CAPITAL DEVELOPMENT

Quality Management Plan

Revision April, 2012

Revision History

Revision #	Date	Prepared By:	Approved By	Date

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1 Introduction

1.1 General

Capital Development is Utah Transit Authority's (UTA) operating unit that deals directly with capital transit projects for UTA. The projects undertaken by UTA involve planning, design, and construction of transit-related projects.

The UTA Quality Management System is incumbent upon all projects managed by UTA project managers and all consultants and contractors under contract to UTA.

1.2 Application

The requirements specified in this plan are aimed primarily at achieving a quality product by establishing consistent quality processes.

1.3 Terms and Definitions

For quality managements terms and definitions see appendix A.

2 Quality Management System

2.1 General Requirements

Quality is defined as "conformance to requirements." Evaluating the quality of work being produced on a project must be based on requirements that are defined before the work is started, not after the work has begun. Furthermore, these requirements must be clearly communicated, understood, and agreed to by the parties involved. This approach is critical to achieving quality expectations. It is basic to determining what information and tools the person producing the work will need to "do it right the first time," and to avoid excessive expenditures for audits, checking, and rework to do the job "right."

2.2 Documentation Requirements

2.2.1 General

Documentation of the UTA Quality Management System for Capital Development includes the following:

a) *Quality Management Plan*

b) *Design Quality Plan*

c) *Construction Quality Plan*

d) Project Management Plan

e) Capital Development Procedures

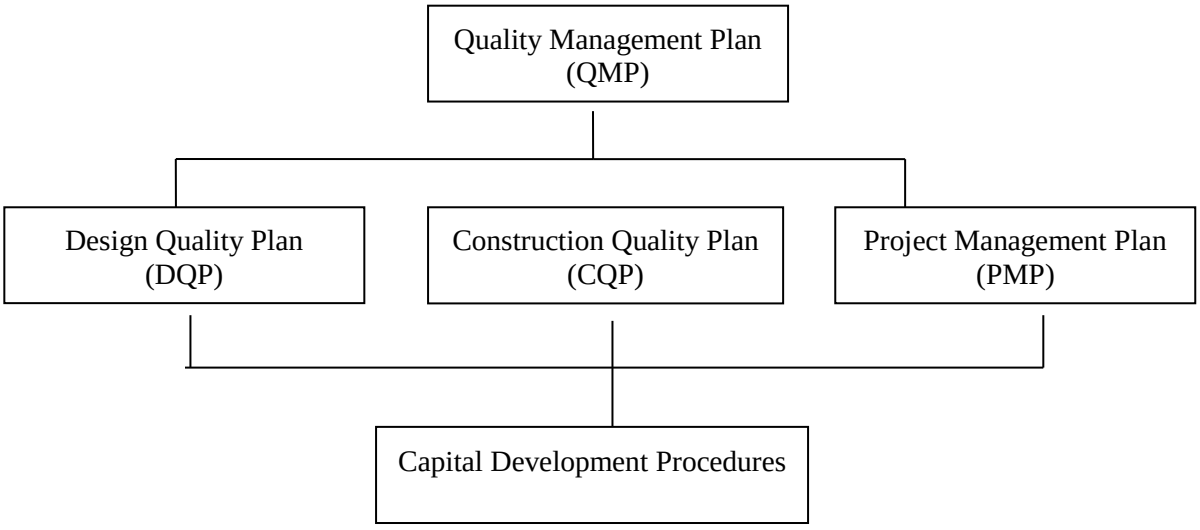

Figure 1. Quality Management System Components

2.2.2 Quality Manual

The UTA Capital Development Quality Manual is comprised of three documents: *Quality Management Plan*, *Design Quality Procedures*, and *Construction Quality Procedures*.

2.2.2.1 Quality Management Plan (QMP)

The requirements specified in this plan are aimed primarily at achieving quality projects by preventing nonconformity at all stages of projects from planning through operations. The UTA document *Quality Management Plan* addresses the elements and guidelines that will be followed in order to achieve quality on all projects undertaken by Capital Development.

2.2.2.2 Design Quality Procedures (DQP)

The UTA document *Design Quality Procedures* provides standards for performance of quality control activities by project staff. UTA's quality management for design activities is carried out through managing various design processes which exist both within and across functions. The DQP is a dynamic document and revisions are performed as required.

2.2.2.3 Construction Quality Procedures (CQP)

The UTA document *Construction Quality Procedures* provides the minimum quality assurance and quality control requirements for construction projects. Contractors must provide a quality management plan acceptable to UTA before any construction work is performed.

2.2.2.4 Online Versions of QMP, DQP, and CQP

Copies of the QMP, DQP, and CQP may not be provided to the project manager and team members, but they are expected to review the online versions and to be familiar with the procedures directly affecting the performance of their duties. Electronic versions of the latest QMP, DQP, and CQP are available in the SIRE document management system or at the following address in the UTA computer network:

\\En-apps\Common\GENERAL Files\DESIGN Info\Design Quality Procedures\Quality Management Manual

2.2.3 Project Management Plan (PMP)

A project management plan is one of the most important management tools. A separate and specific PMP is prepared for each major UTA capital project. Good practice dictates that requirements be clearly identified and agreed to by UTA, the project manager, senior project staff, and special consultants before substantial resources are committed to performing the work. The project management plan serves as the basis of that agreement.

The PMP facilitates identification of UTA's expectations and provides the information needed for project and support staff to do the job right the first time. Quality procedures require that project management plans be prepared for all projects that are interdisciplinary in nature or of sufficient size to involve more than a few months of effort. The project manager is responsible for preparation of the PMP and is required to complete it within the first few weeks of the project.

2.2.4 Control of Records

Records that have been created are maintained to provide evidence of conformity to requirements and the effective operation of the Quality Management System. Records must remain legible, readily identifiable, and retrievable. A documented procedure has been established to define the controls needed for the identification, storage, protection, retrieval,

retention time, and disposition of records. The SIRE document management system has been implemented to ensure that documents are managed properly.

2.2.4.1 Quality Records

In order to ensure that all quality records are identified, collected, indexed, accessible, filed, stored, and discarded, it is the responsibility of each individual within the project team to ensure that the quality records which they generate are legible, complete, and entered in SIRE document management system.

The project manager is responsible for making sure that project quality records are entered into SIRE by the project team.

2.2.4.2 Field Records

One of the primary responsibilities of a construction inspection staff is documenting on a daily or routine basis that construction is being performed in accordance with the contract. Full documentation on non-conformances and field inquiries must be maintained to aid in the closing of the contract.

3 Management Responsibility

3.1 Responsibility, Authority, and Communications

UTA Capital Development management ensures that responsibilities and authorities are defined and communicated within the department.

3.1.1 Chief Capital Development Officer

The UTA chief Capital Development officer is responsible to ensure that UTA Capital Development establishes, implements, and maintains a quality management system.

3.1.2 Project Manager

The project manager is responsible for all project activity and must initiate and control the process of defining requirements on a project. For the UTA staff, consultants, and contractors assigned to the project to do their job "right the first time," great care must be taken to define not only the output requirements (deliverables), but also the input requirements necessary for producing work that will conform to the deliverable requirements.

Community leaders, businesses, and residents of the UTA service area are suppliers of information and decisions that are necessary for the team to meet UTA's quality expectations. It is the project manager's responsibility to ensure that this information is obtained and communicated to his or her staff as needed.

Furthermore, the project manager must not assume that the full range of knowledge and experience necessary to know all of the project's detailed requirements has been given. The project manager must assume the responsibility and take the initiative for extracting this required information from project stakeholders and all other affected parties. If necessary, the project manager must advise UTA of the consequences of not receiving information in the form and at the time that it is needed.

The use of a carefully prepared project management plan can be a great aid both in clarifying UTA's expectations with regard to the quality of our deliverables and in extracting the type of information needed to produce these deliverables. Many projects have special requirements that must be understood and defined by a project manager and key project team members. Preparation of the project management plan must be the first order of business on any new project.

3.1.3 Project Director

UTA assigns a project director to the projects that they feel need the additional management. A project director has a subset of responsibilities similar to those of a project manager. One cannot assume that the project manager of UTA is fully knowledgeable of all the requirements necessary for work to be produced right the first time.

The project director must be sure that the design criteria is complete and that selected options have been discussed and agreed upon with UTA staff before any work is started.

UTA's expectations regarding the quality of our deliverables must be determined during contract negotiations. Samples of the types of work planned or to be produced should be furnished, and an agreement on number of drawings and drawing content must be reached before any contract is executed. Reports and other deliverables should be dealt with in a similar fashion.

4 Program Realization

4.1 Quality Program

For planning, design, and construction-related services, consultants and contractors are expected to submit a quality program for review and approval by the project manager. Consultants should be advised at the time their scope of work is negotiated that they are expected to submit such a program. There should be references to quality of performance in the contract. In situations where services by sub-consultants are to be carried out under the direction of consultant staff, the consultant's project manager must be prepared to assume full responsibility for quality control of the sub consultant's efforts.

4.2 Design and Construction Inputs

4.2.1 Program Delivery Inputs

Inputs relating to program delivery requirements are determined and records are maintained (see 4.2.4). These inputs may include:

a) PMP

b) UTA performance goals and standards

c) UTA project design criteria

d) Environmental documents

e) Current year and overall project schedule and budget

4.2.2 Agreeing On Requirements

The basic objective of the project management plan is to achieve conformance to established requirements the first time—every time. There has to be a mutual understanding of the requirements, and agreement that they can be met, if we are to do it right the first time. Because each project is unique and because proposals and contracts do not define requirements in detail, not everyone involved in a project may agree with or fully understand the initial definition of requirements. Every effort must be made to ensure that these requirements have been properly communicated and understood.

4.3 Design and Construction Outputs

Computerized design calculations, CADD produced drawings, and railroad signal drawings are all outputs that require quality control checks and reviews to insure accuracy.

4.3.1 Document Review

All proposals, studies, reports, technical memoranda, instruction manuals, letters, and procedures, to be provided to an outside organization, are to be reviewed by a minimum of one person prior to their issuance.

Each reviewer is responsible for reviewing his or her own discipline's contributions and assuring that there are no conflicts with interfacing parts of the document. A corrected copy is then submitted for editorial review and final sign-off by the originator before production. It is essential that major project reports, proposals, studies, and contract documents be subjected to more in-depth review to ensure that findings and recommendations are in keeping with UTA standards and the state of the art.

4.3.2 Design Reviews

All design and construction documents are to be reviewed by UTA management. The project manager is responsible to ensure that these reviews are performed prior to submission for procurement or construction. The project manager may call upon project directors, engineers, or other project personnel to participate in this review.

4.4 Design and Construction Verification

Design and construction verification is based, in part, on checking of drawings and calculations. As drawings, design analyses, and specifications are developed, copies are made to serve as check prints. Check prints are independently checked by designers who are technically competent in the procedures required for the task. This process is described in the DQP. Because of the progressive nature of designs, the checker must consult with the designer about differences that have been found. The checker is expected to review design criteria, specifications, environmental documents, and rationale pertinent to the design as well as the calculations themselves.

4.5 Purchasing Process

UTA Capital Development ensures that purchased products or services conform to specified purchase requirements.

The purchasing process for products and services is described in detail in UTA's *Procurement Standard Operating Procedures*. The electronic copy of the latest version of this document is available at UTA Intranet:

> http://intranet [Corporate Policies & Procedures] [II. Corporate Policies] [General Matters] [B. Procurement]

4.6 Consultant Quality Control

UTA requires of its consultants and their sub consultants a high level of diligence and care in the performance of services. Consultants and subcontractors are expected to submit a quality program for review and approval by the project manager or use the UTA QMP. In situations where services by sub consultants are to be carried out under the direction of consultant staff, the project manager must be prepared to assume full responsibility for quality control of the sub consultant's efforts.

4.7 Contractor Quality Control

Quality assurance and control during construction is essential to deliver quality projects. Similar to design consultants, contractors may have their own quality manual, reviewed by UTA, with UTA issuing a statement of no objection, as indicated in the contract. Contractors that do not have a quality manual, and do not want to develop their own manual, can use UTA *Construction Quality Procedures*.

Appendix A—Terms and Definitions

The following is an alphabetized listing of terms and definitions for use in the *Quality Management Plan*.

achieving quality	This occurs by working to avoid problems, identifying the causes when problems occur, and taking the steps necessary to eliminate the conditions that cause them.
acceptance	The act of endorsing or adding positive authorization, or both, for apparent correctness, or to receive with consent.
acceptance criteria	Specified limits placed on characteristics of an item, facility, process, or service defined in codes, standards, or other design documents.
agency	A subdivision of federal, state, county, district, or local government. The term used herein includes designated representatives of the agency.
approved for construction documents	Those design documents which have been certified to have met all requirements for construction by the designer and would allow the general contractor to initiate construction.
as–built	The record set of construction drawings which includes change orders, field adjustments, utilities, or site conditions which did not appear on the original contract drawings.
audit	A documented activity performed in accordance with written procedures or checklists to verify, by examination and evaluation of objective evidence, that applicable elements of the quality assurance program have been developed, documented, and effectively implemented in accordance with specified requirements. An audit should not be confused with surveillance or inspection activities performed for the sole purpose of process control or product acceptance.
auditor	Any individual who participates in the performance of an audit.
back-checker	Person who reviews the checker's comments and updates the document original. Preferably the back-checker should be the originator.
basis of design	The design-build contract provides the requirements upon which the detailed final design is to be based.
calibration	Comparison of two instruments or measuring devices, one of which is of known accuracy and traceable to national standards, to detect, correlate, report, or eliminate by adjustment any discrepancy in the accuracy of the instrument or measuring device being compared with the standard.

change order	A contract modification signed by both parties to the contract, issued after the execution of a contract, which adds to, deletes from, or otherwise revises the requirements, scope of work, and/or the contract terms and conditions.
change proposal	The documents which identify, quantify, and justify additions, deletions, or other revisions to the construction contract scope of work.
checker	The person assigned to check documents developed by designers and drafters in that discipline or section.
check print	A copy of a document original in its final format used for the purpose of checking and recording additions, deletions, and corrections to the document original.
check print stamp	A special stamp to be affixed on the face of the document (or on the back of the document, if room is not available on the front) to record who performed various checking and review activities and the dates the activities were completed.
configuration	Physical and functional arrangement of an item as defined in design documents and achieved in manufacture, fabrication, or construction of that item.
construction documents	Drawings (plans) and specifications giving a detailed and precise representation of the configurations and arrangements of the materials and items being constructed. Construction documents are not to be used for construction until they are released for construction.
construction drawings (plans)	Drawings or plan sheets which form part of the construction documents.
contract	A variety of agreements or orders for the procurement of supplies or services. An agreement, enforceable by law, between two or more competent parties, to do or not do something not prohibited by law, for a legal consideration.
controlled document	A drawing, specification, calculation, record, report, or other document where a change could affect another design.
copy	A full or reduced scale reproduction, on photocopy, microfiche, or microfilm, of the document as it existed in its original form in the project files.
corrective action	Measures taken to rectify conditions adverse to quality and, where necessary, to preclude repetition.
cost of nonconformance	Cost of doing things wrong. Measurement of the cost of wasted effort and the "fix" to make things right is a good tool for identifying areas needing attention and setting priorities for the elimination of problems. Application and understanding of these principles is basic to UTA's quality management system.

design	Technical and management processes which commence with identification of design input and which lead to and include the issuance of design output documents.
designer	The engineering organization responsible for the design of the project. UTA or consultant is the designer together with sub-consultants.
design change	A change to a drawing, specification, or other design document which has been released or issued for construction.
design characteristics	Any property or attribute of an item or process that is distinct, describable, and measurable.
design coordination review (DCR)	A formal interdisciplinary review of all or a portion of a design submittal.
design directives	The formal series of intra-organization memoranda established to describe and convey drawings, criteria, parameters, or other design requirements subsequent to establishment of the original basis of design.
design document	A drawing, specification, calculation, record, report, or other document, including shop drawings and special process procedures, which may be used for design, manufacture, fabrication, installation, testing, examination, and certification of items.
design input	Those criteria, parameters, bases, or other design requirements upon which detailed final design is based.
design interface	The areas of interaction between design disciplines, or discrete design sections, where one could invalidate the other's design assumptions or affect the constructability of the finished design.
design output	Documents such as drawings, specifications, and other documents defining technical requirements of structures, systems, and components.
design process	Technical and management processes which commence with identification of design input and which lead to and include the issuance of design output documents.
design quality manager	The person assigned to perform QA reviews on all design packages before documents are submitted for UTA review or release for construction, and who oversees the QA/QC program for all the UTA design operations.
design revision	A revision to a drawing, specification, or other design document during the course of design development and prior to the release of said documents for construction.
deviation	A specific written authorization, granted after a task has been initiated, to depart from a particular performance or design requirement of a specification, drawing, or other documents.

discipline task manager	Person responsible for all design functions, including schedule, budget, and QC functions, within a specified area of engineering or architectural expertise.
document	A single drawing or a logical compilation of related calculations, data, report text, design analyses, specification sections, cost estimates, meeting minutes, or project-related correspondence describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results.
document original	The up-to-date original drawing, text, form, or other document type from which copies to be delivered to the client will be reproduced.
engineer of record	The designer for the project, i.e., UTA or consultant.
existing conditions	The surveys, topographic mapping, utility locations, plans for existing structures, and all other drawings and reports defining existing physical conditions of a site or facility.
inspection	Examination or measurement to verify whether an item or activity conforms to specified requirements.
internal audit	An unbiased and independent audit of the quality control system in use.
nonconformance	A deficiency in characteristic, documentation, or procedure which renders the quality of an item unacceptable or indeterminate. Examples include: physical defects, test failures, incorrect or inadequate documentation, or deviation from prescribed processing, inspection, or test procedures.
originals	The documents or records in the highest form in which they exist in the active project files. This might be original outgoing correspondence, printed copies of a published document, original copies of calculations, quantity take-offs and other design analyses, original reproducible drawings, original construction oversight engineer diaries, and field records.
originator	The engineer, architect, planner, designer, or other person who develops a specific document. In the case of drawings, the originator is the individual (designer) who provides the design information, sketches, and instructions to the drafter.
procedure	A documentation or description of how any activity is to be performed. It may include specification of duties, functions, and responsibilities, methods to be employed, equipment or materials to be used, and sequence of operations.
project manager	The person appointed to be responsible for successful execution of the project.

project management plan (PMP)	A document that establishes the basic project guidelines to include scope of project, location, design requirements, work program, deliverables, budgets, schedules, and principal project personnel.
qualification (personnel)	The characteristics or abilities gained through training or experience, or both, as measured against established requirements such as standards or tests, which qualify an individual to perform a required function.
quality	Conformance to requirements. Requirements must be identified and mutually agreed upon by the client, the project manager, and senior project staff before work on the project begins.
quality assurance (QA)	All those planned and systematic actions necessary to provide adequate confidence that a structure, facility, system, or component will perform satisfactorily in service.
quality assurance program	The total effort of development, documentation, and implementation of policies and procedures in achieving and verifying quality in accordance with specified requirements.
quality assurance surveillance	Term used to describe a review or observation performed for the purpose of verifying that applicable requirements of quality are properly obtained.
quality control (QC)	The acts of examining, witnessing, inspecting, checking, and testing of in-process or completed design work, including in-progress plan sheets, studies, and reports to determine conformity with contract requirements.
quality record	A record which furnishes documentary evidence of the required and obtained quality of items or activities affecting quality. This may be in the form of any type of media such as written reports, drawings, and charts.
receiving	Taking delivery of an item at a designated location.
reject	A disposition imposed for substandard work or for a nonconforming condition.
request for information (RFI)	A request from the construction group for additional information to clarify design data on plans which have been released or issued for construction.
request for revision (RFR)	Request for change in the plans after issuance of plans for construction.
review print	Copy of the checked and updated document original developed by a single discipline, or consolidated from input of several disciplines, that is used for review by the lead engineers for each discipline involved in development of the document, and by other reviewers the project manager may designate. This term is synonymous with review draft when applied to report-type documents.

rework	The process by which a nonconformance can be brought into conformance by completion through re-designing or other corrective means.
service	The performance of activities such as design, fabrication, inspection, non-destructive examination, repair, or installation.
software	Computer programs or sets of instructions formulated in any one of the programming languages such as C, C++, ASP, Java, Visual Basic, or HTML. These instructions provide for transfer of data from and to the user as well as all mathematical operations necessary for the solution of a given task. For the purposes of these procedures, software shall only mean engineering or management applications software.
specifications	The written portion of the construction documents which may consist of special provisions, project standard special provisions, UTA project specifications, and other published specifications referenced in the construction documents.
standard drawings	Detailed plans issued by UTA for general application and repetitive use in connection with the project.
subcontract	The document utilized to employ the service or support of a lower-tier party to perform all or a portion of one or more facets of the scope of work assigned to the prime contractor under the provisions of the prime contract. The agreement is authenticated by both parties and incorporates the terms and conditions of all applicable portions of the prime contract.
technical coordination review (TCR)	A formal intra-disciplinary review of the technical aspect of all or a portion of a design submittal.
traceability	The ability to trace the history, application, or location of an item or activity by means of recorded identification.
verified copy	A copy of a document or file upon which the project manager or person responsible for reproduction of that document has verified with his/her signature and date that the copy represents a current, complete, and accurate reproduction of the document as it exists in the project files.
verifier	Person who verifies that changes recommended by checkers and accepted by the back-checker have been made on the original document. Preferably the checker should be the verifier.
waiver	Documented after-the-fact authorization to depart from specified requirements.
zero defects	Quality standard that requires a personal commitment to meet requirements. Any level of error and wasted effort is not acceptable.

NOTE:

1. Whenever signature, stamp and/or initial is used herein, it shall mean the signature, stamp or initial and date, clearly readable and positively identifying the signing individual.
2. The forms included herein are intended to show the information which is to be contained in them. Contract requirements may dictate the use of alternate formats.
3. "Approval", "review", and "assurance" by the contractor, as used herein, shall mean signature, stamp, and/or initial by an authorized individual.
4. When required by context in this manual, the singular shall be interpreted as the plural, and vice versa; and the feminine, masculine, or neuter gender shall be treated as such other gender as appropriate.

Definitions in the contract take precedence over definitions contained herein, should any conflict exist.