quality Assurance Personnel: The role of quality assurance personnel is to assure that the CQC system is functioning properly. To do this, QA personnel:

- Examine the quality control methods being used to determine if the contractor is properly controlling design activities in design-build contracts.
- Examine the quality control methods being used to determine if the contractor is properly controlling construction activities.
- Make certain that the necessary changes are made in the contractor's QC system, if excessive construction deficiencies occur.
- Assist the contractor in understanding and implementing the contract requirements.
- Examine ongoing and completed work.
- Review QC documentation to assure adequacy.

C. Contractor Quality Control: The primary function of CQC is the successful execution of a realistic plan to ensure that the required standards of quality construction will be met. In CQC, the contractor defines procedures to manage and control their own, designer of record, consultant, architect-engineer, all subcontractor and all supplier activities so that the completed project complies with contract requirements.

For design-build contracts this includes providing and maintaining a Design Quality Control plan as a part of the overall contract QC plan. This plan, as a minimum, must assure that all documents are reviewed by a technically competent, independent reviewer specifically named in the plan. This review cannot be performed by the same designers that produced the product. The design QC plan is managed by a Design QC Manager who has verifiable engineering or architectural design experience or is a registered engineer or architect. The Design QC Manager is under the supervision of the QC Manager.

D. Quality Control Personnel: As stated previously, CQC is a contractor responsibility. This includes:

- Produce the quality specified in the plans and specifications, and for design-build contracts in the Request for Proposal, as well as the contractor's accepted proposal.
- Develop and maintain an effective CQC system.
- Perform all control activities and tests.
- Prepare acceptable documentation of CQC activities.

The contractor also is required to place a competent representative onsite to oversee the CQC system. They must have full authority to act for the contractor on CQC matters. Their responsibilities include workmanship, methods, and techniques to ensure that all work is performed properly by qualified and careful craftsmen. For design-build contracts, responsibility also includes design quality and the performance of constructability, operability, environmental and sustainable review of the design.

EXERCISE 6.1

1. What is the primary function of QA?

2. What is the role of QA personnel?

3. What is the primary function of CQC?

4. What are the roles of QC personnel?

5. For design-build contracts what additional requirements must be included in the QC plan?

Submodule 6.2: Three-Phase Control System

Objectives: After completing this submodule, you will be able to:

- Define the purpose of control of onsite construction through the Three-Phase Control System.
- List the responsibilities of QC personnel regarding the three-phase control system.

A. Purpose: The primary purpose of the Three-Phase Control System is to require the contractor to plan and schedule the work to ensure that they are prepared to start each new definable feature of work. **The three phases of control (preparatory, initial, and follow-up) are the core of the Construction Quality Management System. When they are performed as outlined in the specifications, success in completing the work to comply with requirements of the contract is enhanced.** In Module 3, Submodule 1, the three-phase control system was mentioned as a required part of the contractor's quality control plan.

B. Three-Phase Control Responsibility: Develop, schedule and implement procedures for tracking control phase meetings for definable features of work in the QC Plan.

- Notify appropriate personnel of time, date and agenda.
- Conduct Meetings (preparatory and initial).
- Safety considerations and Activity Hazard Analyses (AHAs).
- Document actual discussions and provide minutes to attendees.
- Monitor work in place throughout the follow-up phase.
- Conduct additional control phase meetings, as needed.

C. The Three-Phase Control System:

1. **Preparatory Phase:** Perform this phase prior to beginning work on each definable feature of work. Perform this work as detailed below:
    - Review of each paragraph of applicable specifications and references.
    - Review of contract plans.
    - Check to assure that all materials and/or equipment have been tested, submitted, and approved.
    - Check to assure that provisions have been made to provide required control inspection and testing.
    - Examination of the work area to assure that all required preliminary work has been completed.

- Physical examination of required materials, equipment, and sample work to assure that they are on hand and conform to approved shop drawings or submitted data.
- Review of the appropriate activity hazard analysis.
- Discussion of procedures for constructing the work including the review of repetitive deficiencies.
- Check safety to include compliance with the safety plan and activity hazard analysis.

Notify the Government in advance of beginning any of the required action of the preparatory phase as required in the QC specifications.

The Preparatory Phase consists of a meeting conducted by the QC Manager and attended by the superintendent, other CQC personnel (as applicable), and the foremen responsible for the definable feature. Document the results of the preparatory phase actions by separate minutes prepared by the QC Manager and attached to the daily CQC report.

2. **Initial Phase:** This phase must be accomplished at the beginning of a definable feature of work. The "Initial Phase" will verify that control for the work developed in the "Preparatory Meeting" is implemented and the work is performed to the level of workmanship mutually agreed to. Perform this work as detailed below:
    - Review minutes of Preparatory Meeting.
    - Check preliminary work.
    - Verify adequacy of controls to ensure full contract compliance.
    - Establish level of workmanship.
    - Resolve all differences.
    - Check safety to include compliance with the safety plan and activity hazard analysis. Review the activity hazard analysis with workers.

    Notify the Government in advance of the beginning of the Initial Phase as required in the CQC specifications.

    The QC Manager oversees the Initial Phase Meeting. Separate minutes of this phase will be prepared by the QC Manager and attached to the daily CQC report. Repeat the initial phase for each new crew to work onsite, or any time established level of workmanship is not being met.

3. **Follow-up Phase:** Perform daily checks to assure continuing compliance with contract requirements, including safety and control testing, until

completion of the feature of work. Document the checks as a matter of record in the CQC documentation.

Conduct final follow-up checks and all deficiencies corrected prior to the start of additional features of work. QC personnel should continually refer to the standards set in the "Preparatory and Initial Phases."

D. Cautionary Note: QC personnel, during day-to-day duties, can easily fall into the trap of only working to detect deficiencies when in fact their role is to prevent deficiencies.

Three Phases – What is Involved?

DFOW: CMU Walls		
Preparatory Phase	Initial Phase	Follow-up Phase
	Start Construction	

Preparatory Phase	**Initial Phase**	**Follow-up Phase**
Review Plans and Specs	Establish Workmanship Standards	Ensure Contract Compliance
Verify Submittal Approval		Maintain Quality
Review Test Plan	Resolve Conflicts	Ensure Testing Reports are Submitted
Check Preliminary Work		
Examine Materials	Ensure Testing is Performed	Ensure Rework is Completed
Discuss Construction Methods		
Review Safety	Review Safety	Review Safety

Three Phases – Who is Involved?

DFOW: CMU Walls		
Preparatory Phase	Initial Phase	Follow-up Phase
	Start Construction	

Preparatory Phase	**Initial Phase**	**Follow-up Phase**
QC Manager QC Specialists Superintendent Subcontractors QA Representative	QC Manager QC Specialists Superintendent Subcontractors QA Representative	QC Manager QC Specialists Superintendent Subcontractors QA Representative

Three Phases – Simplified Schedule

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Clear & Grub									
Excavation									
Foundations									
CMU Walls					**P** **I** **F/U**				
Roofing									
Electrical									
Mechanical									
Finish Work									

P – Preparatory Phase, I – Initial Phase, F/U – Follow-Up Phase

EXERCISE 6.2

1. What is the primary purpose of the three-phase control system?

2. Regarding the three-phase control system, what are the responsibilities of quality control personnel?

3. Working as a group complete a preparatory phase checklist for the placement of concrete for a vertical foundation wall that is 12” thick, 16’ high and 230’ long. Assume that preparatory inspections for the formwork, rebar and embedded items including embedded conduits have already been completed.

4. Working as a group review the following situations and discuss how a properly conducted initial phase inspection might have prevented the problem.

   a) Wall tile installation in 325 bathrooms of a large hospital is complete. The 4” square ceramic tiling is not lying uniformly flat (and outside of tolerances) on the grout bed and the owner is concerned about the obvious shadows that are evident between tiles under certain lighting conditions.

   b) Floor system consisting of 2.5” concrete on metal deck on metal joists on steel beams/girders experienced excessive movement during concrete placement. Floating of low spots and grinding of high spots was required.

   c) 275 electrical outlets 10A electrical outlets were installed. 15A outlets are required furthermore some of the outlets test with reverse polarity.

   d) Rough-in electrical is proceeding on schedule but ten days into the installation it is discovered that the outlet boxes and conduits were made in China.

   e) Initial phase meeting for interior painting was held; however, the government did not attend, and the initial phase checklist was not completed nor was it attached or referenced in the QC daily report.

   f) Mechanical plumbing rough-in has been proceeding for 6 weeks. Preparatory and Initial inspections were held and properly documented.

The QC is walking thru the work area most days but neglects to document any follow-up inspections on the QC daily report. Yesterday it was discovered that the wrong schedule pipe was being installed.

5. Identify the appropriate phase (preparatory, initial, or follow-up) of construction for the ten activities listed below by placing a P, I, and/or F in next to it.

CHECKING TEMPERATURE OF IN-PLACE CONCRETE

OBSERVING ERECTION OF A SAMPLE PANEL OF CMU

VERIFYING ALL SUBMITTALS HAVE BEEN SUBMITTED AND APPROVED

DEVELOPMENT OF AN EXCAVATION PLAN

START UP OF THE PAINTING CONTRACTOR

GRADATION CHECK OF STONE AT THE QUARRY

CALIBRATION CHECK OF DENSITY METER BEFORE BRINGING TO SITE

DAILY CHECK OF WORKERS' HARD HATS

REVIEW OF CONTROLS PERTAINING TO A FEATURE OF WORK

REPLACEMENT OF A LIFT OF CONCRETE

Sample Preparatory Phase Checklist

Contract No.: Date:

Definable Feature: Spec Section(s):

Government Rep Notified (Y/N): Hours in Advance:

Personnel Present:

Name	Position	Organization	Phone/Email

(List additional personnel on reverse side)

Submittals

Review Submittals and Submittal Register. Have all submittals been approved? (Y/N):

If No, what items have not been submitted or approved?

Are all materials on hand? (Y/N):

If No, what items are missing?

Check approved submittals against delivered material. (This should be done as material arrives.)

Comments:

Material storage

Are materials stored properly? (Y/N):

If No, what action is taken?

Specifications

Review each paragraph of specifications.

Comments:

Discuss procedure for accomplishing the work.

Comments:

Clarify any differences:

Preliminary Work and Permits

Ensure preliminary work is correct and permits are on file.

If not, what action is taken?

Testing

Identify test to be performed, frequency, and by whom.

When required?

Where required?

Review Testing Plan

Has test facilities been approved

Has testing equipment been calibrated?

Safety

Review applicable portion of EM 385-1-1

Activity Hazard Analysis approved? (Y/N):

Corps of Engineers comments during meeting.

/s/

Contractor QC Manager

Sample Initial Phase Checklist

Contract No.: Date:

Definable Feature: Specification Section(s):

Government Rep Notified (Y/N): Hours in Advance:

Personnel Present

Name	Position	Organization	Phone/Email

(List additional personnel on reverse side)

Review of Preparatory Meeting Minutes

Comments:

Preliminary Work

Ensure preliminary work is complete and correct. If not, what action is taken?

Comments:

Establish Level of Workmanship

Where is work located?

Is a sample panel required?

Will the initial work be considered as a sample?

Comments:

Safety

Review job conditions using EM 385-1-1 and job hazard analysis.

Comments:

/s/

Contractor QC Manager

Submodule 6.3: Documentation

Objectives: After completing this submodule, you will be able to:

- Explain the purpose and importance of the Contractor Quality Control (CQC) Report.
- List the components of the CQC Report.
- Explain the purpose and importance of the Government Quality Assurance (QA) Report.
- Discuss the review and use of quality management reports.

A. Quality Management Record Keeping: A comprehensive record keeping, and information exchange system is an indispensable quality management tool. In addition to identifying specific deficiencies, careful report analysis will also detect patterns in the team's performance. If these patterns are detrimental, early detection and correction will save time, effort, and money for both the Government and the contractor. Documentation is a required element of the contract just like steel and concrete.

B. The Contractor Quality Control Report: The requirement for the contractor to submit daily QC reports is established in the QC specification. As discussed previously, the Coordination Meeting or the Mutual Understanding Meeting should include a detailed discussion of reporting procedures, information required in the reports, and the importance of the reports. The QC Report is to be submitted at a prescribed time every day, and all information relating to QC activities is to be included in the report.

RMS should be used to compile the daily report using the standard template.

Major elements of information required in the QC Report include, but are not limited to the following:

- Contractor/subcontractor and their area of responsibility.
- Operating plant/equipment with hours worked, idle, or down for repair.
- Work performed each day, giving location, description, and by whom. When a Network Analysis System (NAS) is used, identify each phase of work performed each day by NAS activity number.
- Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
- Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

- Submittals reviewed, with contract reference, by whom, and action taken.
- Off-site surveillance activities, including actions taken.
- Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- Instructions given/received and conflicts in plans and/or specifications.
- Attach QC Specialists' and Design QC Manager's reports.
- Contractor's verification statement.

When activities are completed, they must be so noted on the daily QC Report. The Government conducts a final follow-up inspection for completed activities.

The QC Manager may attach separate reports for subcontractor work, or these reports may be combined into one consolidated report.

The QC reports must present an accurate and complete picture of QC activities. QC reports should not concentrate only on work items that have been completed, but also must provide evidence of control activities. They should be precise, factual, legible, as objective as possible, and emphasize QC actions.

QA personnel evaluate QC reports as they are received. If statements are discovered in the report that are contrary to QA personnel's knowledge of the work, action will be taken to resolve the differences. The contractor may be asked to resubmit an incomplete or incorrect report with corrections.

C. Deficiency Tracking System/Rework Items List: Included as a part of the CQC program is a requirement for a formal deficiency tracking system. As outlined in the accepted QC plan, it will consist of a cumulative list of job deficiencies/rework items. This includes items identified by QA personnel, QC staff, testing failures, etc. Continually maintain this list with dates of corrective action. The system is subject to review by the government.

D. The Government Quality Assurance Report: The QA report is the Government's record of project-related events and is prepared for each visit day. The QA report is not intended to duplicate information contained on the QC report. The contractor does not receive the government's QA report.

E. What Right Looks: Documentation is a contract requirement and it is in the best of interests of all parties that quality management activities are adequately documented. If the project were to move into litigation any contemporary documentation normally carries greater weight than memories of what might have happened 5-years ago. Good documentation also supports a positive performance rating.

Examples of what “right looks like” are provided in Appendix J, not only to set a standard, but to provide examples of effective techniques for documentation.

EXERCISE 6.3

1. What are the major components of the sample Quality Control Report in submodule 3.2?

2. How often are Quality Control and Quality Assurance Reports required?

3. Review the documentation provided in the “What Right Looks Like” examples and identify 3 things that you feel are good practices for the Preparatory, Initial and Daily Report.

4. Following (4a through 4e) are situations relating to documentation and three-phase control. Read the situations carefully and respond to the requirement(s) accompanying each.

    a. The G. J. Company has a contract for rehabilitation of three barracks. The work consists primarily of addition of partitions and installation of A/C equipment and duct work. On the day duct work installation started, the Daily Report stated: "Started installing duct work today. Everything looked okay." Is this report feature adequate? Explain.

    b. The G. J. Company continues work on rehab contract. Today's activities involve the continuation of insulating duct work. After several review sessions with the contractor with regard to proper documentation of activities, the QC Daily Report comments were, "Insulation of duct work being done in accordance with specifications, vapor barrier was ripped in a couple of places and insulator was a little light in use of staples." Rewrite the contractor's comments to make them acceptable.

    c. The Paw Power Construction Company has a contract for construction of a high-rise administration building. Work was in early stages of construction and a subcontractor had just completed backfilling sanitary sewer lines. The utilities sub foreman had been designated as QC Manager for this portion of the work. His report was attached to the main report. A preparatory and initial phase have been performed and recorded earlier. This report stated, "All

work completed in accordance with directions received at preparatory phase."

i. Is it permissible to accept sub-reports attached to the Daily Report?
ii. Is it permissible to reference the preparatory phase?
iii. Is anything missing?

d. Results of Surveillance: Bowers installed base of manhole #2 approximately 10 ft. east of its correct location. Pipe between manholes #6 and #2 is being removed and the pipe between manholes #3 and #2 is being extended to a new location for manhole #2.
   i. What does this report say?
   ii. Rewrite the report so that it states clearly what is intended.

e. You are the QC Manager. You are to begin installation of ceramic floor and wall tile. Both the floor and the wall are to receive a setting bed. The floor has floor drains, and waterproofing has been completed. The wall has electrical receptacles.
   i. Who would you want at the initial phase of the work?
   ii. What would you check?
   iii. What items should be contained in the QC Report covering the Initial Phase?

Submodule 6.4: Testing

Objectives: After completing this submodule, you will be able to:

- Discuss the objectives of contractor and Government testing.
- Describe contractor testing procedures.
- List testing requirements.

A. Importance of Testing: Testing is an extremely important part of CQM. If tests are not performed properly, there are many construction procedures and materials that cannot be confirmed as adequate. Visual observation alone is insufficient.

B. Types of Tests: The contractor performs quality control (QC) testing to determine whether construction procedures and materials are producing the desired contractual product. The government performs quality assurance (QA) testing to verify that the contractor's control testing is adequate.

C. Procedures: The contractor must outline proposed “testing procedures” as defined in Section 01 45 00.00 10 and/or Section 01 45 00.00 20 in the QC Plan. These proposed procedures must be discussed at the Coordination Meeting or the Mutual Understanding Meeting. Any disagreement regarding testing procedures must be settled before construction begins.

The contractor must provide a list of required control tests and specify whether the tests are to be performed by an independent, approved testing laboratory, or using their own personnel and facilities. For USACE contracts “approved testing laboratory” means laboratories that have been validated by the Materials Testing Center (MTC) at Waterways Experiment Station in Vicksburg, MS. USACE validated testing laboratories and the tests that they are approved to perform are listed at https://mtc.erdc.dren.mil/.

Regardless of which method of testing the contractor uses, they are required to assure that specified laboratory procedures are used and that laboratory facilities are certified.

QC testing is verified in a random manner by QA testing. QA tests are unannounced sporadic tests that repeat QC tests. QA testing can be performed by:

- Government personnel using the contractor's equipment and facilities,
- An independent testing laboratory, or
- A field office, district, or division government laboratory.

QC personnel must be knowledgeable concerning laboratory and testing procedures. They must be able to visually recognize proper and improper testing procedures. All involved personnel should become aware of the methods to be used for and the extent of QC testing.

Before testing begins, the following questions should be answered and verified against the approved QC Plan:

- Has all required testing been identified?
- Are test reporting requirements understood?
- Have laboratory facilities and testing equipment been verified as acceptable?
- Are laboratory personnel qualified?
- Has the calibration of equipment been verified as accurate?
- Is there a procedure for documenting corrective steps?

After QC testing has begun, a thorough examination must be made of the test reports submitted to ascertain that:

- Reports are being submitted for all tests performed,
- Reports are complete and accurate, and
- Failing tests must be retested and cross referenced to the original failing test.

D. Test Tracking System: In accordance with Section 01 45 00.00 10 and 01 45 00.00 20, the contractor must establish and maintain a system to track verification, control and acceptance tests. Each planned test type and frequency must be entered into the tracking system prior to beginning work. Results and dates of individual tests are to be added to the system as they are performed. Any failing test results will have retests performed, entered into the system and cross referenced. The tracking system must be reviewed frequently to assure that any activity underway is having all planned tests performed as scheduled.

E. Failing Tests: Failing tests must be reported to the government and a course of action identified to correct the issue. Failure to identify failed tests is a very serious breach of contract

EXERCISE 6.4

1. Define QC testing.

2. Define QA testing.

3. Who performs QC tests?

4. Who performs QA tests?

5. What questions should be answered before testing begins?

Submodule 6.5: Completion of Work

Objective: After completing this submodule, you will be able to:

- Describe project completion procedures.

Quality Management Completion Procedures:

A. Testing of Completed Systems: Perform testing of completed systems as required by the technical specifications of the contract.
B. Contractor Punch-Out: Near the completion of all work or any increment thereof, the contractor prepares a punch list and makes corrections. Quality Assurance personnel will not prepare the contractor's deficiency list. The contractor should correct deficiencies promptly so that project schedules are met. All major deficiencies noted during this contractor's punch-out inspection must be corrected prior to the pre-final inspection.
C. Pre-Final and Final Inspections: Participating in the pre-final and final inspections will be QA personnel and QC personnel. The QC Manager will assure that all deficiencies noted during the pre-final inspection are corrected prior to the final inspection and report the status of corrective actions to the Government. The client/customer is invited to the final inspection. Any deficiencies noted at these inspections by client/customer personnel, whether design or construction related, will be examined by the Government and the contractor notified if corrective action is required under the terms of the contract. All significant deficiencies must be corrected prior to turnover.
D. Complete As-Built Drawings: As-built drawings are updated continually throughout the project. During the final stages of construction, the QC Manager will review and complete these drawings. While the status of as-built drawings is a concern throughout the project, it is of significance, as the project comes to an end, to prevent any loose ends.
E. Operations and Maintenance (O&M) Manuals: The QC Manager will assure submittal of all required operation and maintenance data in accordance with scheduled submittal dates.
F. Instruction and Training Procedures: If the contract requires operation and maintenance training of client/customer personnel, the QC Manager will make certain that all O&M Manuals are submitted, reviewed and approved prior to specified training being conducted by qualified instructors.
G. Materials Turnover: The QC Manager will verify that all required keys, spare parts and materials have been sorted, identified, and demonstrated to be usable prior to final inspection.
H. Warranty: The QC Manager will ensure that all warranty information is provided. Procedures for warranty notification and correction should be in

place. FAR Clause 52.246-21 Warranty of Construction states the general warranty period for construction work is one year from the time of acceptance by the government unless stated otherwise in the specifications. If the manufacturers of individual components provide a longer warranty, this extended warranty period accrues to the government. If the contractor repairs or replaces a component of the project during the warranty period, then this component is warranted for one year from the repair or replacement date.

EXERCISE 6.5

1. What is the appropriate chronological order for the quality management completion procedures listed in this submodule? Explain.

Module 7: MAKING THE SYSTEM WORK

Objectives: After completing this module, you will be able to:

- List problems, which may occur during construction.
- Name and discuss the means by which requirements may be enforced.
- List corrective measures that may be taken by the Government and the authority for each.

A. Problem Categories: Problems encountered during construction vary according to the specific project. Most problems, however, fit into one or more of the following categories:

- Delays – There may be delays in submittals, in the correction of deficiencies, or because of lack of contractor's acceptance of the CQC principles.
- Planning and Control – Many problems can be caused by a lack of planning and control and a failure to take corrective action in the planning and control process.
- Testing – Improper, inadequate, or untimely testing can adversely affect the project.
- Documentation – Problems occur because of late, incomplete, or incorrect documentation. Making a written record of quality control action and test results is as important as taking the actions. The CQM reporting system may cause appropriate action to be taken or may be the basis of settlement of expensive claims at a future date, after people directly involved are no longer available. If documentation is inadequate, communications break down, and then the legal positions of both the government and the contractor are jeopardized.
- Misunderstanding of CQC Responsibility – This problem is often the result of a lack of review of the contract QC requirements, a lack of familiarity with the QC Plan, or failure to communicate roles to other personnel involved in the QC process. For example, completion testing on all component systems, e.g. Duct Air Leakage Tests (DALTS), Testing and Balancing Systems (TABS), HVAC Controls System, electrical hi-pot tests. When possible, these misunderstandings should be solved at the field level.

Personal one-on-one discussion and actions at the field level often provide acceptable solutions to the problems. If discussions with onsite personnel are not fruitful, the problem must be elevated to the next level. The important thing is for the problem to be identified early so that it can be prevented, or corrective

action can be taken. If an agreement cannot be reached, the Government makes the final determination.

B. Government Options: Proper effective QC can prevent adverse Government actions. The Government will issue written notifications of compliance shortfalls either by official letter or a non-compliance notification (NCN) (Navy). However, if efforts at the field level do not bring the desired result, the Government has no choice but to initiate action under the Contract Clauses of the contract that provide the means for enforcing contract compliance.

A. Requiring contractor removal and replacement of deficient materials and/or workmanship - Contract Clause, Inspection of Construction, FAR 52.246-12. This contract clause allows the Government to require the contractor to expose, test, and ultimately remove and replace deficient work. In the event the work was correctly installed, the Government will be responsible for associated costs.
B. If necessary, the Government may employ another contractor to make the corrections performed if they refuse to correct it themselves. If adversarial relationships develop, which could be costly to the contractor, a copy of directive type letters to the contractor should be furnished to the surety company.
C. Withhold Payment - Contract Payment Clause. Grounds for withholding payment include the contractor's failure to:
    1. Perform in accordance with the terms of the contract,
    2. Provide the Quality Control Plan giving assurance of their intent and ability to comply with quality standards,
    3. Build to quality standards.
    4. While the Government is obligated to pay for satisfactorily completed work, it has no obligation to pay a contractor for deficient work.
D. Requiring removal of unqualified personnel - Contract Clause, Material and Workmanship, FAR 52.236-5. If contractor personnel are deemed to be incompetent, careless, or otherwise objectionable, the Government can require the removal of such personnel from the project. However, under other provisions of the contract, if the Government deems the QC staff to be too small, but not incompetent, it may direct the addition of personnel.
E. Requiring the contractor to assume personal supervision - Contract Clause, Superintendence by the Contractor, FAR 52.236-6. If the contractor does not provide an adequate superintendent, the contract allows the Contracting Officer to require the contractor to assume personal supervision of the work.
F. Halting Work. Another Government option is halting work until deficiencies are corrected.
G. The Contracting Officer may direct the contractor to cease work and any item or work feature pending satisfactory correction of any deficiency in

that work--particularly if the defective work is to be become inaccessible if further work proceeds.

H. If the contractor refuses to stop and correct the deficiency immediately, a letter from the Contracting Officer may be issued, directing the contractor to cease that particular operation.

I. Issuing an unsatisfactory performance appraisal.
    1. If the contractor fails to correct serious deficiencies in their performance, they may be cited as unsatisfactory on their annual or final CPARs rating.
    2. Interim unsatisfactory appraisals may be issued at any time before construction is completed. This will afford the contractor the opportunity to correct their deficient operations and avoid issuance of a final unsatisfactory appraisal at contract closeout.
    3. Even a single unsatisfactory appraisal can influence future awards of USACE and NAVFAC contracts to that contractor. Conversely, outstanding work by a contractor is reflected in outstanding performance appraisals, safety awards, and public recognition.

J. Cure Notice – A cure notice informs the contractor of the specific failure(s) and gives the contractor an opportunity to cure the issue(s) within 10 days (or any longer period the Contracting Officer may consider reasonably necessary). There must be enough time remaining in the contract performance for the contractor to cure or fix the deficiency within ten days or within the period specified by the Contracting Officer.

K. Show Cause Notice – A show cause notice is used when the contractor has failed to perform as required by the contract. It requests the contractor to explain in writing why the government should not take further steps (i.e. termination for default) against the contractor. A show cause may be appropriate when the contractor would not have ten days to “cure” the issue.

L. Terminate the Contract - Contract Clause, Default (Fixed-Price Construction) FAR 52.249-10. The most drastic type of action is to terminate the contract. In most cases, termination for default is not in the best interest of the Government. Termination action is taken only after all else fails.

C. Making the "System" Work: The QC Manager must act quickly and confidently when problems are discovered. The QC Manager cannot sit back and hope that problems will correct themselves. Their job is to control construction quality by taking action to make certain that problems are corrected and prevented. The Government is serious about CQC and will hold the contractor responsible for contract compliance.

D. Quality Assurance Personnel: Quality Assurance personnel will use the ASSESSMENT WORKSHEET FOR CONTRACTOR QUALITY CONTROL PROGRAM, to evaluate the contractor's CQC system. The results of this assessment can be used to provide a final performance rating to the contractor at the end of the project. (NAVFAC contracts only! For sample of form see NAVFAC P-445.)

EXERCISE 7

1. Name the categories of problems that normally occur during construction.

2. What options are available to the Government under the Contract Clauses of the contract?

3. What is the preferred resolution for any problem that occurs?

4. Analyze the cases on the following pages and answer the questions included with each. Be prepared to discuss your answers with other members of the class.
    a. Contractor is constructing a commissary. The contract was awarded in April, which allowed for enough time to enclose the building before onset of cold weather. Building is scheduled to be complete in May of next year, which necessitates doing the inside finish work during winter months. The client/customer has scheduled delivery of equipment and stock for June. Work was progressing satisfactorily, and the contractor was about to start roofing operations in mid-September when the resident engineer discovered the contractor was installing untreated lumber for edge strips, curbing, etc., which was in violation of the specifications. Work was stopped, and after some investigation, contractor advised the resident engineer that the best delivery on treated lumber was eight weeks, which would delay enclosing the building and ultimately delay turnover to the client/customer. The contractor requested waiver of treated lumber requirement.
        i. Where did the contractor's control system break down?
        ii. Where did the Government assurance system break down?
        iii. What are the resident engineer's courses of action?

    b. Contract involves construction of a major barracks complex including 25 dormitories. Project is 75% complete and occupied by troops when the client/customer complains that the opaque panel in the lower window section is allowing precipitation to penetrate during driving rain. The leaks have stained carpet and ceiling tile. Investigation reveals that leaking panels are improperly glazed and

do not conform with the contract drawings and specifications. All windows had been factory glazed and were warehoused onsite. Although a vinyl strip covered the glazing, careful examination of the windows prior to, and after, installation would have revealed the construction deficiency.

i. Identify the steps within the CQC system that failed, thereby creating the construction deficiency.
ii. Identify the steps within the Government's QA system that failed to detect the breakdown in the contractor's QC system.
iii. Keeping in mind that there are 4,200 windows involved in the contract, what corrective measure should the resident engineer employ?
iv. What action should be taken on remaining buildings not completed?
v. Assume, because of the magnitude of the problem, that the contractor and window manufacturer refuse to comply with your directive; what tools in the contract does the resident engineer resort to?

c. Contract is for a large barracks complex involving 47 buildings. There are 1,500 fan coil units to be installed throughout the project. As the fan coil units were delivered to the site, the mechanical subcontractor discovered that the units contained 1/2" valve in lieu of a 3/4" as indicated on the contract drawings. Contractor's shop drawings also indicated a 3/4" valve. Contractor immediately advised the resident engineer of the discrepancy. The contractor further advised that the supplier's standard unit is furnished with a 1/2" valve and requested permission to use units as delivered. All units were delivered in one large shipment, and some were needed for immediate installation.

i. Was the subcontractor quality control system working?
ii. Where does the supplier fit into the problem?
iii. What measures should Government QA personnel now employ?
iv. In this instance, should the resident engineer investigate possible design error in specifying a 3/4" valve?

d. Project includes several masonry buildings requiring joint reinforcement. Contractor proceeded with sample masonry panel erection without approved materials despite Government QA personnel objection. Contractor has now completed wall erection on one building and Government QA personnel discover the contractor is using wrong joint reinforcement. Contractor superintendent states bar joists will be erected tomorrow morning.

i. What questions first come to mind as to the effectiveness of

the contractor's quality control system?
ii. Where did the Government's quality assurance role first break down?
iii. What Contract Clauses should be employed by the resident engineer now?

e. Project is a small flood control dam with reinforced concrete outlet structure. Contractor testing requirements are specified in detail and require full-time quality control personnel at concrete batch plant. Concrete production has commenced, and after one-week concrete cylinder breaks indicate extremely low compressive strength. It is immediately discovered that the plant measuring devices had not been calibrated.
i. What is the government's first corrective action to be taken?
ii. What apparent deficiency existed in the contractor's quality control system?
iii. Basically, where did the Government quality assurance role fail?
iv. What Contract Clauses must now be employed by the Government?

f. On an underground electrical distribution project, the contractor was to install a run of 2/0 cable in the system. The project had been completed and accepted two years ago, when it was discovered that this run of cable was #2 instead of 2/0 and totally inadequate for the future load.
i. What corrective measure, if any, is available to the Government to have the deficient cable replaced?
ii. Should the contractor's quality control system and Government's assurance system prevent isolated instances of this type? How?

g. The contract for construction of the outlet works at a flood control and recreation reservoir required steel gates. The prime contractor to a fabricator in Los Angeles subcontracted the gates. All CQC requirements on the gates were delegated to the fabricator. The resident engineer arranged for Government periodic QA visits to the plant. The plant inspector advised the resident engineer that the welding procedures and the welders had not been certified prior to commencement of fabrication. The QC contained no entry on this subject.
i. In this instance, what role does the prime contractor assume?
ii. Where did the prime contractor fail in the quality control system?

iii. Where did the Government's QA role break down?
iv. What steps does the Government take now?

h. The contract was for construction of multipurpose classrooms at the Air Force Academy. The rooms were to receive carpet that had been color-coordinated with the room furnishings. Carpet was scheduled for delivery August 1, which allowed only 3 weeks for laying and completion of project prior to start of classes. Carpet was delivered August 1, and it was immediately discovered that the carpet did not adequately match the approved sample.
    i. Could the CQC system have prevented this? How?
    ii. Did the Government fail in its QA role by not inquiring as to the status of carpet manufacture?
    iii. What steps should the Government take now?

i. Contractor on a major multi-building project started their first concrete placement this morning. Contractor is placing a monolithic foundation using a leased concrete pump truck. Two-thirds of the foundation had been placed when the concrete pump failed. No standby placement equipment was available as required by the contract, which created a cold joint before the pump could be repaired.
    i. What was the first step that failed in the contractor's QC program?
    ii. How could the Government's QA role have prevented this incident?
    iii. Would proper QC reports alerts to a failure of this type in the system?
    iv. What corrective measures should the Government employ to prevent further incidents of this type?

j. An airfield project involved placement of a concrete apron for helicopters. The specifications required the use of jet fuel-resistant joint sealant. The sealant was required to be Government tested and approved prior to use. The specifications further required that the joints be sealed immediately after the curing period. Contractor started placement of concrete when it was discovered that the sealant had not been submitted for testing.
    i. In what meeting should the testing requirements of the contract be discussed in general?
    ii. At what phase should this specific testing have been discussed?
    iii. Within the Government's QA role, where should we have detected this deficiency?
    iv. What corrective measures does the resident engineer use?

Module 8: RESIDENT MANAGEMENT SYSTEM (RMS 3.0) – CONTRACTOR MODE (CM) AND GOVERNMENT MODE (GM)

Module 8 is mandatory for Contractors having USACE of Engineer contracts. It is optional for Contractors with NAVFAC contracts; however, some RMS Quality Control functions may be similar to NAVFAC requirements. The Navy uses eCMS as their software.

Submodule 8.1: Introduction and Overview

Objectives: After completing this submodule, you will be able to:

- List the benefits of the RMS-GM and RMS-CM applications for controlling Contract Administration and Construction Quality Management.
- List major benefits and output products of the RMS-CM and RMS-GM applications.

A. Introduction and Background: *Resident Management System, version 3.0* (RMS 3.0), is a construction information management (CIM) system USACE developed to control construction quality management and contract administration. It has two modes; RMS-GM, used by the Government, and RMS-CM used by the Contractor. RMS started in the late 1980s and was developed by a Resident Engineer, Mr. Haskell Barker, Los Angeles District. Early DOS based RMS used a simple database to provide simple automated methods to use desk top PCs for Resident Office construction quality management and contract administration. As computers became more powerful and “windows” made construction applications more “user friendly,” RMS transformed to an integrated Construction Management Information system used at Resident Office, Contractor Offices and USACE District-level Management. In 2001 RMS use was mandated by USACE.

RMS 3.0 is maintained by the RMS Support Center and has become a powerful CIM application. RMS 3.0 uses an inter-relational database that feeds project construction phase data into USACE financial (CEFMS) and project management (Promise 2 (P2)) applications. RMS 3.0 can import contractor generated CPM schedules and resource data from a commercial application like Primavera ™ P6 using the Standard Data Exchange Format. See specific contract specifications for detailed schedule requirements as they may differ. Gone are the days of importing/exporting between RMS and QCS. The exchange of data between RMS-GM and RMS-CM is in real time with RMS 3.0.

RMS 3.0 is a network-based program, used by USACE Resident Engineers, Districts, Divisions and HQUSACE and is fed by the Contractor's RMS-CM program. Both are simple to learn and use. Supplemental training to the Contractor's will be available upon request. When RMS-CM and RMS-GM are used from the very start of the contract, and maintained current, users have found it to be an outstanding tool to control quality, increase productivity, improve contract administration and help document construction quality.

B. Construction Management Uses: RMS-CM payment, schedule and QC data exported to RMS-GM is standardized for integration with CEFMS and P2 and allows higher levels of Contractor and USACE Management to track a contract's status and allows earlier identification of project-related issues. C*ontract status data* consists of *budget* and *schedule* information plus a field report.

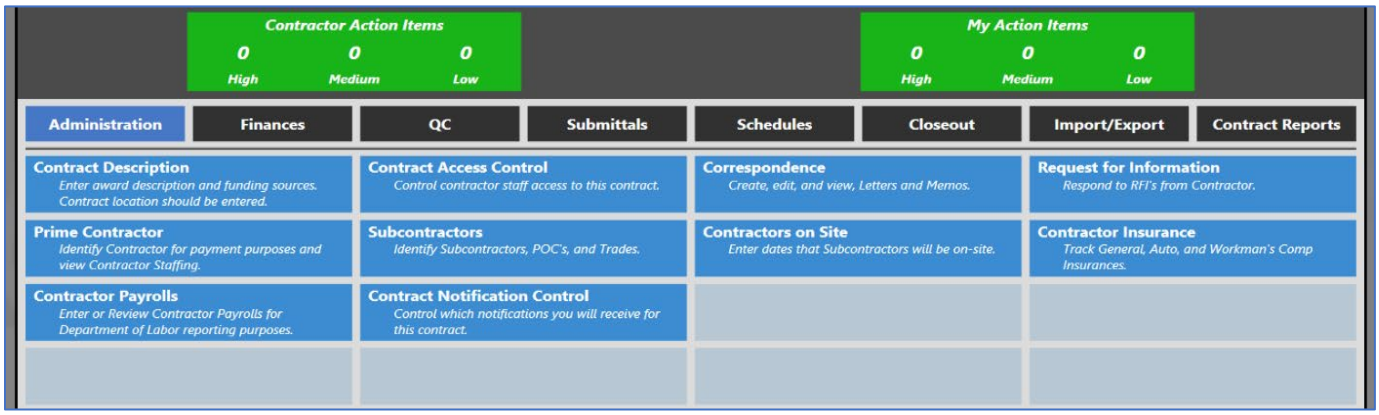
C. RMS 3.0 Contractor Mode: *RMS-CM* is the Contractor's Quality Control module of the Government's *Resident Management System* (RMS). This software has been implemented as the USACE standard worldwide. RMS-CM is to be used daily by the Contractor while performing normal duties. RMS-CM is specified in USACE contracts in Specification Section 01 45 00.00, Quality Control, and 01 45 00.15 10, RMS-CM, where required computer hardware and detailed execution instructions are described. RMS-CM has templates of most required forms and required reports. Data entry for these are described in detail in the RMS-CM and RMS-GM User's Guides. Screen shots of two primary modules in RMS-CM, "ADMINISTRATION" and "QUALITY CONTROL", are shown below with descriptions of various Submodules.

D. RMS-CM Functions: Project Construction, Activity Planning, Scheduling and Quality Control, more specifically:

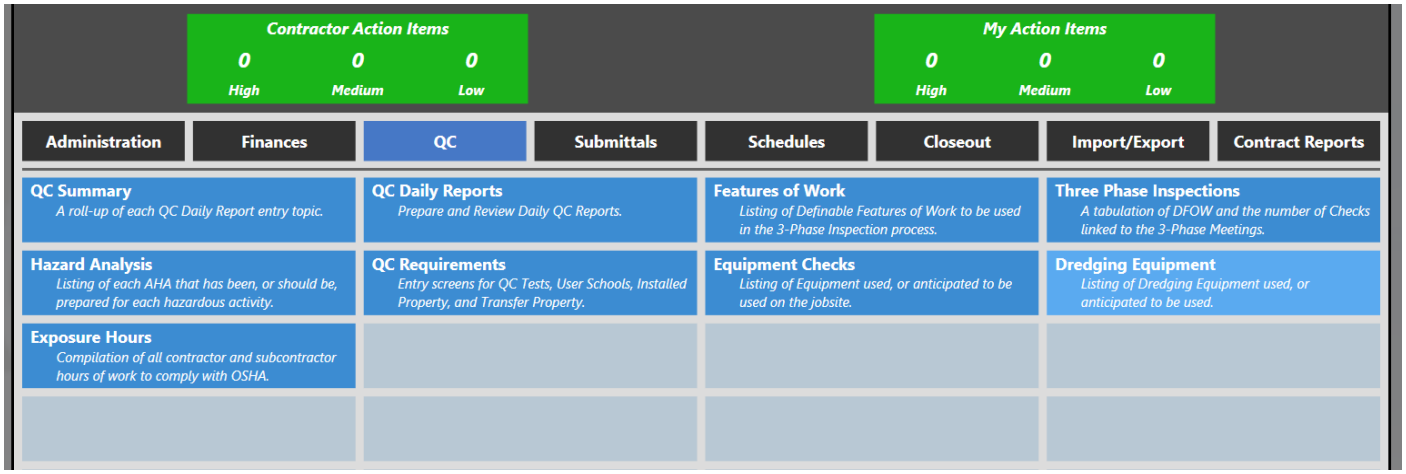
- QC Daily Reports
- Procurement Reports
- Submittal and RFI Management
- Contract Administration
- Progress Payments
- Correspondence Tracking
- Safety Administration and Accident Reporting
- Contract Modification Processing
- Management Reporting

A. Contract Administration (**Administration Module**)– RMS-CM supports construction contract administration by transferring Government furnished data after award; and Contractor QC staff enters administrative data in RMS-CM. RMS-CM and RMS-GM indexes and tracks all incoming and outgoing

correspondence related to a contract. This feature allows the Contractor and the Contracting Officer field construction staff to maintain a complete historical record of correspondence and effectively relate it to contract and construction management activities over the life of the contract. The Contractor enters RFI's in RMS-CM and receives RFI responses from the Government's RMS-GM. This module also submodules to that allow the Contractor to add subcontractors, to track Contractor Insurance and Payrolls, and select options for Contract Notification Control.



B. Quality Control Data (QC Module) - Contractor QC Staff can easily input data for Quality Control daily reports, Three Phase Inspections (i.e., Preparator, Initial and Follow-up Phase Checklists),Activity Hazard Analyses (AHAs), Planned QC Requirements (i.e., QC Tests, User Schools, Installed Property and Transfer Property), On-site Equipment, Deficiency Tracking List and Exposure Hours. The Contractor enters data for the QC Daily Report and generates a QC Daily Report form, which is signed and stored in the QC Daily Report submodule and submitted electronically to the Government. Completion of updated *quality control data* daily to the Government provides the Resident Engineer data to help ensure the Contractor's Quality Control system is functioning properly and that quality of construction is achieved. It also assists Area Engineer and District-level managers with construction-related data for decisions and monitoring at levels above the Resident Office.



C. **Submittal Register and Transmittal Control (Submittals Module):** The Submittal Register, if used properly, helps the Contractor regulate the timely flow of materials and equipment on-site. A powerful feature of RMS 3.0 is it imports the submittal register data file generated by designers from Specs Intact specifications software. Once the RMS-CM submittal register is completed by Contractor it is exported to the RMS-GM database, and submittal status can be tracked by Contractor QC Staff. Used correctly it ensures more timely review and transmittal turn around.

D. **Construction Schedules (Schedules Module):** RMS-CM facilitates schedule analysis showing proposed schedule and effect of logic changes. The Contractor's schedule is uploaded in RMS-CM after converting to Standard Data Exchange Format (SDEF). The SDEF provides a capability to import and export scheduling and work activity data with several commercial scheduling systems. It is an independent piece of software, which also enables conforming commercial system to communicate with each other. Use of this feature will not only speed up a complex task but will also help reduce the number and size of construction-related disputes and claims.

E. **Cost Control and Payment (Finances Module):** The Contractor can use the RMS-CM Progress Payment feature for cost control, preparing prompt pay certifications, and tracking invoices and progress payment requests. Since RMS-CM interfaces with RMS-GM, and RMS-GM interfaces with CEFMS, the Pay Request process is expedited.

E. Field Uses of RMS-CM: RMS-CM is Government furnished software to Contractors without cost. The Contractor needs to access https:// rms.usace.army.mil for RMS-

CM setup files, installation instructions, and demonstration videos. Users' Guides and additional helpful information are also available on the website which is maintained by the RMS Support Center. Training necessary to learn the RMS-CM program usually requires ½-1 day of instruction and demonstration.

The RMS-CM program directly benefits the Contractor QC Staff in:

- **Daily QC Report:** Provides fully integrated Daily Reporting for Quality Control personnel as required by the contract.
- **Punch List Items:** Provides the mandated Deficiency Tracking System required by the contract.
- **Scheduling:** Provides an easy means to import schedule Activities by importing from commercial scheduling packages (e.g., Primavera™).
- **Submittals:** Provides a comprehensive program to submit, process and track transmittal of Submittal items required by the contract (e.g., ENG Forms 4288-R and 4025-R).
- **Payment:** Automates the Payment Request Process (Invoice) for monthly progress updates.
- **Subcontractors:** Provides comprehensive information on items requiring action by Subcontractors, including work items not yet complete, outstanding submittal actions required, status of Insurances and payrolls, etc.
- **QC Requirements:** Provides complete tracking for *Transfer Property, Installed Property, Quality Control Testing,* and *User Schooling* as required by contract.
- **Three-Phase Inspection:** Provides a tool to alert the contractor of prior similar difficulties and challenges from current and previous contracts for use in the Preparatory, Initial, and Follow-up inspection process (Lessons Learned, Safety Checks, Inspection techniques, etc.).
- **Action Items:** Provides a comprehensive report mechanism itemizing outstanding items or items requiring attention covering all area of the contract administration process.
- **Reports:** The RMS-CM reports are available in each major area and many can be sorted or tailored for desired output.

F. Benefits of RMS 3.0:

- Exchange of data between Contractor and Government is in real time.
- Reduces input. Once data is entered one time on easy to use input screens, the computer draws on that data for a wide variety of input-output products. Many items are either drawn from other databases (such as Network Analysis data) or selected through "look-up tables" eliminating the need to completely type them.
- Merges data drawn from the RMS-GM and RMS-CM databases to produce useful tools to perform QC and QA functions.

- Provides reports for key suspense items and data.
- Generates products to assist Quality Control such as:
    - Submittal Registers, submittal tracking, and completed/signed (filled in) Transmittal Forms.
    - Three-Phase Control checklists, agenda, and meeting minutes.
    - Integrated deficiency tracking system.
    - Daily QC Reports and QA Reports.
    - Various closeout documents (including Installed Property, Transfer Property, User Schooling, etc.).

G. Other RMS-CM and RMS Features: Because data is being entered early and a database is built early in a job, the software allows QC and QA staff to effectively manage an assortment of QC/QA items:

- Tracks pay estimate data and generates pay requests. Carries scheduling activities and resource data input from commercial scheduling packages (i.e., Primavera™).
- Tracks a variety of personnel data, subcontractor listings, correspondence, RFIs, and safety items.
- Once start data is input, RMS 3.0 automatically prints heading data onto numerous reports and forms at the correct place. Most contracts will include some CQM forms but as RMS-CM versions are updated, forms may slightly change. Current forms are available in the RMS 3.0 program.

EXERCISE 8.1

1. What is the USACE standard software package used on construction projects?

2. What are the benefits of RMS 3.0?

3. What are the major output products of RMS-CM?

Submodule 8.2: Quality Control Components

Objective: After completing this submodule, you will be able to:

- Describe three major QC components included in RMS-CM.

A. Preparatory and Initial Phase Meeting Agendas and "Check" Databases:

Preparatory, Initial, and Follow-up Control phases provide common structure for CQM System in USACE contracts. Included in RMS 3.0 is a large database (+/- 12,000 items) of useful quality control data:

- Repetitive deficiencies list developed from lessons learned on past similar USACE contracts
- "Checks," and requirements that are "flagged" as being worth special attention.

Past deficiencies and Checks are linked to definable features of work or specification section number. Once Definable Features of Work are agreed to by QC and QA, a feature of work is selected by Contractor from an available list; RMS-CM then generates an agenda for preparatory or initial control phase meetings. This agenda includes a comprehensive checklist on the definable feature of work to review at the meetings.

In addition, QC and QA staffs can review contract drawings and specifications to make additions to the special interest "Checks" on any definable feature of work.

RMS-CM has various reports for QC Manager use. Contractor has the capability to export data in each Submodule either in Excel, or PDF, formatted reports. RMS-CM can also automatically generate on meeting agenda forms, required applicable tests, submittal status, and relevant contract data, such as schedule activities

B. Submittal Process in RMS 3.0: Using RMS-CM linked with RMS-GM makes transmittal tracking and submittal item managing easier. Once data for a submittal item is entered in the system, it never needs to be re-described. By entering dates and action codes promptly, RMS-CM output documents make procurement, submittal tracking and material control easy for QC personnel. RMS-CM integrates important submittal dates to corresponding work break down activities in the construction schedule. Submittal items must be approved or materials, or equipment, prior to the Preparatory Phase Inspection meeting. Outstanding submittal items will be reflected as *Outstanding* on *Pay Estimate Worksheets*. RMS-CM automatically generates and numbers transmittal forms ENG Form 4025-R, complete with contract data and items selected for transmittal.

C. QC/QA Deficiency Tracking System: RMS-CM includes QC/QA Deficiencies is meant for Contractors, and QA, to add deficiencies during the life of the project, including during the punch-out inspection, Pre-Final and Final inspections, and warranty period. Deficiencies can be sorted by various categories for managing correction status. RMS-GM software has a similar function for tracking Deficiencies during the contract. The QC/QA Deficiency in the QC Daily Report meets the Quality Control specification requirement for having a formal deficiency tracking system.

D. Summary: RMS 3.0 provides the Contractor and the USACE management level overview of RMS-CM and RMS-GM software with general descriptions of major RMS-CM components. RMS-CM and RMS-GM are like any commercial CIM application, data must be entered daily and maintained current. As new users learn RMS-CM and work with it they will find ways that RMS-CM makes their job easier. To be successfully used to the best advantage, RMS-CM and RMS-GM requires a partnering effort between the Contractor and the USACE field office staffs and may require District level support. Speak with your District representative about further training in RMS-CM.

EXERCISE 8.2

1. What are three major QC components included in RMS?

Module 9: NAVFAC's ELECTRONIC CONSTRUCTION AND FACILITY SUPPORT CONTRACT MANAGEMENT SYSTEM (eCMS)

Objectives: After completing this module, you will be able to:

Identify functionality available in eCMS.

List the benefits of eCMS.

List the major CQM output components of eCMS.

A. Introduction:

NAVFAC eCMS is a web-based, enterprise project collaboration tool developed to improve post-award management of schedules, RFIs, designs and submittals. The system allows for collaboration via website while providing tools to properly route submittals, issues, non-compliances and daily reports. As the principle construction management tool for NAVFAC, eCMS is available for all projects but Navy policy in August 2020 required that it be implemented for the following criteria. These criteria may be adjusted in a later date and will be updated as soon as applicable.

For all Military Construction (MILCON) projects, and other construction projects above $1M including Commander, Navy Installations Command (CNIC) centrally managed projects facilities sustainment, restoration and maintenance (CMP-FSRM) and U.S. Marine Corps (USMC) – M2R2 projects, project teams (including construction managers, engineering technicians, designers, project managers, contract specialists, subject matter experts, contractors, etc.) will fully utilize eCMS for RFIs, submittals, issues, non-compliance notices, punch lists, checklists, daily reports, etc. to allow the collection of necessary construction data, KPI, and metrics.

For all projects above the Simplified Acquisition Threshold (currently $250K), project teams will utilize eCMS, at a minimum, as an electronic share drive to ensure maintenance of project technical files (use of the various communication and site management modules is highly recommended).

For all projects below $250K, project teams are encouraged to utilize eCMS, but its use is optional.

NAVFAC eCMS is strongly encouraged for all users as it provides a means for electronic cloud storage of all materials indefinitely. The application serves as a collaborative mechanism, at no cost, to our Contractors and customers. Coordination with the CM/COR is required, by specification, to complete the access request form and submitting to NAVFAC Information Technology Center (NITC). All the functionality in eCMS is associated with construction administration and Quality Control/Assurance to some extent. eCMS is the standard project collaboration system that will be used throughout NAVFAC.

B. eCMS Functionality:

Dashboards:

Default landing page for users of a project.

Displays interactive gauges of RFIs, Submittals, Open Action Items, etc.

Active link to RFI, Submittal or Open Action item in question. Will launch from this page.

Navigation to a new project shows the matching dashboard.

Ability to search for project or Responsible Contact.

Communication Management:

The Contractor and the Government will have the ability to submit, respond, track and forward RFIs, Submittals, Communications, Internal Issues, and meeting minutes within the

system. Document Packages can be uploaded and stored in numerous folders that correspond to the role or aspect of the contract.

Attachments can be made in the form of a photo, PDF or WORD document, drawing, schedules, etc.

The system allows for the audit of timelines. Thus, a Submission can be forwarded to an SME and the due dates for all reviewers is known. This can be done case-by-case or by standard template for reoccurring submissions on a project.

Communications and Issues Internal Routing (also referred to as Issues), can be used to convey information or assign a task to a team member or stakeholder. Using these applications will allow information, reminders, and task deadlines to show up on the recipient's Project Calendar and My Actions list.

Requests for Information (RFIs):

Can be generated by either the Contractor or the Government.

Routed to the other for response.

Contain the ability for attachments to include PDFs, WORD Documents, photos, schedules and more as required.

Can have "reviewers" assigned by NAVFAC personnel.

Provide visual reminder of New and Modified submittals within the function tree view and via orange and blue banners within the list view.

Contains auto audit tracking features.

Submittals:

Allows import of a large submittal register from a comma-delimited file.

Users can export the submittal register.

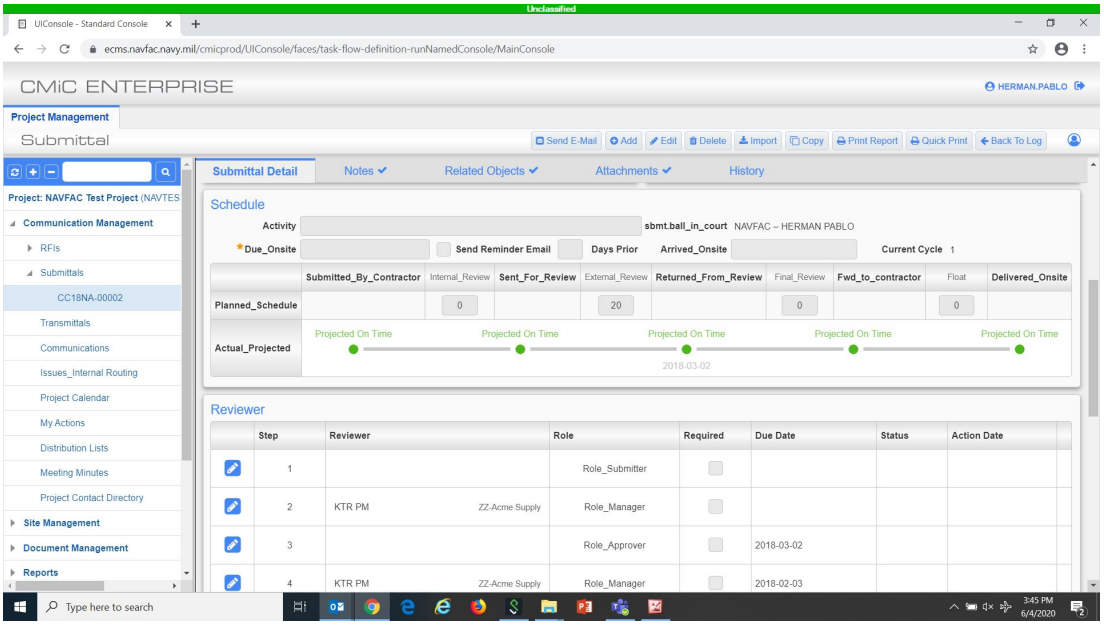
The Contractor initiates submittals against the register.

Routed to the Government for review or file.

Contain the ability for attachments to include PDFs, WORD Documents, photos, schedules and more as required.

Can have "reviewers" assigned by NAVFAC personnel.

Provide visual reminder of New and Modified submittals within the function tree view and via orange and blue banners within the list view.



Contains auto tracking features.

My Actions

List of upcoming due dates for RFIs, Submittals, Action Items, Communications, and Issues or Internal Routing tasks.

Can be grouped by type of action or due date.

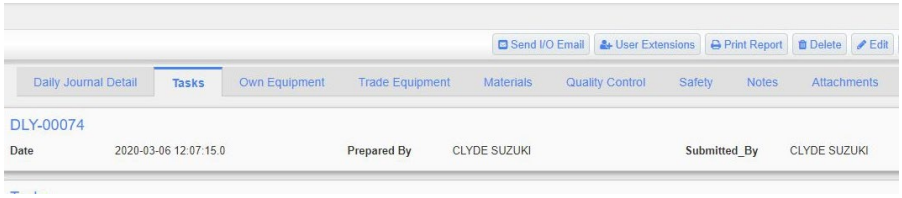
Site Management – Section contains Daily Reports, punch lists and checklists and other deliverables from the Contractor to NAVFAC. For Government utilization it also contains the Non-Compliance Notices that can be issued to the Contractor. All these items are easily created, tracked and updated deliverables within the project.

Daily Reports:

Contractor will be able to generate and submit the Daily Report, QC Report, Preparatory Phase Checklist, Initial Phase Checklist, and Rework List.

The Daily Report combines the quality control report, production report and safety reporting. The Daily Journal Detail tab provides date of report, weather and more. The task

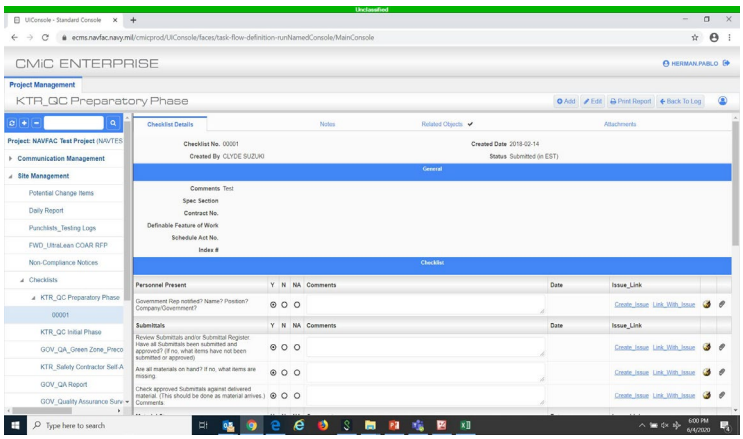
tab of the Daily Report (as shown below) captures information at the site such as materials delivered, labor hours, equipment used, work completed, and additional comments.



The Quality Control Section of the Daily Report captures much more detailed information on the work completed at the job site. Including the phase, definable features of work, activity codes, a compliance with contract check box and remarks.

Checklists within Site Management provide for QA, QC and various FSC assessments.

In support of the three phases of control eCMS has a Preparatory Phase Checklist to capture the information specific to the First Phase of Control. This form documents the meetings that occur on each Definable Feature of Work to ensure an understanding exists regarding approved submittals, material storage, requirements of the specifications/plans, testing, safety, etc.

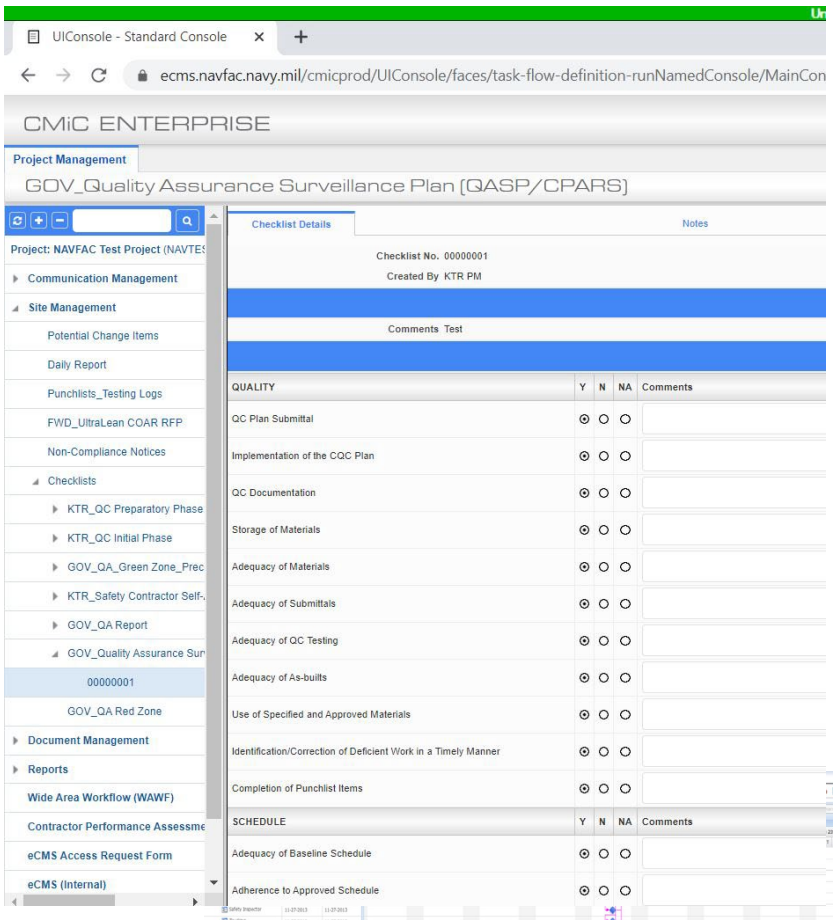


The Initial Phase Checklist captures information specifically for the Second Phase of Control. This form documents the establishment for workmanship quality required by the contract while still documenting personnel present, safety and concurrence with preparatory work. Any problems or deficiencies incurred are resolved so the follow-on work (3rd Phase of Control) can be installed with no or a minimum of deficiencies.

Attachments to all submissions can be made in the form of a photo, PDF or WORD documents, EXCEL files, drawings, or even schedules.

All submissions are routed to the Government for review.

Government will be able to generate the QA Report (as shown below), KPI checklists, Red Zone Checklist, Non-Compliance Notices, Punch lists and more.



As noted with submittals these all provide the to track submission checklist dates features within features ability dates, and the tabs.

Schedules (accessible from Management & Document Management): Site

Ability to view, compare baseline and monthly schedules and

Can import P6 and MS Project schedules

Tools allow for view of critical path, tasks that have a desired % of completion, or search for specific activities.

Able to view “related objects” which include RFIs, Submittals, issues or communications linked to the schedule.

File folders for the storage of native schedule files, PDF versions of the schedule and reports.

Contains auto document and audit tracking features.

Document Management – This section also contains the scheduling application with features noted above and numerous folders for Contractors and Government to include Pre-Award Documentation, Warranty, Partnering, Photos and many more.

Safety/Environmental

File folders for the storage of safety and environmental related documents.

Government will be able to generate Safety Audits.

Photos

File Folders for the storage of project photos

Ability to view a variety of photo formats

Ability to redline photos.

Constructability Reviews

Provides a link to DrChecks.

DrChecks is a website for the generation, management, and tracking of constructability review comments for NAVFAC and other Federal Agencies.

Additional folders exist with FEC specific forms which include the constructability review checklist.

PSPDF viewer allows for the mark-up of drawings as needed during review.

Commissioning

File folder for the storage of all Commissioning related documents.

Contains auto document and audit tracking features.

Other folders also exist for the storage of the Contract Drawings, Contract Specifications, Meeting Minutes, Reports, etc.

C. Benefits of Using eCMS:

Usage of a commercial off the shelf industry accepted software package configured to NAVFAC requirements.

Instant upgrades that are documented and transparent to the user.

Reduced response time on RFIs, Submittals, etc.

Long term storage of project files. No files removed because security policy or email requirements.

Enhanced project communication between all project stakeholders.

Real time project status management and data retrieval.

Better visibility to Contractor & Government Senior Management.

Reduced administration expenses.

Real time collaboration and problem solving.

D. Major CQM Output Products of eCMS:

Submittal Register, submittal tracking (date/time stamping of all entries).

Three-Phase Control checklists, agenda, and meeting minutes.

Deficiency tracking system.

Daily QC and QA Reports.

Daily Production Reports.

Schedule Integration for data retrieval and report writing.

Central storage area for all CQM and Production documents.

E. Summary:

The information provided in this module is only an overview of NAVFAC's eCMS system. A web-based training system is available that covers navigation, search techniques, running system reports and in-depth knowledge of each functionality covered above. NAVFAC provides the web-based training and access to eCMS when a contractor has an active construction contract with NAVFAC.

EXERCISE 9

1. What are the benefits of using eCMS?

2. List the major CQM output products of eCMS.

Appendix A Components of CQC

Specification Sections

- 01 30 00 Administrative Requirements
- 01 33 00 Submittal Procedures
- 01 35 26 Governmental Safety Requirements
- 01 45 00.00 10 Quality Control
- 01 45 00.00 20 Quality Control
- 01 45 00.15 10 Resident Management System Contractor Mode (RMS-CM)
- 01 45 35 Special Inspections
- 01 78 00 Closeout Submittals
- 01 78 23 Operation and Maintenance Data

****Specialized contracts may include the following Specification Sections**

- 01 33 16.00 10 Design Data (Design After Award)
- 01 33 23.33 Aviation Fuel System Specific Submittal Requirements
- 01 35 29.13 Health, Safety, and Emergency Response Procedures for Contaminated Sites
- 01 45 00.10 20 Quality Control for Minor Construction
- 01 78 23.33 Operation and Maintenance Manuals for Aviation Fuel Systems
- 01 78 24.00 10 Facility Data Requirements
- 01 78 24.00 20 Facility Electronic Operation and Maintenance Support Information (eOMSI)
- 01 83 00.07 40 Reliability Centered Acceptance for Facility Shells
- 01 83 13.07 40 Reliability Centered Acceptance for Superstructure Performance Requirements
- 01 86 26.07 40 Reliability Centered Acceptance for Electrical Systems
- 01 91 00.15 10 Total Building Commissioning
- 01 91 00.15 Total Building Commissioning

Quality Control (QC) Plan

Preconstruction Conference

Preconstruction Safety Conference

Project Schedule

QC Plan Meeting

QC/QA Coordination Meeting or Mutual Understanding Meeting

Three Phases of Control System

- Preparatory Control Phase and report
- Initial Control Phase and report
- Follow-up Control Phase

Safety

- Conduct and document daily safety inspections
- Activity Hazard Analysis (AHA)

Quality Control (QC) Documents

- Contractor Quality Control Daily Report
- Contractor Production Report
- Preparatory Phase Checklist
- Initial Phase Checklist
- Deficiency/Rework Items List
- Testing Plan and Log
- Submittal Register
- Contractor's Submittal Transmittal Form

Submittals

- List of Definable Features of Work (DFOW)
- Quality Control Plan
- Environmental Protection Plan
- Base Access Plan
- Accident Prevention Plan

Offsite Fabrication, Testing and Inspection

Material Receipt and Check-Out

Deficiency/Rework Items Tracking and correcting

Non-compliance notice

Request for information (RFI)

Control Testing and recording/reporting

System Testing

Training of Government personnel in operation and maintenance of equipment

Commissioning

Punch-out Inspection

Pre-final Inspection

Final Acceptance Inspection

As-built drawings

Operation and Maintenance (O&M) Manuals

- O&M System Instructions (OMSI)
- Electronic O&M System Instructions (eOMSI)
- O&M Training

Warranties

- Warranty Inspections

Turnover of keys and spare materials

Appendix B Example QC Plan USACE

Keyes Construction Co., Inc.

General Contractor

5318 Madison St.

Denver, Co 80200

May 19, 20xx Serial No. MC-4

Area Engineer

U.S. Army Corps of Engineers

563 W. Granger

Colorado Springs, CO 80900

RE: One Tactical Equipment Shop

DACA92-97-C-0111

Ft. Carson, CO

Gentlemen:

We are submitting, herewith, our Quality Control Plan for the above referenced project for acceptance.

Very truly yours,

Warren J. Cooper

Construction Manager

Appendix B

QUALITY CONTROL PLAN

KEYES CONSTRUCTION COMPANY, INC.

FOR CONSTRUCTION OF - ONE TACTICAL EQUIPMENT SHOP

FORT CARSON, COLORADO

CONTRACT NO. W912P9-XX-C-0111

MAY 20xx

Appendix B

TABLE OF CONTENTS

May 19, 20xx Serial No. MC-5

Army Engineer

U.S. Army Corps of Engineers

563 W. Granger

Colorado Springs, CO 80900

RE: One Tactical Equipment Shop

DACA92-97-C-O111

Ft. Carson, CO.

Gentlemen:

This is to introduce Morton S. McCray for the position of Contractor's Representative for Quality Control on the above referenced project.

Very truly yours,

Warren P. Crossen

Construction Manager

May 19, 20xx

Morton S. McCray

Quality Control System Manager

3636 Belview Avenue

Colorado Springs, CO 80900

RE: Quality Control

One Tactical Equipment Shop

DACA92-97-C-0111

Dear Mr. McCray:

This is a Letter of Direction to you outlining your duties and responsibility as our Quality Control Representative on the above referenced project.

You will be responsible for preparing and maintaining the Submittal Register Form 4288 for the duration of the project. You are required to check all shop drawings for accurate dimensions and to ensure compliance to applicable specifications and drawings as to the quality of materials being proposed for the project. This also applies to all subcontractors, offsite fabricators, and suppliers.

You will make, on a continuing basis, sufficient daily follow-ups to ensure that all workmanship and materials in the construction of this project are in conformance with the specifications and drawings.

You will be responsible for all testing as required by the specifications, a qualified testing laboratory will be furnished to you, as outlined in The Keyes Construction Quality Control Plan.

You will be present during all testing and coordinate all such tests as required in accordance with the specifications and the Corps of Engineers Representative.

The quality control system will include three phases of control and tests. Primarily, Preparatory Phase, Initial Phase, and Follow-up Phase. You are directed to Section 01 45 00.00 10/01 45 00.00 20, paragraph 3.6 for specific instructions outlining these control phases. Record all control phases and tests on the Quality Control Report and submitted the following workday covered by the report to the

government Representative. Submit all test results in triplicate, not later than three calendar days after the tests are performed.

You are directed to review The Keyes Construction Quality Control Plan as well as the Project Specifications, Amendments and Drawings, in their entirety. If there is an item not understood, you are to consult your Quality Control Support Team.

The Quality Control Support Team will consist of the Project Superintendent and Keyes Construction Project Management.

Sincerely,

Warren P. Crossen

Construction Manager

Appendix B

QUALITY CONTROL PLAN

1. PURPOSE

This document establishes the Quality Control System of Keyes Construction Company, Inc. to provide the necessary supervision, control phases and tests of all items of work, including that of suppliers and subcontractors, that will ensure the compliance of all work with the applicable specifications and drawings in respect with the contractor-furnished equipment, materials, workmanship, construction, finish, functional performance, and identification.

2. POLICY

Keyes Construction Company, Inc. through the utilization of a Quality Control System, strives to obtain a uniform, high quality level of workmanship throughout all phases of procurement, fabrication, construction and installation of equipment and facilities, to assure this end, the following principles will be observed:

- Assure the highest quality by maintaining supervised controls and written instructions governing quality control procedures and practices, establish clearly defined responsibility and authority for compliance.
- Conform to all contractual requirements, specifications, applicable military standards and the Keyes Construction Company, Inc. Quality Control Plan. Compile accurate records of test certifications and other required documentation.
- Notify Project Management, and the government of quality discrepancies for immediate corrective action. Assure that corrective action is implemented properly.
- The Quality Control System Manager will be housed in a space separate from the Project Management staff and shall be under the supervision of Keyes Construction Company, Inc. home office.

3. ORGANIZATION

3.1. Quality Control System Manager (QCSM) - Reports to and receives authority directly from Keyes Construction Company, Inc. management. The Quality Control System Manager shall formulate and implement as required the written procedures and instructions contained in this plan. Actual practices are not limited to this plan and where a discrepancy exists between this plan and the contract requirements, the contract requirements shall prevail. Consults with project supervisory personnel to assure compliance with the quality control requirements of the contract. Coordinates the quality control efforts of subcontractors and suppliers to correspond with the overall Quality Control Plan. The QCSM shall provide direct feedback and advise the government representative regarding the effectiveness and capability of the quality control organization, including but not limited to coordination, field engineering, office engineering, accounting for government- furnished property, etc. QCSM will be physically on the project site for the duration of the contract work. QCSM will review and coordinate submittals and approvals for contractor furnished materials and equipment, conduct tests, and follow-ups of subcontractor's work as required to ensure compliance with contract plans and specifications.

3.2. Contractor's Other Personnel - Quality control functions will be carried out by other contractor's personnel to include the Project Superintendent who will be physically on the job-site for the duration of the contract work. Contractor’s other

personnel will assist the Quality Control System Manager in other areas as required to fully implement the Quality Control Plan. The QC system manager may delegate such duties to other contractor's personnel who may be assigned to the project on a temporary basis such as Field Engineers and Superintendents.

3.3. Commercial Testing Firms – Commercial testing firms to be utilized are:

Testing Laboratory, Inc.
2003 E. Willard St.
Denver, Colorado 80900

4. PROCEDURES

4.1. Control of Onsite Construction - The Quality Control System Manager will perform enough control phases and tests of all work, including that of subcontractors to ensure conformance to applicable specifications and drawings with respect to the materials, workmanship, construction, finish, functional performance, and identification. The Quality Control organization will perform at least three phases of control for all definable features of work, as follows:

- Preparatory Phase - Performed prior to beginning each definable feature of work. Notify the Government and other appropriate persons at least 24 hours in advance of the meeting.
  - Review contract requirements.
  - Check to assure that all materials and/or equipment are on hand and have been tested, submitted, and approved as required.
  - Check to assure that provisions have been made to provide required control testing.
  - Examine work area to assure that all preliminary work has been accomplished.
  - Review hazard analysis.
- Initial Phase - Performed at the beginning of a definable feature of work. Notify the Government and other appropriate persons at least 24 hours in advance of the meeting.
  - Check preliminary work.
  - Check new work for compliance with contract documents.
  - Review of control testing.
  - Establish level of workmanship.
  - Check for use of defective or damaged materials.
  - Check for omissions and resolve any differences of interpretation with the Government representative.
  - General check of dimensional requirements.
  - Check safety compliance.
- Follow-Up Phases - Perform daily checks to assure continued compliance with workmanship established at the initial phase.
  - Assurance of continuous compliance with contract drawings and specifications.
  - Daily control testing.

4.2. Receiving and Warehousing - Inspection of permanent construction materials received will be performed by the Quality Control System Manager, or other contractor personnel. Visual inspection will be made for:

- Identification
- Damage

- Completeness
- Evidence of compliance with approvals
- Proper documentation
- Results of receiving inspection will be recorded on an appropriate report form and will be made available to the Government.

4.3. Offsite Control - Facilities of offsite fabricators and suppliers will be surveyed as required to assure that all requirements of the contract drawings and specifications are met and maintained and to assure delivery of quality products. The results of each survey will be recorded on an appropriate form and will be made available to the Government. The fabricator or supplier will be notified of any deficiencies and will be required to submit a report of corrective actions taken. The contractor will inform the Government of offsite surveys.

4.4. Documentation - The Quality Control System Manager will maintain current records of all control activities and tests. These will include factual evidence that the required control phases and tests have been performed, including the number and results; nature of defects, causes for rejection, etc.; proposed remedial action; corrective actions taken; contractor's records will cover both conforming and defective features and will include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records on an appropriate form will be furnished to the Government daily.

4.5. Drawing and Document Control - Contract drawing, work orders and change orders issued for construction will also be issued to the Quality Control System Manager. It is the responsibility of the Office Engineer to issue all technical information to the Quality Control System Manager. It is the responsibility of the Quality Control System Manager to maintain this technical information, keep it current, and record updates as approved revisions occur. No technical information will be replaced or revised without receipt of properly authorized change notice, revision, or equal.

4.6. Materials Certification - Copies of all purchase orders or subcontracts requiring receiving inspection will be given to the Quality Control Department for receiving and record purposes. When the purchase order requires vendor certification of materials, equipment, or supplies, such certification shall be verified as to accuracy and conformance and may be used in lieu of a test for those properties covered by the certification. Copies of all certifications received will be maintained in the Quality Control folder and will be available to the Government upon request or submitted as provided in the contract specifications.

4.7. Workmanship Inspection - Items which will be embedded in the concrete placements or areas which will be covered up by a following operation will be inspected by the Quality Control System Manager. The Quality Control System Manager shall verify by signature that all items installed are in accordance with the contract drawings and specifications prior to the placement of concrete or covering. Any corrective action required will be recorded.

4.8. Calibration of Equipment - All contractor furnished measuring and test equipment shall be calibrated and maintained to traceable government standards. Records of these calibration certifications will be maintained by the Quality Control Department and made available to the Government upon request.

- Each instrument will be plainly and permanently numbered, the equipment will be operated only by those persons directly

responsible for the equipment or personnel under their cognizance.

- Each piece of equipment will be checked for accuracy as recommended by manufacturer for frequency of calibration. Required calibration of measuring and test equipment will be conducted by a certified laboratory.
- Measuring and test equipment dropped, damaged, or believed to be inaccurate will be removed from services and recalibrated.

4.9. Final Inspection and Test - Prior to final inspection or start of tests, all systems being inspected or tested shall be completed and accepted by the Quality Control System Manager, after this acceptance, the final inspection and test may proceed in accordance with the following steps:

- Verify the test personnel have a working knowledge of the special characteristics of the instruments being used.
- Note the inspection or test requirements and criteria for successful completion of the required inspection or test.
- Upon satisfactory verification of these requirements the test may proceed. Each reading will be verified and documented by the Quality Control System Manager. All functional validations or tests will be performed by the Quality Control Department unless otherwise noted. No functional test will be performed by the Quality Control Department unless otherwise noted. No functional test will be accepted without properly authorized and approved test procedures.
- The general requirement of final acceptance will include, but not be limited to, the following:
  - General appearance
  - Workmanship
  - Cleanliness of areas and equipment
  - Identification of equipment
  - Painting
  - Removal of unused material and temporary facilities
  - Condition of job files and completion of paperwork

4.10. Revision Policy - Activities, programs, and procedures not covered in this Quality Control Plan or proposals or additions to these standards, shall be discussed at meetings held for that purpose at such times and places the Quality Control System Manager may select, and shall take such action to request acceptance from the government to incorporate such revisions as deemed necessary. A record shall be kept of such meetings and interested parties present, together with the subject matter reviewed. Such meetings shall be held as required by changes in the contract specifications for the purpose of reviewing the QC plan, to entertain revisions, additions or deletions. Accepted revisions shall be incorporated in the plan as first revision, second revision, etc., a revised index page shall be included.

5. TESTING METHODS

All testing will be in accordance with the applicable section of the specifications.

6. RECORDING FORMS

The contractor quality control personnel will perform all tests as indicated in the contract specifications using the appropriate Corps of Engineers ASTM, or other approved test methods. The following list itemizes some of the forms which the

contractor quality control personnel intend to use. This list is not all inclusive and may be revised and updated as conditions require. The contractor's records will be available for review by the Government.

- Subcontractor Daily QC Report - To be filled out daily by the subcontractor's quality control personnel covering the day's quality control activities, approved by the Prime Contractor's Quality Control System Manager, and placed in the Prime Contractor's file.
- Construction Quality Control Daily Report - To be used by the Quality Control System Manager to report the day's quality control activities of the Prime Contractor and all subcontractors, submitted to the government daily.
- Trip Report - Used to report activities covering offsite trips. Will be submitted with the contractor's Quality Control Daily Report.
- Daily QC reports and all attachments will be submitted in duplicate on the first working day following the day covered by this report.
- Copies of all inspection and test reports including data and calculation sheets will be submitted with the daily QC report.
- Quality Control System Managers' reports will contain notations specifically defining the phase of control on each day's activities and note compliance or non-compliance with previous phases when applicable.
- The Government will be notified 24 hours in advance of all tests to be performed in the field.
- Concrete Placement Card - To be filled out prior to, during and after concrete placement to document that preparatory, initial and follow-up phases have been made for concrete placement. A copy of this report is to be included with the daily QC report.
- Concrete Summary - Provides a running summary of concrete test results. To be kept in contractor's files and made available to the Government upon request.
- Density Test Summary - Provides a running summary of soil testing results. To be kept in contractor's files and made available to the Government upon request.

7. QUALITY CONTROL PROCEDURES

7.1. Surveillance of Subcontractors' Operations - Surveillance of the subcontractors' operations is the responsibility of the Quality Control System Manager. Major discrepancies that come to their attention will be recorded and transmitted to the related subcontractor. The contractor's Quality Control System Manager has authority to act directly with subcontractor representatives on routine quality control activities. If the discrepancy is related to a concrete placement or will be covered by preceding operation, a resolution will be made prior to the item being covered. Major discrepancies will be followed up daily, upon correction of the major discrepancy, the date corrected will be noted and by whom. There is one Quality Control System Manager for the Keyes Construction Company, Inc. with support of the Project Superintendent and Keyes Construction Company, Inc. Project Management. Surveillance of the subcontractor's operations is the responsibility of the Quality Control System Manager. The Contractor's Quality Control System Manager has authority to act directly with subcontractor representatives on routine quality control activities. In addition to the Contractor's

Quality Control System Manager, the Mechanical and Electrical Contractor's Superintendent will act as their quality control engineer and will be directly responsible to the Contractor's Quality Control System Manager, and the Keyes Construction Company, Inc. Quality Control Support Team.

7.2. Inspection Acceptance Procedures - All construction work shall be in accordance with the contract drawings and specifications. All rework or changes which change existing engineering drawings or specifications must be authorized. All construction work will be recorded on the Quality Control System Manager's report. Work found in compliance with the drawings and specifications will be so noted. If discrepancies are found, they will be handled in accordance with inspection discrepancy procedures.

7.3. Inspection Discrepancy Procedure - Intended as an inspection system whereby all discrepancies in quality, workmanship, materials, equipment, supplies, and/or unauthorized deviations from engineering requirements on specifications can be called to the attention of responsible supervision personnel.

- Discrepancies will be recorded on the Quality Control Daily report form. Each discrepancy will be assigned a number by the recording Quality Control System Manager. A concise statement locating the discrepancy and description of the discrepancy will be filled in by the Quality Control System Manager.
- When material, equipment, supplies, or workmanship, that does not conform to the contract drawings or specifications are rejected, the rejecting Quality Control System Manager will initiate a discrepancy report and immediately furnish copies to the contractor's Project Manager and Superintendent or Subcontractor's Job Representative.
- Upon reviewing the discrepancy report, the Project Manager or their representative and the Quality Control System Manager will examine the rejected items. If in their opinion, any of the rejected items can be reworked to a usable condition, the discrepancy report will be so noted. However, if, in their opinion, the item cannot be reworked either from a practical and economic standpoint, the item shall be scrapped, and an entry made on the discrepancy report concluded to that effect.
- Upon completion of rework on items specified for rework, the Quality Control System Manager will be notified and will re-inspect the item(s) to the original requirement plus the rework information on the discrepancy report. If it is found acceptable, the discrepancy report will be so noted. From this point on, the item(s) will be handled in the normal manner. If, however, the item(s) is still not acceptable to the Quality Control System Manager due to poor workmanship, etc., arising from the rework, we will treat this item as a first time rejection and this will be resubmitted for inspection only after further rework.
- The discrepancy report log will be periodically reviewed by the Project Manager with the Quality Control System Manager to formulate a disposition of each listed uncorrected discrepancy. They will establish timetables for final resolution of all discrepancies.

7.4. Concrete Testing Procedures - Field testing of concrete and preparation, handling, curing, and testing of cylinders will be in accordance with ATSM and CRD Standards as set forth in paragraph 5.1. In addition, the following ASTM Standards will be followed:

- C 173-73 Air content of freshly mixed concrete by the volumetric method.

- C 47O-73T Molds for forming concrete tests cylinders vertically.
- C 617-73 Capping cylindrical concrete specimens.
- C 683-71T Compressive and flexural strength of concrete under field conditions.

Test cylinders will remain in the area where they are prepared for the first 24 hours properly protected as set forth in ASTM 31-69. They will then be transported to the laboratory, removed from the mold and immersed in a tank of saturated lime water until time of testing. Transportation from work area to laboratory area on the job-site will be in boxes containing wet sand or sawdust and will be protected from freezing. Field test specimens for concrete paving shall be in accordance with paragraph 13 of the contract specifications.

8. DEFINABLE FEATURES OF CONSTRUCTION WORK

8.1. General Requirements

8.1.1. Special project procedures to include coordination of work, project meetings, submittals, and quality control.

8.1.2. Administrative Requirements.

8.1.3. Environmental Protection.

8.1.4. Job Conditions.

8.2. Site Work

8.2.1. Excavation, Trenching and Backfilling for utilities Systems to include sewer, gravity, drainage, and water lines.

8.2.2. Clearing and grubbing, backfilling for buildings.

8.2.3. Grading.

8.2.4. Fence, chain-link.

8.2.5. Concrete for sidewalks and curbs.

8.2.6. Bituminous Paving.

8.3. Concrete

8.3.1. Concrete materials, concrete procedures, concrete formwork, forms, form ties and accessories, concrete reinforcement, concrete finishing, concrete curing and grouting.

8.3.2. Testing.

8.4. Masonry

8.4.1. Masonry procedures, mortar, mortar accessories, unit masonry, cavity wall construction to include bringing inner and outer wythes up simultaneously, reinforcement, wall ties, flashing, and cleaning.

8.4.2. Acceptance of Sample Panel.

8.4.3. Testing.

8.5. Metals

8.5.1. Structural steel, framing to include metal materials and methods, metal fastening, metal joints, welding, expansion control, and miscellaneous metals

8.5.2. Steel Roof Decking.

8.5.3. High Strength Bolts.

8.6. Thermal and Moisture Protection

8.6.1. Damp proofing

8.6.2. Fireproofing

8.6.3. Sealants

8.7. Doors and Windows

8.7.1. Metal doors and frames, special doors, metal windows, glazing and miscellaneous hardware, caulking.

8.8. Finishes
- 8.8.1. Ceramic tile.
- 8.8.2. Gypsum wallboard.
- 8.8.3. Acoustical treatment to include metal suspension system for acoustical tile and lay-in panel ceiling.
- 8.8.4. Resilient flooring.
- 8.8.5. Painting.
- 8.8.6. Furring (metal).

8.9. Specialties
- 8.9.1. Metal toilet partitions
- 8.9.2. Fire extinguisher cabinets
- 8.9.3. Toilet accessories

8.10. Equipment
- 8.10.1. Fueling system for motor vehicles

8.11. Furnishings
- 8.11.1. Lockers

8.12. Special Construction
- 8.12.1. Pre-engineered structures
- 8.12.2. Liquid storage tanks

8.13. Mechanical
- 8.13.1. Insulation to include:
  - Pipes
  - Ducts
  - Equipment
  - High density inserts, insulation protective shields, clips or U bolt support for multiple pipe hanger supports.
- 8.13.2. Plumbing systems
  - Waste/vent piping to include; underground soil piping, above ground soil piping.
  - Interior piping rough-in to include; galvanized, black iron and copper, including drains, fittings, valves, and piping supports.
  - Plumbing fixtures to include flush valves, faucets, and accessories.
  - Cleaning and operational testing.
- 8.13.3. Heating systems
  - Equipment and system accessories
  - Fuel oil/gas piping and supports
  - System testing and balancing
- 8.13.4. Air distribution systems
  - Equipment and accessories.
  - Duct work to include galvanized supports, dampers, louvers, diffusers, duct line support and fire dampers.
- 8.13.5. Automatic temperature control systems
  - Equipment and materials
  - Installation of materials and equipment
  - System testing
- 8.13.6. Sprinkler Systems
  - Equipment
  - Piping and supports

- Accessories

8.14. Electrical

8.14.1. Exterior Electric Distribution, Aerial

- Pole setting.
- Placement of crossarms, pins, insulators, pole line hardware and conductors.
- Placement of fuse cutouts, surge arresters, reclosers, potheads, pole mounted transformers to include grounding conductors, grounding conductor testing and cable terminations.

8.14.2. Exterior electrical distribution, underground

8.14.3. Duct line excavation, placement of ducts and miscellaneous materials.

8.14.4. Placement of in ground junction or pull boxes and manholes.

8.14.5. Placement of duct bank concrete encasement.

8.14.6. Transformer pad placement.

8.14.7. Mounting of pad mounted transformers.

8.14.8. Cable placement to include splicing, fire-proofing, and cable terminations.

8.14.9. Grounding conductors and testing.

8.15. Electrical distribution, interior

8.15.1. Wiring methods to include conduit rough-in, raceway boxes, outlet boxes, panelboard cabinets, placement of conductors and conduit placement below the slab for slab-on-grade construction.

8.15.2. Wiring devices, panelboards, switch-boards, and lighting fixtures.

8.15.3. Motors and transformers.

8.15.4. Testing.

8.16. Fire Detection and Alarm System

8.16.1. Wiring methods to include conduit, ground rods, detectors, control panels, power supply, door holders, audible fire alarm and annunciator panel.

8.16.2. Testing.

Appendix B

CONTRACTORS QUALITY CONTROL REPORT (QCR) DAILY LOG OF CONSTRUCTION	REPORT NUMBER Page 1 of 2
	DATE
PROJECT	CONTRACT NUMBER
CONTRACTOR	WEATHER Weather Caused No Delay Temperature Min 46 °F, Max 50 °F; No Precipitation; No Wind

QC NARRATIVES

Activities In Progress:

Materials Delivered:

General Comments:

PREP MEETING:

INITIAL INSPECTION:

Safety Inspection / Safety Meetings:

PREP/INITIAL DATES (Preparatory and initial dates held and advance notice)

A preparatory inspection was held today for the following feature:

An initial inspection was held today for the following feature:

ACTIVITY START/FINISH

The following activity was started today:

Activity No Description

No activities were finished today

QC REQUIREMENTS

QA/QC DEFICIENCY (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected)

Appendix B

CONTRACTORS QUALITY CONTROL REPORT (QCR) DAILY LOG OF CONSTRUCTION	REPORT NUMBER Page 2 of 2 DATE
PROJECT	CONTRACT NUMBER

CONTRACTORS ON SITE (Report first and/or last day contractors were on site)

LABOR HOURS

The following labor hours were Reported today:

Employer	Labor Classification	Number of Employees	Hours Worked
	Total		

Total hours worked to date:

EQUIPMENT HOURS

The following equipment hours were Reported today:

Serial Number	Description	Idle Hours	Operating Hours
	Total		

Total operating hours to date:

ACCIDENT REPORTING (Describe accidents)

No accidents reported today

CONTRACTOR CERTIFICATION	**On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.**		
QC REPRESENTATIVE'S SIGNATURE	DATE	SUPERINTENDENT'S INITIALS	DATE

Appendix B

Sample Preparatory Phase Checklist

Contract No.: Date:

Definable Feature: Spec Section(s):

Government Rep Notified (Y/N): Hours in Advance:

Personnel Present:

Name	Position	Organization	Phone/Email

(List additional personnel on reverse side)

Submittals

Review Submittals and Submittal Register. Have all submittals been approved? (Y/N):

If No, what items have not been submitted or approved?

Are all materials on hand? (Y/N):

If No, what items are missing?

Check approved submittals against delivered material. (This should be done as material arrives.)

Comments:

Material storage

Are materials stored properly? (Y/N):

If No, what action is taken?

Specifications

Review each paragraph of specifications.

Comments:

Discuss procedure for accomplishing the work.

Comments:

Clarify any differences:

Preliminary Work and Permits

Ensure preliminary work is correct and permits are on file.

If not, what action is taken?

Testing

Identify test to be performed, frequency, and by whom.

When required?

Where required?

Review Testing Plan

Has test facilities been approved

Has testing equipment been calibrated?

Safety

Review applicable portion of EM 385-1-1

Activity Hazard Analysis approved? (Y/N):

Corps of Engineers comments during meeting.

/s/

Contractor QC Manager

Appendix B

Sample Initial Phase Checklist

Contract No.: Date:

Definable Feature: Specification Section(s):

Government Rep Notified (Y/N): Hours in Advance:

Personnel Present

Name	Position	Organization	Phone/Email

(List additional personnel on reverse side)

Review of Preparatory Meeting Minutes

Comments:

Preliminary Work

Ensure preliminary work is complete and correct. If not, what action is taken?

Comments:

Establish Level of Workmanship

Where is work located?

Is a sample panel required?

Will the initial work be considered as a sample?

Comments:

Safety

Review job conditions using EM 385-1-1 and job hazard analysis.

Comments:

/s/

Contractor QC Manager

CONCRETE PLACEMENT CARD

LOCATION:

START TIME: FINISH TIME: CUBIC YARDS:

		Status			Status
A	Line & Grade		G	Ground Busses/Wires	
B	Surface Preparation			Size	
C	Forms			Location	
	Alignment			Adequately Support	
	Stability			Welding	
	Form Surface		H	Electrical Boxes & Panels	
	Special Block outs			Size	
	Safety of Work Area			Location	
	Form Treatment			Adequately Supported	
	Chamfer Strips			Sealed Against Concrete	
	Cleanliness		I	Piping	
				Size & Material	
D	Reinforcement			Location	
	Location			Support	
	Spacing			Sleeves	
	Splices			Leak Test	
	Tie Wires		J	Water stop	
	Chairs & Spacers			Size-Type	
E	Embedments			Location	
	Anchor Bolts		L	Other Features	
	Embedded Steel				
F	Conduits				
	Size				
	Adequately Supported				
	Flush Coupling				
	Clear of obstruction				
	Concrete tight				

REMARKS:

Appendix B

CONCRETE SUMMARY

Report No.: Date:

Test	Date	Class	Spec	Slump	Air	7-Day	28-Day	Other	Location	Remarks

Appendix B

Report No.: Date:

TRIP REPORT

COMPONENT: VENDOR: SPEC REF:

PURPOSE OF TRIP:

CONTACT:

PERSONNEL PRESENT:

SUMMARY:

Appendix B

PERMANENT MATERIALS REPORT

Project:

Location:

Materials:

Supplier:

Subcontractor:

Freight Line:

Damage Report:

Inspected By

Appendix B

DEFICIENCY REPORT NO.

Date: Contract No.:

Contractor

Location:

Reference Specifications Paragraph

Reference Contract Drawing Sheet No.:

Deficiency:

Corrective Action

Acknowledged:

Appendix B

SOIL COMPACTION REPORT

Test Type	Depth Elev.	Max. Dry Density	O.M.C. %	Dry Density	Moisture %	Compact. %	Soil Type	Spec. Reg.	Passed Failed

Appendix C Preconstruction Meeting Agenda

PRECONSTRUCTION MEETING AGENDA

A. Introduction
    a. Personnel Introductions and Contact Information
        i. Area/Resident Engineer/ACO
        ii. Project Engineer/Office Engineer/COR
        iii. Quality Assurance Personnel
        iv. District Personnel (If in attendance)
        v. Contractor Personnel
        vi. Base/Post Personnel (Military) or Local Authorities (USACE -Civil Works)
        vii. Using Service Personnel/Other Project Stakeholders (If in attendance)
B. General Contract Information
    a. Meeting purpose
    b. Description of Work
C. Contract Administration
    a. Contracting Officer (KO)/Administrative Contracting Officer (ACO) Authority(s)
    b. Contracting Officer Representative (COR) Authority(s)
    c. Lines of Authority and Communication
D. Contractual Rules and Regulations for Operations and Conduct of Contractor Employees
E. Base/Post Rules and Regulations for Operations and Conduct of Contract Employees (Presented by Base or Using Service Personnel)
F. Contract Partnering Policy
G. Verification/Discussion - Certificates of Insurance
H. Contractor's Responsibility for Inspection of Work
I. Proposed Methods for Performance of Work
J. Subcontracting and Amount of Work Performed by Prime Contractor
K. Contractor's Efforts and Submittal of Reports on Small Business Subcontracting
L. Contractor Quality Control (To be discussed in detail at subsequent Coordination Meeting or the Mutual Understanding Meeting)
M. Environmental Protection Requirements
N. Accident Prevention and USACE Safety Manual (EM 385-1-1) (To be discussed in detail at subsequent Preconstruction Safety Conference)
O. Method of Submitting Correspondence, Shop Drawings and Samples (To be discussed in detail at subsequent Coordination Meeting or the Mutual Understanding Meeting)
P. Modifications and Claims (Contractor to be advised that modifications are limited to those authorized in writing by the KO or designated ACO.
Q. Project Schedule
    a. Schedule Requirements - Preliminary & Initial Schedules
    b. Schedule Cost Loading
    c. Critical Materials and Specialized Inspections
    d. Frequency and Method of Periodic Schedule Review
R. Value Engineering – Construction
S. Labor Standards Requirements
T. Prompt Payment Act
U. Contractor Performance Appraisal
V. Other Pertinent Items, Special Clauses and Technical Provisions

Appendix D Coordination Meeting or Mutual Understanding Meeting Agenda

A. Introduction
    a. Area/Resident Engineer or ROICC/SGE
    b. Project Engineer or AROICC/AREICC
    c. Quality Assurance Personnel
    d. Contractor Personnel
    e. Stakeholders
B. CQC Specifications
C. Contractor Quality Control System
    a. Quality Control Staff
        i. "Chain of Command"
        ii. Individual Responsibilities
    b. Submittals
        i. Scheduling (ENG Form 4288R) Updates
        ii. ENG Form 4025R
        iii. Follow-up of Disapprovals
    c. Testing
        i. Frequency
        ii. Who Performs/Qualifications
        iii. Lab Approval
        iv. Documentation with Auditable Trail
    d. Quality Control Daily Reports
        i. Contractor Name and Address
        ii. Project Name, Contract Number, Location, Date, and Report Number
        iii. Weather
        iv. Contractor/Subcontractor Area of Responsibility
        v. Materials/Equipment Delivered to Job Site
        vi. Record any Preparatory, Initial, and Follow-up Phase activities held. Note results of surveillance or necessary corrections.
        vii. Testing Performed and Results Noted
        viii. Verbal Instructions Received
        ix. Controversial Issues
        x. Signed by the QC Manager
        xi. Definable Features of Work
    e. Three-Phases of Control System
        i. Preparatory
            1. Shop Drawings
            2. Work to be built upon
            3. Equipment
            4. Control Testing
            5. Government Furnished Equipment (where applicable)

6. Sample Panels
7. Construction Methods

ii. Safety and Activity Hazard Analysis
1. Recordkeeping
2. Notification of Government Representative

iii. Initial
1. Contract required with respect to quality
2. Corrective measures
3. Recordkeeping
4. Notification of Government Representative
5. Safety and Activity Hazard Analysis

iv. Follow-Up
1. Continuing Quality
2. Corrective Measures
3. Recordkeeping

v. QC Plan
1. Correct Deficiencies
2. Discuss
3. Procedure to be followed when deficiencies are discovered.
4. Cooperation
5. Changes to the Plan
6. Required to revise plan if something proves to be incorrect after construction begins.
7. Proposed changes must be submitted in writing to Area/Resident Engineer or ROICC and accepted.
8. Administration of the QC Plan is the sole responsibility of the contractor.

vi. Punch-Out Inspection
1. Deficiencies noted by QC Manager
a. Corrected prior to Pre-final/Final Inspection
2. Pre-final/Final Inspection
a. Conducted with contractor, Government, and using agency or customer personnel.
b. Additional punch-list items noted.
c. Payment withheld until corrected.

D. Government Quality Assurance
E. Discussion

Appendix E “What Right Looks Like”

01 45 00.00 10 - QUALITY CONTROL: Maintain current records providing factual evidence that required quality control activities and/or tests have been performed. Include in these records the work of subcontractors and suppliers on an acceptable form that includes, as a minimum, the following information: (a-k below)

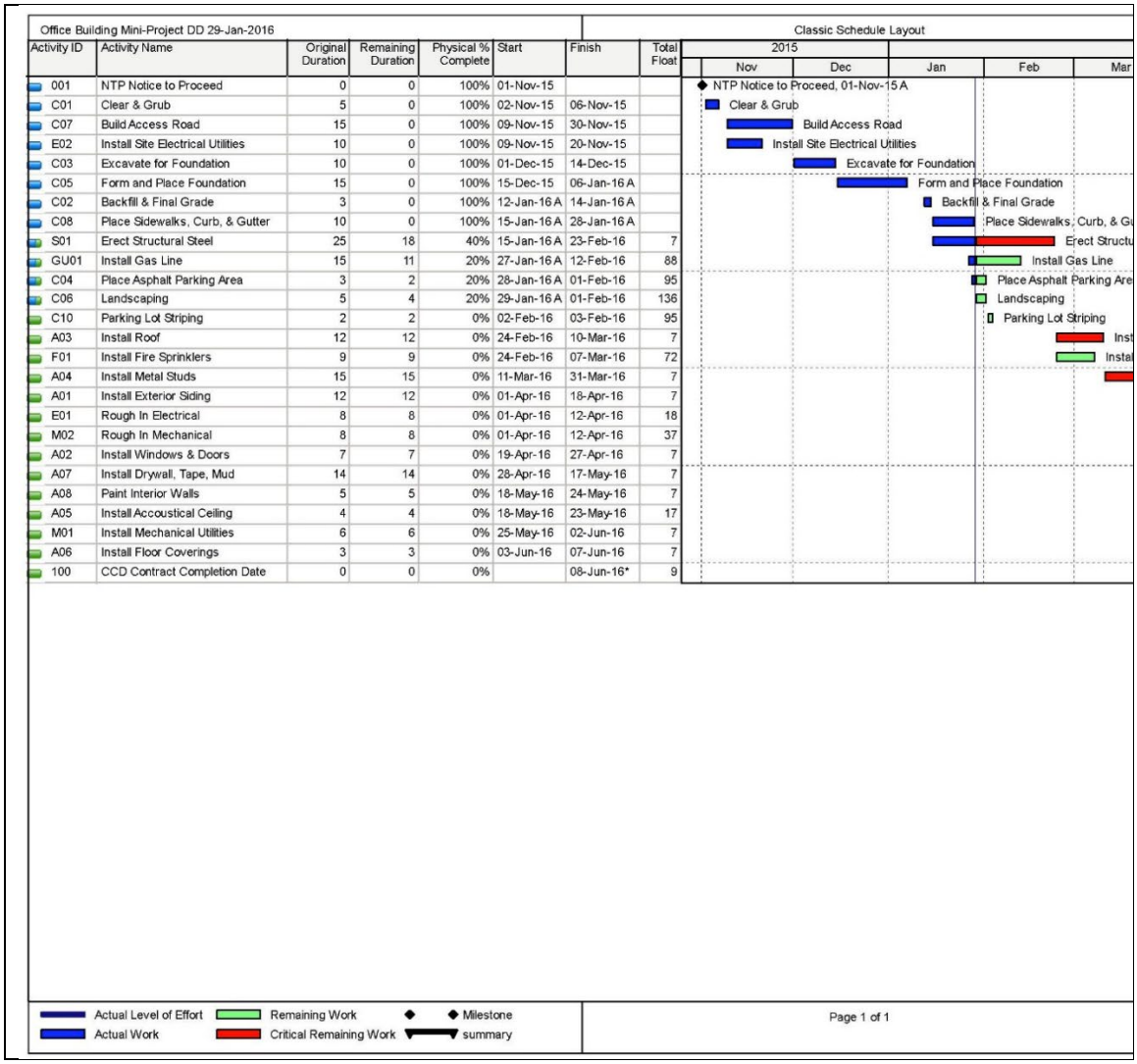
a) Contractor/subcontractor and their area of responsibility.
b) Operating plant/equipment with hours worked, idle, or down for repair.
c) Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
d) Test and/or control activities performed with results and references to specifications/drawings requirements. Identify the control phase (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action.
e) Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements
f) Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
g) Offsite surveillance activities, including actions taken.
h) Job safety evaluations stating what was checked, results, and instructions or corrective actions.
i) Instructions given/received and conflicts in plans and/or specifications.
j) Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identification of the Independent Technical Review (ITR) team, the ITR review comments, responses and the record of resolution of the comments.
k) Contractor's Verification Statement.

Indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. Furnish the original and one copy of these records in report form to the Government daily within [_____] hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed.* As a minimum, prepare and submit one report for every 7 days of no work and on the last day of a no work period. All calendar days must be accounted for throughout the life of the contract. The first report following a day of no work will be for that day only. Reports must be signed and dated by the CQC System Manager. Include copies of test reports and copies of reports

prepared by all subordinate quality control personnel within the CQC System Manager Report.

Coordinate with the COR on the specific contract for how to handle contract documentation.

Project Schedule: QC documentation should “mirror” the Project Schedule. If work is coming up, getting started or in process then documentation of quality control activities is required. The schedule presented below was developed to support the initial, preparatory and daily report examples that follow for a fictitious example project.



Office Building Mini-Project DD 29-Jan-2016 — Classic Schedule Layout

Activity ID	Activity Name	Original Duration	Remaining Duration	Physical % Complete	Start	Finish	Total Float
001	NTP Notice to Proceed	0	0	100%	01-Nov-15		
C01	Clear & Grub	5	0	100%	02-Nov-15	06-Nov-15	
C07	Build Access Road	15	0	100%	09-Nov-15	30-Nov-15	
E02	Install Site Electrical Utilities	10	0	100%	09-Nov-15	20-Nov-15	
C03	Excavate for Foundation	10	0	100%	01-Dec-15	14-Dec-15	
C05	Form and Place Foundation	15	0	100%	15-Dec-15	06-Jan-16 A	
C02	Backfill & Final Grade	3	0	100%	12-Jan-16 A	14-Jan-16 A	
C08	Place Sidewalks, Curb, & Gutter	10	0	100%	15-Jan-16 A	28-Jan-16 A	
S01	Erect Structural Steel	25	18	40%	15-Jan-16 A	23-Feb-16	7
GU01	Install Gas Line	15	11	20%	27-Jan-16 A	12-Feb-16	88
C04	Place Asphalt Parking Area	3	2	20%	28-Jan-16 A	01-Feb-16	95
C06	Landscaping	5	4	20%	29-Jan-16 A	01-Feb-16	136
C10	Parking Lot Striping	2	2	0%	02-Feb-16	03-Feb-16	95
A03	Install Roof	12	12	0%	24-Feb-16	10-Mar-16	7
F01	Install Fire Sprinklers	9	9	0%	24-Feb-16	07-Mar-16	72
A04	Install Metal Studs	15	15	0%	11-Mar-16	31-Mar-16	7
A01	Install Exterior Siding	12	12	0%	01-Apr-16	18-Apr-16	7
E01	Rough In Electrical	8	8	0%	01-Apr-16	12-Apr-16	18
M02	Rough In Mechanical	8	8	0%	01-Apr-16	12-Apr-16	37
A02	Install Windows & Doors	7	7	0%	19-Apr-16	27-Apr-16	7
A07	Install Drywall, Tape, Mud	14	14	0%	28-Apr-16	17-May-16	7
A08	Paint Interior Walls	5	5	0%	18-May-16	24-May-16	7
A05	Install Accoustical Ceiling	4	4	0%	18-May-16	23-May-16	17
M01	Install Mechanical Utilities	6	6	0%	25-May-16	02-Jun-16	7
A06	Install Floor Coverings	3	3	0%	03-Jun-16	07-Jun-16	7
100	CCD Contract Completion Date	0	0	0%		08-Jun-16*	9

Appendix E

Sample Preparatory Phase Checklist

Contract No: W911KB-15-C-xxxx Date: 15 Jan 2016

Definable Feature: **GAS LINE INSTALLATION**

Spec Section:

01 35 26	Governmental Safety Requirements
01 50 00	Temporary Construction Facilities and Controls
01 57 20.00 10	Environmental Protection
01 57 23	Temporary Storm Water Pollution Control
31 23 00.00 20	Excavation and Fill
32 12 16	Hot-Mix Asphalt (HMA) for Roads
32 16 13	Concrete Sidewalks and Curbs and Gutters
33 11 23	Natural Gas and Liquid Petroleum Piping

Government Rep Notified: 48 Hours in Advance? YES

Personnel Present

Name	**Position**	**Company/Government**
Greg	Project Manager	Quality R US (QRUS)
Frank	CQCSM	Quality R US (QRUS)
Shirley	Project Superintendent	Quality R US (QRUS)
Richard	Administration, QC	Quality R US (QRUS)
Bob	QAR	Corps of Engineers (COE)
Jim	Installation Rep	3CES/CECCG
Staff Sergeant Jones	Installation Rep	3CES/CECCG
Karl	Subcontractor	RGB Contracting
Ron	Subcontractor	Walker Paving
Kurt	Testing Agency	Independent Testers Lab (ITL)
Nathan	Testing Agency	Independent Testers Lab (ITL)

Submittals

Review submittals and/or submittal log ENG Form 4288-R. Have all submittals been approved?

Yes

If No, what items have not been submitted? **None**

Are all materials on hand? **No materials are on site yet. Pipe will be delivered next week. Subcontractor has not mobilized to the site to date. Mobilization depends on pipe delivery. According to Karl of RGB Contracting the HDPE pipe should arrive at the Port via barge on Wed., 27 Jan 16.**

If No, what items are missing? **HDPE piping.**

Check approved submittals against delivered material. (This should be done as material arrives.)

Comments: **CQCSM will check materials and equipment when they arrive on site.**

Material Storage

Are materials stored properly? **See response above.**

Specifications

Review each paragraph of specifications.

Road closure notification was made but will be revised due to delivery date of pipe. 7-day notice will be provided as specified.

Utility tie in requires 7-day notice. Notice will be provided for tie in.

Discuss procedure for accomplishing the work.

Utility Locates

Work Clearance Request process is being handled by Richard X. (CQC). We still need Comm and Electrical locates. Locates for Comm are about one-half complete and are scheduled to continue Monday, morning, 25 Jan 16 0830 hours. Electrical locates are scheduled to be completed by 27 Jan 16.

Government QAR (Bob) talked about the 2 extra isolation valves issue addressed in RFI -002. Bob indicated that he hoped to have a positive answer by this afternoon. Bob will contact QRUS Project Manager (Greg) with the information.

SAP Plan will be turned by early next week. Still need testing information for concrete and asphalt. These will follow.

Also need Nuke density testing certification. CQCSM will follow up.

Mobilizations and Road Closures

Road Closure notification was submitted on 18 Jan 16 by RGB Contracting (Karl). This will change as delivery of the piping has been pushed back till next Wednesday. Karl will re-submit road closure dates with the required 7-day notice. This information will be submitted to the QAR, (Bob). Karl. also stated that he would like to bore at some locations depending on utility locate information.

Excavation/Pipe Installation

RGB hopes to lay approximately 2,500 lf of pipe per day if all site conditions are favorable.

Work will begin at Apple Street and proceed NW to Lincoln then North to Walnut and around.

QRUS surveyor has established all control points.

Soil density testing will be as shown in specification Section 31 23 00.00 20.

CQCSM, QAR, and RGB superintendent will walk site immediately following this meeting to identify what landscaping will be impacted by the excavation. QRUS will accomplish Landscape replacement immediately upon completion of Gas Line.

Locations of bioventing wells will be staked and flagged. QRUS (Richard) will identify locations from map.

RGB (Karl) will be on site to document and take record photos of the installation.

CQC (Frank) will use a small PID ("sniffer") to check soil as excavation proceeds. Any reading that exceeds 30 parts per million, he will call an ITL qualified testing technician. Any contaminated soil that is removed from the trench will be stockpiled on a plastic liner and covered. RGB will carry plastic in one of their trucks just in case. 3CES (Jim) requested that either he or the Staff Sergeant Jones be notified immediately if an environmental issue arise.

Pipe will be bedded with fill that is less than 1 ½" in diameter.

Paving of any roadways or parking lots will be accomplished by subcontractor Walker Paving per Specification Section 32 12 16. Any road closures will be submitted with 7-day notification. Asphalt testing will be done by ITL per DOT requirements.

Sidewalk and curb and gutter replacement will be accomplished by subcontract ABC Concrete per Specification Section 32 16 23. Concrete testing will be done by ITL per DOT requirements.

Pressure testing of gas piping will be accomplished by RGB per specification Section 33 11 23.

As-built drawings will be submitted when gas line installation is complete.

Clarify any differences. **None.**

Preliminary Work and Permits

Ensure preliminary work is correct and permits are on file.

3WG Form 3 "Base Civil Engineering Work Clearance Request" will be posted in Project Office and a copy will be submitted to QAR.

If not, what action is taken? **N/A**

Testing

Identify test to be performed, frequency and by whom.

Soils density testing will be performed per attached and specification section 31 23 00.00 20.

Asphalt testing will be performed per specifications Section 32 12 16.

Concrete testing will be performed per specification Section 32 16 13.

Gas piping will be performed per specification Section 33 11 23.

***Testing information will be submitted separately.

When Required? **Information to follow.**

Where required?

Review Testing Plan. **YES**

Has test facilities been approved? **YES**

Safety

Review applicable portion of EM 385-1-1.

Job/Activity Hazard Analysis was reviewed.

"Installation Special Requirements for Contractors" was reviewed (vehicle passes, "FOD" hazard, do not cross Red Line, Emergency Phone numbers)

Emergency Phone Numbers

Fire or Utility shutdown: Dial 911 from Base Phone or (xxx) 789-1234 from CELL phone.

Environmental

Primary (xxx) 123-4444

Secondary (xxx) 345-6666

Quality R US Safety Program – Safety Meetings are mandatory at 1230 hours each Monday. We will have our first meeting when subcontractor RGB is mobilized and on site.

Activity Hazard Analysis approved: **YES**

Corps of Engineers comments during meeting. **Safety First. Communicate always and remember that no one can change the contract requirements but the Contracting Officer**.

_____

Frank X.

Quality Control Systems Manager

Quality R US

Appendix E

Sample Initial Phase Checklist

Contract No: W911KB-15-C-xxxx Date: 29 Jan 2016

Definable Feature: **GU01 GAS LINE INSTALLATION**

Spec Section:

01 35 26	Governmental Safety Requirements
01 50 00	Temporary Construction Facilities and Controls
01 57 20.00 10	Environmental Protection
01 57 23	Temporary Storm Water Pollution Control
31 23 00.00 20	Excavation and Fill
32 12 16	Hot-Mix Asphalt (HMA) for Roads
32 16 13	Concrete Sidewalks and Curbs and Gutters
33 11 23	Natural Gas and Liquid Petroleum Piping

Government Rep Notified: 24 Hours in Advance? YES

Personnel Present

Name	**Position**	**Company/Government**
Greg	Project Manager	Quality R US (QRUS)
Frank	CQCSM	Quality R US (QRUS)
Shirley	Project Superintendent	Quality R US (QRUS)
Richard	QC	Quality R US (QRUS)
Bob	QAR	Corps of Engineers (COE)
Jim	Installation Rep	3CES/CECCG
Staff Sergeant Jones	Installation Rep	3CES/CECCG
Dave	Foreman	RGB Contracting
Ron	Subcontractor	Walker Paving
Kurt	Testing Agency	Independent Testers Lab (ITL)
Nathan	Testing Agency	Independent Testers Lab (ITL)

Identify full compliance with procedures identified at preparatory. Coordinate plans, specifications and submittals. **Contractor is following procedures and contract documents. See attached Preparatory Phase Checklist for reference.**

Trench backfill compaction checked by ITL with nuclear densometer – all results meet contract document requirement of 95% compaction.

Trench backfill being placed in 6” lifts under structures and paved areas and 12” maximum lifts in the other areas per contract requirements.

Preliminary work. Ensure preliminary work is complete and correct. If not, what action is taken? **Preliminary work is complete and submitted. Items that were still in progress after the preparatory are listed below:**

Utility locates – completed

RFI-002, Isolation Valves has been answered and a modification is forthcoming to add the (2) valves.

SAP plan was finally approved last week by State EPA

Road closure notifications have been made.

Locations of bioventing wells have been staked and flagged and are now annotated on the site plan

Photo record of route has been completed

Establish level of workmanship.

Workmanship is satisfactory and complete per contract documents. Photographs were taken and are attached to this report to document agreed upon level of workmanship.

Where is work located? **Gas line excavation and installation began at Apple Street and 18th and will continue as shown on drawings via Lincoln, then Walnut, then Freedom Blvd. to 18th and Magnolia.**

Resolve any differences

None.

Check Safety

Review job conditions using EM 385-1-1 and job hazard analysis.

Safety meeting was held at site today. Emergency Response procedures and safety program and installation heightened security requirements were covered. Barricading open trenches was also discussed. RBG personnel are using appropriate PPE.

Frank

Quality Control Systems Manager

Quality R US

CONTRACTORS QUALITY CONTROL REPORT (QCR) **DAILY LOG OF CONSTRUCTION – MILITARY**	REPORT NUMBER 090 Page xx of xx DATE 29 January 2016
PROJECT Office Building Mini Project Example	CONTRACT NUMBER W911KB-15-C-9999 NA

01 45 00.00 10
3.9 DOCUMENTATION
Maintain current records providing factual evidence that required quality control activities and/or tests have been performed. Include in these records the work of subcontractors and suppliers on an acceptable form that includes, as a minimum, the following information (a-k below):
...
Indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. Furnish the original and one copy of these records in report form to the Government daily within [ ] hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, prepare and submit one report for every 7 days of no work and on the last day of a no work period. All calendar days must be accounted for throughout the life of the contract. The first report following a day of no work will be for that day only. Reports must be signed and dated by the CQC System Manager. Include copies of test reports and copies of reports prepared by all subordinate quality control personnel within the CQC System Manager Report.

QC NARRATIVES <u>Activities in Progress</u> > C08 Place Sidewalks, Curb & Gutter: ABC Concrete performing final cleanup and starting to demobilize. > S01 Erect Structural Steel: Statewide Erectors setting columns along A line between grids 6 and 10. > C04 Place Asphalt Parking Area: Walker Paving started laying down A/C in south parking area. > C06 Landscaping: Jones Landscaping placing and spreading topsoil on north side of site adjacent to green belt. Also planting shrubbery. > GU01 Install Gas Line: RGB Contracting continuing with trench excavation and laying pipe. No issues. Initial inspection held today.	*c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.*
<u>Materials Received</u> 05 21 00 STEEL JOIST FRAMING: First shipment of open web steel roof joists arrived. Piece count consistent with shipping documents. No damage noted. Stored onsite on protective cribbing with top chord down and the larger joists (36") on their side per 05 21 00 paragraph 1.4.	*e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.*
<u>Submittals</u> No submittals were reviewed today.	*f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.*
<u>Offsite Surveillance Activities</u> Mechanical subcontractor QC representative (Sam Rogers) is at AHU supplier to verify compliance for the large AHUs that will be installed in the penthouse.	*g. Offsite surveillance activities, including actions taken.*

Job Site Safety Evaluations See attached Daily Safety Report prepared by Jim Smith (SSHO)	h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
Instructions given/received Received an answer from the government on RFI-063, "Sealing of Vapor Barrier" at penthouse eave condition.	*i. Instructions given/received and conflicts in plans and/or specifications.*
Design Quality Control N/A	*j. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identification of the Independent Technical Review (ITR) team, the ITR review comments, responses and the record of resolution of the comments.*
PREP/INITIAL DATES (Preparatory and initial dates held and advance notice) Preparatory Inspections: C10 Parking Lot Striping to start next week. Preparatory scheduled for 1 Feb. Advance notice provided to QAR today via email. Initial Inspections: (I) C04 Place Asphalt Parking Area: An initial inspection was conducted at 0800 hours in the south parking area. See attached meeting minutes and sign in sheet. (I) GUO1 Install Gas Line: An initial inspection was conducted at 0900 hours. See attached meeting minutes and sign in sheet.	*d. Test and/or control activities performed with results and references to specifications/drawings requirements. Identify the control phase (Preparatory, Initial, Follow-up) ...*
ACTIVITY START/FINISH Started Today C06 Landscaping Finished Today No activities finished today	
QC REQUIREMENTS (QC Tests, User Schools) (F) C04 Place Asphalt Parking Area: A follow-up was conducted at 1400 hours in the west parking area. CQCSM observed Independent Test Laboratory (ITL) taking samples and tests as required per 32 12 16 paragraph 3.11; in-place density, laboratory air voids, grade and smoothness. Results are due back Monday. (FF) C08 Place Sidewalks, Curb & Gutter: Final follow-up conducted between 1400 and 1430. The following were in attendance: CQCSM, superintendent for ABC Concrete, government QA and PE. All deficiencies have been cleared no new deficiencies found.	*d. Tests …. performed with results and references to specifications/drawings requirements. Identify the control phase (Preparatory, Initial, Follow-up) ...*

(F) S01 Erect Structural Steel: A follow-up inspection was conducted along grid line A between grids 6 and 10. Direct Tension Indicator Washers (DTIWs) at Grid A/8 for the beam to column high strength bolted connections were found to be installed under the turned nut which is incorrect (05 12 00 paragraph 3.2.2.1). QC deficiency QC-0021 was created for tracking.

(F) C06 Landscaping:
1) 32 93 00 Exterior Plants, paragraph 3.3 Plant Bed Preparation. Verified depth of plant pit and all plant material per paragraph 3.4 Plant Installation. No deficiencies noted.
2) 32 93 00 Exterior Plants. Paragraph 2.2.2 On-Site Topsoil. Verified final grade and 6" required depth for all parking lot islands per drawing L01.

(F) GU01 Install Gas Line: 33 11 23 Natural Gas and Liquid Petroleum Piping. Conducted follow-up inspection late pm and verified pipe burial depth/elevation as well as the bedding material w/r to under pipe depth and compaction. Trench backfill being placed in 12" lifts in non-traffic areas. No deficiencies noted.

QA/QC DEFICIENCY (Describe QC Deficiency items issued, Report QC and QA Deficiency items corrected)

d. ...List of deficiencies noted, along with corrective action.

Item No.	Location	Description
QC-0021	Grid A/8	DTIWs incorrectly installed

CONTRACTORS ON SITE (Report first and/or last day on site today)
Quality R US (prime)
ABC Concrete
Statewide Erectors
Walker Paving
Jones Landscaping
Independent Test Laboratory*

* First day on-site
** Last day on site (none)

a. Contractor/subcontractor and their area of responsibility.

LABOR HOURS
The following labor hours were Reported Today

Employer	Labor Classification	Number of Employees	Hours Worked
Quality R US	Project Superintendent	1	10
Quality R US	Quality Control Manager	1	10
Quality R US	Laborer	2	20
Quality R US	Carpenters	2	20
ABC Concrete	Cement Mason	2	20
Statewide Erectors	Ironworkers	6	60
Walker Paving	Paver	4	40
Jones Landscaping	Landscapers	2	20

Independent Test Lab.	Engineer Tech	1	10
RGB Contracting	Foreman	1	10
RGB Contracting	Operators	2	20
RGB Contracting	Laborers	2	20
TOTAL		26	260

EQUIPMENT HOURS

The following equipment hours were reported today:

b. Operating plant/equipment with hours worked, idle, or down for repair.

Equipment	**Hours**
Forklift (1)	10
Pickup (3)	30
Genie Lift (1)	10
Paver (1)	10
Dump truck (1)	10
Bob Cat (2)	20
Backhoe (1)	10
Front end loader (1)	10

ACCIDENT REPORTING (Describe accidents)
No accidents were reported today

CONTRACTOR CERTIFICATION	**On behalf of the contractor, I certify that this Report is complete and all equipment and material used and work performed during this Reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.**	*k. Contractor's Verification Statement*

QC REPRESENTATIVES SIGNATURE	DATE	SUPERINTENDENT'S INITIALS	DATE

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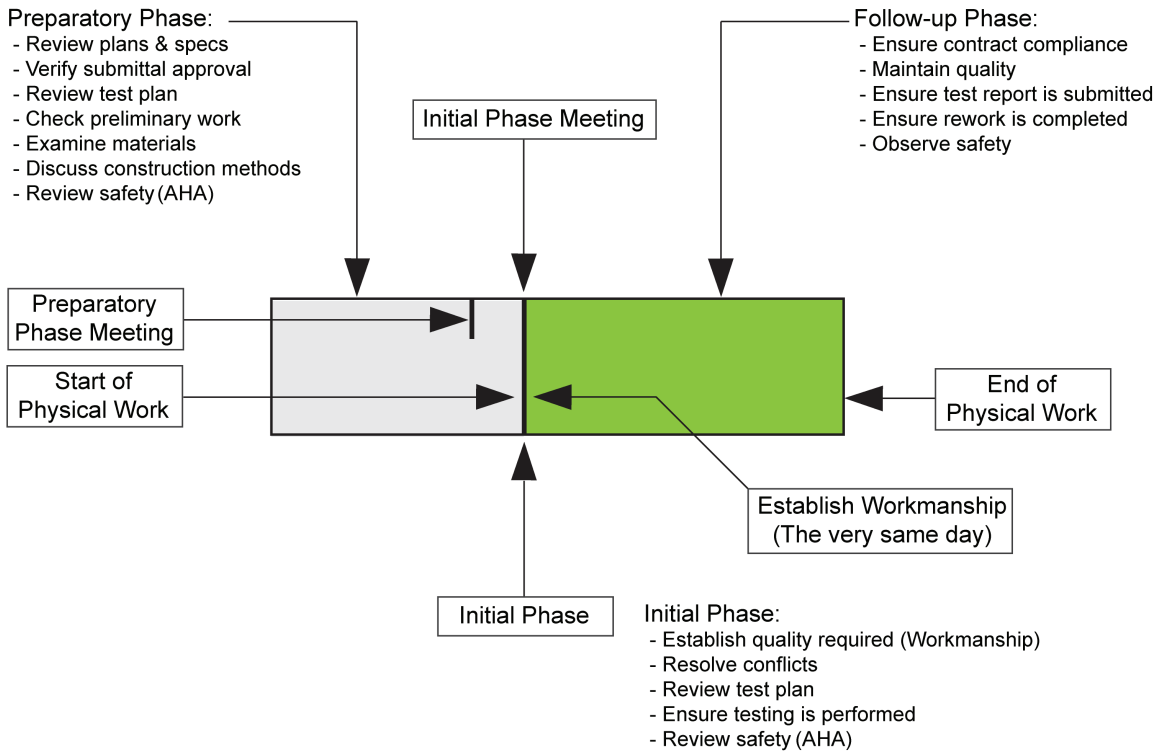
Three Phases - **What is involved?**



Three Phases - **Who is involved?**