

MSD Wastewater Engineering

Designer Quality Control Plan Guidelines

Guidelines, as defined for this manual, are detailed minimum requirement to implement a Designer Quality Control Plan

7/9/2014

Quality Control Plan Acknowledgement Form

Project Name:	
Design Status:	
Project Number:	

The undersigned have read and concur with this Quality Control Plan:

_____ Date

_____ Date

_____ Date

_____ Date

_____ Date

_____ Date

Table of Contents

Cover	1
Quality Control Plan Acknowledgement Form	2
Table of Contents	3
Section 1 – Introduction	
1.1 Purpose	4
1.2 Roles and Responsibilities	4
Section 2 – Minimum Requirements	
(Consultant QC Plan must have these EXACT headings in the order shown)	
2.01 Project Description	6
2.02 Lead Consultant’s Quality Control Organization	6
2.03 Project Team	6
2.04 List of Deliverables, Responsible Persons, Completion Dates	6
2.05 Design Review Process	6
2.06 Document Control	6
2.07 Sub Consultant Quality Control	7
2.08 Computer Aided Design (CAD) Management	7
2.09 Schedule Management	7
2.10 Field Survey Quality Control	7
2.11 Quality Control Check Process	7
Checklists/Forms	
Design Quality Control Checklist	8
MSDGC Easement Checklist	11
Quality Control Sign-Offs Form for Design Submittals	13
QC Verification Letter Example	14

Section 1 - Introduction

1.1 Purpose

The purpose of these guidelines is to assist the consultant-led project team in creating a project specific Designer Quality Control Plan for preconstruction activities. These guidelines represent **minimum** requirements for plan implementation. The Design Consultant's corporate officer responsible for quality merges these guidelines with corporate Quality Assurance/Quality Control requirements. The Design Consultant is responsible for the overall quality of the final design product and is required to incorporate the review of all sub-consultant's work into the project specific Designer Quality Control plan.

A well-structured Designer Quality Control Plan helps to ensure that designs are economical, constructible, maintainable and appropriate for their locations and surroundings. The project team is required to submit the project specific Designer Quality Control Plan to MSDGC Document Control.

MSDGC's Quality Assurance Engineer approves the project specific Designer Quality Control Plan prior to the Consultant starting any design work. Adherence to the project specific Designer Quality Control Plan is required regardless of schedule or deadlines.

The project specific Designer Quality Control Plan assists with the verification that the design and project documents are produced with due diligence using acceptable industry standards, appropriate techniques, available resources and reasonable decisions by competent professionals. The project specific Designer Quality Control Plan is a process tool and does not replace the sound judgment and experience of competent professionals. It is the project design team's responsibility to ensure the quality of project documents **before** they are submitted to MSDGC.

MSDGC reserves the right to audit the Design Consultant for compliance with Quality Assurance/Quality Control procedures as provided in the Master/Professional Services Agreement. No additional compensation is provided to the Design Consultant for time or materials associated with the audit.

1.2 Roles and Responsibilities

1.2.1 Designer's Corporate Officer Responsible for Quality:

- Prepares and administers corporate quality standards.
- Reviews project specific Designer Quality Control Plans for compliance with corporate policies/standards.

1.2.2 Quality Assurance Manager:

- Verifies that all project documents were checked in accordance with the Quality Assurance/Quality Control procedures.
- Cannot perform **ANY** of the Quality Control Procedures.

1.2.3 Engineer of Record:

- Responsible for the design.
- Stamps the final plans and calculations.
- Licensed in the State of Ohio

1.2.4 CAD Manager:

- Verifies that all project drawings follow MSDGC's CAD Standards (conveyance projects) or National CAD Standards (treatment projects) and the project Specific CAD Management Plan.
- Develops a CAD management strategy to unify the project teams CAD work (including sub-consultants).

1.2.5 Project Team Design Leader:

- Typically is the Project Manager for the Design Consultant.
- Implements the Quality Assurance/Quality Control Procedures.

1.2.6 Discipline Design Lead:

- Ensures Quality Assurance/Quality Control procedure compliance within their specialized discipline (including sub-consultants).
- Monitors design activities for compliance with criteria and standards.
- Verifies that assigned personnel are capable of performing the required analysis or calculations.
- Releases the completed contract documents for their specialized discipline (Do not release any contract documents until the Quality Assurance/Quality Control process is complete).

1.2.7 Originator (Designer):

- Responsible for design completeness, accuracy, adequacy and inter-disciplinary coordination.
- Responsible to ensure quality control is performed and documented.
- Cannot rely upon the Quality Assurance/Quality Control procedure to correct design or calculation deficiencies.
- Presents all calculations in a neat and logical manner to facilitate checking.
- Reviews the completed plan set to ensure that it satisfies the design intent.
- Cannot function as the Checker or Quality Assurance Manager.

1.2.8 Checker:

- Checks work product independently of the Originator.
- Can only check work that he/she did not originate.
- Must be competent and experienced in the type of element being checked.
- Cannot function as the Originator, Back Checker or Quality Assurance Manager.

1.2.9 Back Checker:

- Reviews corrections asserted by the Checker.
- In most cases, the Back Checker is the Originator.
- Cannot function as the Verifier or Quality Assurance Manager.

1.2.10 Corrector:

- Incorporates all corrections.
- In most cases, the Corrector is the Originator.
- Cannot function as the Verifier or Quality Assurance Manager.

1.2.11 Verifier:

- Verifies back checked corrections were accurately made.
- Confirms all information is highlighted to verify that all information was checked.
- In most cases, the Verifier is the Checker.
- Cannot function as the Corrector or Quality Assurance Manager.

Section 2 – Minimum Requirements

2.01 Project Description

Provide a general overview of the project and the various disciplines involved in the design. State what development phase the project specific Designer Quality Control Plan is for (Planning, Design or both).

2.02 Lead Consultant's Quality Control Organization

Provide identification, responsibility and authority of Design Consultant's corporate Quality Control officer/manager and an organizational chart describing the Consultant's quality assurance team/manager's interface with the project team.

2.03 Project Team

Provide a list of the key personnel on the project for the prime and sub consultants. The list will include Originator (Designer), Checker, Back Checker, Corrector, Verifier, Cad Manager, Quality Assurance Manager and Engineer of Record. A brief resume shall be provided for personnel listed. *It is important to note that if a personnel change occurs after initial submission of qualifications and resume, an amendment to the Quality Control Plan shall be submitted to Document Control including required information.*

2.04 List of Deliverables, Responsible Persons, Completion Dates

Provide a list of design submittals, individuals responsible for specific roles and completion dates.

2.05 Plan Design Review Process

Provide all necessary detailed elements of the design review process including report, calculation, design and specification checking protocols (Track changes in Microsoft Word to be maintained). Specify detailed procedure for checking, revising and reviewing markups. Describe the manner by which the plans will be checked. For example, RED markings by the Checker, BLUE by the Back Checker, YELLOW by the Corrector and GREEN by the verifier. Maintain and organize all plan markups for future audits. Complete the Quality Control Check Process Form for each deliverable. It is not necessary to submit the Quality Control Check Process Form with your design deliverable.

2.06 Document Control

Include Design Consultant procedures for Document Control. Include management of project files (and emails) for all members of the project team.

2.07 Sub Consultant Quality Control

Describe the sub-consultant's quality control process. Describe the Design Consultant's process to review sub-consultant's work. Maintain a quality control log of the review of the sub-consultant's work.

2.08 CAD Management

Describe the CAD Management Strategy to coordinate the work of the prime and sub consultants so that MSDGC CAD Standards are followed (conveyance projects should follow MSDGC CAD Standards, treatment projects should follow the National CAD Standard).

2.09 Schedule Management

Describe the quality control process of the project schedule to ensure all project team members (including MSDGC Branches) concur with the time required for design, estimates, review, value engineering, etc.

2.10 Field Survey Quality Control

Describe the field survey quality control process. Items to consider may include instrument calibration, crew experience, surveyor of record coordination, benchmark & datum, courthouse & monumentation research, utility research & marking, Civil 3D coordination, field book review and basemap preparation.

2.11 Quality Control Check Process

Distribute the *Quality Control Plan Acknowledgement Form* to the key personnel listed in this plan to sign/date the form for acceptance of this project specific Designer Quality Control Plan. This form will follow your cover sheet for your QC Plan.

Section 3 – Checklists & Forms

The following checklists & forms are provided to establish a minimum level of quality control and shall be used as a basis for the development of the project specific checklists

“DESIGN” Quality Control Checklist

Project Name:	
Design Status:	
Project Number:	

FORMAT			
YES	NO	N/A	
			All drawings are the correct size.
			All drawings have been prepared with the required CAD software.
			Project titles are correct and consistent for all documents.
			Prescribed title blocks have been used.
			Line weights are correct.
			Text size and font style are correct.
			Process, mechanical, electrical and Instrumentation & Controls symbology are correct.
			Graphic scales are shown.
			Drawing numbering system is correct and consistent between disciplines.
			Specifications are in the correct format (MSDGC Detailed Provisions or CSI).
			Completion of MSDGC CAD Standard Plan Checklist.
			Completion of MSDGC CAD Standard Profile Checklist.
			Drawings sealed by Engineer of Record.

FUNCTIONAL DESIGN			
YES	NO	N/A	
			Proposed systems and processes meet the stated performance objectives.
			Design reflects the most effective solution to meeting the design criteria.
			MSDGC directions from previous meetings and reviews have been incorporated.
			Design has been analyzed for problematic secondary effects.
			Level of complexity of the design is appropriate.
			Operating staffing level is appropriate.
			Maintenance and training burden is appropriate.
			Lessons learned are incorporated.
			All existing conditions are shown and field verified for accuracy.
			Existing buried utilities are verified by survey of field markings.
			Design is appropriate for chosen equipment and procurement methodology.
			Geotechnical recommendations included in the plans and specifications.

“DESIGN” Quality Control Checklist (Continued)

CONSISTENCY			
YES	NO	N/A	
			Physical drawings agree with diagrammatic drawings.
			General arrangement drawings are consistent across disciplines.
			Plan views are consistent within disciplines and consistently oriented.
			Plan drawings are to a consistent scale.
			Sectional views are oriented consistently and sectional references are clear.
			Equipment list is complete and tag numbers are consistent and correct.
			Drawn elements are consistent across matchlines.
			Dimensioning and survey control are sufficient for layout and construction.
			Technical specifications are complete and in accordance with standards.
			Specification requirements are explicit where required.
			Functional and performance-based specifications are used where appropriate.
			Preferred vendors are listed appropriately to optimize competition.

CONSTRUCTABILITY			
YES	NO	N/A	
			Proposed site affords sufficient material laydown space.
			Utility review information included.
			Locations and depths of excavations are feasible.
			Shoring requirements are feasible.
			Proposed site affords sufficient access for equipment.
			Conventional equipment may be used for lifting and placement operations.
			Required field welding is accessible and can be performed as shown.
			Piping and equipment layouts allow sufficient room for assembly.
			Confined space entry requirements are identified.
			Site is amenable for multiple contractor access if applicable.
			Impacts of process outages are identified.
			Proposed construction sequence is described and understood across disciplines.
			Soil (Top of rock) information shown.
			Construction methods are consistent with the Geotechnical Baseline Report.

“DESIGN” Quality Control Checklist (Continued)

CALCULATIONS			
YES	NO	N/A	
			Calculations include title, date, preparer’s name and checker’s name.
			Manual calculations are on computation paper in clear and legible print.
			Calculation pages are sequentially numbered.
			Record calculations bear the stamp of a qualified professional engineer, architect or surveyor as applicable.
			Assumptions and design criteria are listed.
			References to text books or technical papers are included as appropriate.
			Clarifying sketches, maps or diagrams are included.
			Computer software is identified by name and revision date.
			Input and output data are clearly indicated.
			Computer calculations include a narrative of the computational process.
			Electronic versions of input and output files are provided.
			Calculations contain a summary of conclusions and results.
			Sealed by the Engineer of Record.

EASEMENT QUALITY CONTROL CHECKLIST

PRINT DATE FOR DRAWING			
YES	NO	N/A	
			Located on plans.

PROPERTY OWNER INFORMATION			
YES	NO	N/A	
			Property owner names.
			Parcel numbers.
			Transfer dates.
			Transfer references.

EASEMENT COMPONENTS			
YES	NO	N/A	
			Easement language block.
			Property owner signature block.
			Notary block.
			County Administrator block.
			Sewers Chief Engineer block.

MSD COMPONENTS			
YES	NO	N/A	
			Project name block.
			Project identification block.
			Township, Section, Range (Military Survey).
			Accession number.
			Construction accession reference.
			Take area calculation tables.
			MSD CAD standards followed.
			PDF only submitted at review stages.

EASEMENT QUALITY CONTROL CHECKLIST (Continued)

SURVEY COMPONENTS			
YES	NO	N/A	
			CL sewer easement property corner references.
			Metes & bounds easement references.
			Property line references.
			Easement take area references.
			Survey stamp & signature.
			Basis of bearings at north arrow.
			Topo and buildings not displayed.

Quality Control Sign-Off Form for Design Submittals

Project Name:	
Design Status:	
Project Number:	
Deliverable to be Checked:	

QA Manager (Print Name)	Signature	Date
Engineer of Record (Print Name)	Signature	Date
Project Team Design Lead (Print Name)	Signature	Date
Checker (Print Name)	Signature	Date
Back Checker (Print Name)	Signature	Date
Corrector (Print Name)	Signature	Date
Verifier (Print Name)	Signature	Date

QC Verification Letter Example

<Date>

Wastewater Engineering Building
MSDGC Document Control
1035 Woodrow Street
Cincinnati, Ohio 45204

Attention: <Project Manager>

Re: <Project Number> - <Project Name>
Task Order Number <TO Number>
<X%> Design Submission
QC Verification

Dear <Project Manager>:

<Consultant> has performed a quality control review of the above referenced documents for the subject project. This review is in accordance with the QC Plan reviewed and approved by MSDGC Quality Assurance.

If you have questions or comments, please feel free to contact me.

Sincerely,

<Consultant>

<Consultant Project Manager Signature>

<Consultant Project Manager>
Senior Project Manager