23 April 2010

US Army Corps of Engineers®
Middle East District

Engineering Division

DESIGN QUALITY CONTROL PLAN

PROJECT NAME: [NAME]

PROJECT LOCATION: [LOCATION]

CONSTRUCTION CONTRACT TYPE: Design Bid Build

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1.0
QUALITY CONTROL

1.1 Purpose

This Design Quality Control Plan (QCP) outlines the general guidelines associated with ensuring a quality design is produced for the [Insert project name here.] This plan also documents the interdisciplinary parties responsible for the design and the quality of the design. Quality controls from each discipline are incorporated into every phase of the design to ensure quality.

1.1.1 Project Scope

[Insert project scope here]

1.2 References

MED guidelines and requirements followed are all outlined in:

1. ER 1110-1-12, USACE Engineering and Construction Quality Management Regulation, 21 July 2006.
2. Engineering Division Procedures Manual

1.3 Responsibilities

Engineering (EN) Division has the responsibility for accuracy and completeness of this design including calculations, file keeping and other key points. Each project delivery team (PDT) member has the responsibility for carrying out the functions associated with their assigned position and of implementing all procedures correctly which are needed to carry out this design to the best of their abilities and to the highest level of quality possible. Each PDT member will be responsible for completing their own design analysis and design checklist. See reference 2 for more information on the technical coordinator and PDT responsibilities.

1.4 Basis of Design

The design will be based on customer requirements, field investigations, cost constraints, technical and general requirements. All applicable codes (documented in the design analysis), regulations, standards, guidelines, and specifications will be applied during the design of this project [or the reasons for why they are not applied will be documented in this plan]. The project's DD Form 1391 is also a crucial part of the basis of this design. [Describe all assumptions, crucial design features, and special/unique considerations for this specific project here!]. Describe any waivers that will be used for this design and state who is responsible for providing the waiver. Waiver should be provided in the design analysis.

If using a previous project's design to leverage off of to use for this project's design state so and note which previous design will be used as leverage. Also include all design calculations and analysis that was used in the previous design and include it within this project's design analysis.

LEED considerations as specified by the customer directly or via the DD Form 1391 will also be incorporated into the design. State that there were no LEED requirements if there is no requirement for LEED certification.

1.4.1 Consultants

List any outside consultants that will contribute to the design of this project. Consultants are AE firms, other districts, any centers of expertise (Omaha). Describe their role in this design. List the disciplines or areas of expertise that they will be responsible for. Or state that no outside consultants are required for this design. If any communication design is required, state so and list United States Army Information Systems Engineering Command Fort Detrick, MD as a consultant (this is who Chip and Mike work for).

1.5 Methods

Methods for computations and calculations:

All will be:

- Clear
- Organized

- Referenced accordingly

Design aids:

- (If applicable)

Computer:

- Geotrans- used for coordinate transformation
- Inroads- used for grading, earth quantities and profiles
- Global Mapper- for image conversions
- ArcView- for GIS files
- Pipe-Flow- for pump and pipe designs
- TRACE 700 – for calculating heat/cooling loads
- CAPS – for fan size calculations
- Engineering Tool Box – for sizing HVAC package sizes
- PowerCivil- for site planning (similar to Inroads)
- AeroTurn- for designing airfields
- AutoTurn- for designing roads and parking areas
- Google Earth Pro- for locating sites and adjacent facilities
- PCASE- for pavement designs
- CSANDSET- for foundation designs
- PC CCost (1391 Parametric Estimate)- for preperation of and editing 1391's for MILCON programming process
- PACES- (Design Build, ROM, Budget Estimates) for parametric construction estimates/budgetary estimates/ROM estimates/design-build RFP solicitations. PACES is a comprehensive program incorporating cost models for new construction, alteration and renovation. The user can develop cost estimates for: Building facilities, site work, building renovation and Life Cycle cost.
- MII Estimating Software- for detail estimates
- HII/HAG (or Historical Analysis Generator-Second Generation)- is the Tri-Service Cost Engineering community's central electronic repository for the collection of historical construction cost information for military projects. Data contained within HII is used to develop the Office of Secretary of Defense Unit Price Guidance book which is published annually and used by installation planners to develop planning estimates for the DD1391. HII may also be accessed by any Tri-Service cost engineer to query the database for information they may find helpful for the development of military

construction cost estimates. Submission, approval and analysis of historical construction data is performed entirely online.

1.5.1 Quality Reviews

Peer, client, branch chief, BCOE, and independent technical reviews (see section 3) will all occur for this design. All are designed to minimize errors, highlight/resolve design scope conflicts, highlight/resolve constructability issues, and ensure the package is complete. In other words these reviews are an important means of ensuring that EN's designs are of the highest level of quality. The branch chiefs are responsible for assigning the peer reviewers. They are listed in the table below.

Peer Reviewers

Discipline	Name	Phone Number
Architectural		(540) 665-
Mechanical		(540) 665-
Fire Protection/Safety		(540) 665-
Civil		(540) 665-
Electrical		(540) 665-
Communications		(540) 665-
Structural		(540) 665-
Geotechnical		(540) 665-
Specifications		(540) 665-
Cost Engineer		(540) 665-

1.5.2 Design Checklist

Each discipline will follow their respective design checklists. The design checklists are the primary means of ensuring a consistent level of quality is embedded in the design. The checklists will be filled out and attached to the design analysis.

1.5.3 Quality Control Plan Monitoring

This plan is a living document and will be discussed periodically at team meetings and updated as needed. At a minimum this plan will be reviewed and updated (if necessary) at design submittal stages.

Revision History

Item	Section	Revision	Date
1	A	Added QC Manager Signature Line	April 23, 2010

2			
3			
4			

1.5.4 Record Keeping and Filing

All paper computations and drawings, once reviewed and approved, will be captured by electronically scanning them and saving them in a read only format in the project record file folder on a designated server (i.e. SharePoint). This QCP will also be stored electronically on a designated server for archiving and information sharing purposes.

1.6 Project Design Risk

Risk is the potential inability to achieve the customer's objectives within defined cost, schedule, and technical constraints. It has two components 1) the probability of failing to achieve an outcome and 2) the consequence or impact of failing to achieve this outcome. EN will use a three tiered scale for both components coupled with a green, yellow and red color code. The probability component will be rated as negligible (green), likely (yellow) and near certainty (red). The impact component will be rated as low (green), moderate (yellow) and high (red). The technical coordinator with input from the PDT and the PM will identify and rate each risk. Methods for mitigating identified risks should also be developed. The table below lists all the risks for this project design and the methods that will be used to mitigate the risks.

RISK 1. Change in Project Scope/Change in Customer Requirements		
Probability of Occurrence	**Impact**	**Description of Impact**
		• Design re work or modification required. • Schedule slip
		Mitigation Method(s)
Near Certainty	High	• Maintain constant communication with customer. Solicit feedback frequently.
RISK 2. Lack of Site/Field Investigations/Design Charrette		
Probability of Occurrence	**Impact**	**Description of Impact**
		• Design re work or modification required. • Schedule slip
		Mitigation Method(s)
Negligible	Moderate	• Conduct design charrette early.
RISK 3. Insert Here		

Probability of Occurrence	Impact	Description of Impact
		• Design re work or modification required. • Schedule slip
		Mitigation Method(s)
Near Certainty	High	• Maintain constant communication with customer. Solicit feedback frequently.

2.0 PROJECT TEAM

2.1 Project Delivery Team

The project delivery team member disciplines, names and contact information are listed in the table below.

[Insert team members' names and phone numbers into table below.]

Discipline	Name	Phone Number
Project Manager		(540) 665-
Insert Client POC Title		
Technical Coordinator		(540) 665-
District POC (i.e. AED POC)		
Architectural		(540) 665-
Mechanical		(540) 665-
Fire Protection/Safety		(540) 665-
Civil		(540) 665-
Electrical		(540) 665-
Communications		(540) 665-
Structural		(540) 665-
Geotechnical		(540) 665-
Specifications		(540) 665-
Cost Engineer		(540) 665-

3.0
INDEPENDENT TECHNICAL REVIEW

3.1 Purpose

The primary objectives of an Independent Technical Review (ITR) are to ensure that:

- The design matches the scope (i.e. DD Form 1391).
- The project meets the applicable codes and engineering practice.
- Concepts, features, methods, analyses, details and project costs are appropriate, valid, fully coordinated, and correct.
- All relevant engineering and scientific disciplines have been effectively integrated.
- Appropriate computer models and methods of analysis were used and basic assumptions are valid and used for the intended purpose.
- The source, amount, and level of detail of the data used in the analysis are appropriate for the complexity of the project.
- Content is sufficiently complete for the applicable design milestone of the project and provides an adequate basis for future development effort.
- Project documentation is appropriate and adequate for the design milestone.
- Any deviation from guidance and standards are identified and properly approved.

The primary focus of the ITR is on significant deficiencies, but comments on the presentation of drawings, minor numerical errors and spelling, grammar and formatting errors are encouraged.

3.2 ITR Team

The ITR for this design will be done [internally, by another district, or by Name of AE firm]. The ITR team members are listed in the table below.

Discipline	**Preliminary**	**Final**
ITR Team Leader	Name	Name
Architecture	Name	Name
Mechanical	Name	Name
Fire Protection	Name	Name
Civil	Name	Name
Electrical	Name	Name
Communications	Name	Name

Structural	Name	Name
Geotechnical	Name	Name
Specifications	Name	Name
Cost Engineer	Name	Name

3.3 ITR Responsibilities

The responsibilities of the primary parties involved with this process are discussed in reference 2. The responsibilities of everyone involved with the ITR must be adhered to in order for the ITR to add quality to the design.

3.4 ITR Process

See reference 2 for the procedure for conducting an ITR. Incorporating the ITR comments will improve the quality of EN designs.

4.0 SIGNATURES

4.1 Signatures of Concurrence

Concur:

_______________________________	____________
(QC Manager)	Date
_______________________________	____________
(Tech Coord) Architectural	Date
_______________________________	____________
Communications	Date
_______________________________	____________
Mechanical	Date
_______________________________	____________
Structural	Date
_______________________________	____________
Fire Protection	Date
_______________________________	____________
Geotechnical	Date

____ ____________
Civil Date

Specifications Coord Date

Electrical Date

Cost Engineer Date

4.2 Statement of Certification

I certify that this QCP has been checked by a senior architect for inter and intra disciplinary coordination and that I have assigned a peer reviewer for the discipline(s) within my branch.

Architectural Branch Chief Date

I certify that this QCP has been checked by a senior electrical engineer for inter and intra disciplinary coordination and that I have assigned a peer reviewer for the discipline(s) within my branch.

Electrical Branch Chief Date

I certify that this QCP has been checked by a senior mechanical and a senior fire protection engineer for inter and intra disciplinary coordination and that I have assigned a peer reviewer for the discipline(s) within my branch.

____ ______________

Building Systems Branch Chief Date

I certify that this QCP has been checked by a senior structural and a senior geotechnical engineer for inter and intra disciplinary coordination and that I have assigned a peer reviewer for the discipline(s) within my branch.

____ ______________

Structures/Geotech Branch Chief Date

I certify that this QCP has been checked by a senior civil engineer for inter and intra disciplinary coordination and that I have assigned a peer reviewer for the discipline(s) within my branch.

____ ______________

Civil Branch Chief Date

I certify that this QCP has been checked by a senior cost estimator for inter and intra disciplinary coordination and that I have assigned a peer reviewer for the discipline(s) within my branch.

____ ______________

Technical Services Branch Chief Date