Design-Build Demonstration Program

Quality Manual Outline

Draft

April 2013

California Department of Transportation

DISCLAIMER

In developing its own Quality Program (QP), the Design-Builder is encouraged to follow the organization and format of this Quality Management Plan (QMP) Outline. The Design-Builder may elect to enhance the QMP Outline. When using the QMP Outline, the Design-Builder shall make changes to section headings and text as needed to meet project-specific requirements and the Design-Builder's own quality approach. However, at a minimum, quality measures included in this outline shall be included in the final QM. The Department accepts no responsibility for the content of the QMP Outline, nor does the Department warrant that use of the QMP Outline will result in contract compliance.

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The Design-Builder shall update this Table of Contents based on the plans developed for the project.

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INTRODUCTION

Design-Build Project : [Project EA]

General

The Design-Builder has the primary responsibility for the overall quality assurance and quality control for both the design and construction elements of the project to be completed including those performed by a subcontractor, fabricator, supplier, vendor, agent, or other entity with contractual obligations to complete design or construction elements of the project. This section describes the Department's requirements of the Quality Management Plan (QMP) for the Project and how it will be implemented.

The QMP must be approved by the Department in writing prior to the start of any Work activities. The Department will deliver its approval or disapproval of and comments on each QMP submission within fifteen Working Days following Department's receipt of the QMP. The Department may partially approve the QMP at its sole discretion. After the QMP has been approved, any revisions to the QMP, staffing levels, or key quality personnel will require prior written Department approval.

Quality Policy

The Design-Builder's Quality Policy is based on the fundamental concept that the control of quality is a team obligation that recognizes that quality is built into every aspect of the project. Our team will provide quality products and services that meet or exceed California State Department of Transportation's (Department's) and FHWA requirements and standards, delivered safely, on time, and within budget. Quality work will be the responsibility of every individual performing the work. Quality will be obtained through appropriate planning and control of work operations and by specific quality control activities such as reviewing, checking, inspecting, testing, and quality surveillance/audit.

Design-Builder to expand the Quality Policy for the Project from the Executive Committee

Quality Program, Quality Management Plan, and Quality Manual

The Quality Program (QP) includes the Quality Policy, Quality Objectives (Section 5.3) Design and Construction Quality Management Plans, procedures, work instructions, and records for the Project. The QP is discussed in further details in Section 4.0.

The QMP describes the overall policies, program, organizational responsibilities, procedures, and the means of ensuring that all disciplines, aspects, and elements of the work will comply with the requirements of the Contract Documents and that all materials

incorporated into the work will perform satisfactorily for the purposed intended. It describes the processes, procedures and details of reviews and checks that will be performed on the design of the project components, and the inspections and tests that will be performed on construction materials and workmanship to ensure the overall quality of the constructed project.
The QMP describes and defines participant roles; quality review responsibilities and activities; quality requirements for design/construction integration; the specific quality measures and application instructions; and necessary Quality Assurance (QA) documentation and verifications to which technical reports, project documents, design drawings, engineering calculations and construction documentation must comply.

The QMP also includes procedures and forms for both the Design and Construction phases, the Materials Control Schedule (MCS) and the Document Management Plan (DMP), and utilizes the QMP templates provided by the Department as the starting point of its development.

The Quality Manual is comprised of four separate volumes as follows:

- **Volume I** – Quality Management Plan (This includes the overall Quality management Plan, Design Quality Management Plan, including the Quality Organizational and Process Flow Charts, and the Construction Quality Management Plan.)
- **Volume II** – Construction Quality Assurance Inspection and Testing Plan
- **Volume III** – Materials Control Schedule
- **Volume IV** – Document Management Plan

Volume I covers eight chapters. The seventh chapter, Product Realization, includes the Design Quality Management Plan (DQMP, Chapter 7A) and the Construction Quality Management Plan (CQMP, Chapter 7B). It includes a Quality Organization Chart (TAB xx), and both a Design Quality Process and Construction Quality Process Flow Chart (TAB xx). The DQMP is supported by Procedures (TAB xx) and Forms (TAB xx), both included in Volume I.

The Procedures and Forms for Volume I are numbered using the following format:

Quality Management Documents:
QM### for the documents associated with the overall Quality Management Plan.

Design Quality Procedures:
DQP### for the general and design-related Quality Procedures.

Design Quality Forms and Figures:

DQP###FA for design-related Quality Forms.

The ### is same for the Procedure number and the Form number for forms associated with a given procedure is F for Form and the letter A-Z designating multiple forms for a given procedure.

Volume II contains the Construction Quality Assurance Inspection and Testing Plan and is a supplement to the CQMP (Chapter 7B in TAB 1) of Volume I.

The Inspection and Testing Plan includes the construction quality procedures and forms and uses the following format:

Construction Quality Procedures:
CQP### for construction-related Quality Procedures.

Quality Forms and Figures:
CQP###FA for construction-related Quality Forms.

The ### is same for the Procedure number and the Form number for forms associated with a given procedure is F for Form and the letter A-Z designating multiple forms for a given procedure.

The Inspection and Testing Plan is a separate document, managed under a separate distribution and approval process.

Volume III contains the Materials Control Schedule for Design-Build projects. It represents the minimum Construction Inspection and Testing requirements for this project.

Volume IV contains the Document Management Plan. It includes documents that use the following format:

Document Management:
DM### for the document management procedures.

REVISIONS

Revisions to this manual are made on a per-page basis as necessary to clarify, refine, or adapt the QMP for new or changed requirements. Each revised page has a revision number and date in the top header. All manual revisions are recorded in the bottom footer by revision and approval names and dates and are distributed via the Design-Builder's tracking software, after approval by the Department. The table of content page QM001 2 of 50 of this manual should be updated as well.

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MANUAL DISTRIBUTION

The following list identifies all parties holding controlled copies of this document. Modifications to this document will be distributed to the entire list. Those holding controlled copies are responsible for maintaining an updated document and for distributing updated copies, as necessary, to staff reporting to them. The Design-Builder shall update this form.

☐ xxxxxx
Document Manager
Design-Builder

☐ xxxxxx
Quality Manager
Design-Builder

☐ xxxxxx
Construction Manager
Design-Builder

☐ xxxxxx
Design Manager
Design-Builder

☐ xxxxxx
CQAM
Design-Builder

☐ xxxxxx
Project Manager
California Department
of Transportation

☐ xxxxxx
Design Manager
California Department
of Transportation

☐ xxxxxx
Project Manager
Design-Builder

☐ xxxxxx
Executive Committee
Design-Builder

☐ xxxxxx
Executive Committee
Design-Builder

☐ xxxxxx
Executive Committee
Design-Builder

☐ xxxxxx
DQAM
Design-Builder

☐ xxxxxx
Construction Manager
California Department
of Transportation

☐ xxxxxx
Contract Manager
California Department
of Transportation

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APPROVALS

The information presented in this document defines a Quality Program that substantially complies with the project requirements. This signature page covers approval for the Quality Management Plan (Volume I), the Construction Quality Assurance Inspection and Testing Plan (Volume II), the Materials Control Schedule (Volume III), and the Document Management Plan (Volume IV). The Design-Builder shall update this sheet.

Approved: _____
[xxxxxxx], California Department of Transportation, Contract Manager

Approved: _____
[xxxxxxx], California Department of Transportation, Project Manager

Approved: _____
[xxxxxxx], Project Manager, Design-Builder, Design Manager

Approved: _____
[xxxxxxx], Project Manager, Design-Builder, Construction Manager

Approved: _____
[xxxxxxx], Construction Quality Assurance Manager, Design-Builder

Approved: _____
[xxxxxxx], Construction Manager, Design-Builder

Approved: _____
[xxxxxxx], Design-Manager, Design-Builder

Approved: _____
[xxxxxxx], Quality Manager, Design-Builder

Approved: _____
[xxxxxxx], Design Quality Assurance Manager, Design-Builder

Approved: _____
[xxxxxxx], Design-Builder Executive Committee

Approved: _____
[xxxxxxx], Design-Builder Executive Committee

Approved: _____
[xxxxxxx], Design-Builder Executive Committee

Design-Build Demonstration Program

Volume I
Quality Management Plan

Draft

California Department of Transportation

Written by:	Revised by: <xxxxx>	Approved by: <xxxxx>
Date: < xx xx xx >	Date: < xx xx xx >	Date: < xx xx xx >

QUALITY MANAGEMENT PLAN

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1.0 TERMS AND DEFINITIONS

1.1 GENERAL

This section provides standardized definitions for the terms used in this Quality Management Plan. It also identifies frequently used abbreviations and acronyms. Should any discrepancies exist; definitions set forth in the Contract will take precedence over definitions contained in this QMP.

1.2 ABBREVIATIONS AND ACRONYMS

CADD	Computer Assisted Design and Drafting
Caltrans	California Department of Transportation
CAP	Corrective or Preventive Action Plan
CAPM	Critical Activity Point Manager
CD	Construction Documents
CM	Construction Manager
COC	Certificate of Compliance
CR	Constructability Review
CTC	California Transportation Commission
CQAM	Construction Quality Assurance Manager
DBE	Disadvantaged Business Enterprise
DCS	Document Control System
DM	Design Manager
DMP	Document Management Plan
DQAM	Design Quality Assurance Manager
DQMP	Design Quality Management Plan
DTM	Design Task Manager
DVBE	Disabled Veterans Business Enterprise
EOR	Engineer Of Record
FDC	Field Design Change
FDR	Formal Design Review
IAST	Independent Assurance Sampling and Testing
IDR	Inter-Discipline Design Review
IS	Information Systems
ISO	International Standards Organization
ITR	Independent Technical Review
MOT	Maintenance Of Traffic
MCS	Materials Control Schedule

NCR	Non-Conformance Report
NDC	Notice of Design Change
OSE	Oversight Engineer
OTS	Over the Shoulder
PM	Project Manager
PQM	Project Quality Manager
QA	Quality Assurance
QC	Quality Control
QM	Quality Manual
QMr	Quality Manager
QMP	Quality Management Plan
QO	Quality Organization
QP	Quality Program
RCF	Review Comment Form
RDC	Request for Document Clarification
RFC	Released for Construction
RFI	Request for Information
RFP	Request for Proposal
RFR	Request for Revision
TI	Testing and Inspection Procedure
WI-FI	Worker-Identified Opportunities for Improvement

1.3 TERMS AND DEFINITIONS

Accept	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.
Accuracy	The degree of conformance of a measurement to a recognized standard.
Agency	A subdivision of Federal, State, County, District, or Local Government. The term used herein includes designated representatives of the Agency.
As-Built Documents	The as-built documents described in Book 2, Section 2.4.

Audit	A systematic, independent and 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 Control and Quality Assurance program have been developed, documented, and effectively implemented in accordance with specified requirements. An audit differs from verification or inspection activities
Audit Finding	A deficiency or discrepancy of an item, activity, or document identified during audit and recorded on an Audit Finding Sheet.
Auditor	Any individual who conducts an audit.
Back Checker	Person who reviews the Checker's comments. Except in extraordinary circumstances, the Back Checker should be the Originator.
Basis of Design	The requirements upon which the detailed design is to be based, provided by the Design-Build Contract.
Calendar Day	Every day shown on the calendar, beginning and ending at midnight.
Calibration	Comparison of two instruments or measuring devices or any metrological characteristics, one of which is of known accuracy and traceable to national metrology 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.
Caltrans	The Department of Transportation
Certificate of Compliance	A document signed or otherwise authenticated by an authorized individual or qualified party attesting that the materials, items, or services are in accordance with specified requirements and accompanied by additional information to substantiate the statement.
Certification	The act of determining, verifying, and attesting, in writing, to the qualifications of personnel, processes, procedures, materials or items in accordance with applicable requirements.
Change Order	A contract modification signed by both parties to the contract, and FHWA, as applicable 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 that identify, quantify and justify additions, deletions, or other revisions to the contract scope of work. These documents do not revise the contract documents.

Checker	The person assigned by the Design Manager to check documents developed by designers and drafters in a particular discipline or section. Except in extraordinary circumstances, the Checker should also serve as the Verifier.
Check List	List of items required to be considered as part of a quality procedure. A check list is required for the Project record to document completion.
Check Print	A copy of Document Original in final format used for checking and recording additions, deletions, and corrections.
Check Print Stamp	A special stamp to be affixed on the face of document (or on the back of the document, if room is not available in front) to record who performed various checking and review activities and the dates the activities were completed.
Computer Assisted Design and Drafting (CADD)	Software to support engineering calculations and drawings in the creation of engineering Plan sheets; in particular, CAICE or InRoad (as currently used) for engineering calculations and MicroStation for engineering drafting.
Conceptual Design	Preliminary plans, 30% plans, and Structures Type Selection Reports are included as a design development milestone to be formally reviewed by the Department.
Construction Documents	Drawings (plans) and specifications giving a detailed and precise written and graphical representation of the items to be constructed. Construction documents are not to be used for construction until they are "Released for Construction."
Construction Manager	Person assigned as manager of construction effort.
Construction Quality Assurance Manager (CQAM)	The person assigned to implement construction quality activities and supervise the quality inspection and testing personnel. Verifies that the construction-related work is being properly implemented, inspected, and tested by trained staff. This individual reports to the Project Quality Manager.
Construction Quality Management Plan	The elements of the overall project Quality Program that address intended quality processes to be implemented during construction activities.
Construction Team	To be defined
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. The signed agreement between Department and the Contractor, defining the scope of work the Contractor is to perform.

Contract Documents	Documents listed in Section 1.3 of Book 1 and including all exhibits thereto.
Contract Manager	A Department Engineer who performs QA and oversight for Design-Build projects as the Department single point of contact for the Design-Builder.
Contractor	The person or persons, firm, partnership, corporation, or combination thereof, private or municipal, who have entered into a contract with the Department of Transportation, as party or parties of the second part or their legal representatives.
Controlled Document	Any document subject to documented control procedures to ensure information is disseminated completely and recorded properly. Examples of controlled documents include QMP and Plans that have been reviewed or released for construction.
Copy	A full or reduced scale reproduction of an original document in the Project files. It may be photocopy, microfiche, microfilm, or other media.
Corrective Action	Measures taken to rectify conditions adverse to quality and, where necessary, to preclude repetition or an undesirable occurrence.
Critical Activity Point	A specific point in the design or construction process at which further activity associated with the deliverable is suspended until formal acceptance of the interim product is obtained. Acceptance is formally obtained when all issues and design changes have been resolved, all materials testing and inspection procedures have been performed and provide passing results, and the Work meets Contract requirements. The Critical Activity Point Manager, the foreman in charge of the activity, and Department will sign off at the Critical Activity Point to provide formal acceptance.
Department	Department of Transportation of the State of California as created by law.
Department Project Manager	To be Defined
Design	Technical and management processes that commence with identification of design input (requirements) and lead to and include the issuance of design output documents that define the characteristics (specifications) of the expected product or process.
Design-Builder	The Contractor, responsible for the design and construction of the Project.
Design-Build Team	[Company Name] Designer Team and [Company Name] Builder Team [Add definition]

Design Change	A change to a drawing, specification, or other design document that has been released for construction.
Design Disciplines	Technical specialties within the Design Organization that comprise the primary design engineering skill areas and operations.
Design Documents	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. The medium can be paper, magnetic, electronic, optical or computer disc, photograph, master sample or combination of these.
Design Exceptions	To be Defined
Designer	See "Engineer of Record"
Designer of Record (DOR)	See "Engineer Of Record"
Design Information Bulletins	The formal series of memoranda established to describe and convey drawings, criteria, parameters, or other design requirements subsequent to establishment of the original basis of design.
Design Input	Those criteria, parameters, basis, or other design requirements upon which detailed design (output) 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 Manager	Person assigned as manager of design effort.
Design Output	Documents such as drawings, Specifications and other documents defining technical requirements of structures, systems, and components.
Design Process	Technical and management processes that commence with identification of design input, and lead to and include the issuance of Released For Construction Documents.
Design Quality Assurance Manager (DQAM)	The person assigned to perform QA audits on all design packages before documents are submitted for review or released for construction, and who oversees the Quality Assurance program for all design operations. This individual reports to the Project Quality Manager.
Design Quality Management Plan (DQMP)	The elements of the overall project Quality Program that address intended Quality Control and Quality Assurance processes to be implemented with the design activities.
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.

Design Task Manager	Person responsible for all design functions, including schedule, budget and Design Quality Control functions, within a specified discipline or area of expertise. The Design Task Manager may also be the Lead Design Engineer for any specified area or discipline.
Design Team	To be Defined
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.
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 that describe, define, specify, report or certify activities, requirements, procedures or results. The medium can be paper, magnetic, electronic, optical or computer disc, photograph, master sample or combination of these.
Document Control	To be defined
Document Manager	See "Document Control Manager"
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.
Drawings	The plans or sheets that form the graphical representation of the designed and planned work, included in the Construction Documents.
Engineer Of Record (EOR)	California Registered Professional Engineer, responsible for and in charge of the Design of the Project and signs and seals Final Design. (etc)
Environmental Compliance Manager	To be defined
Executive Committee	To be defined
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.
Final Design	A 100% design formally submitted to the Department by the Design-Builder with the intention of reaching Department concurrence prior to RFC, and included as a design development milestone
Final Proposal	To be defined
Formal Design Review	Formal Department process of oversight associated with a Conceptual (30%), Intermediate (60%), Final (100%) or a Released for Construction package.

General Contractor	See "Design-Builder."
Independent Assurance Sampling Testing (IAST)	Process to ensure that a documented review on all testers and observers working on the project is performed on a yearly basis. The review is an independent check, of all testers and each type of test they run on the project, in order to validate proper sampling and testing procedures are being followed, and that equipment is calibrated correctly.
Inspection	Observation, examination, testing, or gauging/measurement to verify whether an item or activity conforms to specified requirements.
Inspector	Any of certified or licensed individuals with the competence and training to perform inspections, observations, testing, examination, review and approval of work in accordance with the Contract Documents.
Inter-Discipline Design Review (IDR)	A formal interdisciplinary review of all or a portion of a design submittal.
Intermediate Design	An in progress set of design documents that are engineered to approximately 60% level of completeness and formally submitted to the Department for review, and included as a design development milestone
Internal Audit	An unbiased and independent audit of the Quality Control System being employed by a given Organization in order to allow self-declaration of conformance.
Lead Design Engineer	Senior Engineer for a particular discipline on the Project, reporting to the Design Task Manager. The Design Task Manager may also fulfill the Lead Design Engineer role.
Material Approval Engineer	Part of the Quality Organization responsible for the approval of materials in accordance with the *Caltrans Construction Manual*
Material Control Schedule	See Volume III for more definition
Monitor	To watch, observe or examine a work operation. The observation and examination results may be recorded, but do not necessarily require a sign-off by the monitoring party. Construction monitoring activities often require more specific documentation.
Nonconformance Report	A deficiency in characteristic, documentation, or procedure, which renders the quality of an item unacceptable or indeterminate by failing to meet requirements. Examples include physical defects, test failures, incorrect or inadequate documentation or deviation from prescribed design processing, inspection or test procedures.

Non Conforming Work	Work performed that does not meet requirements of the Contract Documents.
Notice of Design Change (NDC)	A document initiated by Design-Builder or the Department for notification of a change in design that could affect previously Released for Construction Documents.
Organization	A group of people and facilities with an arrangement of responsibilities, authorities and relationships.
Originals	The documents or records in the highest, most complete form in which they exist in the active project files. This includes, but is not limited to copies of outgoing correspondence, printed copies of a published document, original copies of calculations, quantity take-off and other design analyses, original reproducible drawings, and original resident 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 who provides the design information, sketches and instructions to the CADD operator.
Over the Shoulder (OTS) Reviews	Informal meetings between the Design-Builder and Department Design staff during the development of a Design package intended to generate discussion and provide conceptual- level feedback. No minutes of these meetings are kept and any Design-Builder actions based on these meetings are at the Design-Builder's own risk. However, the effort put forth by the Design-Builder towards these OTS reviews should help streamline Department Design reviews.
Owner	Department
Partnering Team	To be defined
Plan(s)	See "Drawings."
Post-Design Services Manager	Performs functions of Project Design Manager after design phases is completed. Reviews submittals, responds to Request For Information (RFIs) and NDCs.
Procedure	A documented, written specification for performing a particular activity. It may include specification of duties, functions, responsibilities, methods to be employed, equipment or materials to be used, and sequence of operations.
Project	Design-Build [Project E.A].as defined in the Contract, including all deliverables in all phases of the work.
Project Manager	The individual responsible for planning, administering, and authorizing resources for all operating units within the Design-Builder's organization. Reports directly to the Executive Committee.

Proposal	Those documents constituting Design-Builder's response to the RFP, including any supplements to proposals as may have been requested by Department.
Qualification	The characteristics or abilities gained through training or experience or both, as measured against established requirements such as standards or tests specified to qualify an individual to perform a required function.
Qualified Procedure	An approved procedure that has been demonstrated to meet the specified requirements for its intended purpose.
Quality Assurance (QA)	The total effort of developing, documenting, implementing policies and procedures and defining roles and responsibilities in order to achieve and verify quality in accordance with specified requirements. The QA program's objectives are to achieve Department confidence and satisfaction and to assure that a design output, structure, facility, system, or component will perform satisfactorily in service.
Quality Assurance Verification	Review or observation performed for the purposes of verifying that applicable quality standards are properly implemented and quality results obtained.
Quality Control (QC)	The acts of examining, witnessing, inspecting, checking and testing, and when necessary, revising in-process or completed design work, including in progress plan sheets, studies, charting and reports to determine conformity with contract requirements.
Quality Control System	To be defined
Quality Control Verification	The act of monitoring or observing to verify whether an item or activity conforms to specified requirements..
Quality Manager (QMr)	The person assigned the overall responsibility for developing, implementing, maintaining, and ensuring the success of the Quality Program. This person verifies and provides confidence that the Work meets the requirements of the Contract. This person has no responsibilities in the production of the Work, but has the authority to stop Work. Reports directly to the Executive Committee.
Quality Manual	To be defined see Page Q001 3 of 7
Quality Objectives	To be defined Appendix A section 5.3
Quality Policy	To be defined
Quality Program (QP)	The quality policy, quality objectives, Design and Construction Quality Management Plans, procedures, work instructions, and records.

Quality Record	A completed document or record furnishing evidence of successful implementation of any given aspect of the Quality Program. These records may include any number of formats or media, such as written reports, electronic media, drawings, charts, etc.
Quality Supervisor	A person possessing specialized field skills assigned to directly supervise the inspection and testing of specific construction elements commensurate with those skills (e.g. structural concrete testing).
Quality Testing Supervisor	Part of the Quality Organization responsible for overseeing all materials testing on the project.
Receiving	Taking delivery of an item at a designated location.
Rejection	A disposition imposed for substandard work or for a nonconformance condition.
Released for Construction (RFC) Documents	Those documents that have been certified to meet all requirements for construction by the Designer. Such documents include Released for Construction Documents that allow construction of portions or all elements for a particular location.
Request for Information (RFI)	A formal request for additional information regarding the design and construction of the project which may be initiated by anyone associated with the project.
Request for Proposal (RFP)	Design-Build RFP, [Project E.A] and all addenda, as prepared and distributed by Department.
Responding Engineer	To be defined
Review Comment Forms	The forms used to document all comments and their resolution. They are generated in project reviews such as IDR, CR, ITR, and Department reviews.
Service Line	A utility line, the function of which is to connect an individual service location (e.g., a single family residence or an industrial warehouse) to another Utility line which other Utility line connects more than one such individual line to a larger system. The term “Service Line” also includes any Utility on public or private property that services structures located on such property.
Shop Drawings	Drawings submitted by the Design-Builder depicting the proposed fabrication and/or assembly of structural elements or the installation of materials or equipment which illustrate the construction of work. They are to be submitted to the Engineer of Record for review and processing and upon review, copies are to be forwarded to the Department.

Specifications	The written portion of the Construction Document, which may consist of special provisions, Project standard special provisions, the Standard Specifications of the Department and other published Specifications referenced in the Construction Documents.
Standard	The result of a particular standardization effort approved by a recognized authority.
Standard Plans	Detailed plans issued by the Department for general application and repetitive use in connection with the Department projects; the Standard Plans will not apply to the work except with regard with regard to work contractually required to follow the Standard Plans or in connection with any design furnished by Design-Builder which specifies the Standard Plans as applicable.
Standard Specifications	*Caltrans Standard Specifications for Construction 2006*, as modified in the other Contract Documents.
State	The State of California.
Subcontract	The document utilized to employ the service or support of a separate party to perform all or a portion of one or more facets of the scope of work assigned to the Design-Builder under the provisions of the prime contract. Both parties authenticate the agreement.
Subconsultant	See "Supplier."
Supplier	Any supplier of services or products used by Design-Builder to complete the work on the Project.
Task Force	To be defined
Temporary Construction	Construction activities covered by design documents but not incorporated into the final constructed project.
Utility(ies)	A privately, publicly, or cooperatively owned line, facility and/or system for supplying power, light, gas, telecommunications, telegraph, telephone, water, pipeline, or sewer service if such systems are authorized by law to use public highways for the location of their facilities. The necessary appurtenances to each utility facility shall be considered part of such utility. Without limitation, any Service Line connecting directly to a utility shall be considered an appurtenance to that utility, regardless of the ownership of such Service Line. The term “Utility” is sometimes also used to refer to a “Utility Owner.” The term “Utility” shall specifically exclude existing storm water facilities connected with drainage of the roadway.
Utility Agreement(s)	An agreement made among Department and a Utility Owner for addressing one or more Utility conflicts associated with the Project.

Utility Owner	The owner or operator of a Utility
Verification	The act of reviewing, inspecting, observing, testing checking, auditing or otherwise determining and documenting whether items, processes, services or documents conform to specified requirements.
Verified Copy	A copy of a document or file upon which the Design Manager or other 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	The person who verifies that changes recommended by the Checker and accepted by the Back Checker, have been made on the original document. Except under unusual circumstances, the Checker is also the Verifier.
Waiver	Documented authorization to depart from specified requirements.
Work	Design: Those activities undertaken to prepare, and those activities affecting the quality of the Project's design plans, reports, studies, calculations, standards, specifications and special provisions. "Work" also includes purchasing, fabricating, handling, shipping, receiving, storing, cleaning, checking, verifying, maintaining and modifying, as they relate specifically to preparation of the design. Construction: The delivered product or project and all activities associated with delivery.
Working Day(s)	Any Calendar Day other than Saturday, Sunday, or a Holiday
Working Drawings	See “Shop Drawings”.

2.0 SCOPE AND EXCLUSIONS

2.1 GENERAL

This Quality Management Plan (QMP), as part of the Quality Manual (QM), contains the general policies and specific procedures for the design and construction-related activities of [Project Title]. The Quality Policy, Quality Objectives, Quality Management Plan, procedures, work instructions, and records comprise the Quality Program.

2.2 QUALITY PARTNERING CHARTER

As members of the Project Partnering Team, [Design-Builder] agrees on and commits to team values that will guide our behavior and help us establish solid working relationships throughout the project. These ground rules are:

- Honesty With Each Other - Trust
- Quality Minded - Earn Respect
- Pride Professionalism
- Responsive and Expeditious Team Work
- Listening - Understanding
- Integrity - Do What You Say
- Partnering at All Levels
- Resolution of Issues at the Lowest Possible Level. Direct, honest Communication that leads to Coordination and Cooperation
- Emphasis, Plan and Implementation of Safety in all Actions and Attitudes

Together, through partnering and team work, using our ground rules as the foundation, it is our aim to successfully achieve the goals we have listed below:

- Meet project milestones as shown in the proposal
- Minimize impacts to the traveling public – positive public perception
- Produce quality work
- Have no environmental violations - Achieve all bonuses
- Have a safe project - Zero accidents
- Make the project profitable for all
- Provide a team work environment
- No unresolved issues or claims at the end of the project - No DRB Issues
- Keep the public informed
- Provide timely responses
- Have a proud finish

- Have fun

2.3 PROJECT

This Quality Manual is written to meet the requirements of the Request for Proposals (RFP) for the [Project Title], [Project EA] The Client is the California Department of Transportation (Caltrans).

Design-Builder Project Office

ADD DESIGN-BUILDER PROJECT OFFICE MAILING AND PHONE CONTACT INFORMATION

Project Manager

ADD NAME, MAILING AND PHONE INFORMATION

Design Quality Contacts

ADD NAME, MAILING AND PHONE INFORMATION

Construction Quality Contacts

ADD INFORMATION

2.4 SCOPE

The QP defined by this document will meet Department directives and requirements, provide independent confirmation that Project deliverables satisfy specific Contract requirements, and promote a seamless, transparent interface with Department, allowing Department staff to observe all deliverables for the Project as they are developed.

The Quality Manual will not be revised without prior written approval from Department. However, this is a living document, subject to ongoing review and revision to better meet the needs of the interested parties over the life of the Project. Revisions to improve the quality procedures and processes are expected and will promote the ability to meet Project requirements.

2.5 EXCLUSIONS

There are no exclusions in this QP for either the Design or the Construction phases.

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3.0 NORMATIVE REFERENCE

3.1 GOVERNING CONTRACT

This Quality Manual addresses both the design and construction-related Quality Program requirements of Chapter 2.4 (Book 2) of the RFP, [Project EA], and all addenda, as prepared and distributed by Department.

This document was prepared by [Company Name]. [Company Name] serves as the Design-Builder and manages the Project. [Company Name] is a supplier to [Company Name] of design and related services for the Project. [Company Name] is a supplier to [Company Name] of both design and construction services, primarily related to geotechnical engineering and construction testing and inspection.

3.2 NORMATIVE REFERENCE

Documents that form the normative basis for the technical disciplines associated with this Project are listed in the RFP. Other documents may be added as the design teams begin work.

This Quality Management Plan is not ISO-compliant and is not required to be so unless deemed necessary by the Design-Builder during implementation of the Project.

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4.0 QUALITY PROGRAM

4.1 GENERAL

The Design-Builder has established and, on an ongoing basis, documents, implements, and maintains a Quality Program (QP).

This section describes the QP to be implemented for this Design-Build Project. The QP consists of general design and construction quality procedures. It is supported by defined procedures and programs presented in other documents, which may include the following:

1. Project Management Guide
2. Document Control Plan
3. CADD Standards
4. Submittal Plan
5. Safety Management Plan
6. Public Information Plan
7. Environmental Management Plan
8. Utility Management Plan
9. Vegetation Management Plan
10. Visual Quality Management Plan
11. Traffic Management Plan
12. Maintenance Management Plan
13. As-Built Documents

4.2 USE OF THE QUALITY MANAGEMENT PRINCIPLES

This QP has been developed to be visible, to be transparent with regard to decision-making and operations, and to foster continual improvement. The guidance to management is based on eight quality management principles. All eight are reflected in the QP by this Quality Management Plan, and are listed below.

- Customer focus
- Leadership

- Involvement of people
- Process approach
- System approach to management
- Continual improvement
- Factual approach to decision making
- Mutually beneficial supplier relationships

4.3 QUALITY ORGANIZATION

The responsibilities of all personnel who manage, perform, and ensure the quality of the work include:

- Initiate action to prevent the occurrence of Non-conforming work
- Identify, evaluate, and document quality problems
- Recommend or initiate quality improvement solutions
- Stop the work when Non-conforming work is identified, until the deficiency is corrected

The primary roles and responsibilities of the key individuals that comprise the project Quality Organization (QO) are defined as follows:

The QO is comprised of two separate groups; Quality Control (QC) and Quality Assurance (QA). The organization is depicted graphically in Figure QM0003F1 of Volume I of this QMP.

QC, under the direction of the Project Manager (PM) includes design and construction. The Design Manager (DM) who is responsible for design QC leads the design team. The Construction Manager (CM) leads the construction team. A team of QC personnel and QC laboratories performs construction QC, under direct management of the CM.

The Project Quality Assurance organization operates under the oversight of the Quality Manager, who reports directly to the Executive Committee and also provides all reports and documents to the Department. The Design Quality Assurance Manager (DQAM) manages Design QA. Construction QA is under the direction of the Construction Quality Assurance Manager (CQAM). These two individuals will report directly to the Quality Manager, limiting the influence of schedule, performance, or cost on the QA. QA includes the development and maintenance of QC processes and procedures, oversight and the requirements for QA auditing.

The QO will provide the QC procedures and QA review, testing, and inspections `necessary to ensure the project quality meets contract requirements

4.3.1 QO KEY POSITIONS

The QO includes the following eight key Quality Management positions:

1) **Quality Manager**—Responsible for the overall quality assurance activities of the project.

2) **Project Manager**—Responsible for the overall management and implementation of the project including the quality control activities of the Quality Management Plan.

3) **Construction Quality Assurance Manager**—Responsible for quality assurance of the construction.

4) **Design Quality Assurance Manager**—Responsible for quality assurance of the project design.

5) **Construction Manager**—Responsible for quality control inspection and testing of the construction work.

6) **Design Manager**—Responsible for design development and quality control of the design work.

7) **Materials Approval Engineer**—Responsible for the approval of materials in accordance with *Caltrans Construction Manual*.

8) **Quality Testing Supervisor**—Responsible for overseeing all materials testing on the project.

Roles and responsibilities of the quality staff are detailed in DQP101.

4.3.2 QUALITY ORGANIZATION'S AUTHORITY TO STOP WORK

The key QO staff listed above has sufficient authority and organizational freedom to identify quality problems and to initiate, recommend, provide, and verify implementation of the solutions. The Quality Assurance staff do not report to and are not under the authority of any design or construction staff. Even though the quality organization will not be influenced by any potential impact of implementation on the project schedule or budget, the quality organization is cognizant of the design team's need to anticipate these issues and facilitate schedules, maintain budget, and improve organization delivery performance.

If there is evidence that the QMP is not being followed, all key QO staff have the authority to stop work until the appropriate quality procedures are implemented.

For the QO to stop work, the QMr must notify the Executive Committee and Department verbally, followed by written notice within 24 hours. The notification shall identify the reason for stopping the work. After receiving verbal notification, the Design-Builder is responsible for completely halting work on the activity. The QM and PM will develop a written plan of action to resolve the issues and implement any changes.

When the issues(s) have been resolved to their satisfaction, the QMr will provide verbal notification, followed by written notification, to both the Executive Committee and Department that the stop work directive is removed and work may begin immediately. Department retains the authority to override the Design-Builder's decision if it feels that the proposed solution is not acceptable.

4.4 DOCUMENTATION OF THE QUALITY PROGRAM

4.4.1 Preparation and Maintenance of the Quality Manual and the Quality Management Plan

4.4.1.1 Quality Manual

The Quality Manual under which this plan is written incorporates several manuals under which the Design-Builder and its subcontractors currently operate. It is compliant with or based on relevant sections and procedures taken from Design-Builder and Design-Builder's member organizations or suppliers.

4.4.1.2 Quality Management Plan (QMP)

The Quality Program defined in this QMP complies with the objectives and policies of the [Corporate Name] Quality Manuals. This QMP complies with the relevant provisions of the [Project EA] Quality Program.

4.5 DOCUMENTATION REQUIREMENTS

4.5.1 Controlled Documents

All documents related to quality and administrative procedures have controlled distribution throughout the Project organization. They are available to all employees in hard copy and available electronically to those connected to the Project network. Design team staff is provided orientation and training on the Project's quality program and administrative procedures. Distributing and updating controlled documents is further defined in the Document Management Plan (Volume IV).

4.5.2 Document Management Plan

A Document Management Plan (Volume IV) has been written which defines the processes and procedures that:

- approve documents for adequacy prior to use,
- review and update as necessary and re-approve documents,
- ensure that changes and the current revision status of documents are identified,

- ensure that relevant versions of applicable documents are available at points of use,
- ensure that documents remain legible and readily identifiable,
- ensure that documents of external origin are identified and their distribution controlled, and
- prevent the unintended use of obsolete documents and apply suitable identification to obsolete documents if they are retained for any purpose.

4.6 CONTROL OF QUALITY RECORDS

4.6.1 Preparation and Maintenance of the Quality Manual and Management Plans

This Quality Manual will be maintained by the Quality Manager, who will review and update the manual at least every three months, based on the discussion and findings of quality management meetings. The Quality Manual is considered a living document and is subject to revision as necessary to facilitate and improve the quality process for the Project.

4.6.2 Control of Project-Specific Quality Records

Quality records are maintained by document control personnel and provide evidence of conformity with the objectives and requirements of the Document Management Plan and the QMP. Records are available through the Document Manager.

Audit forms for design packages delivered to Department are filed with binders holding the records for each individual package, including the audit forms and records. A copy of each audit form (unexecuted) and a log of all audits completed is maintained electronically.

Audits of other processes and systems are included in the QA files, separate from the design files. Electronic copies of all audit forms are also maintained.

All completed forms and documents that are maintained electronically are write-protected. They are retrievable by the Document Manager and viewable on the server.

All design records will be retained for a specified period after completion of the Project. Quality audit forms are considered part of the Project record and will be maintained for the same period.

5.0 MANAGEMENT RESPONSIBILITY

5.1 MANAGEMENT COMMITMENT

Management has established its commitment to quality on this Project with a comprehensive Quality Program. Management has committed to the following:

- Establish a Quality Policy
- Establish Quality Objectives
- Communicate the importance of meeting customer, statutory, and regulatory requirements
- Conduct management reviews on a quarterly basis
- Provide resources necessary to meet Project requirements
- Continually improve the work processes and deliverables

The tasks and processes required to meet these commitments are defined throughout this QMP.

5.2 CUSTOMER FOCUS

Customer requirements are defined during the planning stages by the RFP and by discussions with Department. During design, ongoing meetings and review processes provide continuing feedback to the design team regarding Department needs and requirements.

5.3 QUALITY OBJECTIVES

The Quality Program will promote project quality and design and construction activities that are completed safely, with minimal impact to traffic flow, on schedule, and within budget.

In accordance with the requirements of this Project, the Quality Program will be implemented immediately with focus on the following objectives:

- Implementing well-designed quality programs, and continually improving all aspects of the process as the Project progresses.
- Partnering with Department to make the design, construction, and management processes open to inspection and oversight.
- Effectively communicating the [Project EA] Quality Program to all members of a well-trained and enthusiastic [Corporate Name] team, so that the Quality Program is effectively implemented with priority over schedule and budget.

- Basing decisions on factual information gathered in a manner that is open to inspection to prevent undue influence of personnel tasked with meeting scheduling and budget goals, potentially at the expense of quality.
- Empowering quality personnel by support from upper management and clear definition and communication of quality roles.
- Bringing subcontractors and suppliers to the [Corporate Name] team who are as committed to providing a superior end product.
- Implementing improved document and data management that is accessible to Department and that continues effectively into the post-design phase.

5.4 RESPONSIBILITY, AUTHORITY, AND COMMUNICATION

5.4.1 Responsibility and Lines of Authority

The Design-Builder is responsible for measuring the quality of the work product and demonstrating to Department that the work meets the requirements of the contract.

Contractually, the QO is part of the Design-Builder's organization.

The Executive Committee has delegated authority and responsibility to the Project Manager to design and build the Project to the requirements of the RFP, Department Standards, and all applicable State and Federal regulations and laws. The Project Manager has been directed to use the Quality Program in the design and construction of the Project.

To show compliance to Department requirements, workers have been directed to identify quality problems during design and construction, and to show improvement during the design and construction process. The Project Manager has directed the Design Manager to use the QP in designing the project. The Project Manager has directed the Construction Manager to use the Construction Quality Inspection and Testing Plan (Volume II) in constructing all features of the Project.

The Executive Committee has delegated authority and responsibility to the Quality Manager to develop, implement, and maintain a Quality Program consistent with the RFP. The Quality Manager has directed the Design Quality Assurance Manager to perform design quality activities related to training, audits of deliverable packages, review of design inputs, and implementation of the QP.

The QM has directed the Construction Quality Assurance Manager (CQAM) to perform quality activities that will help prevent nonconformance during design and construction, certify that suppliers and subcontractors are informed and capable of meeting the project requirements, ensure that the Construction Quality Inspection and Testing Plan is implemented, coordinate with the CM to ensure that all elements of the project are inspected and tested in accordance with the QMP.

All periodic reporting, non-conformance issues, and concerns about quality will be forwarded to both Department and the Executive Committee.

5.4.2 Internal Communication

The QMr, the DQAM and the CQAM will communicate regularly, in person or by phone, with the Department Contract Manager, the PM, the DM, and the CM. The QO's Daily Inspection Reports and Field Observations will be available electronically for all entities to inspect at all times.

The DQAM will prepare a monthly summary of the design packages audited during that period. The summary will describe any quality issues identified and the resolution of those issues.

Communication of quality issues will be completed in a timely manner. Quality issues will be resolved at the lowest possible level, often at the site, with the appropriate inspector and foreman agreeing on a solution.

Open communications will be encouraged. When necessary, communications will be formally documented. Instances of these include but are not limited to:

- Constructability Review of Submittal Packages
- Inter-Discipline Design Review of Submittal Packages
- Independent Technical Review of Submittal Packages
- Formal Oversight Review by Owner

5.5 MANAGEMENT REVIEW

The Quality Program review team will regularly meet throughout the life of the project with the Executive Committee for the express purpose of assessing the suitability, adequacy, and effectiveness of the Quality Program. These ongoing Quality Program reviews are also used to:

•provide the Owner an opportunity to view [Corporate Name]'s internal procedures and their successes and failures, and

•gain Department's input on the QP and to voice any concerns or considerations relevant to the ongoing work.

The Quality Program review team proposes to conduct these reviews, auditing both the design and construction processes. The quality testing, reviews, analyses, and audit findings will be summarized and presented for review by all attendees. The review will identify opportunities for improvement and required modifications to the Quality Program.

For this project, the Quality Program review team will meet monthly at a minimum and other times as warranted and take all necessary measures to address all findings promptly.. That team will include:

- Executive Committee
- Quality Manager
- Design Quality Assurance Manager
- Construction Quality Assurance Manager

Department will be invited to attend and will be given copies of all reports and summaries.

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6.0 RESOURCE MANAGEMENT AND TRAINING

6.1 PROVISION OF RESOURCES

It is the policy of the Design-Builder to provide the resources required to implement and maintain the QP, to continually improve its effectiveness and to meet and exceed customer requirements.

The Quality Organization will provide CQAM, DQAM, staff Inspectors, and sampling and testing staff to meet the project schedule. The staffing levels will be adjusted on a monthly and weekly basis, depending on the work being accomplished on each day, so that all work will be inspected and tested according to the QP.

Quality is assured by assigning full-time, dedicated, and competent staff to perform quality functions consisting of surveillance, training, and auditing of quality processes and procedures used to perform the design and construction work.

Utility Owner inspection staff will be given a monthly look-ahead schedule and one-week notice as to when their work will be constructed to allow them to schedule their inspections accordingly.

6.2 COMPETENCE, AWARENESS AND TRAINING

The Contract Manager, Project Manager, Quality Manager, Design Quality Assurance Manager, and Construction Quality Assurance Manager will determine the competence necessary for personnel working on the project. Personnel will be trained in their job duties and the skills necessary to complete their work right the first time. All personnel on the project will be made aware of:

- the relevance and importance of their activities,
- how the individual members function as a team, and
- how each worker contributes to meeting the Quality Objectives.

6.3 HUMAN RESOURCES

Human resources keep track of ongoing education, training, skills, experience, and performance of all staff. These records are maintained corporately and project managers review these records in order to identify staff for projects of all kinds, including initial and ongoing needs of long-term projects.
The Design-Builder's certification and training plan is included in Section 9.0.

6.4 INFORMATION

Flow and distribution of all paperwork and communications are clarified in Communication Protocols (DQP204).

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7A DESIGN QUALITY MANAGEMENT PLAN

7A.1 QUALITY ORGANIZATION AND RESPONSIBILITY

The QO is described in Section 4 (Quality Program) of this QMP and shown on Figure QM003F1. Design Quality Assurance is under the direction of the QMr and the DQAM. The Design Quality Control is under the direction of the PM and the DM.

7A.2 OVERVIEW OF DESIGN QUALITY PROGRAM

Detailed procedures applicable to the design quality processes are provided in Design Quality Procedures (DQPxxx). The DQPs are referenced within this Volume I, where appropriate. The DQPs are dynamic documents, with additions/revisions issued when the processes require modifications, refinements, or clarifications.

The Design Quality Program consists of several steps, involving:

- Planning the work.
- Preparing design documents.
- Checking and reviewing the documents.
- Making revisions.
- Auditing and Certifying.
- Releasing documents for construction.

There are iterations to each of the steps, depending on the specific type of document, but the basic design quality process is as shown in Figure QM004F1. Specifics regarding the steps are:

1. **Quality Planning**. Quality is achieved through accurate planning, coordination, supervision, and technical direction; proper definition of job requirements and procedures; and the use of appropriately skilled personnel performing their work functions with care.

   Quality procedures included in later sections of this QMP define a QP that achieves its quality goals through a transparent process of open communication, trust, and a partnering atmosphere that addresses concerns promptly, before they become problems.

2. **Design Documents Preparation**. The design team prepares the design documents, using the established design criteria for the project and appropriate inter-discipline and Task Force coordination (via regular scheduled meetings, written communications, etc.). Task Forces (which include representatives from the Design-Builder, Department, and local agencies representatives as needed) meet weekly or bi-weekly during the design phase and periodically thereafter.

Some task forces may be added, combined, or eliminated as design progresses. The Task Forces will generally be discipline specific.

3. **Checking**. All design documents are subjected to inter-discipline design checking process (color-coded system) per DQP410, DQP411, DQP412, and DQP413. For design documents where inter-discipline design checks are warranted, an Inter-Discipline Design Reviews (IDR) is performed per DQP401. All documents that affect construction activities are subjected to Constructability Review as defined per DQP403.
   Before delivery to the Department, all design documents shall be subject to the Independent Technical Review as per DQP402.
   The Checker checks the design documents following the procedures detailed in the above quality procedures using the forms appropriate forms as required.

4. **Revisions** Checker corrections and comments and review comments are evaluated and incorporated into the documents by the Originator, as appropriate.

5. **Audit.** The DQAM audits the design documents in accordance with DQP601 and Section 7A.3.9 and certifies them as meeting the requirements of the QMP, using Form DQP601FB.

6. **Document Control**. The Document Control Manager logs and copies audited design documents, files them in the project files, and transmits electronic versions to Department and other approved project stakeholders.

7. **Review**. Department identified Design-Build team Reviewers, and other approved project stakeholders review the design documents in accordance with Section 7A.3.8 and DQP404 and document comments with Form DQP404FA.

8. **Resolution Comment Meetings**. The design team, Department, and other Reviewers meet following the review to discuss and agree on comments, per Section 7A.3.12.

9. **Revision**. The design team makes the necessary revisions to the design documents to address the comments as agreed upon and advance the design to the next level.

10. **Checking/Audit/Review/Revision cycle**. Repeat the checking/ audit/ review/ revision cycle through each required submittal described in Section 7A.3.7.

11. **Prepare and Audit RFC Submittal**. The design team prepares the RFC documents in accordance with Section 7A.3.15 and submits the RFC package to the DQAM. Using Form DQP418FA, the DQAM audits and certifies the

documents in accordance with Section 7A.3.9, indicating that the documents are approved for RFC. The DQAM stamps the documents "Released for Construction" in accordance with Section 7A.3.15. If the package is for RFC of Maintenance Of Traffic (MOT) Plans, it is also transmitted to the Department Traffic Engineer for approval prior to the DQAM stamping each sheet "Released for Construction". The package is then returned to the DM.

12. **Release for Construction (RFC).** The DM transmits the signed and sealed RFC Design Documents stamped "Released for Construction" to Document Control along with the DQAM's certification that the design package may be released for construction.

13. **Document Control**. Document Control logs and copies the audited RFC documents, files them in the project files, and transmits electronic versions to Department and other approved project stakeholders.

14. **Acceptance of Final Design** Department acceptance of the final design occurs after Department acceptance of construction.

The steps for changes to documents that have been previously released for construction are described in Section 7A.3.16 (Design Changes During Construction).

7A.3 DESIGN CONTROL

7A.3.1 Design and Development Planning

The project schedule will form the basis for planning the project work process. Budget, schedule, and staffing requirements are the key components identified in this planning stage. The other elements to be defined or identified at this initial stage include the project deliverable packages, coordination with outside stakeholders and regulators, required permits and timelines for obtaining those permits. Construction staging will be defined based on numerous factors, including but not limited to:

- maintaining traffic as normally as possible,
- earthwork considerations, and
- customer-driven considerations, such as acquisition of right-of-way.

7A.3.2 Design and Development Inputs

In addition to the project requirements listed above and the set of contractual, technical, and regulatory standards compiled, each design discipline will also define other design inputs necessary to complete the work. For instance, drainage designers will acquire any comprehensive stormwater plans previously done for the project area. Structures designers will assess any data requirements related to site (geotechnical, seismic) or climate (severe winter temperatures).

Inputs for design also include any computer software planned for use. All gathered or calculated data will be organized and maintained by the Design Task Manager, available to all design engineers and others with use for it.

7A.3.3 Design and Development Outputs

Intermediate outputs, such as the geotechnical reports associated with a bridge, will follow the same process as final outputs before being released or utilized in other design tasks. Design packages will be compiled for review by the Owner and ultimately for Release for Construction (RFC). The entire set of RFC packages is actually an intermediate output, since the final output, a constructed roadway, relies on this information.

A listing of all proposed submittals is included in a Document Management Plan (Vol. IV).

7A.3.4 Design and Development Review

The Design Quality Process Flow Chart (Figure QM004F1) defines the design and review process in graphic form.

7A.3.5 Design Checking

All design documents that are submitted for formal review or release undergo detailed QC checks beforehand. Detail checking is completed on all deliverables according to the following procedures:

- Checking of calculations in accordance with DQP410
- Checking of Plans in accordance with DQP411
- Checking of Specifications or special provisions in accordance with DQP412
- Review of studies, reports, other design documents in accordance with DQP413
- Checking of structural design plans and calculations in accordance with DQP414
- Checking of computer program input in accordance with DQP415

7A.3.6 Formal Design Reviews (FDR)

Several review procedures define the ongoing review of the design as it progresses from proposal stage to completed RFC documents. Formal Design Reviews occur for the:

- Conceptual Design Submittal – refer to Section 7A.3.7.1

- Intermediate (60%) Design Submittal – Refer to Section 7A.3.7.2, and the
- Final (100%) Design Submittal – Refer to Section 7A.3.7.3

These procedures include the following:

- **Inter-Discipline Design Reviews (IDR):** These reviews assure that all aspects of the design are considered as the design progresses including safety. These reviews are accomplished by routing the design documents of one discipline to all other disciplines for review and comment. Formal comments are returned in written form and each comment is tracked until resolution is reached and incorporated into the design or otherwise resolved.
- **Independent Technical Reviews (ITR)**: This review provides the technical expertise of senior staff to the design. The ITR members are chosen for their prior experience with the Owner and extensive background and experience on similar projects. Reviewers are not involved directly in the project design; their reviews focus on assuring that the design meets all project requirements, utilizes the best technology and methodology available, and includes client-specific preferences. Their input is given periodically in formal comments that are written and tracked until resolution is reached and the comments are incorporated into the design or otherwise resolved. [Corporate Name] will assign only the most experienced staff to this role for each discipline defined.
- **Constructability Reviews (CR):** These reviews assure that construction-related expertise is incorporated into the design. Construction Manager, Construction experienced engineers and Project Managers will complete these reviews, adding practical construction considerations to the design. The reviews include the use of tracked, formal comments returned to the design team in written form. Each comment is tracked until resolution is reached and incorporated into the design or otherwise resolved.

For this project, the IDR, ITR, and CR will be conducted concurrently. After all reviews are completed and comments are received, the design team will assess the comments and meet with the reviewer to resolve them. Tracking forms will document this progress. Once all comments are resolved, the design package will be forwarded to the Owner for review.

7A.3.7 Design Submittals

The four types of submittals are described below. Review procedures are defined in:

- Inter-Discipline Design review in accordance with DQP401
- Independent Technical review in accordance with DQP402
- Constructability Review in accordance with DQP403
- Review Comment Procedure in accordance with DQP404

- Review of Studies, reports, Other Design Documents in accordance with DQP413

7A.3.7.1 Conceptual Design Submittal

The intent of the Conceptual Design submittal is to provide a formal opportunity for Department, the Design-Builder, various design team disciplines, and other approved project stakeholders to review the construction documents and plans in order to ensure that the design is progressing appropriately and proceeding in the right direction, the plans reflect Design-Builder requirements for construction, design features are coordinated, and there are no fatal flaws within a given discipline or between disciplines. The contents of the conceptual submittal for each discipline shall include the following documents (if applicable), and other items as mutually agreed by members of the applicable Task Force.

Roadway: Design Exceptions identified

Structures: Type selection, preliminary foundation reports, preliminary seismic report, draft hydraulic report.

7A.3.7.2 Intermediate Design Submittal

Intermediate Design submittal package is prepared when the design for a given element or area is 60% complete. The submittal may include plan sheets, Specifications, technical memos, reports, studies, calculations, and other pertinent data, as applicable. The submittal shall include [Form xxxx] resulting from the Conceptual Design Submittal. The contents of the conceptual submittal for each discipline shall include the following documents (as applicable), and other items as mutually agreed by members of the applicable Task Force:

Roadway: Draft Plans, Draft Standard Special Provisions (SSP's), Draft Non-Standard Special Provisions (NSSP's), Design Exception Matrix with conceptual approval by Department, Draft Reports

Structures: Unchecked Plans, SSP's, Draft NSSP's, Final Foundation Reports, Final Seismic Report, Final Structure-related Hydraulic Report

7A.3.7.3 Final Design Submittal

The Final Design submittal package is prepared when the design for a given element or area is 100% complete. The submittal shall include plan sheets, specifications, technical memos, reports, studies, calculations, and other pertinent data, as applicable. The submittal shall include [Form xxxx] resulting from the Intermediate Design Submittal. The contents of the 100% submittal for each discipline shall include the following documents (as applicable), and other items as mutually agreed by members of the applicable Task Force:

Roadway: Final Plans, Final SSP's, Final NSSP's, Approved Design Exceptions, Final Reports

Structures: Final Plans, Final SSP's, Final NSSP's

As a result of the on-going discussion and resolution of design and construction issues via the regularly scheduled Task Force Meetings, Resolution Comment Meetings, and informal reviews, it is anticipated that there will be very few revisions or changes at this stage. If there are no comments on the Final Design Submittal, the package is ready for the RFC Submittal.

7A.3.7.4 Release For Construction (RFC) Submittal

The RFC submittal is prepared when all comments from the Final Design Submittal have been addressed and appropriately incorporated. If revisions agreed to in the submittal reviews are still outstanding, the review process and timeline will revert back to the Final Design Submittal. Refer to Section 7A.3.15 (RFC Procedure) for details on the RFC process.

7A.3.7.5 FHWA Approval - Design Exceptions

This Design-Build Project is a High Profile project determined by FHWA which will include their full-oversight. Therefore, the 13 Controlling Criteria for Design Exceptions (HDM, Chapter 80, "Application of Design Standards") will require written approval by FHWA. After approval of the Design Exceptions by Department, if there are any of the 13 design exceptions identified, Department will be responsible to obtain FHWA written approval prior to RFC.

7A.3.8 Department Reviews

These reviews are completed in accordance with the Contract requirements and the DQMP. In general, Department Reviews will include informal Over-the-Shoulder reviews during design, and formal reviews prior to RFC. The formal reviews include the use of electronically tracked, formal comments delivered to the Design Team for resolution. At a Comment Resolution Meeting, scheduled and attended by the Design-Builder Construction Team and Design Team each comment is tracked until resolution between Department's reviewer and the [Corporate Name] designer is reached and the comment incorporated into the design or otherwise resolved.

7A.3.8.1 Over-the-Shoulder Reviews

Over-the-Shoulder reviews are generally cursory reviews and are intended to minimize disruption to ongoing design work while providing timely comments and feedback on the design.

Over-the-Shoulder reviews by Department representatives (and other approved project stakeholders, as appropriate) will occur through attendance at the Task Force Meetings, through attendance at the Comment Resolution Meetings that occur at the conclusion of formal reviews, and through routine day-to-day interaction. Feedback from the reviews is documented in the meeting minutes, as appropriate.

7A.3.9 Quality Assurance Audits

Audits are periodically preformed by the DQAM to certify that the QC procedures and all applicable reviews have all been implemented. All design documents submitted for formal RFC are accompanied by an approval form that is signed by the DQAM, certifying that the submittal documents have been audited for compliance with the QMP and have passed the audit. If the design package has previously been reviewed, per Section 7A.3.4, the DQAM will also verify that prior comments have been resolved and incorporated, as applicable.

7A.3.10 Other Stakeholder Reviews

As applicable, stakeholder organizations, including municipalities, counties, watershed management organizations, or utilities, to name a few, will be requested, to review and comment on the design. These reviews will be scheduled and scoped per the Department's direction. The scope of the reviews will be documented if it is not already included in the Contract. In most cases, the comment tracking forms will be used and the same review and comment resolution process will be followed.

7A.3.10.1 Utilities–Utility Owner Supplied Designs

Utility Owners prepare a complete package of their design and construction plans, including applicable standards and special provisions, and submit them to the DM for review. The utility package is subject to a Final Design Submittal Review in accordance with Section 7A.3.7.3. Reviewers include Department, the Design-Builder, local government engineers, as applicable, and other utility owners. The DM or designee only verifies that each relocated utility, as designed, is compatible with and interfaces properly with the design and construction of the project. The Design-Builder provides constructability reviews to verify that the design and construction is consistent with the Utility Agreements.

Comments are made in writing on Form DQP404FA and forwarded to the DM via Document Control by the date and time indicated on the package transmittal letter. The DM returns all review comments to the Utility Owner to be addressed. Comments must be addressed to the satisfaction of the comment originator.

Once comments have been satisfactorily addressed, the package shall be audited by the DQAM to verify that the appropriate reviews have been completed and comments addressed. The package is Released for Construction in accordance with Section 7A.3.15 (RFC Procedure), steps 4 thru 8.

7A.3.10.2 Utilities—Design-Builder Utility Designs

Utility designs prepared by the Design-Builder will be designed, checked, reviewed, audited and approved in accordance with Sections 7A.3.3, thru 7A.3.9.

7A.3.11 Review of Shop Drawings

After design is completed, reviews of Shop Drawings are undertaken in accordance with the Review of Shop Drawings procedure (DQP417).

7A.3.12 Comment Resolution Meetings

Comment Resolution Meetings are part of the ongoing review process between the Owner and designers. Both the Design-Builder Construction Team and Design Team will attend these meetings which will be held to discuss and address comments, come to resolution, and clarify any technical issues that may affect the process. These meetings are to take place within 10 days after the review comments have been issued.

7A.3.13 Design and Development Verification

Verification will be performed in accordance with planned procedures to ensure that the design packages have incorporated all applicable requirements and met all design standards. This verification is formally completed as part of the ITR process described above.

7A.3.14 Design and Development Validation

Validation will be performed in accordance with planned procedures to ensure that the resulting product is capable of meeting the requirements for the specified application or intended use, when known. Since the intended use of the RFC design package is to facilitate construction of the end product, this validation of suitability for construction is formally completed as part of the CR process described above.

7A.3.15 RFC Procedure

1. After the Final Design Submittal review, the design team makes the necessary revisions to the design documents to address the comments.
2. The design team checks all revisions made to the Final Design Submittal package in accordance with Section 7A.3.7.3
3. The DM ensures all Final Design Submittal review comments are addressed, resolved, and incorporated.
4. The DM assembles the RFC Package and has the Engineer-of-Record sign and date their seal on the documents and verifies the date and revision number on each on each document. The DM and Design Task Manager (Lead) sign Form DQP418FA and submit the RFC Package to the DQAM for audit.
5. The DQAM performs the RFC Package Review Audit and Certification in accordance with Section 7A.3.9. The DQAM signs Form DQP418FA to certify that the design package may be RFC'd. The DQAM submits the RFC Package to the PM.
6. The Project Manager verifies the Constructability Review in accordance with DQP403. The PM signs Form DQP418FA certifying that the design package may be RFC'd. The PM submits the RFC Package to Department.

7. Department Contract Manager reviews the package to verify review comments have been addressed, signs Form DQP418FA as "Concurs" and returns the package to the DM through Document Control. If the RFC Package is for or includes Maintenance of Traffic (MOT) Plans, both Department Traffic Engineer and Department Contract Manager review the package to verify review comments have been addressed, signs the documents as approved, and returns the package to the DM through Document Control.
8. Document Control logs, copies, distributes, and files the RFC documents in accordance with the Document Control Plan.

For RFC of documents associated with changes to previously RFC'd documents (i.e. NDCs and RFIs), refer to Section 7A.3.16 of this QMP.

7A.3.16 Design Changes During Construction (RFI / NDC)

Several processes address design changes after drawings have been RFC'd. The design change process allows for design changes during construction to maintain or improve quality, constructability, or to modify the design to address unexpected or changed conditions in the field. These include the following:

- Request for Information (RFI)
- Notice of Design Change (NDC)

Notification of impending design change is distributed in accordance with the Document management Plan (Volume IV) requirements (for Request for Information/Notice of Design Change). All RFI/NDC's are stored in the RFI module of the Design-Builder's tracking software (refer to Volume IV, Document Management Plan for additional information regarding document control of these issues).

Control of Design Changes. Each time a plan or special provision is released, it is given a sequential number of the release and the date it is released. This number and date are tracked by Document Control to control each plan change that is RFC'd.
Plan sheets or special provisions have the changed area clouded. On plan sheets, the revision number is placed inside a triangle, next to the clouded area and also in the revision box with an explanation of the changes made to the document along with reference to the RFI/NDC number associated with the change and the date the sheet is RFC'd. For each subsequent revision to the plan sheet, the previous cloud is removed and the new change area is clouded along with adding the associated revision number in a triangle next to the clouded area and in the revision box. The revision box provides a history of the changes to each plan sheet and RFC dates.

7A.3.16.1 Design Change Initiated by Design Team or Department– Notice of Design Change

As design progresses, the design team may determine that a previously released package or plan sheet requires a change to maintain the overall quality of the design. The Designer or Department initiates a notice of design change through Form

DQP505FA and DQP505FB in the Design-Builder's tracking software to the Construction Manager (distribution of the NDC notification is in accordance with the Document Management Plan). The NDC notification includes a description of the change, the drawings or special provisions the change relates to, and the date when the updated documents will be ready for RFC.

The Design-Builder will not construct any items affected by the identified changes until after the updated plans are RFC'd.

Changes to documents that have previously been RFC'd are made in accordance with "Control of Design Changes" per Section 7A.3.16, above.

All plans, calculations, and special provisions with design changes must meet the same quality control checking procedures as outlined in Section 7A.3.5 of this QMP.

During development of the design document revisions, Department is given Over-the-Shoulder review opportunities so that their comments and feedback can be incorporated prior to the DQAM's RFC audit. When applicable, the Environmental Compliance Manager reviews the documents for compliance with project environmental commitments, mitigation requirements, and permits. The DM determines the need for internal design reviews based on the significance/magnitude of the change.

The NDC package is treated like a Final Design submittal, and RFC of the documents (including DQAM audit) follows the RFC procedure steps in Section 7A.3.15 of this QMP.

7A.3.16.2 Design Change Initiated in the Field—Request for Information

An RFI may be issued to improve constructability, address differing field conditions, increase cost effectiveness, or address errors or ambiguities in the plans.

7A.3.16.2.1 Initiation

Department or the Design-Builder design and construction staff may initiate a RFI through RFI Form DQP504FA and DQP504FB in the Design-Builder's tracking software to the Project Manager who transmits the RFI to the EOR and the Department Contract Manager (DCM).
Via the RFI module, the party requesting the RFI explains the issue and proposed change, listing any plan sheets or specifications affected by the change, and including any schedule requirements of the change. Red-lined plan sheets or specifications should be attached if necessary to clarify the proposed change.
It is not acceptable to issue an RFI to address Non-conforming work. Work that has not been constructed per plans, specifications, and contract requirements is deemed non-conforming and must be addressed using the process detailed in Section 8.3 (Control of Non-conforming Product) of this QMP.

7A.3.16.2.2 Validity of RFI Request

The EOR and the DCM review all RFIs They determine whether or not the RFI requires design input and the procedures outlined in either Section 7A.3.16.2.3 or 7A.3.16.2.4 are then followed. Design input is required whenever plan sheets or specifications need to be corrected or revised.

7A.3.16.2.3 RFI Procedure—Design Input Not Required

For RFI's where design input is not required and the RFI is completely handled in the field, the EOR prepares written clarification. With the DCM concurrence, the RFI is distributed and responded to in accordance with the Document Management Plan.
The Design-Builder incorporates changes into the final work. The Design-Builder's design team is responsible for reflecting changes as a result of the RFI on the As-Built plans (see Section 7A3.17).

7A.3.16.2.4 RFI Procedure—Design Input Required

For RFIs where design input is required (i.e., corrections or revisions are required to the sealed documents), the Project Manager distributes the RFI to the Design Manager via the Design-Builder's tracking software in accordance with the Document Management Plan (copies to the design team require action, copies to Department at this point are informational).

Revisions to Plans or Specifications that Do Not Require Re-release of Documents

The Design Manager forwards the RFI, via the Design-Builder's tracking software, to an appropriate member of the design team for review and response. The design team member handling the issue is deemed the Responding Engineer. If the Responding Engineer determines that the changes resulting from the RFI are minor or a written response will provide sufficient clarification of the issue, the response may consist of a written response provided directly in the "Response" portion of the RFI within the Design-Builder's tracking software. Where applicable, a hand sketch or a copy of the plan sheet affected may be attached via the Design-Builder's tracking software to the response, with the change clearly marked by hand and clouded with reference to the RFI number.

During development of the response, Department is given Over-the-Shoulder review opportunities so that their comments and feedback can be incorporated in a timely manner. The response is checked by another designer and when applicable, reviewed by the Environmental Compliance Manager. Within the response, the Responding Engineer includes the following, as applicable:

- The name of the person who performed QC on the response and the date
- A statement that environmental concurrence was received, by whom, and when
- A statement regarding information from discussions or Over-the Shoulder reviews with Department.

If calculations are performed in preparation of the response, the calculations are checked in accordance with the procedures detailed in Section 7A.3.5. The calculations are not distributed with the response unless specifically requested; however, the calculations are filed with the other RFI documents in the Design-Builder's tracking software. Once the design response is complete, the DM distributes the RFI in accordance with the Document Control Plan.

The Design-Builder incorporates changes into the final work. The Design-Builder's design team is responsible for reflecting changes as a result of the RFI on the as-built plans (see Section 7A.3.17). The plan changes should be disseminated to the Construction Surveyor and QA Surveyor.

Revisions to Plans or Specifications that Require Re-release of Documents

The DM determines the design team member best suited to address the RFI and forwards them the RFI for review and response. The design team member handling the issue is the Responding Engineer. If the Responding Engineer determines that the RFI requires revisions to plan sheets or specifications, there are two components to the RFI response:

1) Written Response: When the response is complete, the Responding Engineer documents the required changes directly in the "Response" portion of the RFI within the Design-Builder's tracking software. Within the response, the Responding Engineer includes the following, as applicable:

- The documents to be RFC'd
- A statement that environmental concurrence was received, by whom, and when
- A statement regarding information from discussions or Over-the Shoulder reviews with Department.

2) RFC of Design Documents: All plans, calculations, and special provisions created or modified as a result of the RFI response must meet the same quality control checking procedures as outlined in Section 7A.3.5 of this QMP. During development of the response, Department is given over-the-shoulder review opportunities so that their comments and feedback can be incorporated prior to the DQAM's RFC audit. When applicable, the Environmental Compliance Manager reviews the documents for compliance with project environmental commitments, mitigation requirements, and permits. The DM determines the need for internal design reviews based on the significance/magnitude of the change. The RFI package is treated like a Final Design submittal, and RFC of the documents (including DQAM audit) follows the RFC procedure steps in Section 7A.3.15 of this QMP. Changes to documents that have previously been RFC'd are made in accordance with "Control of Design Changes" per Section 7A.3.16, above.

7A.3.17 As-Built Drawings

The design team prepares As-Built drawings for the project. As-Builts will be compiled towards the end of the project. Changes to the designs will be tracked via the Request for Information/Notice of Design Change NDC (RFI/NDC) process to ensure As-Builts

are accurate. These drawings conform to the CADD standards identified in the Conformed RFP section. As-Built drawings will provide sufficient detail for Department to use the drawings for future activities along the roadway.

7A.3.17.1 Data Gathering Procedures

The Design-Builder will prepare field notes and sketches during construction of all project elements including drainage, utilities, Advanced Traffic Management Systems (ATMS) conduit, signal conduit, and other underground features not visible at the surface. These field notes will include enough survey data to locate the features within the project coordinate system.

7A.3.17.2 Quality Control Checking

Field notes will be checked before incorporation into the As-Built drawings. A Checker will check the as-built information, with the field books, to confirm the accuracy of the As-Built drawings, following the procedures for checking design drawings. The QO will provide periodic audits of the As-Built drawings to evaluate conformance with this QMP.

7A.4 DESIGN ACCEPTANCE

Department acceptance of the design will occur after acceptance of construction. The QO audits provide documentation for Department that verifies all design packages released for construction are in compliance with the QMP. For QMr certification of constructed work, refer to Section 7B.7

The following items are transmitted to Department in accordance with the Document Control Plan to document final design:

- As-Built design plans and specifications
- Design calculations
- Design reports
- Electronic files
- Manufacturers' warranties
- Other project design documentation.

7B PRODUCT REALIZATION: CONSTRUCTION QUALITY MANAGEMENT PLAN

7B.1 QUALITY ORGANIZATION AND RESPONSIBILITY

The Quality Organization (QO) is described in Section 4, Volume I (Quality Management Plan) of Quality Program and shown on Exhibit [QM003F1]. Construction Quality Assurance is under the direction of the Quality Manager (QM) and the Construction Quality Manager (CQAM). The Construction Quality Control is under the direction of the Project Manager (PM) and the Construction Manager (CM).

The Design-Builder shall establish and maintain, either directly or through a quality assurance and control Subcontractor, an effective design and construction quality organization with the following elements, authority, and responsibility:

1. The Quality Organization shall designate an individual to serve as Quality Assurance Manager. The Quality Assurance Manager shall be responsible for all quality assurance issues, quality control, documentation, and reporting;
2. The Quality Organization shall exercise quality control over all phases of the Work from initiation of design through completion of construction Work. The Quality Organization shall also control the quality of equipment and materials to be supplied under this Contract;
3. The Quality Organization shall have the authority and responsibility for reliability, quality control, inspection planning, establishment of the Quality Control System and acceptance and rejection of design documents, materials and manufactured articles in the construction of the Work and the production of equipment and materials to be provided under this Contract;
4. The Quality Organization shall verify inspection operation instructions to ascertain that supplies, equipment, and materials meet all prescribed requirements;
5. The Quality Organization shall endeavor to detect and promptly assure correction of any conditions that are not in compliance with the Contract or Final Design Documents. These conditions may occur in designs, purchases, manufacture, construction, installation, tests, or operations that culminate in defective supplies, services, facilities, technical data, or standards.
6. The Quality Organization shall provide a system for final inspection and testing of each element of the completed Work. The system shall measure the overall quality of each completed element of the Work, and shall include procedures for identification segregation, and disposition of non-conforming materials; and
7. The Quality Organization shall establish and maintain a quality control audit program.

7B.2 OVERVIEW OF CONSTRUCTION QUALITY PROGRAM

This section defines Project Quality Program requirements to ensure compliance to contract documents, applicable regulatory requirements and industry standards. The Project Quality Program, supported by specific and detailed procedures, defines the project organization; processes and responsibilities that will ensure the design, construction, procured equipment and materials, installation and testing will comply will all specified contract documents.

Detailed procedures applicable to the construction quality processes are provided in Volume II (Construction Quality Inspection and Testing Plan) & Volume III (Materials Control Schedule) of the Quality Manual. The Volume II & III are referenced within this Volume I, where appropriate. The Volume II & III are dynamic documents and additions/revisions are issued, as needed, when the processes require modifications, refinements, or clarifications.

The Design-Builder is required to identify the intended Quality Assurance efforts for all field survey work and be included as part of the Quality Program.

7B.2.1. Procurement Control

The Design-Builder shall require that each subcontractor and supplier maintain a Quality Program for the Work it performs or the services and supplies it provides. The Quality Program shall be submitted to the Design-Builder for review and approval.

A. Products, materials and services shall be purchased from subcontractors, fabricators, and suppliers that have a demonstrated effective product quality history. Subcontractors and suppliers shall be evaluated and approved based on their ability to meet defined quality, safety and reliability performance standards. Project Quality Assurance personnel shall participate in the evaluation process.

B. The Department specified quality and design requirements shall be passed down to subcontractors, fabricators and suppliers. Where equipment procurement is involved the methods and means for handling, storage and packaging shall be defined in procurement documents. Subcontractors, fabricators and suppliers performance shall be monitored and evaluated by Project Quality Assurance personnel to ensure compliance to contract documents.

C. Records of supplier, fabricators and subcontractor qualifications and performance monitoring shall be maintained by the Design-Builder and available to the Department upon request.

D. Procurement documents shall be reviewed by Project Quality Assurance personnel to ensure appropriate project quality requirements are specified in the procurement documents.

7B.2.2. Process Control

A. Processes (construction, manufacturing, installation, testing, etc.) shall be planned, documented and approved by authorized individuals. Quality workmanship standards shall be stipulated in written standards. Individuals

performing the work shall be trained and qualified in specific processes and quality workmanship standards.

B. The Design-Builder shall require that all civil construction, basic production operations, and all other processing and fabricating, be performed under controlled conditions in accordance with the Quality Program. Establishment of these controlled conditions shall be based on the documented Work instructions, adequate production equipment, and special working environments if necessary; and statistical analysis, tests, and other quality control procedures may be used when appropriate in the quality assurance process.

C. Adequate in-process inspection and test points shall be included to ensure conformance to contract requirements. The Department may impose inspection and test points to verify compliance. Inspection by the Department does not relieve the Design-Builder from performing required inspections and tests.

D. In-process and completed Work shall be documented. Records of completed Work operations shall be maintained by the Design-Builder, and available to the Department.

7B.2.3. Control of Special Processes and Job Control Testing

A. Special processes and job control testing associated with hardware fabrication or construction shall conform to applicable Government Rules and Standards, Industry Standards and the Department contract requirements. Examples of special processes and job control tests may include, but are not limited to: (Specified example may not be typical for this project.)

Special Processes	Job Control Testing
Welding	Concrete
Non-destructive Testing	Corrosion Control
Coatings	Soils
Painting	Asphalt
Piling	

B. Inspection and test laboratories performing special processes or job control testing shall have an appropriate current certification issued by a recognized regulatory agency. The laboratory shall be reviewed and approved by the Department Contract Manager before Work starts. Special process inspections and tests shall be accomplished by qualified technicians, certified inspectors or other qualified or certified individuals as specified in Governing Rules or Standards, Industry Standards, the Department Specification or other applicable controlling document. The credentials of the technicians or inspectors performing special process inspections or tests and job control tests shall be reviewed for compliance to applicable codes, standards, special training/tests etc. and accepted by the Design-Builder before inspections and tests are performed. Records of credentials shall be maintained by the Design-Builder at the jobsite and available to the Department upon request.

7B.2.4. Inspection and Testing

A. All Work performed under this contract shall be subject to oversight inspection and testing by Department and other persons designated by the Department including material and equipment receiving, in-process and final construction activities, in-process tests, qualification tests, equipment installation and tests, and systems integration testing and acceptance to ensure consistent compliance to contract documents. Material and equipment procurements shall be subject to the Department Source Inspection

B. Detailed inspection instructions shall be prepared and include workmanship standards for all in-process and final construction and installation activities. Inspections Instructions shall be prepared and approved by individuals with appropriate knowledge and expertise and shall be reviewed and accepted by Project Quality Assurance personnel before related Work starts.

C. Results of inspections and tests shall be validated by printed name, signature and date on the test document by the test technician, reviewing test engineer or appropriate responsible individual and the inspector who witnessed the test.

D. Inspection and test personnel shall be trained and qualified in their areas of responsibility. Design-Builder shall verify appropriate certifications as required by Contract Documents, Government Codes and Standards, Industry Standards, etc. Certification records shall be maintained and available to the Department upon request.

E. All materials and each part or detail of the Work may also be subject to inspection and testing by the Department. In addition, when any Local Agency or Utility Owner is to accept or pay for a portion of the cost of the Work, its respective representatives have the right to inspect the Work. Such inspection does not make such person a party to the Contract nor does it change the rights of the parties hereto. Design-Builder hereby consents to such inspection and testing. Upon request from the Department, Design-Builder shall furnish information to such persons as are designated in such request and shall permit such person's access to all parts of the Work.

F. The Department may impose inspection critical activity points to verify compliance to contract documents during all phases of Work. For the minimum required critical activity points, please refer to the attached Volume II – Construction Quality Assurance Inspection and Testing Plan. The Design-Builder may not proceed with Work until each critical activity point has been released by the Department. Inspections by the Department do not relieve the Design-Builder from performing contractually required inspections.

G. Design-Builder shall not be relieved of obligations to perform the Work in accordance with the contract documents by reviews, tests, inspections or approvals performed by others. The reviews, inspections, tests, and approvals conducted by the Department, Government agencies and others do not constitute acceptance of the materials or Work reviewed, tested or

inspected. The Department may reject or accept any Work or materials, request changes and/or identify additional Work which must be done at any time prior to the Final Acceptance date.

H. At all times before Final Acceptance, Design-Builder shall remove or uncover such portions of the finished construction as directed by the Department. After examination by the Department or designee, Design-Builder shall restore the Work to the standard required by the contract documents. If the Work exposed or examined is not in conformance with the requirements of the contract documents, then uncovering, removing and restoring the Work and recovery of any delay to any critical path occasioned thereby shall be at Design-Builder's cost. Furthermore, any Work done or material used without adequate notice to and opportunity for prior inspection by the Department may be ordered uncovered, removed or restored at Design-Builder's cost and with no entitlement for a time extension even if the Work proves acceptable after uncovering. If Work exposed or examined under this Section is in conformance with the requirements of the Contract Documents and adequate notice and opportunity for prior inspection was given to the Department, then any delay to the Critical Path from uncovering, removing and restoring Work shall be considered a Department caused delay, and Design-Builder shall be entitled to a contract modification for the cost of such efforts and recovery of the delay to any Critical Path occasioned thereby.

I. Records of all inspections and tests that provide results that the Work passed defined acceptance criteria shall be maintained and available to the Department upon request.

J. The Department will track general quantities of materials, labor and equipment. This data will be used to generate production rates for the Project and for future design-build projects. Daily labor information will be required from the Design-Builder in order to verify compliance with the Departments' Labor Compliance program.

K. The Design-Builder shall share quantities and production rates with both their quality staff and Department's staff on the Project. Department may withhold payment to the Design-Builder if they refuse to provide quantity and production rate data as noted.

L. During performance of the Project, the Design-Builder shall collect and preserve the following data, at a minimum, in written form acceptable to the Department.

1. Daily manpower and equipment reports for Design-Builder and each sub-Design-Builder for construction-related activities
2. Daily occurrence logs for construction-related activities, recording in narrative form all significant occurrences on the Project, including:
    a. Unusual weather `
    b. Asserted Force Majeure events

c. Events and conditions causing or threatening to cause any significant delay or disruption or interference with the progress of the Project

d. Significant injuries to person or property

3. A listing of each activity depicted on the current Project Schedule status submittal that is being actively prosecuted

4. A daily record in a standard format recording all labor, materials, and equipment expenses that are being incurred

7B.2.5. Inspection and Test Status

Source Inspection for all materials to be incorporated in the project shall be conducted by the Department. The Design-Builder is required to submit the source of all materials to be incorporated in the project.

7B.2.6. Control of Measuring and Test Equipment

A. Measuring and test equipment, including software when applicable, shall be controlled and provided with a status by individual item to ensure the accuracy and reliability of the equipment is maintained on an ongoing basis. Control elements shall include:

1. Calibration standards shall be traceable to the National Institute of Standards and Technology (NIST).
2. Measuring and test equipment shall be uniquely identified i.e., equipment type, identification number, location etc.
3. The next calibration due date shall be clearly indicated on individual measuring and test equipment items.
4. Calibration intervals shall be identified, documented and periodically reviewed for effectiveness.
5. Handling, preservation and storage of measuring and test equipment shall ensure that the accuracy and fitness for use is maintained.
6. Measuring and test equipment calibration records shall be maintained and available for review by the Department.
7. Verification and documentation of developed software.

B. Measuring and test equipment found to be out of tolerance, damaged, or lost during use shall be documented on a Nonconformance Report. Work inspected or tested with out-of-tolerance or damaged equipment shall not be acceptable until the nonconformance is resolved and all characteristics previously inspected have been corrected and verified.

7B.2.7. Control of Nonconforming Items

A. All items whether material, equipment, or hardware, including construction and testing that do not conform to Contract Documents or Reference Information Documents shall be documented on a Nonconformance Report, segregated and controlled until the nonconforming condition(s) is analyzed, dispositioned, corrected and the corrective action verified. Only then may the items be returned to use. The organization responsible for creating the nonconforming condition(s) shall be responsible for investigating the cause of the nonconformance, and initiating corrective action including implementing steps to prevent recurrence. The cause of the problem, disposition, and corrective action shall be documented and available to the Department upon request.

B. Nonconforming hardware and materials shall be reviewed by qualified and authorized individuals to determine the appropriate disposition and corrective action. Disposition of nonconforming items and materials include:

- Rework to meet the original design.
- Repair to achieve fitness for use.
- Accept the condition as-is.
- Reject the condition and return the hardware and material to the supplier.

C. Repair and accept-as-is dispositions shall be approved by the Department before affected Work proceeds.

D. The status of nonconforming hardware and materials shall be maintained and status reports distributed to responsible organizations. This includes distribution to Design-Builder's senior management and the Department Contract Manager at least monthly or as designated by the Department. Records associated with nonconforming hardware and materials shall be maintained and available to the Department upon request.

7B.2.8. Handling, Shipping, Storage and Preservation

Methods and means for handling hardware and materials to prevent damage or deterioration shall be provided by the Design-Builder. Hardware and materials shall be stored in designated controlled areas such as stock rooms, designated hold areas, segregated areas, etc., to facilitate accountability and to prevent damage, deterioration and theft. The Design-Builder shall define methods for authorizing receipt and dispatching hardware and materials.

7B.2.9. Quality Records

Quality records are documents that specify the design, document results of inspections and tests, and include all other related documents. Quality records shall be identified, collected indexed and stored in a manner that precludes damage, loss or deterioration. Specific retention times and location shall be designated and the records shall be accessible for use. At a minimum, quality records shall be identified by title, contract number, revision, date, and signed by an authorized individual. Quality records are considered valid only if stamped (controlled) or signed by an authorized individual.

Corrections or revisions to quality records shall receive the same level of review and approval as the original document. All quality records shall be available for review by the Department upon request. The Quality Assurance material test results and test records shall be submitted to the Department within 24 hours of a test either electronically or hardcopy. For material testing of items in which a longer testing period is required, the test results and test records shall be submitted within 24 hours of completing the test. All records shall be filed in accordance to the filing categories as discussed in Chapter 5-1.2 of the *Caltrans Construction Manual*.

7B.2.10. Quality Audits and Surveillance

A. Quality audits and surveillances shall be scheduled, planned, and conducted on an ongoing basis covering all project quality related activities and project phases. The audit/surveillance schedule shall be maintained current and available to the Department upon request. The Department Quality Management may participate as an observer on audits/surveillances. Quality audits consist of an evaluation of the effectiveness of a specific process. Quality surveillances consist of an evaluation of the effectiveness of a specific activity.

B. Qualified, trained and experienced quality personnel independent of those responsible for the activity being audited shall conduct audits and surveillances. Records of qualifications, training and experience shall be maintained and available to the Department upon request.

C. Results of quality audits and surveillances shall be documented and, at a minimum, distributed to management of the subject organization and the Department. Management of the subject organization shall be responsible for conducting investigative actions to determine and document the problem cause and implementing corrective actions to correct the problem and prevent recurrence.

7B.2.11. Quality Training

Identify and document training needs to support Work in the contract documents and provide for the training of all personnel performing activities affecting quality. Personnel performing specific assigned tasks shall be qualified on the basis of appropriate education, training and experience. Records of training activities shall be retained as quality records and available to the Department Quality Management upon request.

7B.2.12. Quality Control and Quality Assurance Inspection

A. Quality Control and Quality Assurance Inspections shall be performed on all Work to ensure compliance to contract documents. All Work shall be subject to continuous inspection during all work shifts and off-site work activities. Assignment of inspection personnel shall be consistent with the level of activity and complexity of work to be performed. Such inspections shall be by individuals other than those responsible for performing the Work. Work activities subject to inspection include but are not limited to; material and equipment receiving, in-process and final construction activities, in-

process tests, qualification tests, equipment installation and tests, and system integration testing and acceptance.

B. Sufficient inspection points shall be implemented to verify all Work is in accordance with contract documents. Inspections shall be conducted in accordance with prepared Quality Control and Quality Assurance Inspection instructions and inspection frequency checklists that have been approved by the Department Quality Management. Work may not proceed without inspection instructions and checklists in place for the specific work activity.

C. Inspection planning shall be prepared in support of the construction schedule and shall include identification of prerequisite requirements such as approved submittals, material certifications, verification of personnel certifications for special processes, equipment calibration verification, applicable inspection instructions and checklists are available, and the number of inspectors required, etc.

D. Each inspector shall document the results of daily inspections and surveillances on daily inspection reports that include the applicable quality inspection checklists. All inspection documents shall be maintained on the job site as quality records and available to the Department upon request.

E. Inspection personnel shall have sufficient organizational freedom to identify and report nonconforming conditions and have sufficient training, knowledge and experience to perform specific inspection.

F. Inspections conducted by other than the Design-Builder does not relieve the Design-Builder of responsibility for compliance to all Contract Document requirements.

G. Quality Assurance inspection efforts on all items of work shall meet or exceed the Department's expected inspection levels as shown on Inspection frequency checklists included in the Construction Management Plan.

H. Stop Work will be issued if there is evidence that the CQMP or implementing procedures are not being followed, or if the materials or workmanship are not meeting the contract requirements, the Department may, at its sole discretion, stop Work until appropriate quality procedures have been established and implemented. In addition the Department retains authority to stop work without liability wholly or in part if the Design-Builder fails to:

☐

1. Correct conditions that are unsafe for Project personnel or the general public.
2. Correct unacceptable design or construction practices.

7B.2.13. Access to Work Areas

A. The Department shall have safe access wherever Work is performed under this Contract to conduct audits, inspections and tests to verify compliance to Contract Document requirements. Access includes onsite and offsite work areas and work areas of Design-Builder's subcontractors and suppliers. Local agencies and utility companies shall have access to the work performed on their facilities.

B. Audits, inspections and tests conducted by the Department and other authorized third parties shall not in anyway relieve the responsible organization of the responsibility to conduct required inspections and tests to ensure compliance to all contract document requirements.

7B.2.14. Respond to Non-conformances

Design-Builder shall respond to the Department issued nonconformance reports, quality action requests and other documented reports of nonconforming or indeterminate conditions within the time period specified in the document. The response shall include a description of investigative actions, statement of the cause of the problem, action to correct the problem and to prevent recurrence, to the satisfaction of the Department.

7B.2.15. Readiness Review

Participate in readiness reviews scheduled by the Department. Readiness reviews are conducted prior to the start of specific Work activities to conduct prerequisite planning of activities, review required submittals and discuss specific Work to be accomplished. Pre-paving conference is an example of such readiness review. The Department shall authorize the Work to proceed based on results of the readiness review. Work may not proceed without the Department's approval. Construction work plans are required to be discussed in the readiness review meeting.

During these readiness review meetings, the Design-Builder is required to make certain that construction risks are assessed, safe working methods are defined, quality assurance inspection is identified and discussed and workers involved are made aware of the risks associated with the task, and that tasks are considered in advance of field performance;

7B.2.16. Construction Work Plans

Prepare Construction Work Plans (CWP) for individual Work elements or as specified by the Department. The CWPs are presented and discussed at the Readiness Review Meetings described in Section 7B.2.15 of Construction Quality Management Plan. The subject Work may not proceed until the CWP is approved by the Department. As a minimum, CWPs shall address:

A. Description of the Work and applicable Contract specification section.

B. Include actions that are defined as "special events" in that the Work may constitute exposing the general public to danger, inconvenience or risk.

C. List of required submittals to complete the Work activity.

D. Individual(s) and position(s) responsible for supervision of the Work.

E. Planned start date of the Work, progress rate expected and extended Work hours required.

F. Prerequisite activities required.

G. Include a hazard analysis for the scope of Work.

H. Safety issues.

I. Inspection and/or tests to be accomplished.

J. Inspection critical activity points.

K. The activities which may require construction work plans, but are not limited to:

1. Traffic management segregated into each traffic management operation, including traffic diversions, traffic re-routing, permanent and temporary diversions or detours;
2. Demolition of bridges & other structures and site clearance/clear and grub;
3. Safety fences, safety barriers, pedestrian guard rails, and metal beam guardrails;
4. Drainage and sewer work:
5. Electrical and utility service ducts;
6. Earthworks, including method statements for different types of materials;
7. Structural section (base, lean, pavement etc) including instructions for different type materials;
8. Bicycle lanes, curbs, footpaths and miscellaneous paved areas;
9. Traffic signs, construction area signs and overhead signs
10. Temporary and permanent electrical work (AWIS, MVDS, TMS, RMS)
11. Structures, each being broken down into each main element;
12. Landscape operations, including the monitoring, stripping, preservation and re-use of topsoil;
13. Storm Water Pollution Prevention Plan (SWPPP) implementation.
14. Hazardous material (ADL etc) related work
15. Accommodation works;
16. Service or utility diversions and bypass;
17. Environmental management including treatment of habitat areas and all areas where there is any risk or potential risk of environmental damage and -
18. Special activities as required and identified by the Department.

7B.2.17 Construction Quality Assurance Inspection and Testing plan

The Construction Quality Assurance Inspection and Testing Plan to be submitted by the Design-Builder shall meet or exceed the example provided by the Department and included in the Volume II of the Construction Quality Assurance Inspection and Testing

Plan. The following list identifies items to be in the Construction Quality Assurance Inspection and Testing Plan.

1. The Construction Quality Assurance Inspection and Testing Plan shall describe all of the incoming, in-process, and final inspections and tests to be undertaken.
2. The Construction Quality Assurance Inspection and Testing Plan shall show what products or services are to be subcontracted.
3. The Construction Quality Assurance Inspection and Testing Plan shall be controlled through the provision of document control and be updated when new subcontractor or supplier contracts are implemented.
4. The Construction Quality Assurance Inspection and Testing Plan shall identify critical activity points at which Work shall be formally accepted by independent quality personnel and Department prior to proceeding to the next stage of the Work. The Inspection and Testing Plan shall describe verification of Suppliers' and Subcontractor's compliance with requirements.
5. The Construction Quality Assurance Inspection and Testing Plan shall define the activity to be tested/inspected, the Department to perform the test/inspection, the frequency of test/inspection, the test/inspection procedure or reference standard, the specified requirement reference, and the record that documents the results.
6. All material tests shall reference the activity ID.
7. The Construction Quality Assurance Inspection and Testing Plan shall be approved by the Quality Manager.
8. The Construction Quality Assurance Inspection and Testing Plan shall depict the quality inspection Critical Activity Points from the Materials Control Schedule (Volume III of the Quality Manual) and shall contain a written sign-off form for this activity.
9. The PQP shall identify Work for which statistical techniques will be used as a basis of assurance and control of quality and acceptance and rejection of lots.

7B.2.18 Materials Control Schedule (MCS)

The Design-Builder shall develop a MCS for inspection or testing. Once the MCS has been reviewed and approved by the Department and Federal Highway Administration (FHWA), any recommended changes by the Design-Builder will require approval from the Department and possibly the FHWA.

The Design-Builder shall meet or exceed the quality control sampling frequency shown on the Chapter 6 of the *Caltrans Construction Manual* and the Quality Control Manual for Hot Mix Asphalt. The MCS should include both the Quality Control and Quality Assurance efforts of the Design-Builder. The functions of the QC and QA staff shall be clearly defined in the MCS.

The frequency of sampling indicated in the above referenced sampling and testing matrixes is only a guide and applicable under normal conditions.

In the MCS, both the Design-Builder and the Department shall designate a Material Control Schedule Coordinator for the Project. This person will be directly responsible for all MCS issues that arise on the Project, including:

1. Ensuring all requirements of the MCS are met.
2. Evaluating and resolving of all test result and test tolerance issues.
3. Ensuring proper sampling processes and procedures are utilized by all quality staff.
4. Ensuring all Quality Inspection (QI) Critical Activity Points occur as depicted in the MCS.
5. Reviewing and tracking all quality training requirements.
6. Scheduling Independent Assurance reviews for the Project.
7. Ensuring the Materials Certification for the Project is completed and all issues properly addressed.
8. Ensuring proper completion of all sample cards and all necessary tests are completed on the sampled materials.
9. Coordinating the MCS requirements with all Suppliers and Subcontractors.
10. All samples taken by the Design-Builder's quality staff shall be submitted to the Materials Control Schedule Coordinator before delivery to the Department District Materials Offices for testing.
11. Materials Certification for the Project shall be completed for the Project. This will ensure the MCS requirements are being adhered to and if shortcomings are found, improvements to the Inspection and Testing Plan can be made.

Materials Control Schedule will be covered in Design Quality Management Plan under review of Shop Drawings.

7B.2.19 Construction Surveying Quality Control and Quality Assurance

7B.2.19.1 Construction Surveying Quality Control

7B.2.19.1.1 Development of Field Books and Supplemental Field Staking Data

Three levels of quality control checking will be performed on the data used for construction staking. The process is outlined in the following paragraphs.

The Survey Manager is responsible for preparing the required survey software format data from the design information provided in the form of a "Survey File" by the Project Engineer. Typical highway construction project Survey File deliverables may include electronic slope stake note files, point coordinate files, cross section files, and horizontal and vertical profile alignment files of the highway, ramps, other

roadways, structures, drainage systems, curb flow-lines of curb returns and islands, utilities, earthwork and other features and limits not referenced to roadway alignments, other features that are not parallel or concentric with, or otherwise referenced to roadway alignments, etc.

The Survey Manager will check the Survey File information received to the released design drawing information with respect to the accuracy of the plan, coordinates, elevations, stations, offsets, bearings, angles and slopes to the given typical sections, profile grades, alignments, and super elevations diagrams or tables. A visual check of the information in the surveying software format in conjunction with spot check comparisons between the Survey File data and the released plans provides the first level of quality control checking. If any discrepancies are found at this point, the Survey Manager will not proceed until the discrepancies are resolved and/or corrected.

The Survey Manager will use the confirmed Survey File information to develop field books. A separate field book is developed for each individual feature (i.e., utilities, highways, ramps, frontage roads, bridges, drainage). For some features or locations, supplemental staking plots will be developed in addition to the field books to provide additional information to the survey crew. These supplemental drawings offer an additional level of quality control in more complex areas by providing a visual reference of staking points.

The second level of quality control checking occurs by performing spot checks on the field books and supplemental staking plots. An individual, who has not been involved in preparing the particular aspect of the field book data being checked, will spot-check the information for accuracy. The checker documents his check by placing a red check mark in the field book adjacent to the item checked and initialing the field book. If errors are found, they will be corrected before initialing the field book.

7B.2.19.1.2 Field Survey

The third level of quality control on the construction staking data will be performed in the field by the survey Party Chief. The Party Chief once again will make random spot checks of the field books, completed construction staking notes, and a visual inspection of the staking operations.

7B.2.19.2 Construction Surveying Quality Assurance

7B.2.19.2.1 QA Verification of Field Book

The QA Surveyor ensures that the Survey Manager has performed spot checks in accordance with Section 7B.2.19.1.1 above by performing periodical audits of the field books, control adjustment reports, completed construction staking notes, and staking reports.

7B.2.19.2.2 QA Verification of Field Survey

The QA Surveyor will provide a series of QA checks on actual staked points to verify that the established points for Project Control and construction surveying meet required

tolerances. The estimated frequency of QA field survey verification is provided in Field Survey Exhibit.

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FIELD SURVEY EXHIBIT

Frequency of QA Field Survey Verification

Survey Items	Designated QA Check Points		Estimated Frequency	Comments
	Estimated Total	Proposed		
Control Points	TBD	TBD	1 per 6	Check location & elevation
Clearing stakes	TBD	TBD	1 per 1000' stationing	Check location
Fence stakes	TBD	TBD	1 per 1000' stationing	Check location
ESA stakes	TBD	TBD	1 per 1000' stationing	Check location
Slope stake catch points	TBD	TBD	1 per 1000' stationing	Random selection both sides, mainline, ramps, and frontage roads
Reference Point Slope Stakes (RPSS)	TBD	TBD	1 per 1000' stationing	Random selection both sides, mainline, ramps, and frontage roads
Abutment Fill Stakes	TBD	TBD	2 per bridge cone	Check location & grade
Intermediate slope stakes	TBD	TBD	1 per 1000' stationing	Check location & grade
Rough Grade Stakes (RGS)	TBD	TBD	1 per 1000' stationing	Check location & grade
Contour Grade stakes	TBD	TBD	2 per cont grading area	Check location & grade
Finish Grade Stakes (FGS)	TBD	TBD	1 per 400' stationing	Check location & grade
String line stakes	TBD	TBD	1 per 300' stationing	Check location & grade
Curb and Gutter stakes	TBD	TBD	1 per 300' stationing	Check all at ADA ramps & >6%
Sidewalk stakes	TBD	TBD	1 per 500' stationing	Check all at ADA ramps & >6%
Pipe stakes	TBD	TBD	1 per 200'	Check grade & location
Drainage Inlet Box Stakes	TBD	TBD	1 per 6	Check box grade, location, & relationship to controlling feature (eg: curb or barrier)
Sign Bridge stakes	TBD	TBD	EACH	Check location, elevation, & distance
Overhead Sign Base stakes	TBD	TBD	1 per 6	Check location & elevation
Minor Structure stakes	TBD	TBD	1 per 6	Check location & elevation
Major Structure stakes (Ground)	TBD	TBD	1 per 6	Check location & elevation
Major Structure stakes (Superstructure)	TBD	TBD	1 per 6	Check location
Bent stakes	TBD	TBD	1 per 6	Check location & elevation
Retaining wall LOL Stakes	TBD	TBD	1 per 200 feet of wall per wall For walls less than 1000 lineal feet in length - one check shot at each end and one in the middle. For walls 1000 or more lineal feet in length - one check shot at each end and every 500 feet between	Check location & elevation
Barrier Stakes	TBD	TBD	1 per 500' stationing	Check location & elevation
Pile location stakes	TBD	TBD	1 per 6	Check location & elevation
Signal stakes	TBD	TBD	1 per signal location	Check grade, location, & relationship to controlling feature (eg: curb)

Utility stakes	TBD	TBD	1 per 500' stationing	Check location & elevation

7B.2.19.2.3 Tolerances for QA Field Survey Verification

By using a survey method that provides an independent survey check on the Survey Manager, the QA Surveyor performs a truly independent check of the construction staking. However, due to the inconsistencies of the methods used and operator differences, exact duplications of surveyed points would be rare. Since the difference in the QA field verifications may be greater than the allowable tolerances, the QA Surveyor will identify the field verified point to either conform to the design intent and/or conform to the project specification tolerances. The QA Surveyor will use the tolerances within Survey Verification Exhibit to establish whether the field verified point conforms to the design intent.

SURVEY VERIFICATION EXHIBIT

Tolerances for QA Field Survey Verification with Design Intent

Survey Items	Horizontal Station or Northing tolerance	Horizontal Offset or Easting tolerance	Vertical tolerance	Comments
Control Points	0.03'	0.03'	0.02'	
Clearing stakes	1'	0.5'	N/A	
Fence stakes	1'	0.1'	N/A	
ESA stakes	1'	0.5'	N/A	
Reference Point Slope Stakes (RPSS)	1'	0.3'	0.1'	
Correction stakes	1'	0.2'	0.1'	
Rough Grade Stakes (RGS)	0.5'	0.2'	0.1'	
Contour Grade stakes	0.5'	0.3'	0.1'	
Abutment Fill stakes	0.3'	0.1'	0.1'	
Finish Grade Stakes (FGS)	0.3'	0.03'	0.02'	
String line stakes	0.3'	0.03'	0.02'	
Curb and Gutter stakes	0.2'	0.03'	0.02'	
Sidewalk stakes	0.2'	0.03'	0.02'	
Barrier Stakes	0.2'	0.03'	0.02'	
Pipe stakes	0.3'	0.1'	N/A	
Drainage Inlet Box Stakes	0.03'	0.03'	N/A	
Major Structure stakes (Ground)	0.03'	0.03'	0.02'	
Bent stakes	0.03'	0.03'	0.02'	
Major Structure stakes (Superstructure)	0.1'	0.02'	N/A	
Minor Structure stakes	0.03'	0.03'	0.02'	
Retaining wall Stakes	0.03'	0.03'	0.02'	
Pile location stakes	0.1'	0.1'	0.1'	
Sign Bridge stakes	0.03'	0.03'	0.02'	
Overhead Sign Base stakes	0.1'	0.03'	0.02'	
Signal stakes	0.1'	0.1'	0.02'	
Utility stakes	0.1'	0.1'	0.02'	

7B.2.19.2.4 Documentation of QA Survey Verification

The QA Surveyor will document verification of field survey points using FORM CQP081FA (Field Verification Report). This report will provide a description of the item checked, findings, comments, conformance with specifications and/or design intent, any action taken due to discrepancies, and the resolution of any discrepancies. Any supporting documentation generated for verification of points checked will be attached to the form. The form will be signed and dated at each step of the verification process. A certification signature and seal will be placed at the bottom of the form once all discrepancies have been resolved

All Field Verification Reports, in accordance with the frequency established in Section 7B.2.19.2.2, associated with a particular activity, are required at the corresponding established Quality Check Points.

7B.2.19.3 Coordination between Construction Surveyor & QA Surveyor

To ensure the effectiveness and timeliness of the survey verification process, the Survey Manager is responsible for keeping the QA Surveyor up to date on all construction staking activities. Notification will be provided to the QA Surveyor via frequent e-mail, phone conversations and faxes. This coordination effort is essential for minimizing delays in construction activities.

7B.2.19.4 Resolving Discrepancies

If errors are identified during the QA field verification, the QA Surveyor notifies the Survey Manager and the CQAM. The QA Surveyor and Construction Surveyor try to resolve the discrepancy. The Survey Manager has the opportunity to accept and correct the error or reject the discrepancy. If the discrepancy is not resolved, a meeting is scheduled between the Survey Manager, the CQAM, and the QA Surveyor to resolve the discrepancy. If the discrepancy is not resolved at this level, the issue is escalated to the PM and the Department for resolution.

7B.2.19.5 As-Built Documentation

Field survey records for all plan changes to location, line, or grade will be documented by the Survey Manager, and will be submitted to, and maintained by, the Design-Builder for inclusion in the electronic As-Built files. As-Built drawing processes and procedures will be in accordance with Section 9.5.4, “As Built” of RFP (Book 2) and Section 7A.3.17 (As-Built Drawings) of this QMP.

7B.3 CONTROL OF MONITORING AND MEASURING DEVICES

Monitoring and measuring equipment used on the Project will be appropriate for the work being performed, in working order, and calibrated periodically. When not in use,

the devices will be protected from damage and stored in accordance with manufacturer's as well as Owner's requirements. Records of the calibration will be maintained

7B.4 QUALITY MANAGEMENT PERSONNEL QUALIFICATIONS

Personnel assigned to perform quality assurance inspection, testing, or monitoring of characteristics for acceptance shall not be those performing or directly supervising the Work being accepted. The Quality Manager and the Quality Assurance staff shall have no responsibilities in the production of the design or construction of the work.

Material Testing/Inspection staff and Material Testing labs are required to possess the necessary technical industry certifications and the Department certifies for the Work they are inspecting or material they are testing as discussed below.

All personnel shall have the minimum qualifications listed below:

A. The Project Quality Manager shall have a Bachelors degree from an accredited four- year educational institution in engineering, engineering technology, or related field and a minimum of ten years quality experience, at least five years in a Quality management position. Specific quality experience may be substituted for education, subject to approval by the Department Contract Manager.

B. The Design-Builder shall ensure the following qualification requirements for Quality Assurance staff are met for each shift of work when it is applicable:

    1. Senior Bridge Inspector: The Senior Bridge Inspector shall have a Bachelor of Science degree in Civil Engineering and have a CA Professional Engineer license in Civil Engineering and a minimum of five years of bridge construction inspection experience and certified to the applicable Department certification requirements.

    2. Senior Roadway Inspector: The Senior Roadway Inspector shall have a Bachelor of Science degree in Civil Engineering and have a CA Professional Engineer license in Civil Engineering and a minimum of five years of experience in roadway construction inspection and certified to the applicable Department certification requirements.

    3. Bridge Inspector: The Bridge Inspector shall have a Bachelor of Science degree in Civil Engineering and a minimum of three years experience in bridge construction inspection and certified to the applicable Department certification requirements. Specific bridge construction experience may be substituted for education, subject to approval by the Department Contract Manager.

    4. Roadway Inspector: The Roadway Inspector shall have a Bachelor of Science degree in Civil Engineering and a minimum of three years experience in roadway construction inspection and certified to the applicable Department certification requirements. Specific

roadway/highway construction experience may be substituted for education, subject to approval by the Department Contract Manager.

C. The Design-Builder, Quality Control Engineers shall have a Bachelors degree from an accredited four-year institution in engineering, engineering technology and a minimum of three years project related quality experience. Specific quality experience may be substituted for education, subject to approval by the Department Contract Manager.

D. Material inspection and testing personnel shall have the experience and training commensurate with the work to be performed. Material inspection personnel shall have a minimum of two years experience for the type of work to be inspected. Activities such as special process requiring qualified/certified production, inspection and test personnel shall be identified and the minimum competence level established and described in the Design-Builder's Quality Procedures of the Construction Quality Assurance Inspection and Testing Plan. Material Testing personnel shall report to the Design-Builder Quality Assurance Manager.

E. All Project Quality personnel are subject to review and approval by the Department Contract Manager before assignment to the project. Personnel qualifications/certifications shall be submitted to the Department for review and approval before assignment to the project.

F. All material testers and labs to be used by the Design-Builder shall be Department certified.

G. The Design-Builder shall perform all laboratory testing at a Department certified and approved lab; all AASHTO Materials Reference Laboratory (AMRL) accredited facility for all material tests required in the contract.

H. Quality Assurance staff are required to inspect pre-construction work such as SWPPP, Traffic Control, and other work during design stage/investigation and prior to construction stage.

7B.5 FAILURE TO PERFORM

Nonconforming Work is Work that the Department determines does not conform to the requirements of the Contract documents. Nonconforming Work shall be removed and replaced to be acceptable to the Department, at Design-Builder's cost; and Design-Builder shall promptly take all action necessary to prevent similar deficiencies from occurring in the future. The fact that the Department may not have discovered the Nonconforming Work shall not constitute an acceptance of such Nonconforming Work. In the event the Design-Builder fails to correct any Nonconforming Work after receipt of notice from the Department requesting such correction and within the time specified in the notice, then the Department may cause the Nonconforming Work to be remedied or removed and replaced and may deduct the cost of doing so from any moneys due or to become due Design-Builder and/or obtain reimbursement from Design-Builder for such cost. Remedy for Design-Builder's failure to perform will be in addition to any other rights or remedies available to the Department under this Contract.

7B.6 FINAL INSPECTION

At the completion of work, the CQAM, PM, and Department jointly conduct a final inspection of the project. The final inspection includes inspection of the completed work, associated As-Built Documents, certifications, and other documentation and Design-Builder punch list item review. The inspection is accomplished within five business days of notification that the project is ready for final inspection.

During the inspection, quality control documentation may be reviewed. Department and the CQAM jointly agree upon the list of Non-conforming work and the corrective action to be taken, along with an agreed-upon completion date for the corrective action.

The CQAM will ensure that each deficiency identified during the final inspection is corrected before the agreed-upon completion date.

7B.7 FINAL CERTIFICATE OF COMPLIANCE

The PM submits a Certificate of Compliance [Appendix xx] signed by the CQAM and the PM indicating that all materials incorporated in the project conform to the contract requirements.

7B.8 FINAL DEPARTMENT ACCEPTANCE

Department has sole responsibility and authority for Final Acceptance (FOA) of all work.

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8.0 MEASUREMENT, ANALYSIS AND IMPROVEMENT

8.1 GENERAL

It is the policy of the Design-Builder to measure elements of construction during the work. The measurement data will be analyzed and the workers, construction methods, equipment, and materials evaluated to determine whether work is complying with the project requirements. Where deviations occur, the cause will be determined and the construction process changed to produce conformance.

8.2 MONITORING AND MEASUREMENT

8.2.1 Quality Program Performance

8.2.2 Owner Satisfaction

Owner satisfaction will be monitored on an ongoing basis via the following:

- Executive Committee meetings, attended by the Owner, where feedback will be solicited.
- "Lessons Learned" meetings held after key proposal and Project milestones.
    - Proposal stage – after debriefing.
    - Design stage – after first documents are released for construction.
    - Design stage – end of design.
    - Construction stage – after first two months.
    - Construction stage – annually thereafter.

[The Design-Builder is to propose the timing and nature of these meetings]

- Review of correspondence and memos from the Owner.

Informal assessment will occur with each interface of Owner personnel with Design-Builder personnel working on the project. All personnel are responsible to report all incidents of owner dissatisfaction to the Quality Manager. The Quality Manager will determine the cause of the dissatisfaction, and work with the Project Manager to prevent a recurrence.

8.2.3 Internal Audits

It is the policy of the Design-Builder to conduct internal audits of the Quality Program. The Quality Manager is responsible for planning and carrying out the audits. The audits will focus on conformance to the quality requirements established by the Design-Builder

and the use and effectiveness of the Quality Program. The audit results will be part of the review input given to the Executive Committee.

Internal audits to be completed during the project include the following:

- Audits of deliverables to the Owner or other stakeholders before they are delivered
- Audits of the document control system
- Periodic informal spot-audits of Department comment forms, internal comment forms, RFIs, and Design Change paperwork to spot trends, problem areas, or inefficiencies
- Audits of quality activities

8.2.3.1 Schedule of Audit

Item	*Audit Date or frequency*
Design Plans and Special Provisions	The DQAM audits each Conceptual Design, Intermediate Design, Final Design, and RFC for conformance with the Quality Management Plan
Design Changes	The DQAM audits all documents developed as a result of Final Design Changes or Notice of Design Change for conformance with the Quality Management Plan
Construction	The CQAM or their representative will audit construction work as performed through the use of quality check points throughout the duration of the project
Offsite Plants	Audit plant operations and in-house QC program every 4 months during the construction season
Testing Labs	Audit equipment and personnel every 3 months during the construction season

8.2.3.2 Audit Personnel

The QM will designate appropriate trained QO personnel to perform the required audits for the project. These individuals are not involved in either the actual design or construction process and will perform audits in accordance with the written procedures or checklists. The audits of the construction process will be performed via the quality check points.

8.2.3.3 Non-Conformance Reports for the Quality Process

Should the auditor find areas of non-conformance within any of the quality process areas, a Non-conformance Report (NCR) will be written and processed. The non-conformance will be described and documented by the auditor. The CQAM and CM for construction non-conformances, or DQAM and DM for design non-conformances, will review and sign off on the NCR. All NCR's will be processed through the CQAM since the CQAM will be responsible for maintaining an NCR log on Form DQP501FB. If trends (four occurrences or more) continue in non-conformance, the CM, DM, CQAM, or DQAM will develop a plan and/or process changes to eliminate the non-conformance in

the future, a schedule for implementation, required training, and a follow-up review once the new procedure is in place.

8.2.3.4 Documentation Procedures

The DQAM audits and certifies design documents using the Design Quality Audit Checklist form (Form DQP601FB) which includes checklist items to evaluate compliance with the QMP. Audit records will be kept in electronic form on the project's electronic document system.

8.2.1.3 Self-Assessment

A self-assessment is typically conducted during each project by inviting the Quality Manager from one of the Design-Builder team corporations or subcontractor corporations to conduct a project audit.

8.2.4 Measurement and Monitoring of Design

The Design Manager and Design Quality Assurance staff will consider several processes for monitoring and measuring at the beginning of each project. None of these or more than one may be tracked for the entire project or for a given period. Consideration will be given to the number of staff hours required to track the measurements vs. the risks and costs of nonconformance. Processes to be considered for monitoring include:

- Evaluation of Department comments – type of comments and how they change over time.
- Evaluation of internal IDR, ITR and/or CR comments – usefulness, impacts on cost reduction, time required to complete them, effectiveness as loss prevention tool.
- Evaluation of RFIs, FDCs and/or NDCs – necessity, impacts on costs, time required to complete them, effectiveness at resolving issue in field and ongoing design tasks.
- Evaluation of time or labor hours required to complete various processes, including such things as preparation of deliverable packages of various types, or time required for formal comment processes, from disbursement of comment forms to final resolution of all comments.

8.2.5 Measurement and Monitoring of Products

The Construction Quality Assurance Manager is responsible for all required tests and inspections outlined in the RFP. The schedule of tests and inspections is included in Design-Builders Materials Control Schedule (Volume III of the Quality Manual) Projects. The CQAM will update test data daily in the project database.

Test data and inspection results will be kept in electronic form on the project's electronic document system.

The Construction Quality Assurance Manager will notify the Department Contract Manager 10 days prior to NTP2 of the upcoming work. A production and construction schedule will be provided.

All personnel are responsible for identifying quality problems during construction using the Worker-Identified Opportunity for Improvement Program (the WI-FI Program). Quality deficiencies will be reported to the Quality Manager, Construction Quality Assurance Manager, and all inspectors and testers. The deficiencies will be recorded, investigated, evaluated, and resolved.

The quality activities will be documented in test sheets, inspection forms, audit reports, and other record documents. The forms will contain acceptance criteria and the person certifying conformance. The records will be kept in electronic form on the Project's electronic document system.

8.2.6 Measurement and Monitoring of the Satisfaction of Interested Parties

This aspect of the quality program refers to monitoring and measuring the satisfaction of interested parties other than the Department. Surveys or meetings that are held with specific agendas and documented with formal minutes can be used to evaluate the satisfaction of stakeholder groups including the following:

- Design staff
- Construction laborers and foremen
- Suppliers and partners
- Regulatory groups
- Roadway users

Consideration will be given to the number of staff hours required to track the measurements vs. the risks and costs of nonconformance. None of these or more than one may be tracked for the entire project or a given period.

8.3 CONTROL OF NONCONFORMING PRODUCT

8.3.1 General

The Quality Program will identify design documents, materials, products, and construction that do not conform to project requirements. Each instance will be documented, evaluated, resolved, and corrective action taken to prevent a recurrence.

The nonconforming material, product, or construction will be marked or tagged to prevent its unintended use. The material product or construction will not be used until the nonconformance is resolved. When the nonconformance is corrected, additional tests or inspections will be performed to verify the material, product, or construction is proper for the intended use.

All staff will be empowered, encouraged, and educated; regarding the benefits, to report nonconformities as soon as they are discovered.

8.3.2 Nonconformity Review and Disposition

Nonconformities may be identified or discovered through many mechanisms.

Questions from the field to the design team regarding changes to the design Plans or Specifications or changes found beneficial due to field conditions (RFIs), or changes to these documents initiated by the design team (NDCs), are all implemented by procedures developed to document the discovery and resolution of a nonconformity. By completing the resolution process, all nonconformities are tracked until they are resolved.

By using and reviewing the forms, reasons for the nonconformities can be assessed, including whether the nonconformity is supplier- or discipline-related.

8.4 ANALYSIS OF DATA

Quality staff will review all data gathered through formal and informal audits or any of the monitoring procedures discussed above to assess performance against plans, objectives, and other defined project goals and Design-Build Program goals. Through this and other analysis, the Quality Manager, CQAM, and DQAM will seek to determine the root cause of the nonconformity.

Analysis for individual assessments will be defined prior to gathering the data.

8.5 IMPROVEMENT

8.5.1 General

The Design-Builder will continually seek to improve the effectiveness and efficiency of the processes of the organization, rather than wait for a problem to reveal opportunities for improvement. Improvements can range from small-step ongoing continual improvement to strategic breakthrough improvement processes.

Improvement activities will be built into the process of design and delivery by identifying and implementing improvement processes over the course of the overall Project. Consideration will be given to these processes (both small and large) during the Executive Committee meetings that take place quarterly for this Project.

Improvement will be monitored, measured, and recorded.

8.5.2 Corrective Action

The Design-Builder will determine the cause of nonconformities identified by the Quality Program and Department. Corrective action will be developed and implemented to prevent the recurrence.

The corrective action will be focused on eliminating the root cause of the problem. There are many ways to determine the cause of the nonconformity, including analysis by an individual or by assignment to a corrective-action project team. Management will consider the required investment in time and resources against the impact of the problem being considered. Root-cause analysis will be used when appropriate, though it is understood the resources required for this are substantial.

The procedure for corrective and preventive action is included in the quality procedures.

8.5.3 Loss Prevention

Loss prevention in the form of planning will be applied to all production and support processes, activities, and deliverables to ensure the satisfaction of the Owner and other interested parties. For this Project, the Quality Manager and design team will consider completing a self-assessment to determine the adequacy of the QP as defined in this Quality Manual.

8.5.4 Continual Improvement of the Organization

Continual improvement requires the involvement of people. Design-Builder management and the management of their supplier seek to create a culture that encourages people to actively seek opportunities for improvement of performance in processes, activities, and products.

Authority is effectively delegated so that people are empowered and accept responsibility to identify opportunities were the design team can improve its performance.

All staff exhibit a clear understanding of their objectives, roles and responsibilities.

Recognition for achievement of improvements is part of the culture.

Suggestions and assessments are responded to promptly by management.

Improvement opportunities and suggestions will be sought on an ongoing basis. Review and evaluation of suggestions will be timely and as thorough as necessary. Decisions to implement will be made based upon sound evaluation of the facts and

costs. Improvement plans will be based upon review of all available or necessary data and implementation will be efficient and effective.

Draft

9.0 DESIGN-BUILDER's CERTIFICATION AND TRAINING PLAN

The Design-Builder shall insert their certification and training plan from their Technical Proposal here.

TRAINING PLAN

Types of personnel and the training requirements

Staff Level	*Safety*	*Environmental*	*Design QC*	*Construction Quality Plan*	*Work Element Training*	*Specification & Construction Requirements*
Construction Management Personnel	✓	✓		✓		✓
Design Management*	✓	✓	✓	✓		✓
Design Staff*	✓	✓	✓			✓
Construction Foremen	✓	✓		✓	✓	✓
Crafts & Labor	✓	✓		✓	✓	✓
Quality Management*	✓	✓	✓	✓	✓	✓
Inspectors	✓	✓		✓	✓	✓
Sampling & Testing	✓	✓		✓	✓	✓
Subcontractors	✓	✓		✓	✓	✓

*Safety training only needed for those required to visit the construction site.

Safety training will be presented by the Design-Builder's Safety Manager. Safety training includes orientation training, daily "Short course" field toolbox meetings, a monthly "Stand down" safety meeting, and as-needed training such as railroad safety training.

Design quality training is presented by the DQAM. There may be different versions: one for the management staff to understand the quality requirements of design; another is for design staff to develop a detailed understanding of the quality process.

The CQAM develops the construction quality training for the project. There are three versions of this training.

- One version is for management so they understand the construction QMP processes, including the lines of authority and issue resolution procedures.

- The second version is less formal, consisting of a preparation meeting for the foremen on the daily inspection, sampling, and testing procedures necessary for their work. The CQAM or designee will complete training of any work element to ensure the foremen understand the requirements of the QMP and Specifications for that element. The CQAM will provide a review of the sampling and testing requirements for the element and will discuss development of work procedures to meet the quality goals. In addition, sampling and testing personnel are involved in discussing the quality plan for each work element. These preparation meetings occur before beginning any work element or as a review of the requirements at the start of each day. Refresher training will be conducted as needed at the weekly construction meetings and the Design-Builder's daily toolbox meetings, where the CQAM or his/her designated representatives will provide feedback on process and resolutions on quality issues.
- The third version is the formal training for Construction Quality Assurance (CQA) inspectors. Each inspector goes through a training program consisting of 80 hours of formal training or equivalent experience evaluation. In all cases there will be a minimum of 16 hours of orientation and safety training.

Draft

The Design-Builder shall insert their Quality Organizational Chart from their Technical Proposal.

This shall be identified as Figure QM003F1.

Draft

The Design-Builder shall insert their Design and Construction Quality Process Flow Charts from their Technical Proposal.

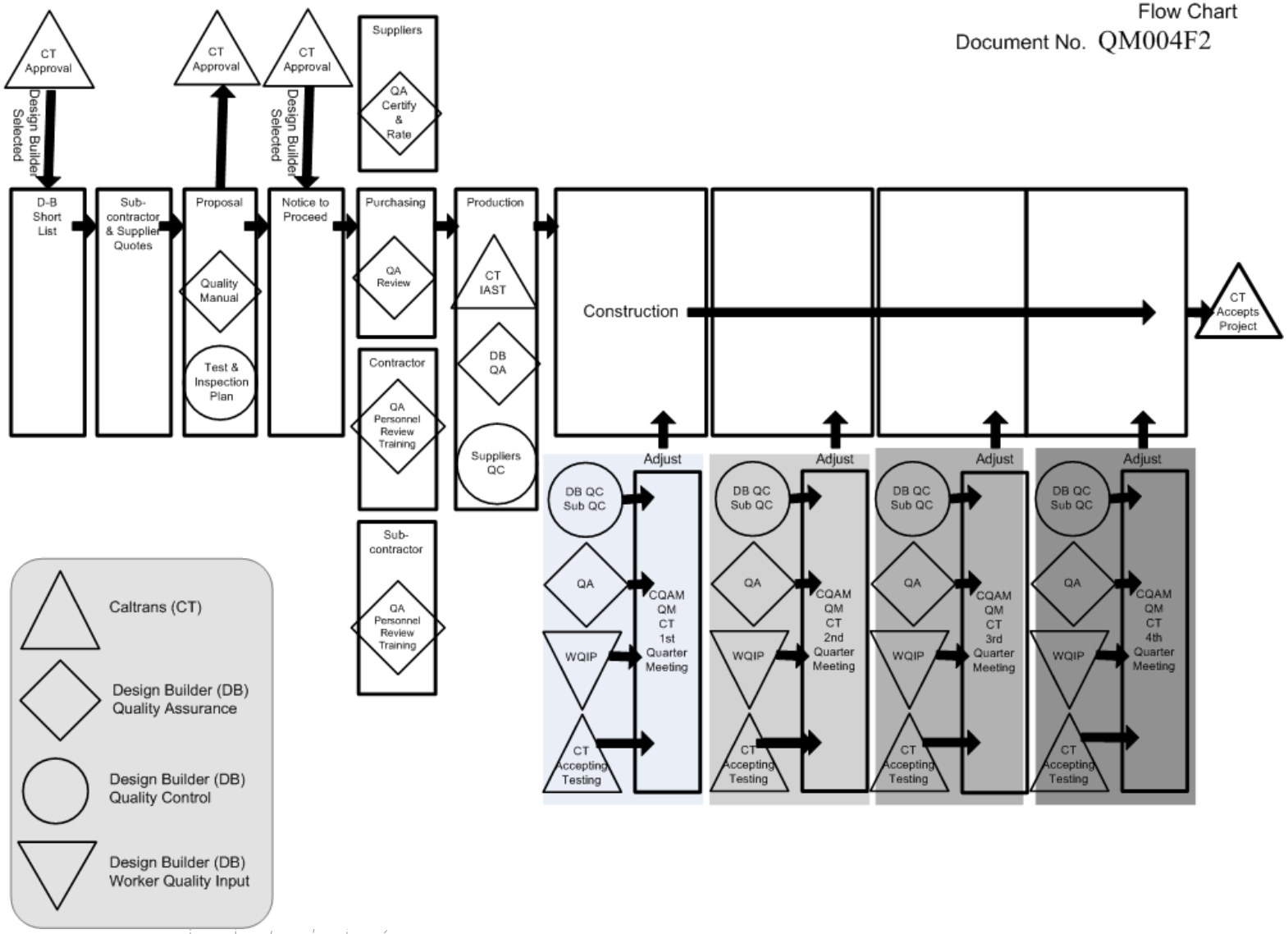
The Design Quality Process Flow Charts shall be depicted as Figure QM004F1.

The Construction Quality Process Flow Charts shall be depicted as Figure QM004F2.

Draft

Construction Quality Process Flow Chart

Document No. QM004F2



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	Coordination with Construction	**6**		
DQP501	Identifying Nonconformances		0	
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DQP503	Stop Work Procedure		0	
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DQP505	Pre-Activity Meetings		0	
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DQP207FA	Monthly Quality Program Summary Report Form		0	
DQP207FB	Monthly Quality Program Certification Form		0	
DQP207FC	Monthly Project Management Certification Form		0	
	Document Management	**7**		
DQP301FA	Electronic File Naming Convention		0	
DQP310FA	Project Document Retention Log		0	
DQP310FB	Office Document Retention Log		0	
	Design			

Document No.	Description	Tab No.	Latest Rev. No.	Rev. Date
DQP404FA	Review Comment Form		0	
DQP410FA	Calculation Cover Sheet		0	
DQP411FA	Detail Checking for Plan Sheets Figure		0	
DQP411FB	Check Print Stamp		0	
DQP413FA	Review of Studies, Reports, and Other Design Documents		0	
DQP413FB	Review Print Stamp		0	
DQP416FA	Computer Program Verification Form		0	
DQP416FB	Project Computer Program Log		0	
DQP418FA	Released For Construction		0	
	Coordination with Construction	**7**		
DQP501FA	Nonconformance Report		0	
DQP501FB	Nonconformance Report Log		0	
DQP502FA	Dispute Resolution Ladder		0	
DQP503FA	Stop Work Notification Form		0	
DQP503FB	Stop Work Notification Log		0	
DQP504FA	Request for Information Form		0	
DQP504FB	Request for Information Log		0	
DQP505FA	Notice of Design Change Form		0	
DQP505FB	Notice of Design Change Log		0	
DQP506FA	Pre-Activity Meeting Agenda (Example)		0	
DQP506FB	Pre-Activity Meeting Minutes (Example)		0	
DQP506FC	Pre-Activity Meeting Log		0	
	Quality Assurance	**7**		
DQP601FA	Project Quality Assurance Checklist (Draft)		0	
DQP601FB	Audit Summary		0	
	Training	**7**		
	This section to be provided by Design-Build Builder.			
	Continual Improvement	**7**		
DQP801FA	Corrective and Preventive Action Process (CAP)		0	
DQP802FA	Worker-Identified Opportunity for Improvement (WI-FI)		0	

Subject: Quality Management Plan

PURPOSE

To provide a system of procedures and forms to facilitate the implementation of an effective Quality Program for this project.

SCOPE

This manual covers procedures related to the Quality Program, including all design activities and several construction procedures. It excludes the construction procedures related to testing and inspection as those are covered in the Construction Quality Inspection and Testing Plan (Volume II).

RELATED DOCUMENTS

Construction Quality Inspection and Testing Plan (Volume II)
Materials Control Schedule (Volume III)
Document Management Plan (Volume IV)

RESPONSIBILITIES

The **Quality Manager** is responsible for implementing this plan. The **Quality Manager** is supported by the **Construction Quality Assurance Manager** and the **Design Quality Assurance Manager.**

The **Project Manager** is responsible of the overall management and implementation of the project including the Quality Control activities of this plan. He is assisted by the Design Manager and the Construction Manager.

The **Design Manager** also serves as the Design Quality Control Manager and is responsible for implementation of design-related quality control activities and all design **Staff** are responsible for implementing the quality control activities associated with deliverables they prepare and to which they contribute (If applicable).

The **Construction Manager** also serves as the Construction Quality Control Manager and is responsible for implementing the construction-related quality procedures included in this plan. All construction **Staff** are responsible for implementing the quality activities associated with work completed on this project.

PLAN

This Plan is included as Chapter 7A of the Quality Manual. See Tab 2 of this document.

DISPOSITION

All quality forms and procedures are filed in accordance with DQP310.

FIGURES AND FORMS

None.

Draft

Subject: TEMPLATE FOR PROCEDURES

PURPOSE

The **"Purpose"** is a concise statement of reason(s) for issuing the procedure.

SCOPE

This "**Scope**" section identifies the conditions under which the procedure is applied within the project. It also contains statements relative to the extent of coverage provided by the procedure.

BACKGROUND AND INTRODUCTION (OPTIONAL)

The "**Background and Introduction (Optional)**" section may be included to provide extended background or explanatory information to assist in understanding and implementing the procedure.

RELATED DOCUMENTS

The following documents are referenced in this Quality Procedure.

None.

The "**Related Documents**" section, when used, is a listing of documents to identify other interfacing procedures.

RESPONSIBILITIES

The "**Responsibilities**" section defines the responsibilities of the individuals (by job title) or management units that implement the procedure. Specific responsibilities are delineated to the level necessary in order to avoid ambiguity. Specific individuals identified by title are highlighted in **Bold** text to allow for ease of review and implementation.

PROCEDURE

Typically, the "**Procedure**" section describes the approved method used by employees in uniformly achieving the intent of the procedure.

1. Procedures will be clear, concise, and complete.

DISPOSITION

The "**Disposition**" section defines final disposition of the deliverable or paperwork associated with the procedure. It also references the interface with Document Control in indicating whether anything is added to the official Project Record.

FIGURES AND FORMS

The "**Figures and Forms**" section, when used, lists the titles and numbers of all forms and figures necessary to implement the procedure.

Draft

Subject: Project Roles and Disciplines – Design and Construction

PURPOSE

To normalize terms for key staff and disciplines associated with this project and to define distribution list for document control.

SCOPE

This information identifies key staffing positions and the major and minor disciplines and support services required to complete this project.

RELATED DOCUMENTS

The numerous documents could require revisions if this procedure is revised.

RESPONSIBILITIES

The entire Design-Builder's organization has the responsibility and authority to contribute to the achievement of quality objectives. All staff will make themselves familiar with the roles and responsibilities as summarized below **.**

Executive Committee

a Manage the Quality Management Program for the project.

b Designate appropriate trained personnel of the QO to perform audits.

c Review project quality performance periodically for conformance to the QMP.

Quality Manager

a Establish the Quality Program for the Project

b Train workers in the operation of the program,

c Has authority to stop any and all Work that does not meet the standards, specifications, or criteria established for the Project.

d Assist in the implementation and monitor the use of the program,

e Report to the Executive Committee on the QP effectiveness and performance

f Make revisions to the QP at the direction of the Executive Committee or Department.

g Will not directly participate in design or construction activities.

Project Manager

a. Responsible for organization and maintenance of a document control system for all quality data.

b Review and certify progress payments for the Design-Builder.

c Review and certify any of the Design-Builder payments to utility owners.

d Ensure reviews coordinated with outside entities.

e Coordinate quality check point (QCP) reviews.

f Review and sign off Non-conformance Reports.

g Assist in developing a plan for process change to eliminate non-conformance trends.

h Initiate evaluation of Field Design Changes (FDCs) at Department' request.

i Review change requests to RFC packages (either RFI/FDC or Notice of Design Changes [NDCs]) for conformance with QMP.

j Responsible for development and maintenance of shop drawing submittal log.

Construction Quality Assurance Manager

a The CQAM or his/her representative will be on site during all construction activities and shall be available or on the Project within two hours of being notified of a problem regarding the quality assurance of any Work.

b Develop, implement, and manage the Design-Builder's construction QA program.

c Oversee QA testing and inspection. Coordinate and schedule resources to provide appropriate QA inspection and testing for all construction efforts on a daily and weekly basis.

d Provide training for the Design-Builder to ensure appropriate training quality procedures are in place, through pre-activity meetings and daily on site reviews.

e Ensure all QO inspector staff has appropriate training and certification for the types of construction activities they will be overseeing.

f Verify that all sampling and testing personnel have the appropriate training and certification for the types of materials they will be testing.

g Has authority to stop any and all Work that does not meet the standards, specifications, or criteria established for the Project.

h Maintain a Non-Conformance Report (NCR) log.

i Maintain utility relocations inspection information.

j Develop and maintain a list of lab equipment available, latest calibration data, and date of inspection.

k Schedule quality check points as audits of on-going construction work for the duration of the project.

l Initiate RFI/FDCs due to constructability issues or differing field conditions.

m Provide a monthly Certificate of Compliance to accompany the monthly invoice of all permanent construction and materials for conformance with Conformed RFP and design requirements.

n Assist the QM in training workers in the Quality Program

o Ensure Critical Activity Point Managers perform at Critical Activity Points

p Coordinate with Department' quality verification testing, inspection, and Independent Assurance (IA) requirements.

q audit suppliers' quality management systems and ensure that production testing and inspection is being carried out and is providing quality results,

r coordinating the flow of quality information from the supplier and subcontractors to the Project,

s review test records from previous production,

t evaluating and analyzing quality data from all sources to determine trends and compliance with Project requirements, and to assess the effectiveness of the Project's construction quality activities,

u Will not directly participate in design or construction activities.

Design Quality Assurance Manager

a The DQAM or his/her representative will be on site during all design activities.

b Implement design portions of the QP.

c Train all design staff in the design quality process. Provide orientation, guidance, and explain to design personnel their responsibilities in fulfilling the QMP.

d Audit and certify design packages and release for construction plans for conformance with the QMP.

e Ensure that all plan sheets, specifications, and supporting design documents are reviewed by the appropriate QO Engineers for conformance with the Conformed RFP standards and criteria.

f Has authority to stop any and all Work that does not meet the standards, specifications, or criteria established for the Project.

g Compile and maintain documentation of design reviews and oversight reviews.

h Certify progress payments that design meets the quality requirements.

i Will not directly participate in design or construction activities.

Sampling and Testing Personnel

a At the direction of the CQAM or his designated representative, take appropriate random samples and tests necessary to meet contract requirements, specifications, and plans.

b Submit documentation to CQAM daily.

Staff Inspectors

a Inspect the work in a variety of areas, as required by the contract, plans, and project specifications, including embankment, PCC and asphalt paving, structural concrete placement, utilities, etc.

b At the direction of the CQAM, inspect aspects of the work in which he/she is qualified.

c Complete Daily Inspection Reports.

d Prepare Materials Receiving Reports to document inspection and acceptance of permanent materials brought to the job site.

Testing Technician

a Perform tests on various materials in the laboratory or field in accordance with applicable test standards and procedures.

The tester and the laboratory providing test results for construction materials must be reviewed and certified/accredited by Department Independent Assurance Program as described in the "Independent Assurance Program Manual", along with Chapter 6 of the "Construction Manual".

Geotechnical Engineer & Pile Driving Analyst

a Prepare wave equation for pile driving hammer.

b Review pile geotechnical data.

c Perform dynamic monitoring of pile driving.

d Perform CAPWAP analysis.

e Inspect foundations.

f Monitor drilled shaft construction.

g Review general earthwork construction.

QA Surveyor

a Monitor and spot check staking data developed by the Construction Surveyor for compliance with QMP.

b Perform QA audits of field construction surveying activities by verification of actual surveyed points.

c At established quality check points, certify that survey data has been located, checked, and verified by the Construction Surveyor.

Document Control Manager

a Organize and maintain records and documents pertinent to QO activities.

Construction Manager

a Coordinate with CQAM on the schedule for work elements to ensure adequate staff is available for QC inspection, sampling, and testing.

b Cooperate in the development of strategies to correct quality issues.

c Review quality issues, NCR's, and weekly inspection reports.

d Develop construction procedures and work plans to meet all quality control requirements.

e Meet with inspectors to review QC process requirements before starting any work element.

f Provide training to all personnel in the appropriate procedure to be used for the work element under construction.

Construction Superintendent

a Execute work process according to work plans and procedures to meet all QC requirements.

b At the direction of the CM or his designee, manage the taking of QC samples and tests to ensure that the Design-Builder's means and methods during construction are sufficient to meet plans, specifications, and contract requirements.

c Submit documentation to CM on a daily or weekly basis.

Process QC Staff

a Provide quality control sampling and testing to develop and refine work processes to meet quality requirements and provide conformance to the contract, plans, and specifications.

b Submit documentation to the CM on a daily basis as performed and needed.

Design Manager

a Direct and manage all design development, plan releases, specification releases, and QC.

b Provide adequate staff to meet schedule.

c Maintain a current status listing of the design section's work, expected audit dates, outstanding audit findings, and current document checking/review status.

d Maintain budget and schedule; report on these on a monthly basis.

e Certify that the Released For Construction (RFC) plans meet all project criteria and the contract.

Quality Testing Supervisor

a Oversee all QA sampling and testing operations.

b Report directly to CQAM.

c Ensure that qualified testers are performing tests according to proper test procedures.

d Must be onsite during testing.

The primary roles and responsibilities of the individuals who support the QO are summarized below.

Project Information Manager

a Responsible for managing public information and community involvement for Department.

b Interact with Department' staff in a team effort to educate and help promote public satisfaction.

c Provide media interviews and information and deliver messages and materials consistent with Department' messaging and standards.

d Create, reproduce, and distribute flyers and graphics to educate the public about the project and construction and traffic impacts.

e Quickly and thoroughly respond to community and commuter complaints.

Structures Design Manager

a Responsible for ensuring that the bridge and structures design is completed and the design criteria requirements are met.

b Must be on site whenever structural design activities are being performed.

Office Assistant

a Under the direction of the PM, assist in labeling, filing, typing and data entry functions as required.

b Prepare progress payment documentation/certification, checking all documentation

c Maintain utility coordination and correspondence

d Compile potential change orders

e Track non-conforming work, its nature, corrective action, and resolution.

f Coordinate sampling and testing schedule.

g Track quality staff, labs, and equipment certification.

h Track all submittals, forward for approval, etc.

i Review environmental documentation.

Materials Approval Engineer

a Cooperate with the CQAM to review all RAM submittals and approve all permanent materials to be incorporated in the project.

b Will be an employee of the design firm for the Design-Build Team.

Design Discipline Lead

a Responsible for all aspects of the design and quality control checking of the project within their respective disciplines.

b Develop a work plan for design that includes a list of work activities and associated schedules and budgets.

c Assign qualified designers to check design work.

d Use project-specific work procedures and forms as required.

e Assign staff to perform design functions, including preparation of drawings, calculations, specifications, and quantities.

f Coordinate the design work effort with the design efforts of other disciplines.

g Assemble and submit the review documents and quality records required by the QMP.

h Oversee technical quality of design plan documents during development.

i Review the draft Design Criteria for conformation with Contract, regulatory, and company requirements.

j Consult on design problems encountered during design.

k Assist in responding to review comments.

Designer Of Record (DOR) or Engineer Of Record (EOR)

a Is an integrated and integral member of the Design-Builder team

b Is in responsible charge of the design of the project and perform design work under the Contract Documents

c Responsible for the control and direction of engineering work within a professional engineer's scope of competence.

d Shall be a Professional Engineer registered in the State of California.

e Responsible to sign and seal the appropriate design documents including Final Design.

f Retains full legal and professional responsibility for the design documents and all materials included therein throughout the performance of the work and thereafter.

g The terms "Design Of Record" and "Engineer Of record" are interchangeable terms.

Design Checkers

Perform thorough check of all calculations, plans, special provisions, and estimates evaluating appropriate engineering practice, conformance with the contract and project criteria, and overall completeness for implementation in the field.

Design Engineers

Perform all engineering tasks to complete their portion of the plans, special provisions, or estimate in accordance with project criteria, standards, the contract, and the QMP.

PROCEDURE

The organizational chart in QM003 – Quality Management Organizational Chart (Tab 3) shows the relationships to each other. A Distribution List is maintained by the Document Control Manager. The Distribution List identifies staff filling each role described below.

Disciplines – the following Disciplines are key to reviews and staffing for this project.

Core Disciplines	Roadway Drainage Structures Traffic Utilities Electrical Landscape
Support Disciplines	ITS Walls (if needed during course of project) Aesthetics/Visual Quality Geotech Design Environmental Compliance Public Involvement Public Relations Surveys
Technical Support	IT/CADD Survey Geotech Field Services
Construction	Constructability
Other	Quality Document Control Subcontract Development and Negotiation (Contract Negotiator)

DISPOSITION

This DQP is maintained as part of the QMP.

FIGURES AND FORMS

Figure QM003 – Quality Organization Chart.

Draft

Subject: Quality Assurance Organization

PURPOSE

To define the functions and responsibilities of the Quality Assurance (QA) Organization.

SCOPE

The QA Organization is one of the support organizations providing services to the project. All activities in the field of quality are directed and controlled through this Organization.

RELATED DOCUMENTS

The following documents are referenced in this Quality Procedure.

None.

RESPONSIBILITIES

The **Quality Manager** is responsible for implementing the quality assurance activities of the Quality Management Plan defined in this document and reporting to the **Executive Committee** the effectiveness of the Quality Program.

The **Design Quality Assurance Manager** is responsible for implementing the design-related functions and policies defined in the Quality Management Plan, this Procedure, and for assisting with training staff to implement the Design Quality Control procedures.

The **Construction Quality Assurance Manager** implements the construction-related function and policies identified in the Quality Manual and the Inspection and Testing Plan. He/she will assist with training of Construction staff in the Quality Procedures and Inspection and Testing procedures. He/she has overall responsibility to ensure the construction activities on this project are completed in accordance with the contract requirements.

The **QA Organization** is responsible for developing and implementing a quality program in a manner that effectively and economically fosters technical excellence, reduces potential risk of errors and omissions, and directs proper attention to liability. If there is evidence that the QMP is not being followed, all key QO staff listed above have the authority to stop work until the appropriate quality procedures are implemented.

PROCEDURE

The project QA Organization's functions including the following:

- Establishing and implementing a Quality Program.

- Overall coordination and direction of the Quality Program.
- Preparing, coordinating, distributing, and maintaining quality policies, procedures, standards, and guidelines.
- Organizing and conducting audits, and establishing the responsibilities related to the conduct of such audits as required in determining that engineering and management activities are being correctly performed.
- Providing support to the project to assure the quality of work essential to the aforementioned quality goals.
- Approving revisions or waivers from the procedures. Department will review any and all proposed changes or additions to the QMP for comment and approval. Department will be notified of all approved revisions or waivers.

DISPOSITION

NA

FIGURES AND FORMS

NA

Draft

Subject: Writing and Maintaining Management Plans

PURPOSE

To provide a standardized format and structure for describing processes used in the design and construction of the project.

SCOPE

The procedure shall apply to all management plans and work plans developed for the project.

RELATED DOCUMENTS

None.

RESPONSIBILITIES

It is the responsibility of the **Project Manager** to develop, implement, and revise Management Plans which describe the processes used in the design and construction of the project. The **Design Manager** is responsible for plans or portions of plans related to design activities.

PROCEDURE

The following is a partial list of plans that will be written for this project:

- Project Management Guide
- Safety Plan
- Utility Plan
- Environmental Management Plan [*The Design-Builder shall update this listing*]
- Traffic Management Plan
- Construction Quality Inspection and Testing Plan
- Design Quality Management Plan
- Public Information Plan

Management Plans will describe the purpose and scope of the process. The plan will define the personnel responsible for the process. The plan will describe the process and its application on the project. The plan will be followed by those executing the work. The distribution of the plan will be controlled. The plan may be revised and its revision will be documented and approved before being reissued by the Project Manager.

DISPOSITION

The plan will be maintained on the electronic document system. Paper copies may be distributed to those assigned by the Project Manager

FIGURES AND FORMS

Management Plan form DQP103FA.

Draft

Subject: Writing and Maintaining Quality Procedures

PURPOSE

To define the method, format, and approvals required to prepare and revise Quality Procedures (QPs).

The **"Purpose"** is a concise statement of reason(s) for issuing the procedure.

SCOPE

Quality Procedures (QPs) provide a standard method or basis for the performance of quality management and implementation activities by Project Staff and the Quality Organization.

Procedure preparation will be coordinated with the Quality Manager, Design Quality Assurance Manager or Construction Quality Assurance Manager as required, Design Manager or Construction Manager as required, the Department, and the Project Manager and staff so that their review and comments can be considered before finalizing the procedure.

The Quality Management Plan is a living document and revisions are issued as needed to conform to and assist staff in meeting project requirements.

This "Scope" section identifies the conditions under which the procedure is applied within the project. It also contains statements relative to the extent of coverage provided by the procedure.

BACKGROUND AND INTRODUCTION (OPTIONAL)

The "**Background and Introduction (Optional)**" section may be included to provide extended background or explanatory information to assist in understanding and implementing the procedure.

RELATED DOCUMENTS

The following documents are referenced in this Quality Procedure.

None.

The "Related Documents" section, when used, is a listing of documents to identify other interfacing procedures.

RESPONSIBILITIES

The **Quality Manager, Design Quality Assurance Manager** and the **Design Manager,** with input from the Construction Team, are responsible for identifying the project activities that require a procedure for Design. The **Quality Manager, Construction Quality Assurance Manager** and the **Construction Manager,** with input from the Construction Team, and the **Project Manager** will identify the project activities that require a procedure for Construction. Together they define the scope and content of the required QPs and how to prepare and distribute each procedure. Individuals within the design organizations assigned responsibility for the preparation of procedures are to follow the format established in this procedure. While the quality staff members are responsible for the preparation, coordination, maintenance and initial approval of QPs, other project staff may be called upon to initiate or review procedures. The **Quality Manager** and a designated member of the **Executive Committee**, along with the Department will review and approve all procedures before they are distributed and implemented.

The "**Responsibilities**" section defines the responsibilities of the individuals (by job title) or management units that implement the procedure. Specific responsibilities are delineated to the level necessary in order to avoid ambiguity. Specific individuals identified by title are highlighted in **Bold** text to allow for ease of review and implementation.

PROCEDURE

Preparation of a QP procedure follows the outline used in this procedure. Headings are in bold and all caps. Only those headings that are applicable should be used.

1. Quality Procedures are produced with the headers, footers, margins, fonts and formatting shown on this procedure.

2. The Design Quality Assurance Manager or Construction Quality Assurance Manager assigns procedure numbers prefixed by "DQP" for the general and design procedures or "CQP" for the test and inspection plan. The Quality Procedures address the following areas:

   DQP101 through DQP199 – General

   DQP201 through DQP299 – Project Management

   DQP301 through DQP399 – Document Management-related

   DQP401 through DQP499 – Design-related

   DQP501 through DQP599 – Design/Field Coordination

   DQP601 through DQP699 – Quality Assurance

DQP701 through DQP799 – Training

DQP801 through DQP899 – Continual Improvement

DQP901 through DQP999 – <OPEN>

Forms for each procedure are numbered similar to the procedure with the number followed by FA or FB for the first and second forms associated with a procedure. For example, **DQP404** is the Review Comment Procedure and **DQP404FA** is the Review Comment Form.

Testing and Inspection procedures and forms are numbered as follows:

CQP100 through CQP199 – Construction Quality Testing Procedures

CQP200 through CQP299 – Construction Quality Testing Forms

CQP300 through CQP399 – Construction Quality Inspection Procedures

CQP400 through CQP499 – Construction Quality Inspection Forms

3. When a revision is issued to a previously approved procedure the revision will be incorporated as follows:

- Deleted text is colored red and struck-through in red.
- Added text is in red (added text).
- Changes in the document will be followed by a superscripted number ([1]) denoting the revision number associated with the change that is numbered.
- Revisions are numbered xxx.01, xxx.02, and so on. The revision box in the header is filled in with the revision number and the date of the revision.
- The table of contents is revised to include the new documents and revision numbers; any eliminated forms/procedures are struck-through in red with red font, added forms/procedures are in red font.
- The revised procedures will be put into practice as soon as they are delivered to document control. Document control will distribute the updated procedures to all staff holding copies of the controlled document.
- The Quality Manager will approve all quality procedures and revisions to procedures. Revisions to procedures follow the same general review pattern as the original procedures. All new or revised DQP and CQP Procedures are reviewed by the Project Manager and Design Manager, and reviewed and approved by the Department's Project Manager prior to inclusion in the QMP.

Typically, the "Procedure" section describes the approved method used by employees in uniformly achieving the intent of the procedure. Procedures will be clear, concise, and complete.

DISPOSITION

The Quality Manual, including the Quality Management Plan and the Construction Quality Management Plan (Inspection and Testing Plan), including all associated forms and procedures, is a controlled document. All revisions and updates will be handled accordingly. Updates will be delivered to document control for distribution to all staff listed on the Distribution page.

The "**Disposition**" section defines final disposition of the deliverable or paperwork associated with the procedure.

FIGURES AND FORMS

The "**Figures and Forms**" section, when used, lists the titles and numbers of all forms and figures necessary to implement the procedure.

Draft

Subject: Quality Incentive Program

PURPOSE

To define the scope and implementation of a program that will give incentive to Design-Builder staff to meet the requirements of the project and exceed Department expectations with regard to delivery and performance of constructed improvements.

SCOPE

The Quality Incentive Program establishes guidelines for use in identifying improvements and recognizing staff members who have contributed to the performance of the Design-Builder Team in a manner that conserves project resources, positively impacts schedule, improves morale and commitment of team members, facilitates effective communications and exceeds expectations of the Department, the quality staff, and the Executive Committee Members. The budget for this Program is XXXXX and the full amount will be awarded throughout the duration of the project.

BACKGROUND AND INTRODUCTION

Design-Build projects require design and construction staff to perform under more intense schedule and procedural requirements than typical design-bid-build projects. The Quality Incentive Program reflects the emphasis on maintaining a high level of performance under these conditions to produce a product that meets all project requirements.

RELATED DOCUMENTS

The following documents are referenced in this Quality Procedure.

1. DQP501 - Identifying Non-conformances.

RESPONSIBILITIES

All Management Staff and Workers, including the **Department's Management Staff**, may identify performance by fellow workers that meet award criteria.

All Staff Members, Managers and Workers may identify opportunities for improvements to work processes that produce the results meeting award criteria.

The Quality Manager, Design Quality Assurance Manager, Construction Quality Assurance Manager and the Executive Committee Members are exempt from submitting recommendations or suggestions.

The **Quality Assurance Staff** and the **Executive Committee Members** will determine award recipients.

PROCEDURE

1. All Project Staff, Managers and Workers associated with the project are encouraged to present nominations and proposals for Quality Incentive Awards. Non-conformance reports can be used to identify opportunities for improvement.

2. The Executive Committee, Quality Manager, Design Quality Assurance Manager, and Construction Quality Assurance Manager will review nominations and proposals to determine the extent to which they meet the following:

   - Conserve project resources,
   - Positively impact schedule,
   - Improve morale and commitment of team members,
   - Facilitate effective communications, and
   - Exceed expectations of the Department, the quality staff and the Executive Committee Members.

3. Awards will be made by the Executive Committee, throughout the course of the project. Input from the Department may be requested during review of the nominations or proposals.

4. There are no predetermined amounts for each award and no predetermined numbers of awards.

5. Employees employed by the Department, including consultant staff, are ineligible for any awards.

DISPOSITION

A record of Quality Incentives awarded will be maintained by Document Control. A copy of each award will be forwarded to the Human Resources Department of recipient's employer and to the Public Information Consultant for the project.

FIGURES AND FORMS

DQP105FA – Quality Incentive Program Nomination Form.

Subject: Quality Program for Suppliers

PURPOSE

To establish the requirements for preparation and implementation of acceptable Quality Programs by suppliers (subconsultants).

BACKGROUND

All suppliers are required to perform with a professional level of diligence and care in performance of the scope of services equal to that defined for this project. All suppliers' planning and design services must comply with a Quality Program, including preparation of a QMP. Each supplier will adopt and follow their approved QMP. Formal plan submittal quality audits and informal review audits will document the supplier's continued implementation of their quality program.

SCOPE

This procedure applies to all technical consultants retained as subconsultants, referred to herein as suppliers, to provide Project services such as surveys, investigation, testing, analyses, and design. It also applies to all subcontractors completing work associated with this project.

RELATED DOCUMENTS

The following documents are referenced in this Quality Procedure:

1. DQP103 - Writing Management Plans

RESPONSIBILITIES – DESIGN

The **Design Manager** will maintain an updated list of Design services suppliers and inform the Quality Manager or the Design QAM of any additions to the list.

The **Design Quality Assurance Manager (or the Quality Manager)** has the responsibility of advising the supplier of the intent of this procedure and of verifying compliance by periodic audit.

The **contract negotiator** must assure that the supplier's scope of work and budget adequately reflects the quality requirements.

RESPONSIBILITIES – CONSTRUCTION

The **Project Manager** will maintain an updated list of subcontractors and inform the Quality Manager or the Construction Quality Manager of any additions to the list.

The **Construction Quality Assurance Manager (or the Quality Manager)** has the responsibility of advising the subcontractor of the intent of this procedure and of verifying compliance by periodic audit.

The **contract negotiator** must assure that the subcontractor's scope of work and budget adequately reflects the quality requirements.

PROCEDURE

The Design QAM or Construction Quality Assurance Manager will request and review a copy of the Quality Management Plan of suppliers and subcontractors. Plans will be reviewed for practical implementation on the project work. Comments and revisions will be made until an acceptable plan is provided.

The Design QAM or Construction Quality Assurance Manager will conduct periodic audits of selected suppliers to verify initial and continued implementation of an approved Quality Program. The Design QAM or Construction Quality Assurance Manager will not audit specifics of implementation, as that is the responsibility of the suppliers.

DISPOSITION

Quality Records are disposed in accordance with DQP310.

FIGURES AND FORMS

DQP103FA – Management Plans

Draft

Subject: CHANGING PROJECT SCOPE [TO BE WRITTEN]

PURPOSE

SCOPE

BACKGROUND AND INTRODUCTION (OPTIONAL)

RELATED DOCUMENTS

RESPONSIBILITIES

PROCEDURE

DISPOSITION

FIGURES AND FORMS

Draft

Subject: Scheduling

PURPOSE

To define the method, used to meet the requirements of schedule management including the preparing, progressing, revising, and submitting of Contract Schedules as outlined in the RFP.

SCOPE

The requirements require that contract scheduling be presented on the latest version of Primavera Project Planner (xxx) . An initial baseline schedule `is to be provided by the contractor following issuance of NTP1. A follow up monthly progress update will show actual progress against the Baseline Schedule and the planned execution for the remainder of the project.

BACKGROUND

The initial baseline schedule provided by the contractor will be used as the basis to show the actual progress of the project with each progress report.

RELATED DOCUMENTS

The following documents are referenced in this Quality Procedure.

None.

RESPONSIBILITIES

The Project Manager in coordination with the Construction Manager and the Design Manager will provide a baseline schedule.

The initial Baseline Schedule shall not use any unspecified milestone, Project float suppression technique, or Project activity durations, logic tie, or sequence that is deemed unreasonable by the Department.

Upon receiving the Baseline Schedule the Department will review and schedule a meeting with the Project Manager for comment review and resolution. Once all review comments are resolved, the Department will approve the updated schedule.

Monthly updates and summaries will be prepared by the Project Manager. Along with the updated baseline schedule a narrative report which describes the physical progress of the work performed will be provided with each invoice or monthly, whichever is more frequent. The report will include the plans for continuing the work during the forthcoming report period, actions planned to correct and negative float, and any delays or problems and their estimated impact on the contract completion date.

PROCEDURE

Project Manager will prepare the baseline schedule and updates and provide them to Document Management.

Document Management will log it in and provide the revision number and distribute to the Department for review.

The Department will review the schedule update and schedule a meeting with the Project Manager for comment review and resolution.

Once all comments are resolved, the Department will approve the updated schedule.

The Department will return the schedule to Document Control. Document Control will note approval date and distribute the schedule to the Project Manager, Construction Manager and the Design Manager.

DISPOSITION

A copy of the initial baseline schedule and a copy of the most recent update will be kept at Document Management.

FIGURES AND FORMS

TBD

Draft

Subject: Communication Protocols

PURPOSE

To implement a process defining the communication responsibilities between the Contractor, Designer and Department. While open, honest discussions are encouraged at all levels of these organizations, at the same time a formal process is also required.

SCOPE

This procedure provides the project team with direction on how communication occurs between the Designer, Contractor, and Department. This procedure includes communication protocols for the following:

1. Written communication and distribution of design and construction documents.
2. Verbal communication protocols for Design Team.
3. Verbal communication protocols for Construction Team.

RELATED DOCUMENTS

The following documents coordinate with this Quality Procedure.

Document Management Plan
Utility Management Plan
Public Information Plan [*Design-Builder shall update this listing*]
Traffic Management Plan
Inspection and Testing Plan

RESPONSIBILITIES

The **Design Manager** is responsible for assuring that the **Design Task Managers** are implementing this procedure.

The Construction **Manager** is responsible for the implementation of this procedure for construction activities.

PROCEDURE

Written Communication and Document Distribution

Written communication among the design team will occur according to the procedures outlined in DM104 – Locating Documents Within Design-Builder's Database, and throughout a series of plans and manuals associated with the project.

Signature authority is identified in contracts and procedures and a summary of signature authorities for this project is included in Figure DQP205FA.

Verbal Communication Protocol for Design Team

Figure 1 below demonstrates the verbal communication process for the Design Team. The Communication Protocol is as follows:

1. All design coordination issues requiring Contractor or Department input shall be routed to the appropriate **Design Task Manager**.

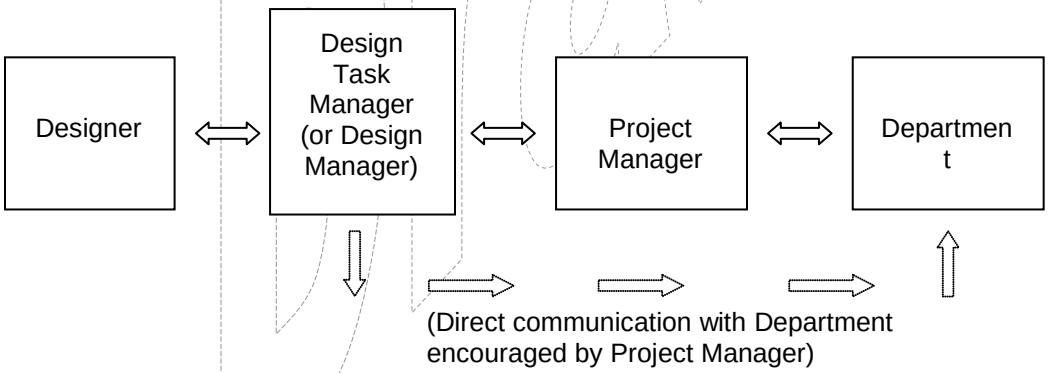
2. If the issue is minor in nature, the Design Task Manager shall discuss the issue with the **Project Manager** or his designee.

3. If the issue is major, the Design Task Manager shall discuss the issue with the Design Manager. The Design Manager will then bring the issue to the Project Manager.

4. If needed, the Project Manager will discuss and resolve the issue with the Department.

5. The Design Task Manager or Design Manager may directly discuss minor design issues with the Department, while keeping the Project Manager advised of the discussions.

Figure 1



Verbal Communication Protocol for Construction Team

Informal verbal communication and coordination between the Construction Team and the Owner will follow the steps outlined below. Conflicts requiring resolution will follow the dispute resolution procedures outlined in DQP502.

1. All construction coordination issues requiring Project Manager or Department input shall be routed to the **Construction Manager.**

2. If needed, the Construction Manager will consult with the **Project Manager**.

3. If the issue requires Department input, the Construction Manager or Project Manager will discuss the issue with the Department.

DISPOSITION

Per individual plans and procedures.

FIGURES AND FORMS

DQP205FA – Signature List

Draft

Subject: Partnering

PURPOSE

It should be the goal of all parties to resolve issues on the project at the lowest possible level and in the shortest amount of time. This requires a commitment from all Project Management Team members to work together in a cooperative environment towards the overall goals of the project. This requires that members consider what is important to the other parties to an issue or dispute.

The first step towards Partnering should consist of the development of a Project Charter where the overall goals and objectives of the project are identified and documented. This is an important step. Once this is developed, then a formal Partnering process and schedule should be developed based on the unique considerations for each project.

It should be recognized that disputes will occur and the importance of Partnering is how the disputes are handled by all parties.

Prior to the initiation of the formal dispute resolution process the Project Management Teams will attempt to resolve the dispute through partnering between appropriate representatives of Department and Design-Builder and including, where appropriate, any Subcontractor, FHWA and other stakeholders with the objective to resolve disputes promptly and through personnel involved in the dispute.

SCOPE

The procedure applies to both internal (within the project team – including Department) and external disputes.

RELATED DOCUMENTS

1. DQP502 – Dispute Resolution

RESPONSIBILITIES

The Project Manager and Department's Project Manager initiate the development of a Project Partnering Charter and Partnering program for the project.

The parties shall attempt to resolve the dispute through partnering between appropriate representatives of the Department and Contractor (including, where appropriate, any Subcontractor) at the following levels:

(1) Project Task Force Teams;
(2) Project Task Force Co-Leads;
(3) Project Discipline Managers;
(4) Project Management Team;
(5) Executive Management Team.

PROCEDURE

At each level, representatives of the parties shall meet and continue to explore resolution until either party determines, in good faith, that effective resolution is not possible at the current level, and notifies the other party that the partnering process is elevated to the next level. If either or both parties make such a determination at any point during partnering at the Executive Management Team level, then the dispute resolution provisions contained in the RFP will apply.

Disputes will be elevated through a controlled “dispute resolution ladder” to the appropriate level to establish a final course of action acceptable to all parties. The dispute ladder contains 5 levels as described in DQP 502FA.

If the dispute is based on either an interpretation of the contract scope of work or based on a required change in the scope of work, the documentation will be in the form of a Change Order.

For any other type of dispute, including conforming to the contract requirements, the documentation will be in the form of a Non-Conformance Report. The form will be posted to the electronic document control system daily

DISPOSITION

The Department and Project Manager sign-off is required prior to final disposition of a dispute.

FIGURES AND FORMS

DQP501FA – Nonconformance Report
DQP501FB – Nonconformance Log
DQP502FA – Dispute Resolution Ladder

Draft

Subject: REPORTING ON QUALITY PROGRAM

PURPOSE

To provide a monthly summary report update on the project quality system.

SCOPE

The procedure applies to all quality activities.

RELATED DOCUMENTS

None.

RESPONSIBILITIES

The **Quality Manager** will certify and compile a report summarizing Quality Program performance monthly. The **Project Manager** will certify project management for the same period.

PROCEDURE

1. The Quality Manager (QM) will draft a report following the format of the Monthly Quality Program Summary Report.
2. The QM, DQAM, CQAM, DM, and CM will review and sign the report and certification statement.
3. The QM will transmit the original signed certification statement to the Project Manager.
4. The Project Manager will review and sign the PM's Certification Statement.
5. The Project Manager will submit originals of both Certification Statements to Department with the monthly report for the project.
6. The QM will transmit the quality summary report and a copy of the Quality Certification Statement to the Executive Committee, with a cc: to the Project Manager.

DISPOSITION

Copies of the reports and certification statements will be filed with Document Control. A copy of the report and the original certification statements will be forwarded to the Owner.

FIGURES AND FORMS

1. DQP207FA – Monthly Quality Program Summary Report
2. DQP207FB – Monthly Quality Program Certification Statement
3. DQP207FC – Monthly Project Management Certification Statement

Subject: Electronic Project Files

PURPOSE

To define the format required for naming and storing non-CADD documents in the electronic project files.

SCOPE

The Scope of this Procedure includes naming and storing files containing meeting agendas and minutes, correspondence, memos, reports, review comment forms, calculations

BACKGROUND AND INTRODUCTION (OPTIONAL)

The project will generate three separate filing systems.

1. **Hardcopy files** will be maintained by Document Management.

2. An **electronic database** will be used to file digital images of all deliverables, communications, forms and other documents that are associated with the project and that can be digitized.

3. **Electronic working files** are created in MSWord and Excel and other software; these files are not intended to contain final deliverable documents. These files must be stored on a server in a manner that is consistent across the disciplines and that allows the files to be found easily as the project progresses.

The third group is the subject of this procedure.

RELATED DOCUMENTS

None.

RESPONSIBILITIES

The **Design Manager** and the **Project Manager** will distribute the procedure. **Design and Construction Staff** generating electronic documents will implement this file naming convention with all files generated throughout the course of the project.

PROCEDURE

The Design-Builder shall incorporate the procedure for this project.

Filing procedures include the following steps.

1 Design Discipline Leads and Construction Leads draft a list of their major deliverables and deliver the list to the Document Manager.

2 The Document Manager sets up the paper files and the document database filing system based on the lists.

3 Design Discipline Leads and Construction Leads set up files on the server (see Exhibit A above) to hold each of the deliverables. This refers to non-CADD files only. CADD files are covered under a separate plan.

4 Design Discipline Leads and Construction Leads file all communications documents (memos, letters, emails, meeting minutes) and deliverable documents (reports, assessments, calculations) on the server AND they deliver a hard copy to Document Management for database and hardcopy filing.

5 Design Discipline Leads and Construction Leads periodically review the filing system to determine whether additional folders are required.

DISPOSITION

The hardcopy files will be reproduced and delivered to the Department. The Database files will be provided to the Department electronically. The server files are working files and are not in final deliverable format; they are retained by the Design-Builder for a period defined in the Design-Builder's Quality Program and the RFP.

FIGURES AND FORMS

DQP301FA – Electronic File Naming Convention

Subject: Control of Quality Records

PURPOSE

To provide a system to ensure that all Quality Records are identified, collected, indexed, accessible, filed, stored and discarded.

SCOPE

This procedure applies to all quality records identified by the Contractor and the Designer for the project.

RELATED DOCUMENTS

The following documents coordinate with this Design Quality Procedure.

1. Document Management Plan (Volume IV)

RESPONSIBILITIES

It is the responsibility of each **Design Team Member** and **Construction Team Member** to ensure the Quality Records that they generate are legible and complete.

The **Design Task Managers** are responsible for control and access to Quality Records for a given design package until the package is Released for Construction.

Document Control Manager receives and retains the Quality Records after a package is Released for Construction (RFC). The Document Manager may assist with routing of forms and monitoring schedules to ensure review comments are delivered within the specified review period.

PROCEDURE

1. Identification and Maintenance

The Design Manager and Design Task Managers define all Quality Records that are generated within the group as part of ongoing Quality Control activities.

All Quality Records are legible, dated, and identifiable to the product, person or event to which they pertain.

All Quality Records are indexed, filed, and stored to facilitate easy access for review, use and audit.

Access to Quality Records is controlled to ensure the integrity of the records while permitting access to those who need the records.

2. Access for Review

Quality records, including design checks and audits as well as construction audit, test, and inspection forms will be stored digitally on a server site available to the Owner.

3. Storage and Maintenance after Completion of Project

All Quality Records will be filed in hard copy versions with signatures and will be stored in facilities that provide a suitable environment to prevent damage, deterioration, and loss. The Project Document Retention Log will be completed as archives are established.

DISPOSITION

Quality Records are retained for the period of time defined in the Project Document Retention Log, at a minimum. Any records not identified in the attachment are maintained for at least one year after completion of the design contract.

Documents may be retained as electronic data or as scanned images rather than in hard copy paper format.

FIGURES AND FORMS

DQP310FA – Project Document Retention Log

DQP310FB – Office Document Retention Log

Draft

Subject: Inter-Discipline Design Reviews

PURPOSE

To coordinate design between and within disciplines in order to verify there are no conflicts, omissions, or misalignments between integrated or adjacent work prior to in-discipline design checking, audit, and review. An Inter- Discipline Design Review (IDR) is completed to formally obtain input from each discipline into each deliverable and to take advantage of opportunities identified.

SCOPE

This procedure defines the items that are specific to Inter-Discipline Design Reviews associated with deliverable packages for Design-Build projects. Deliverables include all design documents delivered to the Department. These include reports, drawings, and specifications, management plans, design memoranda and other documents. Inter-Discipline Design Reviews are relevant when the preparation of the deliverable involves more than one discipline or when the deliverable has an impact on another discipline.

Inter-Discipline Design Reviews will be implemented amongst all core disciplines and will include support disciplines as determined necessary.

RELATED DOCUMENTS

The following documents coordinate with this Design Quality Procedure.

1. DQP101 – Key Project Roles and Disciplines
2. DQP402 – Independent Technical Reviews
3. DQP403 – Constructability Reviews
4. DQP404 – Implementing the Review Comment Procedure

RESPONSIBILITIES

The **Design Manager** is responsible for overall implementation of this procedure. The Design Manager must verify that all comments are appropriately resolved and incorporated and that the review becomes part of the project record.

The **Design Task Manager** is responsible for selecting reviewers, assembling the review packages for distribution by Document Control, consolidating review comments, resolving comments and their final disposition, and ensuring that comments are incorporated or addressed in their discipline's packages.

The **Document Control Manager** is responsible for distributing the review packages, recording receipt of review comments and distributing the comments to the Design Task Managers. The Document Control Manager is responsible for maintaining a clear record of the reviews and updated design deliverables.

IDR reviewers assigned to perform a IDR review are responsible for completing the review in accordance with this procedure and the Review Comment Procedure and for ensuring compatibility of the deliverable with the reviewer's discipline.

PROCEDURE

This procedure applies to all documents submitted for review that affect more than one discipline or which require technical scrutiny as determined by the Design Manager.

1. In consultation with the Department, the Design Manager identifies all deliverables that will require Inter-Discipline Design Reviews.
2. The Design Manager and Design Task Manager will determine the need for or benefit from conducting this review simultaneously with either or both the Independent Technical Review (ITR) or the Constructability Review (CR).
3. The Design Task Manager for the deliverable will implement the review in accordance with the Review Comment Procedure listed in coordinating procedures section of this procedure.
4. The Design Task Manager will identify the disciplines required to participate in the review. At a minimum, all of the core disciplines will be included to complete reviews. Core disciplines and support disciplines are identified in the Key Roles and Disciplines procedure.
5. Inter-Discipline Design Reviews may benefit from comment resolution meetings with several discipline reviewers, the ITR reviewer or the constructability reviewer together. The Design Task Manager will determine whether the group meeting is beneficial and who should attend. The Department will be invited to participate in these meetings.
6. All deliverables will undergo IDR by all Core Disciplines and by Support Disciplines as determined necessary by the Design Lead for the deliverable discipline. The following exceptions apply to this rule.
   a. Geotechnical Reports. The reviews for Geotechnical Reports will include only the following, unless otherwise required by the Geotechnical Design Lead:
      i. Roadway IDR
      ii. Drainage IDR
      iii. Structural IDR
      iv. Constructability Review
      v. Independent Technical Review
   b. Hydraulics Reports. The reviews for Hydraulics Reports will include only the following, unless otherwise required by the Drainage Design Lead:
      i. Roadway IDR
      ii. Structural IDR

iii. Constructability Review

iv. Independent Technical Review

DISPOSITION

In accordance with the Review Comment Procedure DQP404.

EXHIBITS

DQP404FA – Review Comment Form

Draft

Subject: Independent Technical Reviews

PURPOSE

An Independent Technical Review (ITR) is completed to formally obtain input from a senior level engineer or technical expert who has familiarized himself with the project requirements but is independent of the preparation of the deliverable and is not otherwise involved in the project itself.

SCOPE

This procedure defines the items that are specific to Independent Technical Reviews associated with deliverable packages for Design-Build projects. Deliverables include all design documents delivered to the Department. These include reports, drawings, and specifications, management plans, design memoranda and other documents. Independent Technical Reviews are relevant for most project deliverables and are most beneficial when more junior staff members are preparing deliverables or when there are many possible solutions or methodologies for completing the design.

RELATED DOCUMENTS

The following documents coordinate with this Design Quality Procedure.

1. DQP401 – Inter-Discipline Design Reviews
2. DQP403 – Constructability Reviews
3. DQP404 – Implementing the Review Comment Procedure

RESPONSIBILITIES

The **Design Manager** is responsible for overall implementation of this procedure. The Design Manager will discuss the ITR procedure with the Department early in the design development process and will identify the appropriate ITR reviewers. The Design Manager will verify that all comments are appropriately resolved and incorporated before the review becomes part of the project record.

The **Design Task Manager** is responsible for assembling the review packages for distribution by Document Control, consolidating review comments, resolving comments and their final disposition, and ensuring that comments are incorporated or addressed in the design package.

The **Document Control Manager** is responsible for distributing the review packages, recording receipt of review comments and distributing the comments to the Design Task Managers. The Document Control Manager is responsible for maintaining a clear record of the reviews and updated design deliverables.

The **ITR reviewer** assigned to perform an ITR review is responsible for completing the review in accordance with this procedure and the Review Comment Procedure and for ensuring that the solution designed meets project and standard of practice requirements. The ITR reviewer often identifies means of adding value to the design and resolving conflicts in a manner that reflects extensive experience.

PROCEDURE

This procedure applies to all documents prepared for delivery to the Department as determined by the Design Manager after consultation with the Department.

1 The Design Manager identifies all deliverables that will require an ITR.

2 The Design Manager identifies an ITR reviewer with at least 10 years of recognized experience in the area of expertise required for the review. Experts in the field of engineering will have a current valid Professional Engineering License in the state of California.

3 The Design Manager and Design Task Manager will determine the need for or benefit from conducting this review simultaneously with either or both the Inter-Discipline Design Review (IDR) or the Constructability Review (CR).

4 The Design Task Manager for the deliverable will implement the review in accordance with the Review Comment Procedure listed in coordinating procedures section of this procedure.

DISPOSITION

In accordance with the Review Comment Procedure DQP404.

EXHIBITS

DQP404FA – Review Comment Form

Draft

Subject: Constructability Reviews

PURPOSE

A Constructability Review (CR) is completed to formally obtain input from the construction team associated with the project into each deliverable and to take advantage of opportunities identified as well as avoid design that is awkward or unnecessarily difficult to construct.

SCOPE

This procedure defines the items that are specific to Constructability Reviews associated with deliverable packages for Design-Build projects. Deliverables include all design documents delivered to the Department. These include reports, drawings, and specifications, management plans, design memoranda and other documents. Constructability Reviews focus on the drawings and specifications, but may also include management plans and other procedure-related documents that impact construction activities.

RELATED DOCUMENTS

The following documents coordinate with this Design Quality Procedure.

1 DQP401 – Inter-Discipline Design Reviews
2 DQP402 – Independent Technical Reviews
3 DQP404 – Implementing the Review Comment Procedure

RESPONSIBILITIES

The **Design Manager** is responsible for overall implementation of this procedure. The Design Manager must verify that all comments are appropriately resolved and incorporated and that the review becomes part of the project record. The **Design Manager** and the **Project Manager** will together identify the staff who will serve as Constructability Reviewers. The **Design Manager** is encouraged to involve the Department in the CR review process early and often.

The **Design Task Manager** is responsible for assembling the review packages for distribution by Document Control, consolidating review comments, resolving comments and their final disposition, and ensuring that comments are incorporated or addressed in their discipline packages.

The **Document Control Manager** is responsible for distributing the review packages, recording receipt of review comments and distributing the comments to the Design Task Managers. The Document Control Manager is responsible for maintaining a clear record of the reviews and updated design deliverables.

CR reviewers assigned to perform a CR review are responsible for completing the review in accordance with this procedure and the Review Comment Procedure and for ensuring the deliverable reflects design or procedures that do not unnecessarily impede construction activities and reflect any simplifications or savings associated with construction methods of which the designer may not be aware.

PROCEDURE

This procedure applies to all documents submitted for review that affect construction activities as determined by the Design Manager.

1. After discussion with the Department, the Design Manager identifies all deliverables that will require Constructability Reviews.
2. The Design Manager and the Project Manager will identify one Constructability Reviewer for each core discipline to serve the duration of the project. The primary Constructability Reviewer may obtain assistance from other construction staff as the project progresses; however, for ease of managing work flow, the primary CR reviewer will remain the designated recipient of the packages unless he/she is formally replaced.
3. The Design Manager and Design Task Manager will determine the need for or benefit from conducting this review simultaneously with either or both the Independent Technical Review (ITR) or the Discipline Coordination Review (DCR).
4. The Design Task Manager for the deliverable will implement the review in accordance with the Review Comment Procedure listed in coordinating procedures section of this procedure.
5. The Constructability Reviewer will focus on the following criteria:
   - General completeness of information
   - Achievability of specified tolerances
   - Existence of adequate site access for work proposed
   - Restrictions to site access have been addressed
   - Environmental constraints have been addressed
   - Utility conflicts have been addressed
   - Availability of materials
   - Storage area for required materials is available
   - Design is prudent, economical, and consistent with design objectives
   - Any other items that reflect construction perspective and improve deliverable

DISPOSITION

In accordance with the Review Comment Procedure DQP404.

EXHIBITS

DQP404FA – Review Comment Form

Draft

Subject: Review Comment Procedure

PURPOSE

To implement the technical review processes so that all comments are tracked until they are incorporated or otherwise resolved and so that all comments, responses and verification of resolution are documented.

BACKGROUND

Formal reviews of work in progress and draft final design documents are implemented to assure all project requirements are addressed and met.

SCOPE

This procedure facilitates all review processes implemented in development of the design. All Constructability Reviews (CR), Inter-Discipline Design Reviews (IDR), Independent Technical Reviews (ITR), Department reviews and other reviews are documented using the Review Comment Form. This procedure may be implemented manually or electronically with the use of project management software.

Reviews are completed on all project deliverables to the Department prior to Departmental review. Deliverables include drawings, specifications, reports, management plans and other communication defining or otherwise impacting the design of the improvements.

RELATED DOCUMENTS

The following documents coordinate with this Design Quality Procedure and shall be reviewed upon any revision to this procedure.

1. DQP401 - Inter-Discipline Design Review
2. DQP 402 - Independent Technical Review
3. DQP 403 - Constructability Review
4. DQP 801 - Corrective and Preventive Actions

RESPONSIBILITIES

The **Design Manager** and the Project Manager determine which staff are eligible to complete the reviews. For the IDR and ITR reviews, the **Design Manager** will assure that the **Design Task Manager** for each discipline processes the proper reviews. The **Design Manager** will resolve conflicts and issues arising during the process. The Design Manager is responsible for final verification of incorporation of comments and may also designate this responsibility to the Design Task Manager for each discipline.

The **Design Task Manager** is responsible for implementing the review procedure for each required review of each deliverable package. This includes the preparation of the package, filling out the Review Comment Form prior to distribution and selecting the discipline coordination reviewers. After review comments are returned, the **Design Task Manager** is responsible for resolving and addressing all comments. After the design process is underway, the **Design Task Manager** may delegate all but final verification responsibilities to design engineers with adequate skills and experience to implement and lead the review process. The Design Manager is responsible for final verification of incorporation of comments, and may also designate this responsibility to the Design Task Manager for each discipline.

The **Document Control Manager** is responsible for tracking and logging the review package as the package makes its way through the process.

The **Design Quality Assurance Manager** audits the review package and the Review Comment Forms to assure that the process has been fully implemented and all required changes to the documents have been verified.

The **Design Staff** work with the **Design Task Manager** to address and resolve all comments, incorporate corrections and prepare the updated design documents.

PROCEDURE

1. To initiate a review, the Design Task Manager completes the following steps:

- Prepare one review set of documents comprising the deliverable
- Identify all required reviewers
- Prepare a set of Review Comment Forms (DQP404FA) by filling in the information required in blocks 1 through 9 and block 11. Block 1 must include the EXACT name of the submittal (as it included in the DCS database).
- Forward the package to Document Control

2. The Document Control Manager logs the package in to the DCS database and distributes the package to the designated reviewers.

3. Reviewers review the document. See Quality Procedures for requirements associated with CR, IDR, ITR and Department reviews. Reviewers complete the following steps:

- Fill in Block 12 on the Review Comment Form
- Compile comments in first three columns of comment form as follows:
    - **a.** "No." refers to comment number (1, 2, 3…)
    - **b.** "Dwg./Pg." references the location of the item being commented upon
    - **c.** "Comment" column includes the comment itself

- Return Review Comment Form and any supporting information to Document Control.

4. The Document Control Manager logs in the returned forms and files them with the project record. When all Review Comment Forms are returned to Document Control, the Document Control Manager compiles the Review Comment Forms and supporting information with a copy of the deliverable and forwards them to the Design Task Manager. The Document Control Manager maintains a copy of the deliverable and the Review Comment Forms in the project files.

5. Design Task Manager determines whether resolution meetings will take place one-on-one or in a group meeting. Design Task Manager meets with reviewers to resolve all comments and define edits to the deliverable. At meeting, the designer fills in Column 4 in Comments table, recording initial disposition agreed upon in resolution meeting. The reviewer signs and dates Block 13 on every page of the Review Comment Form. The Design Task Manager is encouraged to involve the Department in any resolution meetings conducted.

6. Design Task Manager compiles completed forms and delivers a copy to Document Control.

7. Design Task Manager edits the deliverable to comply with the comments as agreed upon in the resolution meeting. He also records his responses to each comment in Column 5 of the comment table and final disposition of each comment in Column 6 of the comment table of the Review Comment Form.

8. The reviewer reviews the edited document and the Responses and Disposition shown on the Review Comment Form. If he/she agrees with all of the responses and dispositions, he/she signs the form.

9. The Design Task Manager compiles the original Review Comment Forms and signs and dates the form in Block 14 on every page of the Review Comment Form. He/she delivers the package to the Design Manager.

10. The Design Manager reviews disposition and verifies that each comment was incorporated correctly and then initials each comment in Column 7 of the Comment Table in the Review Comment Form.

11. If Concurrent Reviews were completed, the Design Manager will review all comments together and determines whether any overlap is created by the separate reviews and whether any supplemental reviews are required. He/she fills in Block 10 of the Review Comment Form. Supplemental reviews, if required, are completed by following steps 1 through 10 above.

12. If reviews were completed sequentially rather than concurrently, or after the supplemental reviews are completed, the Design Manager fills in Block 10 of the Review Comment Form and moves on to the next step.

13. The Design Manager delivers the final package, including fully executed Review Comment Forms and the final deliverable to Document Control. The package is ready for audit and delivery.

DISPOSITION

Copies of review sets and edited deliverables are filed with Document Control. Review Comment Forms and any supporting information are filed with the deliverable.

FIGURES AND FORMS

DQP404FA - Review Comment Form

Draft

Subject: Detail Checking of Calculations

PURPOSE

To define requirements for preparation and checking of engineering calculations generated as a part of the Released for Construction (RFC) design, excluding structural calculations.

INTRODUCTION

All calculations are to be performed on standard calculation sheets, or spreadsheet facsimiles. All information is to be printed. Title boxes are to be completely filled out and initialed in the sign-off blocks. Pages are to be numbered sequentially. All assumptions, references, units and conclusions are to be clearly stated. Sketches should be used as required to clarify the calculations. The originals and check prints of all calculations are to be indexed and stored in three-ring binders by the Design Task Manager or a designee until filed with Document Control.

SCOPE

This procedure applies to all calculations that are the basis for all study, design, construction, maintenance and procurement documents. Calculations are to be checked as soon as practical after they are completed. Structural calculations are covered under a separate procedure. Calculations completed with the assistance of computer software are covered under this procedure generally and specifically under a separate procedure for detail checking of computer program input.

RELATED DOCUMENTS

The following documents are referenced in this Design Quality Procedure:

2 DQP411 – Detail Checking of Plans
3 DQP411FB – Check Print Stamp
4 DQP415 – Detail Checking of Computer Program Input

RESPONSIBILITIES

The **Design Task Manager** (DTM) assures that the personnel assigned to the Task are capable of performing the required analysis and calculations. The DTM also assures that the calculations are checked and that the original calculations and any checked calculations are assembled, indexed, maintained and stored in an orderly fashion.

The **Designer** (Originator) will use standard calculation sheets, and present all calculations in a neat and logical manner that is conducive to checking. Designer will provide the calculations to the Checker in a timely fashion. The Originator may also function as the Back Checker.

The **Checker** will be an experienced engineer with at least 5 years of experience in the design discipline of the work being checked and at least an equal level of qualifications and experience as the designer. The Checker may be a member of the design organization, but must not have prepared the design being checked. The Checker is responsible for the following:

- Thoroughly checking the calculations including assumptions, mandated parameters and references, given values and formulas.
- Checking for omissions and accuracy of arithmetic.
- Asking questions of the Designer in areas that are not clear, or where additional calculations are required.
- Seeking technical advice if unsure of any particular element of the calculation.

PROCEDURE

Each page of a set of calculations, including computer printouts, is sequentially numbered using the format "X / Y", where X = sequential page number and Y = total number of pages; page numbers appear consistently in the upper or lower right hand corner of the calculations. A calculation cover sheet is completed and attached to each sequentially numbered set of calculations.

1. The checker checks and marks up the originals of calculations.

   - Computer generated calculations, which may or may not be part of hand calculations, are printed to present input data and output results. These are inserted in the hand calculations.
   - The input data of computer calculations shall be checked by the checker in accordance with DQP404FA.
   - The output data of computer calculations shall be reviewed by the checker for being consistent with expected results and check marked or dotted in **red** (or highlighted in yellow) if expected or crossed out in **red** if not expected.
   - Discrepancies that are found by the checker in hand calculations are marked up in **red**.
   - Lines in hand calculations, which do not contain any discrepancies, are check marked or dotted in **red** (or highlighted in yellow) by the checker.
   - Comments by the checker are made in **blue** pencil or ink.

2. The marked up corrections are backchecked by the originator.

   - The Originator places a **green** check mark next to corrections with which the originator agrees.
   - The Originator and Checker discuss the corrections that the originator disagrees with in an attempt to resolve the difference(s).
   - If the correction stands, the originator makes a checkmark in **green** next to the correction. If the correction is rejected, the originator crosses the correction out in **green** and makes changes in **green** to reflect the result of the discussion between the originator and the checker.
   - If the originator and the checker are not able to resolve their differences, the issue is addressed by the DTM. If necessary, it can also be addressed by the Design Manager

3. The DTM makes a determination and the correction in **red** is either check marked in **green** or crossed out in **green** and changed in **green** by the DTM. The checker initials and dates all pages of the hand calculations and the initial and final page of each computer run after completion of the above-described procedure.

   Following back checking, the Originator changes the original set of calculations to reflect the agreed-to corrections.

4. The Checker verifies the original calculation sheets to confirm that the agreed-to corrections have been made. Each correction verified as made to the original is circled in **green**. When all corrections are verified, the Checker signs and dates the "checked by" block on the original calculation cover sheet.

5. The original calculations are then sent to the DTM or designee to be indexed, stored and placed in the Project files.

DISPOSITION

1. All original and check print original copies of calculations are sent to document control after they are checked and finalized by the Design Team. Calculations are considered final when RFC packages based upon the calculations are released.

2. The Design Team may maintain a copy of all calculations in a separate set of binders for their own reference as the job progresses.

FIGURES AND FORMS

Figure DQP410FA – Calculation Cover Sheet

Subject: Detail Checking of Plans

PURPOSE

To provide a uniform, orderly, and efficient method for checking drawings.

SCOPE

The formal detail check of drawings is to be completed before they are submitted for review in each phase of design. These checks include, at a minimum, detail checks performed on the plan sets prior to internal reviews, Department reviews, and prior to Release for Construction (RFC). Timely checking of drawings is important for an efficient design process. A drawing used as a base by several disciplines should be checked and corrected before being used by others, even if it is not yet going out for formal review. This will reduce or eliminate the need to check and correct the same items on related drawings.

RELATED DOCUMENTS

The following documents coordinate with this Quality Procedure.

None.

RESPONSIBILITIES

The **Design Manager** and **Design Task Managers** are responsible for the implementation of this procedure and for drawings and check prints that are stored for QA audit.

The **Originator** (often the designer) of the work on a document has the primary responsibility for accuracy and adequacy. It is not intended that the Originator rely upon the checking system to complete the drawing. The Originator of each document is responsible for initiating the checking process. The Originator is responsible for obtaining the required sign-off by all disciplines. In most cases, the Originator will also function as the Back Checker.

The **Originator** will check the drawing against calculations and confirm that the calculations have been properly checked by signing, or initialing, the Check Print Stamp "By" area prior to checking.

The **Checker** is responsible for checking drawing contents in accordance with this procedure, independent of the Originator. In most cases, the Checker will also function as the Verifier.

The **Back Checker** (usually the Originator, but may be another designated designer other than the Checker) is responsible for confirming/denying corrections asserted by the Checker.

The Corrector (usually the Backchecker/Originator) makes the revisions to the original according to the agreed-upon changes.

The **Verifier** (usually the Checker, but may be another designated designer other than the Corrector) is responsible for confirming that back checked corrections are accurately made to the drawing. In rare instances, with good reason, the Originator will also serve as the Verifier.

PROCEDURE

1. Initiating the Checking Process

As each drawing is deemed ready for checking, the Originator prepares or directs preparation of a "Check Set", a set of plans stamped with the Check Print Stamp (Figure DQP411FB). The Originator numbers, dates, and initials the Check Print Stamp in **blue** ink, confirming "Drawing Checked against Calculations and Calculation Check Confirmed" in the "By:" area of the stamp. The Originator passes the Check Set to the Checker.

2. Checking

The Checker checks the entire drawing for design intent, technical adequacy and conformance to any applicable standards and format. Checking activity is recorded directly on the Check Set. The checker may be a member of the design organization, but must not have prepared the design being checked.

The Checker is responsible for determining that the drawing is consistent with the corresponding calculations, and affirming that those calculations have been properly checked. To document the detailed checking process, the Checker highlights in **yellow** on the Check Set each part of the drawing that is found to be correct. Information found to be incorrect is lined through and corrected in **red** pencil or ink on the Check Set. The Checker signs and dates, using **red** pencil or ink, the "Checker:" line of the Check Print Stamp upon completion of the checking.

> ***NOTE: Red** or **yellow** should not be used to note comments or instructions. These colors are reserved for the checking process. Comments or instructions should be written in **blue** pencil or ink.*

The final Check Set for a Release for Construction submittal must be totally highlighted, indicating that all information has been checked on this Check Set or remains unchanged from a previous Check Set. If a previous Check Set is used as the basis of highlighting an area of the Check Set, the previous Check Set must be attached to the final Check Set.

In the case where no corrections, additions, or deletions are found, there is no need for back checking or further signatures on the Check Print Stamp. The Check Set, signed in the appropriate checked block, should be returned to the Originator for placement in the Project's QA/QC file.

3. Back Checking

The Back Checker reviews each of the Checker's **red** marks on the Check Set. To document the back checking process:

> If in agreement with a Checker's correction, the Back Checker check marks in **green** pencil or ink each of the Checker's red-marked changes and, with the concurrence of the Checker, adds in **green** any additional changes not picked up by the Checker.
>
> If not in agreement with a Checker's correction, the Back Checker confers with the Checker. If both agree that the Checker's correction should not be made, the Back Checker crosses out, the Checker's correction in **green** pencil or ink. The Back Checker should not obliterate the Checker's marks.

Following back checking, the Back Checker signs, (or initials), and dates, using **green** pencil or ink, the Check Print Stamp.

> ***NOTE:*** *The Back Checker and Checker should resolve differences encountered during the checking process so they are not repeated. If the two cannot achieve resolution, the appropriate Design Task Manager or Design Manager should be consulted to resolve the differences.*

4. Correcting the Drawing Original

Correction of the drawing original should be supervised by (or drafted by) either the Checker or the Back Checker. When making the Check Set corrections to the original drawing, the CADD drafter highlights or circles in **blue** pencil or ink each correction as incorporated. When all of the corrections have been made, the person correcting the drawing signs and dates, using **blue** pencil or ink, the "Corrected" block on the Check Print Stamp. A new original drawing is printed. The new original and the Check Set are passed to the Verifier.

5. Verifying the Corrected Check Set

The Verifier compares the Check Set with the new drawing original to confirm that the agreed-to corrections have been incorporated without error. If a correction has been properly made on the Original Drawing, the Verifier cross-highlights in **yellow** the **blue** (circle or highlighted) item. If a **yellow** highlighter is not available, he/she may circle the item in **green**. If a correction has not been made, or is in error, the new drawing is annotated with penciled instructions, and is returned to the corrector.

Once all corrections are verified, the Verifier signs (or initials) and dates the Check Print Stamp in **green** ink, and the Checker (or designee) places the Checker's initials in the "checked by" block on the title block of the original drawing.

6. Drawing Change Management

The CADD Manager shall be responsible for tracking all changes to an established drawing and updating revision blocks as changes are finalized. Progressively revised drawings shall be managed so the potential for edits to obsolete versions is eliminated.

DISPOSITION

1. Check Sets shall be made available to the Department on demand.

2. All original and Check Set original copies of plan sets are sent to Document Control after they are checked and finalized by the Design Team. Plans are considered finished with the checking process when RFC packages based upon the calculations are released.

3. The Design Team may maintain a copy of all plan sets in a separate set of binders for their own reference as the job progresses.

FIGURES AND FORMS

Figure DQP411FA – Detail Checking Procedure for Plan Sheets
Figure DQP411FB – Check Print Stamp

Draft

Subject: Detail Checking – Specifications and Special Provisions

PURPOSE

To define requirements for the checking of Specifications and Special Provisions.

SCOPE

This procedure applies to all final specifications and special provisions provided to a client for construction or procurement.

BACKGROUND

Checking and review of design documents are conducted to assure that the engineering for the Project is sound. Measures for the selection and review of materials, equipment, and elements of the Work included in the Project, are handled with standard specifications, standard special provisions which were included in the RFP, and special provisions that are developed during the design process. This procedure supplements Design in order to assure that work is adequately specified. The specifications currently available include standard special provisions distributed in the RFP, Department Standard Specifications for Construction, and other technical specifications or special provisions.

Each individual Release for Construction package may include specifications or special provisions unique to that particular package. These individual package special provisions will be checked as indicated in this Procedure, and will then be issued for inclusion in the project.

RELATED DOCUMENTS

The following documents coordinate with this Design Quality Procedure.

1 `DQP411 – Detail Checking of Plans
2 DQP411FB – Check Print Stamp

RESPONSIBILITIES

The **Design Manager** or designee is responsible for compiling, organizing, and updating all project specifications and special provisions in the project specification file. This specification file will provide the basis for all individual construction packages.

The **Task Manager** is responsible for implementing this procedure on an on-going routine basis.

The **Originator** of the work on an original specification or special provision or a revision, generally either the Design Task Manager or Design Manager, has the primary responsibility for accuracy and adequacy. It is not intended that the Originator rely upon the checking system to complete the document, or to find and correct mistakes.

The **Originator** will ensure that all changes from the original version of a document are clearly identified on the Check Print. The Originator of each document is responsible for making the Check Print, following that Check Print through the checking process, and obtaining the required sign-off.

The **Checker** is responsible for checking the document, independent of the Originator. The entire document must be carefully reviewed, even if only a small portion has changed, to insure that revisions have not introduced conflict or ambiguities into the document. The Checker will have qualifications equal to or greater than those possessed by the Originator.

PROCEDURE

1. The **Originator** provides to the Checker a complete copy of the specification or special provision with a Check Print Stamp on the reverse side of the first page signed and dated in **blue** ink or pencil.

2. The **Checker** reviews the specification or special provision for applicability and clarity. Each page is marked through with a single yellow line from top to bottom indicating that it was reviewed and corrections are annotated in **red** pencil or ink. Upon completion of the checking, the Checker signs and dates, using **red** pencil or ink, the Check Print Stamp. Checker's comments to Originator will be made in blue ink.

3. The **Originator** back checks the document by reviewing the Checker's corrections. If in agreement with a correction, the Originator check marks the corrections in **green** pencil or ink. If not in agreement, the Originator confers with the Checker. If both agree a correction should not be made, the Originator crosses out in **green** the Checker's red marks. Upon completion of the back check, the Originator signs and dates, using **green** pencil or ink, the back check area of the Check Print Stamp and ensures that the corrections are incorporated into the specification.

4. Either the Originator or Checker verifies that all of the corrections have been incorporated into the original document and signs as the **Verifier** on the Check Print Stamp in **green** ink.

DISPOSITION

1. All original and check print original copies of specifications are sent to document control after they are checked and finalized by the Design Team. Specifications are considered finished with the checking process when RFC packages including the specifications are released.

2. The Design Team may maintain a copy of all specifications in a separate set of binders for their own reference as the job progresses

FIGURES AND FORMS

Figure DQP411FB – Check Print Stamp

Draft

Subject: Review of Studies, Reports, Other Design Documents

PURPOSE

To provide guidelines for review of documents other than engineering drawings and calculations.

SCOPE

This procedure applies to all studies, technical reports, technical memoranda, or procedures contractually required to be provided to the Department. Formal review of study or report-type documents will be performed on all documents prior to their submittal. Administrative / progress reports are not included in this procedure.

All drawings, tables, and calculations included in or appended to such documents are to be checked per specified procedures for those documents, including calculations, drawings and specifications.

BACKGROUND

This review procedure requires that a minimum of two people examine any document prior to issuance.

RELATED DOCUMENTS

The following documents coordinate with this Design Quality Procedure.

1. DQP404 – Review Comment Form Procedure
2. DQP411 – Detail Checking of Plans
3. DQP411FB – Check Print Stamp

RESPONSIBILITIES

The **Design Task Managers** must designate the reviewers and their scope of review for the document. They ensure that the review is completed in accordance with this procedure and maintain and store the QC documentation until the document is released.

The **Originator**, or document coordinator, develops or collates the document, ensures the drawings, tables, and calculations have been checked in accordance with applicable procedures, creates the Review Print and initiates the review process.

Engineers/Technical Specialists carry out the review of the document in accordance with their designated scope, document their comments on the Review Print and sign

and date the Review Print Stamp (Figure DQP411FB), or optionally, record and transmit their comments using the Review Comment Form (RCF).

PROCEDURE

1. After the document drawings, tables, and calculations have been checked, the Originator spellchecks the document, reproduces the document for a Review Print, applies the Review Print Stamp to the first page of the Review Print, and forwards the Review Print to the Design Task Manager.

2. In the space allotted in the Review Print Stamp, the Design Manager and Design Task Manager lists the reviewer(s) and their review responsibility for the document. One additional individual is listed to perform the editorial review.

3. Reviewers are to use unique colors for both comments and respective signature/initials to easily differentiate their comments.

4. Reviewers are to review the document with regard to their responsible area, conformance with project criteria and requirements, and professional policies and content. They are also to review those parts of the document that interface with their area of responsibility to assure that there are no conflicts.

5. The editorial reviewer is responsible for assuring uniform format, proper sentence structure, proper syntax, and spelling.

   NOTE: *It is recommended that only one document Review Print be circulated for each review to minimize duplication or conflicting comments. However, when time constraints or distance considerations dictate, more than one document may be used or optionally, Review Comment Forms may be used instead.*

6. The Design Task Manager or a designee, upon receipt of the completed Review Print, must evaluate each of the review comments and determine the proper disposition. In case of questions, disagreement, or conflict between reviewers, the reviewer(s) and the originator will be consulted.

7. After the corrections are made, the Design Manager and Design Task Manager, or a designee, will verify the dispositions made on the document, and sign off on the Review Print.

8. The completed Review Print along with any Check Prints of drawings or calculations are kept under the control of the Design Manager and Design Task Manager in the office files for QA Audit and owner oversight reviews, until the final deliverable is released.

DISPOSITION

1. All QC documentation is retained by the Design Task Manager until the document is released.

2. After release, all QC documentation is delivered to the Document Control Manager.

FIGURES AND FORMS

Figure DQP413FA – Detail Checking Report
Figure DQP413FB – Review Print Stamp

Draft

Subject: Detail Checking – Structural Design Plans and Calculations

PURPOSE

To provide standards and procedures for an independent analysis or check of bridge design calculations and a design check of structural drawings.

SCOPE

This procedure applies to the structural designs prepared by the Design Task Manager for Structures. Independent design check involves the complete verification of all design elements and details to ensure structural integrity, constructability, and all Project standards and criteria have been satisfied. It also includes the checking of drawings that depict the elements of design for the structure. This independent analysis results in two complete sets of calculations i.e., the original set of design calculations, and the independent set of analysis calculations.

For major structures the following procedures apply:

- DQP414 - Detail Checking of Structural Design Plans and Calculations
- DQP410 - Detail Checking of Calculations
- DQP411 - Detail Checking of Plans

RELATED DOCUMENTS

The following documents coordinate with this Quality Procedure.

1 DQP410 – Detail Checking of Calculation
2 DQP411 – Detail Checking of Plans

RESPONSIBILITIES

The **Structural Design Task Manager** – Assures that the personnel assigned to the Project are capable of performing the analysis or calculations required and assures that the independent design check is performed.

The **Designer** – The Designer will be an experienced structural engineer, currently licensed as a professional engineer in the state of California. He verifies that the completed drawings correctly and completely show the design intent per the Designer's calculations. It is not intended that the Designer rely upon the checking process to complete the drawing. The Designer makes a copy of the completed drawings, and stamps each sheet with the Check Print Stamp, (Figure DQP411FB), numbers and dates each Check print, and then signs and dates each Check Print on the line under

the "Drawings Checked Against Calculations and Calculation Check Confirmed by ___." The Check Prints are then passed to the Checker. The Designer is also responsible for backchecking the corrections made by the Checker, and incorporating these corrections on the drawings.

The **Checker** – The Checker will be an experienced structural engineer, currently licensed as a professional engineer in the state of California. The Checker may be a member of the design team, but must not have been involved in the design of the structure being checked. The Checker will personally make independent analysis calculations for all elements of the structure as shown on the completed drawings. These calculations will not be assigned to another person. The Checker is responsible for asking questions and resolving discrepancies and deficiencies with the Designer, or seeking technical advice if unsure of any particular element of the calculations. The Checker will complete the checking of each drawing as he/she prepares the independent analysis calculations for each element shown on the drawings. The Checker is also responsible to sign the drawing check prints in **green** ink as the Verifier, confirming that any required changes were made.

The **Back Checker** (**Designer**) – Confirms corrections asserted by the Checker and signs in **blue** ink.

The **Verifier** (**Checker**) – Confirms that the backchecked corrections have been accurately made on the drawings and signs in **green** ink.

PROCEDURE

Structural design calculations may be checked by completing two sets of independent calculations and comparing results. Corrections will be made as indicated here.

1. When drawings and calculations are complete, the Designer makes a Check Print set by photocopying the original drawings and provides them to the Checker for checking. Once provided to the checker no changes or additions to the design calculations and drawings can be made unless authorized by the Designer. If the files are altered new Check Prints shall be issued to the Checker immediately.

2. The Checker reviews each element of the design as shown on each Check Print and highlights in **yellow** highlighter on the Check Print all portions checked as correct. Information identified as incorrect is lined through and corrected in **red** pencil or ink. When the entire Check Print has been completely checked, the Checker signs and dates, using **red** pencil or ink, the "checked" block on the Check Print. Comments by the Checker should be made on the Check Print in **blue** pencil or ink.

3. The Designer back-checks the Checker's **red** marks on the Check Print. To document the backchecking process:

   If in agreement with the Checker's corrections, the Designer check-marks in **green** pencil or ink each of the Checker's red-marked changes, and with the

concurrence of the Checker, adds in **green** any additional changes not picked up by the Checker.

If not in agreement with the Checker's corrections, the Designer confers with the Checker. If both the Designer and the Checker agree that a Checker's correction should not be made, the Designer crosses out the Checker's correction in **green** pencil or ink. The Back Checker should not obliterate the Checker's marks.

Following back checking, the Designer signs and dates, using **green** pencil or ink, the "Back checked" block on the Check Print Stamp.

NOTE: *The Designer and Checker should resolve differences encountered during the checking process so they are not repeated. If the two individuals cannot achieve resolution, the Structures Design Task Manager, or Design Manager, is consulted to resolve the differences.*

4. The Designer supervises correction of the original drawing. When making the Check Print corrections to the original drawing, the CADD Drafter circles in **blue** pencil or ink (or highlights with a **blue** highlighter) each correction as incorporated. When all of the corrections have been made, the person correcting the drawing signs and dates, using **blue** pencil or ink, the "Corrected" block the Check Print Stamp. A new drawing is printed, and the new drawing and the Check Print are passed to the Verifier.

5. The Verifier verifies the original drawing to see that the agreed-to corrections have been made. Each correction verified as made to the original is highlighted in **yellow**, on the check print. If a correction has not been made, or is in error, the Check Print is annotated with penciled instructions and is returned to the corrector. When all corrections are verified, the Verifier signs and dates, using **green** pencil or ink, the "Verified" block on the Check Print Stamp.

   The Verifier must also confer with Designer to determine if additional changes to the drawing original have taken place during the checking process. If additional changes not reflected on the Check Print have been made, the Designer issues a new Check Print circling in **blue** pencil or ink**,** the additional changes. The Designer numbers this next generation Check Print (check print # 2) and sends it back through the checking process, with the previous Check Print attached beneath.

DISPOSITION

1. The set of original design calculations, independent analysis check calculations and check prints are sent to the Structures Design Task Manager to be indexed, stored and placed in the QA/QC Project files. Design Task Manager conveys them to Document Control.

2. The Design Team may maintain a copy of all calculations in a separate set of binders for their own reference as the job progresses.

FIGURES AND FORMS

Figure DQP411FB - Check Print Stamp

Draft

Subject: Detail Checking of Computer Program Input

PURPOSE

To provide for systematic checking of computerized design calculations to minimize the possibility of input errors.

SCOPE

This procedure is to be used for checking both local keyed input and non-local (batch) input to software programs.

RELATED DOCUMENTS

The following documents coordinate with this Design Quality Procedure.

1. DQP410 – Detail Checking of Calculation
2. DQP416 – Validation and Approval of Computer Software
3. DQP411 – Detail Checking of Plans

RESPONSIBILITIES

The **Design Task Managers** are responsible for the implementation of this procedure and for project drawings and check prints that are stored for QA audit.

The **Designer (Originator)** provides a copy of the input/output documents and other associated data to the Checkers in a timely and complete manner so that thorough checking can be performed quickly and efficiently. Output values calculated for use in other calculations/input should be circled in black pencil to identify their significance. The Designer will provide a copy of any additional output reports needed by the Checker to verify the design.

The **Checker** thoroughly checks the input parameters and all assumptions, references and mandated values. In the case of interactive CADD input for CAICE or InRoad , the Checker thoroughly checks the output and associated reports as well as measuring or visually verifying the CADD files to ensure the design criteria have been met. In the case of non- CAICE or InRoad related interactive CADD input, the Checker thoroughly checks graphical output by measuring or visually verifying to ensure the desired results have been achieved. The checker shall be skilled in the use of the design software being used.

PROCEDURE

1. Each page of each set of calculations will be numbered sequentially. A calculation cover sheet will be attached as cover to each set of sequentially numbered calculations.

2. When any computer program is run for design, the input associated with the output must be printed at the same time or can be echoed in the output. When completed, the Originator provides to the Checker a complete copy of the input and output with a Check Print Stamp on the reverse side of the first page. The Originator numbers (or names) and dates the Check Print in **graphite** pencil, **blue** pencil, or **blue** ink.

3. For local input, the Checker checks the input and highlights in **yellow** all information identified as correct. Non-local input will be checked prior to forwarding for batch processing. Non-local input is re-checked against actual input when returned with the output. Errors, defects, or non-compliance detected in the output require assessment of the input to correct the deficiencies. Corrections to the input will be noted in **red** pencil or ink. In the case of interactive CADD input for CAICE or InRoad , the output and associated reports, the Checker checks and highlights in **yellow** all information identified as correct and notes in **red** all incorrect information. Interactive CADD design input is checked by reviewing a graphical output along with a design report of the work. Graphical and report output is reviewed by the Checker to assure that desirable results have been attained, and that design standards or required criteria have been met. The Checker highlights in **yellow** correct information and notes in **red** incorrect information. The Checker signs (or initials) and dates, the Check Print Stamp, using **red** pencil or ink, and returns the information to the Originator.

4. The Originator back checks the Checker's corrections using **green** pencil or ink and, if in agreement, corrects the input and reruns the program. If rerun, another Check Print is generated and the input and output are rechecked. The process continues until no corrections are necessary.

DISPOSITION

1. All final Check Prints of input must be kept with the output in a 3-ring binder under the control of the Design Task Manager with the other Project calculations. Access to computer design input and output shall be made available to the Owner at time of Owner Oversight Reviews.

2. All original and check print original copies of calculations are sent to document control after they are checked and finalized by the Design Team. Calculations are considered final when RFC packages based upon the calculations are released.

3. The Design Team may maintain a copy of all calculations in a separate set of binders for their own reference as the job progresses.

FIGURES AND FORMS

Figure DQP410FA – Calculation Cover Sheet
Figure DQP411FB – Check Print Stamp

Draft

Subject: Validation and Approval of Computer Software

PURPOSE

To prescribe the method and documentation required before computer software not pre-approved in the RFP will be used for performing design calculations or other manipulations for the project.

SCOPE

The requirements for verification of software not pre-approved in the RFP apply for all purchased, contracted or locally prepared software which is to be used for design or calculations or is to be turned over for client use. The consultant has provided a record-keeping system of document control for filing of records of verification so that once the verification process is complete, it does not need to be duplicated for identical design applications.

RELATED DOCUMENTS

The following documents coordinate with this Design Quality Procedure.

1 DQP415 – Detail Checking of Computer Program Input
2 DQP410 – Detail Checking of Calculations

RESPONSIBILITIES

The **Design Quality Manager** audits implementation of this procedure and provides guidance when its application is questioned.

Design Task Managers or their Lead Design Engineers are to immediately identify the software to be used, and assess the availability of verification documentation for that software. When documentation for a particular application does not exist, appropriate assignments must be made to fulfill the requirements of this procedure.

PROCEDURE

1. Verify that software in question is not pre-approved by Owner. List of pre-approved software is included at the end of this procedure.

2. When it is determined that a first time usage of software or a new application is required for engineering calculations, the software/software application is to be validated and documented as follows:

Commercially available programs that come with verification documentation may be acceptable as determined by the Owner.

A hand calculation with the same formulation or a parallel technique must be documented and checked in accordance with DQP410.

NOTE: *In order to provide effective and efficient verification, checked calculations from a previous project, or the input and output from a validated program, may be substituted for original hand calculations.*

The same input and assumptions used in the hand calculations are formatted and input into the computer to check the software. Computer input is to be checked in accordance with DQP415.

The output of the computer is compared to the results of the hand calculation with each corresponding answer annotated as equivalent values. Differences not obviously accountable to rounding are to be explained on the output sheet.

Complete documentation of the verification, to include fully checked calculations, checked computer input, printout of program when available, annotated output printout, and a brief description of the processes followed are to be submitted to the Document Control file.

3. This software Quality Control procedure, when performed by any consultant or subconsultant employee, will become an acceptable verification.

4. Updated computer programs will be re-validated by running the updated programs and comparing the output to that of the previously validated version of the program, following the procedures outlined in step (1) of this procedure, or it may be re-evaluated with hand calculations or by verification with other validated programs as approved by the Owner.

5. Subconsultants who use software in the performance of their contracted planning and design work must meet the same requirements for software verification. Subconsultants systems shall identify who maintains supporting documentation.

6. Regardless of its source, computer software must be confirmed as reliable for the intended application.

7. Use of non pre-approved RFP commercial software by the consultant organization will be limited to those applications approved by the Owner.

8. List of Owner's pre-approved software:

Road Design:	Bentley Microstation Bentley GEOPAK AutoTurn GEOPAK Drainage Visual Urban (HY-22) Flowmaster HydroCAD XP-SWMM HYDRAIN CulvertMaster HY-8 HEC-RAS HEC-2 PEAKFQ
Geotechnical Design:	gINT Bently Systems InSitu or GEOPACK Tech CPTDAS – used in Preliminary Design Services to Department ProDAT - used in Preliminary Design Services to Department
Permanent Signing:	SignCAD Synchro/SIM Traffic Version 6
Project Scheduling:	Primavera Project Planner
Word Processing and Spreadsheets:	Microsoft Office

***Note**: This listing should be closely reviewed with the requirements listed in the RFP. If discrepancies are identified, the pre-approved computer software listed in the RFP shall govern.*

DISPOSITION

NA

FIGURES AND FORMS

Figure DQP416FA – Computer Program Verification Form
Figure DQP416FB – Computer Program Verification Log

Draft

Subject: Review of Shop Drawings

PURPOSE

To establish the scope, responsibilities, and procedures for processing shop drawings, submittals for review and approval.

SCOPE

Shop drawings supplement Design documents to further clarify specific design elements. These drawings are created by material suppliers and fabricators and forwarded by the Design-Builder construction staff via submittal to the designer for review. Shop and working drawings for the Project shall include structural steel fabrication plans, anchor bolt layouts, shop details, erection plans, equipment lists, and any other information specifically required by the Construction Quality Assurance Manager, Department Standard Specifications or other governmental entities.

The Design-Builder's design engineers shall review, approve, authorize, and confirm any methods or procedures that are contained in the Department Standard Specifications, then submit the certified and sealed design drawings to the Design-Builder's construction team.

Shop and working drawings and calculations for excavation shoring, cribs, cofferdams, falsework, overhead signs, temporary support systems, formwork, and other temporary Project elements that describe the methods of construction proposed to be used for the Project shall be prepared by the Design-Builder in accordance with their Quality Manual. Receipt of submittals for temporary Project elements by the Department shall in no way constitute approval of the planned Project element or impose any liability upon the Department.

RESPONSIBILITIES

Design Task Managers will process all submittals for their discipline through the Post-Design Services.

PROCEDURES

1. All incoming shop drawings are received by the Construction Manager.
    a. The Construction Manager reviews the package to ensure that the submittal requires input from design, he/she forwards it as follows.
    b. The Construction Manager attaches a Submittal form.
    c. He/she obtains a submittal number from Document Control.

d. He/she indicates the specification section that references the need for this submittal.

e. He/she completes the first three columns on the Submittal form, listing each drawing or item in the submittal package.

f. He/she sends two clean, clear copies of the shop drawing package, along with the SEC submittal form to the Post-Design Services Manager. Note that a maximum of 11" x 17" drawings are preferred.

2. The Post-Design Services Manager will log the Shop Drawing Log.

3. The Post-Design Services Manager forwards the shop drawings for the Engineer Of Record review:

   a. The Engineer of record shall review, approve, authorize, and confirm any methods or procedures that are contained in the Department Standard Specifications.

   b. Post-Design Services Manager or the Engineer of record shall consult with the Department and all other applicable governmental entities that may require review of shop and working drawings and shall coordinate the preparation, submittal, and review of all such shop and working drawings. Where governmental approvals or approvals from Utility Owners are required, shop and working drawings shall be submitted to the applicable party for review and approval in accordance with their requirement

   c. The front of each drawing or item of the submittal is stamped with the Shop Drawing Review Stamp.

   d. One copy of the shop drawing log will be reviewed using standard check print procedures (yellow highlight to indicate items that are correct, red to indicate changes, blue or green pencil or ink to indicate comments).

   e. Each sheet is marked with an Action Code of Approval, Approval as Noted, Return for Correction, Not Approved, or Receipt Acknowledged.

   f. The shop Drawing Review stamp, Action Code, red marks noting requested changes are then transferred onto the second set of the submittal.

4. The Post-Design Services Manager or designee completes the Action column on the table on the Submittal form indicating the Action Code for each sheet of the submittal.

5. The Post-Design Services Manager then logs the completed review into the Shop Drawing Log and maintains a copy of the Submittal Form.

6. The Post-Design Services Manager delivers the entire package to the Construction Document Control Manager, for delivery to the Construction Manager.

7. Approved shop or working drawings shall be provided to the Department at least five Working Days prior to the start of any Project detailed by those drawings. The Design-Builder shall submit five complete 11 x 17 hardcopies of all shop and working drawings and one set of electronic files on CD-ROM of all shop and working drawings available in a digital format. The Design-Builder shall make no changes in any approved shop or working drawing after the design engineer has approved them. Any deviations from approved shop or working drawings shall require the fabricator to submit revised drawings to Design-Builder's design engineers for their approval, as outlined above.

8. The Construction Manager will approve and Release for Construction and provide a copy to Department.

9. Packages that are not approved will be returned to the Construction Engineer.

Draft

Subject: Identifying Nonconformances

PURPOSE

To document the presence of Nonconforming items and their resolution.

SCOPE

The procedure will be used when design or construction is found to not meet the requirements of the project.

RELATED DOCUMENTS

The following documents coordinate with this design Quality Procedure:

1. DQP502 – Dispute Resolution
2. DQP801 – Implementing Corrective and Preventive Action

RESPONSIBILITIES

Any **Contractor staff** or **Department staff,** including all **subcontractor** or **supplier staff** – in short, anyone working on the project – has the responsibility to identify and report nonconforming design or construction to the Quality Manager (QM) or any quality staff member. The **QM, DQAM, CQAM, DM, and CM** have the responsibility and authority to investigate the validity, and assist in the closure of all non-conformance reports to achieve compliance with contract requirements.

The **Quality Manager, Design Quality Assurance Manager, Construction Quality Assurance Manager**, or designee is responsible for the following:

- Ensuring that a NCR control number is assigned for tracking purposes
- Monitoring the Nonconformance Report Log
- Reviewing the nonconformance description for accuracy and completeness
- Performing the initial review of NCRs to evaluate their validity
- Reviewing the approved NCR disposition to verify that all nonconforming conditions have been addressed, the NCR disposition status is correctly indicated and the proposed corrective action is reasonable
- Ensuring that the corrective action is accomplished in accordance with the corrective action stated through inspections by the inspection staff, as required
- Reporting to management all open NCRs on at least on a monthly basis
- Initiating NCRs when warranted or supervising the inspection staff initiating NCRs

- Including all NCRs open at the time of prefinal inspection on the prefinal punch list

The Quality Manager, Design QAM, and Construction Quality Assurance Manager are responsible for the following:

- Reviewing, determining and reporting any identified trends based on audits of the NCR process
- Reporting to the Executive Committee

The **Project Manager** or designee is responsible for the following:

- Ensuring that proposed corrective action resolves the nonconformance, prevents recurrence, and meets specification design requirements
- Initiating and coordinating reviews and approvals/acceptance (from construction and engineering staff, quality control, Department, etc.) as required
- Review the status of all open NCRs on at least a monthly basis
- Review with senior management any reported trends or serious nonconformances

PROCEDURE

Preparing the Nonconformance Report

An NCR, shall be prepared for conditions that are nonconforming to contract requirements. For design, construction, materials, or equipment that do not conform to contract requirements, an NCR is to be issued.

Methods for identifying and controlling the resolution of deficiencies are addressed in the Dispute Resolution Procedure.

When to Write an NCR

NCR's must be written to document nonconforming permanent project work, including submittals, equipment, and the physical work.

Nonconforming work is work that does not meet specifications or other project requirements.

NCRs are prepared when the work is complete or the acceptability of follow-on work affected by the materials or equipment is endangered.

Quality Manager Review

The Quality Manager or designee ensures that the following actions are taken:

- Identification of the organization/individual responsible for disposition of the NCR
- Identification of the reply due date
- Issuance to the Project Manager and appropriate staff and to Department

If the NCR is determined to be invalid, the QM consults with the initiator of the NCR, indicates the reason it is invalid and signs off.

Responsible Organization/Individual Investigation

The responsible organization/individual investigates and determines the root cause of the nonconformance, corrective action to correct the nonconformance, and action to prevent recurrence. The NCR is forwarded to the responsible party for repair (response) and use-as-is dispositions.

Designer's Approval

The Design-Builder's solution will be sent to Department. Department and the responsible engineer for the design affected by the nonconforming condition review and approve all dispositions that have a status of repair (response) or use-as-is.

Project Manager's Review and Concurrence

The Project Manager reviews the documented root cause and proposed corrective/preventive actions to verify that management is in agreement with these items.

Quality Manager, CQAM, DQAM, or Designee Review and Concurrence

The QM, CQAM, DQAM, or designee reviews the proposed NCR disposition to verify that all nonconforming conditions identified have been addressed, and the proposed corrective action is reasonable. The status is updated in the Nonconformance Report Log and the NCR is entered into the DCS website daily.

Quality Inspection

Quality staff conducts appropriate inspections to verify that corrective actions are completed in accordance with the NCR instructions. The method of verification and the results of the verification/inspection are documented. When all actions are accepted, the inspector signs and dates the NCR. Only the QM, DQAM, CQAM or quality inspection staff may verify the corrective actions for the NCR.

If a nonconformance is found at a construction Critical Activity Point, the appropriate corrective actions will be completed in accordance with the NCR instructions and the NCR will be closed prior to the Critical Activity Point Manager signing off at the Critical Activity Point.

Updating the Nonconformance Log

Each NCR is assigned an NCR alphanumeric identification and is logged in the appropriate NCR Log, which is organized to track and abate Design and Construction NCRs.

The CQAM ensures that the Nonconformance Logs are updated as required and that the NCR hard copy is maintained in file for reference and is entered in the electronic document control system.

Resolution Schedule

Per the RFP, resolution will be proposed to Department within five working days.

Closure by Department

The Project Manager or designee will meet with Department to discuss NCR closure documentation, root cause, corrective and preventive action(s) taken and gain acceptance for closure of the NCR. If Department accepts the NCR, Department signs original NCR Block 21. The NCR then will be scanned/uploaded and placed in DCS. If Department rejects the NCR, the Project Manager will have the NCR revised to address Department concerns.

DISPOSITION

A status copy of all NCRs will be placed in the appropriate hardcopy file and uploaded to the web based Project DCS for Department and management to monitor NCRs and OMNs.

FORMS

DQP501FA – NonConformance Report
DQP501FB – NonConformance Report Log

Subject: Dispute Resolution Procedure

PURPOSE

To resolve disputes promptly and through personnel involved in the dispute.

SCOPE

The procedure applies to both internal (within the project team – including Department) and external disputes.

RELATED DOCUMENTS

The following documents coordinate with this design quality procedure:

1. DQP501 – Nonconformance Procedure

RESPONSIBILITIES

The Project Manager is responsible for the implementation of the procedure throughout the project. The responsibilities of other individuals involved are described in the procedure.

PROCEDURE

Disputes will be elevated through a controlled "dispute resolution ladder" to the appropriate level to establish a final course of action acceptable to all parties. The dispute ladder contains 5 levels as described as follows (see DQP502FA – Dispute Escalation Ladder).

Level I – Limited to initial test failure/retest and rejection of "out of spec" materials or inconsistent supplier quality test results that still fall within spec. Foremen will have the ability to ask for a retest if a failure is indicated on an initial test. No specification interpretation will take place. No "out of spec" material will be allowed in the project.

Level II – Will be more advanced construction situations such as out of place or damaged construction steel, misaligned dowel bars, or incorrectly run test procedures, etc. No spec interpretations will take place. Processes will be corrected immediately to the satisfaction of all involved in the dispute – or be elevated to Level III.

Level III – It is expected that this level will rarely be reached. Additionally, Level III disputes may occur when nonconforming product is inadvertently incorporated into the project and the test results are not made available until later in the construction process. Examples would be supplier quality issues resulting in nonconforming items, low concrete compressive strengths, and thin epoxy coatings on reinforcing steel. At this

time Department Project Manager, the Deputy Project Manager, and the Construction Quality Manager will be notified of the issue. A determination will be made whether the material will negatively impact the safety, performance, maintenance, or visual quality of the project and needs to be removed or can remain. Satisfactory resolution will be reached, based upon the findings, or the dispute will rise to Level IV.

Level IV – At this level the Project Manager will replace the Deputy Project Manager in the resolution process.

Level V – Disputes at this level will occur only when a solution can not be reached by the Project Manager and Department Project personnel. This will involve a meeting between the Executive Committee and Department Executive Management. Seldom will a dispute reach this level. With affective partnering and a proactive QMP, it is anticipated that no disputes will rise above this level.

Documentation may be in the form of a Nonconformance Report. A resolution will be formalized and submitted within 5 days.

DISPOSITION

Department and Project Manager sign-off is required prior to final disposition on Nonconformance Reports.

FIGURES AND FORMS

DQP501FA – Nonconformance Report
DQP501FB – Nonconformance Log
DQP502FA – Dispute Resolution Ladder

Draft

Subject: Stop Work Procedure

PURPOSE

To stop work when design and construction will not meet project requirements, when eminent safety issues exist, or when environmental permit compliance is in jeopardy.

SCOPE

The procedure applies to all work that will not meet contract requirements or be accepted by Department.

RELATED DOCUMENTS

None.

RESPONSIBILITIES

The Contract Manager, Project Manager, Quality Manager, Design Quality Assurance Manager, Construction Quality Assurance Manager, Design Manager, Construction Manager, Traffic Engineer, and Environmental Compliance Manager all have authority to stop work.

The Project Manager has the authority to resume work only with the concurrence of the Quality Manager.

PROCEDURE

When an item of work will not meet contract requirements or be accepted by Department, when eminent safety issues exist, or when environmental permit compliance is in jeopardy, the following will occur:

1. Notification – No matter who or how the identified potential stop work issue came to be known by either the QM, DQAM, CQAM, DM, CM, PM or Department PM, all shall be notified via email and voice messaging that a Stop Work Notification (SWN) is planned. The Quality Manager is ultimately responsible to notify all parties.

2. Upon notification the QM will investigate the issue or item of work and determine the need for a Stop Work Notification (SWN). In the event that the QM is not immediately available the progression of authority to investigate and issue a Stop Work Notice will be CQAM, and then the DQAM.

3. If the QM determines that the work needs to be stopped, the QM will issue a SWN in writing to the PM.

4. Project Manager will stop work activities per the SWN.

5. The work shall stop until the QM and Department approve the required corrective actions, and when the Project Manager determines it is appropriate to proceed.

6. The QM will work with the CQAM or DQAM to issue NCRs relating to any nonconformances associated with the SWN.

7. The QM ensures that the SWN Log is updated as required and that the SWN paper copy is maintained in file for reference and is uploaded to the DCS website.

8. All SWNs and resolution will be documented in electronic document control system.

DISPOSITION

Department and QM sign-off is required prior to restarting work.

FIGURES AND FORMS

DQP503FA – Stop Work Notification
DQP503FB – Stop Work Notification Log

Draft

Subject: Request for Information

PURPOSE

To provide a process to address Requests for Information (RFIs) or clarifications to Released for Construction documents requested by the Contractor or the Owner.

SCOPE

This procedure defines the interaction between the Owner, Contractor, and Designer when a request for information or clarification to RFC documents is required.

Requests for Information should be limited to plan and specification clarifications, and should not be used to request revisions to RFC documents.

RELATED DOCUMENTS

The following documents are referenced in this Design Quality Procedure.

None.

RESPONSIBILITIES

The Contractor or Owner generates RFIs. RFI's should be filtered through the **Project Manager** (or his designee), and forwarded to **Document Control.**

The **Document Control Manager** is responsible for assigning an RFI number, and will log the RFI and resolution into the design documentation files.

The Design Task Manager (or Post-Design Manager) is responsible for addressing RFIs in a timely fashion.

PROCEDURE

1. RFIs are initiated by the Construction Manager (or his designee). Owner-initiated RFIs should not be sent directly to the Designer, but should be channeled through the Construction Manager. The first point of contact for the initiator is Document Control, who will identify and reserve the next number in the RFI log.

2. The initiator will complete the RFI form and deliver it to the Document Control Manager. The DCM will log in the RFI and identify it by number.

3. Document Control will forward the RFI to the appropriate Design Task Manager(s) or the Post-Design Manager.

4. The Design Task Manager(s) or the Post-Design Manager will complete the response (typically in memorandum format). The memorandum should reference the RFI number, and should include any needed attachments.

5. The RFI response will be returned to Document Control for documentation and distribution.

6. The RFI does not require any signatures and will be considered "closed" once a response has been completed and distributed.

DISPOSITION

Disposition will be determined at the initial stages of the project, prior to the start of construction. The project distribution list will be edited to include all distribution parties.

Both the Design QA Manager and the Construction Quality Assurance Manager will be copied on all RFIs. Department will also be copied on all RFI's.

FIGURES AND FORMS

DQP504FA – Request For Information
DQP504FB – Request For Information Log

Draft

Subject: Notice of Design Change

PURPOSE

To establish the procedure for revising plan sheets previously Released for Construction. This procedure applies to design changes that are identified by the Designer.

SCOPE

During the course of construction, it may become necessary to revise RFC plans due to changes in design progress, a conflict between design elements, change in Department standards, or discovery of a design error. This procedure applies to situations in which the Designer identifies an issue that necessitates a change to one or more plan sheets and/or specifications previously Released for Construction.

RELATED DOCUMENTS

The following documents are referenced in this Design Quality Procedure.

None.

RESPONSIBILITIES

When the **Designer** identifies a potential design change, it should be immediately reported to the **Design Manager** and the appropriate **Design Task Manager**. It is the responsibility of the Design Manager, or his designee (generally the Design Task Manager) to assess the validity of the potential change, and obtain sufficient background information to thoroughly understand the conditions involved.

The **Design Manager** or **Design Task Manager** will immediately notify the Construction Manager by filling out and processing a Notice of Design Change (NDC) Form DQP505FA. This notification will occur in a timely fashion, sooner if the condition is classified as an emergency.

The Design Task Manager is responsible for addressing the necessary plan changes, adhering to the required QA/QC process, and transmitting the plan revisions to Document Control for distribution.

A copy of the NDC form DQP505FA shall be forwarded to Department. Department reserves the right to a ten (10) day review time on each NDC and Department acceptance of the NDC is required before it is Released for Construction.

PROCEDURE

1. The Designer identifies a potential change, and communicates the issue to the appropriate Design Task Manager and the Design Manager. The Design Manager determines if an NDC is warranted.
2. Document Control assigns an NDC number. The NDC will be entered into the NDC log for use in tracking each individual NDC through closure. The NDC log shall be available on the project network.
3. The Design Task Manager fills out a Notice of Design Change form, describing the reason for the change and the scope of the change. The NDC serves as initial notification to those in responsible charge that a change to RFC plans is forthcoming. The NDC will contain sufficient information to identify the scope of the revision, the work elements affected by the change, the cause, the classification of the NDC, the estimated time to respond to the design issues and any deadlines associated with the change.
4. The NDC form is forwarded to Document Control, and a hard copy is distributed to the Construction Document Control. The Construction Document Control is responsible for forwarding the NDC to the appropriate staff and Department oversight personnel.
5. The Design Task Manager makes the necessary plan changes.
   - If the change is determined to be major in scope (as determined by the Design Manger), a formal plan review and audit process will be conducted as defined in the QMP.
   - If the Design Manager determines the change to be minor in scope, a formal plan review will not be necessary. However, plans and calculations should still be checked according to the QMP.
6. When the plan revisions and requisite QA/QC processes are complete, the revised plans are forwarded to Document Control for distribution. The revised drawings will be accompanied by a copy of the original NDC form and a Re-Release of Drawing transmittal.

DISPOSITION

1. All check prints and calculations associated with each NDC shall follow the checking process outlined in the QMP. Check prints and calculations shall be sent to Document Control for storage.

FIGURES AND FORMS

DQP505FA – Notice of Design Change (NDC)
DQP505FB – Notice of Design Change (NDC) Log
DQP419FA – Re-release of Deliverable Form

Draft

Subject: Pre-Activity Meetings

PURPOSE

To establish required Construction Quality procedures and reporting requirements for pre-activity meetings for each activity preformed on the project.

SCOPE

Pre-activity meetings are held prior to beginning construction work on new types of or large segments of work to be preformed on the project. For example, pre-activity meetings may be held prior to demolition activities or prior to installation of a complex item or component such as a bridge.

The Design-Builder is also strongly encouraged to conduct a pre-activity meeting prior to commencing Design activities on the project to ensure all parties have a clear understanding of the goals, objectives, quality procedures and intended outcomes of their portion of the project.

RESPONSIBILITIES

The **Project Manager** is responsible for ensuring that a pre-activity meeting is held prior to starting construction on any major construction component or new activity. He is also responsible for complete implementation of this procedure.

PROCEDURE

1. Prior to work, the Project Manager, or a Superintendent that the PM designates, will seek feedback from their staff and the Department and will draft an agenda and notify construction staff and the Department that a pre-activity meeting will be held prior to construction. This person will chair the meeting. Chairman will send around sign-in sheet.
2. After the meeting, the chairman of the meeting will draft pre-activity meeting minutes. The meeting chairman will deliver the minutes to Document Control and provide a distribution list for the minutes to Document Control.
3. Document Control will distribute the minutes and file them in the DCS. DCS will produce a log of all Pre-activity meetings held on the project. A format for the Pre-activity Meeting Log is included in DQP507FC the FORMS section.

FIGURES AND FORMS

DQP507FA: Pre-Activity Meeting (Example)
DQP507FB: Pre-Activity Meeting Minutes (Example)

Subject: Corrective and Preventive Actions

PURPOSE

To address opportunities for improvement by identifying the root cause(s) of a problem and determining modification(s) to work processes to improve the delivery of services, design packages and construction activities. The process can be used to address and resolve Nonconformance Reports (NCRs).

SCOPE

This procedure establishes the process for implementing Corrective and Preventive Actions.

DEFINITIONS

2. **Audit Finding** – Documented occurrence or reoccurrence, products or services that do not conform to the QMP and/or contract requirements.

3. **CAP Assignee** – Staff person assigned by management to define the issue and its cause and to draft the Preventive and Corrective Action Plans.

4. **Corrective or Preventive Action Process –** An investigative process used to determine the root cause of problems or potential problems identified by the Audit Finding.

- **Corrective Action Process** – A process to provide for effective corrective action to eliminate problems, and to prevent the recurrence of nonconformance.
- **Preventive Action Process** – A process to provide for effective preventive action to eliminate potential failures of the quality system, or to preclude the occurrence of nonconformity.

5. **Corrective or Preventive Action Plan Assignee** – Designated individual or team assigned responsibility for identifying the root cause, and developing the Corrective or Preventive Action Plan.

6. **Corrective and Preventive Action Plan (CAP)** – A plan to eliminate the problem or potential problem identified in the Audit Finding or by other means.

7. **Implementation Date** – The date when the CAP is implemented.

8. **Initial Response Date** – The proposed date for completion of the CAP.

9. **Objective Evidence** – Collected data that verifies effectiveness of the implemented corrective or preventive action.

RELATED DOCUMENTS

The following documents are referenced in this Design Quality Procedure.

2. DQP501 – Nonconformance Procedure

RESPONSIBILITIES

The **Project Manager** or **Design Manager** or Construction Manager and **Quality Manager** are responsible for designating the CAP Assignee, for implementing the CAPs and for determining whether the Corrective and Preventive Action is effective.

The **CAP Assignee** is responsible for conducting the investigation to determine the root cause, to define the Corrective or Preventive Action Plan (CAP), and to assist in determining its effectiveness.

The **Quality Manager** is responsible for updating the Quality Manual to reflect the Corrective and Preventive Action Plan. The Quality Manager may delegate this to the DQAM or the CQAM.

PROCEDURE

1. The CAP process can be initiated by the Quality Assurance Team, any employee, manager or the Department. A CAP results from:

   - Significant or repetitive nonconformance.
   - Internal and external audit findings.
   - Management Review of the Quality System.
   - Improvements suggested by staff (WI-FI process).

2. The Quality Manager performs an analysis, evaluates the CAP and determines the severity, priority and impact to the organization for the project.

3. The Quality Manager assigns a control number to CAP.

4. The Quality Manager, with concurrence of the Design Manager or Project Manager, identifies who is best suited for finding the root cause and developing the CAP and selects the CAP Assignee.

5. The CAP Assignee is responsible for determining the root cause, developing the Corrective and Preventive Action Plan and determining the implementation time schedule. The Corrective or Preventive Action Plan will identify any immediate needs required to limit damage or liability associated with the CAP. In order to complete this assignment, the CAP Assignee:

   - Collects data and/or samples as appropriate.
   - Documents results of the root cause analysis.
   - Identifies action needed to avoid and prevent future incidents.

- Identifies any needed system or process changes.
- Determines the expected results.
- Determines timing and responsibilities for implementation.

Note: *Root cause for Preventive Action is identified through analysis of work operations, internal processes or external audits, the Constructor's feedback, Department input and feedback; recommendations from the Partnering Evaluation Program, statistics related to processes, and product and quality records.*

The CAP Assignee submits the draft CAP to the Quality Manager for review and submittal to the Design Manager (design-related) or Project Manager (construction-related) for implementation.

Once accepted, the Design Manager, Construction Manager or Project Manager shares the results with the Department and ensures that the Corrective or Preventive Action Plan is implemented.

The Quality Manager and CAP Assignee are responsible for verifying the effectiveness of the Corrective or Preventive Action. Once verified, through collection of documented objective evidence, it is noted on the CAP Report and the CAP is closed.

The Quality Manager submits a copy of this CAP Report to the Design Manager, Construction Manager, Project Manager, Originator and the Department when the CAP is closed.

The Project Manager, Design Manager or Construction Manager will review the CAP documentation, determine its relevance to other projects and issue copies to those Design Task Managers or Superintendents where appropriate.

The Quality Manager is responsible for all Corrective and Preventive Actions, and reports the summary actions to the Department's Project Manager, the Project Manager, Construction Manager, Design Manager, and Design Task Managers.

DISPOSITION

All final CAP Reports are submitted to Document Control and filed with the Project record.

FORMS

DQP801FA – Corrective and Preventive Action Process (CAP)

Subject: Identifying Opportunity for Improvement

PURPOSE

To define the scope and implementation of a procedure that allows workers to formally identify opportunities to improve work processes and deliverables.

SCOPE

The Worker-Identified opportunity For Improvement (WI-FI) procedure establishes guidelines for use in identifying improvements that contribute to the performance of the Design-Build Team in a manner that conserves project resources, positively impacts schedule, improves morale and commitment of team members, facilitates effective communications, or enhances the Best-Value of the project. Improved processes and deliverables will help the Design and Construction Team to meet or exceed expectations of the Department, the quality staff, and the Executive Committee Members.

BACKGROUND AND INTRODUCTION

Design-Build projects require design and construction staff to perform under more intense scheduling and procedural requirements than typical design-bid-build projects. The WI-FI Program reflects the Department's emphasis on maintaining a high level of performance under these conditions to produce a product that meets or exceeds all project requirements. It also gives staff an easy means of communicating suggestions that will help them and others do a better job.

RELATED DOCUMENTS

The following documents are referenced in this Quality Procedure.

1. DQP105 – Implementing the Quality Incentive Program.

RESPONSIBILITIES

All Management Staff may be asked to review suggestions for implementation.

All Staff Members, Managers and **Workers** are encouraged to identify opportunities for improvements to work processes that produce the positive results.

The **Design Manager, Design Task Managers, Construction Manager, Construction Supervisors, Project Manager, Quality Assurance Staff** and the **Executive Committee Members** will review suggestions and identify those worthy of further definition and implementation.

PROCEDURE

6. All Project Staff, Managers and Workers are encouraged to present suggestions and proposals as WI-FIs.

7. Use the WI-FI form (DQP802F) to describe the proposed improvement

8. Submit the WI-FI form to the Quality Manager, the DQAM, or the CQAM.

9. The Quality Manager, DQAM, or the CQAM will identify a review team to evaluate the WI-FI for implementation. The review team will determine the ease of implementation, the potential benefits and make an initial decision on whether to pursue the improvement.

10. If the Review Team decides to pursue the improvement, they will undertake the Preventive Action Process described in procedure for Implementing Corrective or Preventive Actions.

11. WI-FIs that identify suggestions that will have the following results are most likely to be chosen for implementation:

    - Conserve project resources,
    - Positively impact schedule,
    - Improve processes or procedures,
    - Improve morale and commitment of team members,
    - Facilitate effective communications, and
    - Exceed expectations of the Department, the quality staff and the Executive Committee Members.

DISPOSITION

Copies of all WI-FIs will be maintained by Document Control.

FIGURES AND FORMS

DQP802F – WI-FI Form

Subject: Management Plan Template – Design Forms

Table of Contents, if necessary

PURPOSE:

SCOPE:

RELATED DOCUMENTS:

RESPONSIBILITIES:

PLAN:

DISPOSITION:

DRAWING, FIGURES AND FORMS:

Draft

PROJECT QUALITY ASSURANCE PLAN

I. The following elements of the Quality Assurance Manual are applicable to the above project. Include a schedule of deliverables, planned independent technical reviews and assigned reviewers (if known) in the Project Quality Assurance Plan.

2.2.2.1.3 * _____Project Management Plan _____waiver approved (note reason in Section II)
2.2.2.1.3 _____Project Health and Safety Plan
2.2.2.1.7 * _____Independent Technical Review
2.2.2.1.8 _____Coordination Review
3 _____Contract Review
4.2.4 _____Client Feedback
4.4 * _____Work Product Input (Project Criteria)
4.5 _____Work Product Output (Work Product Directives)
4.7.1 * _____Work Product Verification - Detail Checking
_____ Calculations _____Drawings
_____ Specifications _____Studies and Reports
_____ Cost Estimates _____Disclaimers
4.7.2 _____Verification and Control of Computer Programs
4.9 _____Changing the Work Product
5 * _____Document and Data Control
6 _____Purchasing (Procurement of Subconsultant Services)
7 _____Controlling of Client-Supplied Product
8 * _____Identifying and Tracing Products
10 _____Construction Administration
15 * _____Packaging, Storing, Preserving and Delivering Client Deliverable
17 * _____Internal Quality Audits
18 _____Training
20 _____Statistical Techniques
* Required for the project's Quality Assurance Program

II. _____ While general review of the output documents will occur, formal application of the Quality Assurance Program is not required for the following reason(s):

III. _____ The following project-specific supplementary programs, procedures and instructions shall be applied to the above project (note references to procedure descriptions in the Project Management Plan):

Prepared by: _____ Date _____
Project Manager

Approved by: _____ Date _____
Principal-in-Charge or designee

Approved by: _____ Date _____
Office Quality Assurance Officer

cc: Project QA File, Office QA File
Department

FORM TEMPLATE – MS WORD

Draft

QUALITY INCENTIVE PROGRAM NOMINATION FORM

Nomination No. QIP___ (by QA staff)

Nominee:_____

Nomination proposed by:_____

Please identify the basis for this nomination. How has the nominee's work accomplished the following objectives?

☐ **Conserve project resources**

_____

☐ **Positively impact schedule**

_____

☐ **Improve morale and commitment of team members**

_____

☐ **Facilitate effective communications**

_____

☐ **Exceed expectations of the Owner, the QA staff and the Executive Committee Members**

_____

☐ **Other?**

_____

General comments:

_____

Quality Manager:_____

Action taken:_____

MONTHLY QUALITY PROGRAM SUMMARY REPORT

To: Executive Management Committee
From: Quality Management Team
Period: (date from, to)

Summary of Design Quality System:

	PERIOD	TOTAL
Number of Audits (passed/failed)		
Stage: Prior to Department Review		
Stage: Prior to RFC or Final Release		
Stage: Other		
NCRs		
NDCs		
RFIs		
WI-FIs		
Employee Incentive Program Nominations		
Corrective Action Plans initiated/completed		
Preventive Action Plans initiated/completed		

Summary of Construction Quality System:

	PERIOD	TOTAL
NCRs		
FDCs		
Stop Work Orders		
WI-FIs		
Employee Incentive Program Nominations		
Corrective Action Plans initiated/completed		
Preventive Action Plans initiated/completed		

QUALITY MANAGER _____ DATE _____

MONTHLY QUALITY PROGRAM CERTIFICATION

To: <Name>, Project Manager
From: Quality Management Team
Period: (date from, to)

The Quality Management Team hereby certifies that:

1. The work has been subjected to quality processes.
2. Design work has been submitted to an Independent Technical Review that includes review of the design for substantial conformance with the requirements of the Contract.
3. Records of the quality activities are filed in the Project Record and are available for review.
4. Nonconformances identified by the Quality Team and Department are being documented and resolved.
5. The quality data is analyzed for systemic problems in the work processes. When systemic problems are identified, they are investigated, and actions are taken to prevent a reoccurrence.
6. The Quality Program has been implemented in accordance with provisions of the Quality Manual, the Quality Management Plan, and the Construction Quality Inspection and Testing Plan.
7. Personnel working on the project have been trained.

XXXX	QUALITY MANAGER	DATE
XXXX	CONSTRUCTION QUALITY ASSURANCE MANAGER	DATE
XXXX	DESIGN QUALITY ASSURANCE MANAGER	DATE
XXXX	DESIGN MANAGER	DATE
XXXX	CONSTRUCTION MANAGER	DATE

MONTHLY PROJECT MANAGEMENT CERTIFICATION

To: <Name>, Department Project Manager
<Name>, Department Construction Manager

From: <Name> Project Management Team

Period: (date from, to)

The Project Management Team hereby certifies that:

1 The work except as noted in the non-conformances meets the contract requirements.

Draft

XXXX	PROJECT MANAGER	DATE
XXXX	MANAGING PARTNER	DATE
XXXX	MANAGING PARTNER	DATE
XXXX	MANAGING PARTNER	DATE

ELECTRONIC FILE NAMING CONVENTION

All electronic project documents should be named according to the following Naming Convention:

CCC-DDD-yyyymmdd-(*ssss*)nn.DOC

Where …

CCC	**3 letter document type – See list below**
DDD	**2 or 3 letter discipline – See list below**
yyyy	**4 digit year**
mm	**2 digit month**
dd	**2 digit day**
ssss	***Optional Subject***
nn	**2 digit sequential number**

DOCUMENT TYPE		DISCIPLINE	
MEM	Memo	DRG	Drainage
ROC	Record of Conversation	RDY	Roadway
LTR	Letter	RWL	Roadway – Walls
FAX	Facsimile	TRF	Traffic
TRN	Letter of Transmittal	STR	Structures
RPT	Reports	UTY	Utilities
AGN	Agenda	ITS	Intelligent Transportation Systems
MIN	Meeting Minutes	VQA	Visual Quality/Aesthetics
EML	Email	GEO	Geotechnical
OTH	Other	ENV	Environmental Compliance
ADT	Audit	PIN	Public Involvement
		SVY	Survey
		CQ	Construction Quality
		DQA	Design Quality Assurance
		DQC	Design Quality Control
		DC	Document Control
		PM	Project Management

PROJECT DOCUMENT RETENTION LOG

Project Manager:		Review Date:			
	Description	**Retention** (Years beyond ___)		**Date Stored**	**Box Number**
	File Register/Correspondence Log	7	A		
	Correspondence	3	A		
	Budget/Contract/Subcontracts	7	A		
	Project QA File	7			
	Document Distribution List	3			
	Input Reference Data	3			
	Reference Drawings	3			
	Calculations	7			
	Computer Verification	3			
	Drawings	7	C		
	Reports	7	C		
	Specifications	7	C		
	Test Control Records	7	A		
	Meeting Minutes	3	A		
	Design Control – comment forms	0	C		
	Design Control – detail checks	7	C		
	Product Certifications/Traceability Records				
	RFC Forms	7	A		

Cross-Reference:

Comments:

Project Manager: (Signature)	Date:

A. Substantial completion of construction (start of warranty period).
B. End of Warranty period.
C. Final project audit.
D. Date of final acceptance.

Attachment A
RETENTION SCHEDULE FOR QUALITY RECORDS

Standard Element Title	Quality Record Required	Minimum Retention Period	Quality Record Location
Management Responsibility	Management Meeting minutes	Completion of contract	Project Office
Contract Review	Results of contract reviews	Completion of contract	Project Office
Design Control – *review*	Review prints of drawings and specs, DCR/ITR/CR Comment Review Forms	Completion of design contract	Project Office
Design Control – *verification*	Detail check prints of drawings, calculations, and other deliverables	7 years after final acceptance	Project Office
Purchasing	Subconsultant contract review	Completion of contract	Project Office
Control of Customer-supplied Product	Record of unsuitable product(s)	7 years after final acceptance	Project Office
Product Identification and Traceability	Traceability records, where required	Completion of contract	Project Office
Process Control	Production and equipment maintenance records	Completion of contract	Project Office
Inspection and Testing – *Inspection and Test Records*	QA approval for release to construction	7 years after final acceptance	Project Office
Control of Measuring Inspection, Test Equipment	QA audit schedule	7 years after final acceptance	Project Office
Control of Measuring Inspection, Test Equipment	QA audit report	7 years after final acceptance	Project Office
Control of Nonconforming Product	QA audit finding	7 years after final acceptance	Project Office
Corrective and Preventive Action	Corrective action records	Completion of contract	Project Office
Control of Quality Records	Controlled list of quality records	Completion of contract	Project Office
Internal Quality Audits	Internal audit report and follow-up activities	Completion of contract	Project Office
Training	Employee training records	Completion of contract	Project Office

OFFICE DOCUMENT RETENTION LOG

Office: _____

Prepared by: _____

Item or Client/Project Name	Project Number	Type of Files	Date Transferred to Client	Date Stored	Location	Box Number	Retention Period/Date Destroyed

A – Accounting
CR – Corporate Records
PR – Project Related
P – Personal Records
L – Legal
I – Insurance Related

_____
Office Manager

REVIEW COMMENT FORM

DESIGNER

1. PACKAGE:

1. SUBMITTAL ☐ ***DEPARTMENT*** *OVERSIGHT REVIEW* ☐ *EARLY START OF CONSTRUCTION* ☐ ☐ RELEASED FOR CONSTRUCTION ☐ INTERNAL

3. REVIEW TYPE: ☐ IDR ☐ ITR ☐ CR ☐ *Owner* ☐ _____

4. DISCIPLINES: ☐ *Structural* ☐ *Drainage* ☐ *Aesthetics* ☐ *Utilities* ☐ *Roadway* ☐ *Traffic* ☐ *Geotechnical* ☐ ____

5. DATE:

6. COMMENTS DUE DATE:

7. RETURN COMMENTS TO:

1. RESOLUTION MEETING **DATE & TIME:**

2. RESOLUTION MEETING **LOCATION:**

10. Concurrent Review? Checked for overlap by DTM: ☐ **Yes** ☐ **No** **(DTM initials)**

11. REVIEWER:

12. ORGANIZATION: ☐ *XXXX* ☐ *XXXX* ☐ *DEPARTMENT* ☐ _____

No.	Dwg. / Pg.	Comment	Disp.	Response	Disp.	Ver.

No.	Dwg. / Pg.	Comment	Disp.	Response	Disp.	Ver.

Draft

CALCULATION COVER SHEET

Calculation Title: _____

Calculation Number: _____

Total Number of Pages (including cover sheet): _____

Total Number of Computer Runs: _____

Prepared by: _____ Date: _____

Checked by: _____ Date: _____

Description and Purpose:

Design Basis/References/Assumptions

Remarks/Conclusions/Results:

Calculation Approved by: _____

Design Task Manager Date

Revision No.:	Description of Revision:	Approved by: Project Manager	Date:

FIGURE DQP411FA

See DQP411FA – Detail Checking for Plan Sheets - example

Draft

FIGURE QP411FB

CHECK PRINT STAMP

No. _____ Date: _____

CHECK PRINT
Drawing Checked Against Calculations
and Calculation Check Confirmed:

By: _____ Date: _____

Checked: _____ Date: _____

Back checked: _____ Date: _____

Corrected: _____ Date: _____

Verified: _____ Date: _____

Draft

Review of Studies, Reports, and Other Design Documents

I. Assigned Checker: _____

(To be completed by the Project Manager)

Document to be Detail-checked: _____

(Title/Revision Number) _____

Submitted by: _____ Date: _____

Project Manager

II. Review Summary

(To be completed by the checker)

(I have checked the above-referenced document in accordance with the appropriate checklist/s and project scope. My conclusions are as follows:

_____

_____

_____

Reference comments are on: ☐ work product. (Yellow =Item is checked and correct; red =item to be corrected/deleted/added, or: ☐ DQF #04.07-A, pages _____ through _____

III. Checker Report

(To be completed by the checker; approved by the Project Manager or Principal-in-Charge)

A. ☐ The checker's comments have been provided. Checker's signature: _____ Date: _____

or B. ☐ All items have been found to be correct.

C. ☐ Backcheck of checker's comments has been performed by originator, and all issues have been resolved between originator and checker. (Checked with green = agree with reviewer's comment)

D. ☐ All unresolved issues have been submitted to the Project Manager, Principal-in-Charge or designee for resolution.

or E. ☐ Verification of correct incorporation of resolved comments into final document is complete. (Highlighted with yellow = comment has been incorporated; highlighted with blue over yellow = corrections verified by checker)

Submitted by: _____ Date _____

Checker

This detail check has been completed. Any significant issues not resolved between the detail checker and the originator have been resolved by me.

Approved by: _____ Date _____

Project Manager or Principal-in-Charge or designee (as applicable)

cc: Project QA File _____

Office QA Officer _____

Department

FIGURE DQP413FB

REVIEW PRINT STAMP

Phase _____ **Date** _____

REVIEW PRINT

Discipline	Reviewer	Date
(Editorial)		
Project Manager and Design Task Manager		

Draft

COMPUTER PROGRAM VERIFICATION

Program Name: _____

Version Number: _____

Principal Use:

Limitations:

Description of Program Modifications:

Operating Systems Used for Program Verification:

Location of Verification Documentation:

Prepared by: _____ Date _____

Checked by: _____ Date _____

Approved by: _____ Date _____

cc: Office IT Coordinator
Project Quality Assurance File
Department

PROJECT COMPUTER PROGRAM LOG

Computer Program Name	Version Number	In-House/Outside/ Project-Specific	Computer System	Verification Date	PM Initials

☐ The requirement to verify the above-listed programs has been waived for the following reasons:

Principal-in-Charge: _____ Date: _____

Office Quality Assurance Officer: _____ Date: _____

RELEASED FOR CONSTRUCTION

PACKAGE DESCRIPTION: **DATE:**

The Design Task Manager and Design Manager certify that quality control activities have been conducted throughout the design process in compliance with the Design Quality Management Plan and all contractual requirements. The Design Task Manager and Design Manager certify that the deliverable is complete to the appropriate stage of design, is checked, and is ready to be released for construction.

COMMENTS:

SIGNED: _____ DATE: _____

DESIGN TASK MANAGER (LEAD)

SIGNED: _____ DATE: _____

: DESIGN MANAGER

The Design Quality Manager certifies that the following reviews have been completed and that all comments have been resolved:
☐ Design Detail Checking, ☐ Design Coordination Reviews, ☐ Independent Technical Review, ☐ Constructability Review, ☐ Department Oversight Review.

The Design Quality Manager certifies that the work shown conforms to the Contract requirements, that design quality control procedures have followed the Design Quality Management Plan, that the Responsible Engineer has signed all drawings prepared under his or her direction, and by signing this release, the Design Quality Manager approves the audit process and procedures conducted in support of this release.

(For those drawings and documents included in the submittal that are prepared by a manufacturer or supplier or other persons not under his or her direct supervision, the Engineer Of Record shall affix a stamp that indicates the design shown on the sheet or document conforms to the overall design and contract requirements.)

COMMENTS:

SIGNED: _____ DATE: _____

DESIGN QUALITY MANAGER

The Project Manager has verified that:
☐ Design has undergone constructability review and is constructible as represented.
☐ The Released for Construction Package and working drawings for the portion of the Project to be constructed are complete and approved.

COMMENTS:

SIGNED: _____ DATE: _____

PROJECT MANAGER – Design-Builder

Department Contract Manager has accepted the design for construction.

COMMENTS:

SIGNED: _____ DATE: _____

DEPARTMENT CONTRACT MANAGER

NONCONFORMANCE REPORT

1. NCR Control No.:	2. (Sub)Contractor/Supplier:	3. Originator & Organization:	4. Date:

5. Location:	6. Originator:	7. Specification Section & Drawing No.:

8. Contract Requirement:

9. Nonconformance Description:

10. NCR Required?: ☐ Yes ☐ No Quality Assurance Signature	11. Reply requested from:	12. Need Date:

13. Root cause of the problem and action(s) to prevent recurrence:

14. Proposed Action(s):

15. Disposition status: ☐ Reject Work ☐ Rework ☐ Repair ☐ Use-As-Is ☐ Revise ☐ Replace ☐ Redo	16. Notice of Design Change Required? ☐ Yes ☐ No

17. Disposition Prepared By:		18. Design Engineer Approval: (for Construction Repair and Use-As-Is status)		
Signature	Date	Print Name	Signature	Date

Concurrence of Corrective and Preventive Actions:

19.		20.	
Originator	Date	Quality Assurance Signature	Date

21. Department has reviewed the above and accepts the NCR proposed disposition and/or corrective measures.

Print Name	Signature	Date

22. Quality Verification that nonconforming condition has been corrected:

Verified By:

Print Name	Signature	Date

NONCONFORMANCE REPORT LOG

Report No.	Date Issued	Description	Status or Resolution	Date Closed

Date:_____

FIGURE QP502FA
DISPUTE RESOLUTION LADDER
DESIGN

__Resolution Level	Design-Builder Management Level	Design-Builder QA Level	Department Oversight Level
Level I	Technician	Design Manager	Design Lead
Level II	Design Lead	Design Manager	Design Lead
Level III	Design Manager	Design QA Manager	Design Manager
Level IV	Project Manager	Design QA Manager	Project Manager
Level V	Executive Management Board	Design QA Manager	Department Executive Management

FIGURE QP502FA
DISPUTE RESOLUTION LADDER
CONSTRUCTION

Resolution Level	Design-Builder Management Level	Design-Builder Quality Level	Department Oversight Level
Level I	Foreman	Inspector	Senior Inspector
Level II	Superintendent	Senior Inspector	Senior Inspector
Level III	Deputy Project Managers	Construction Quality Assurance Manager	Construction Manager
Level IV	Project Manager	Construction Quality Assurance Manager	Project Manager
Level V	Executive Management Board	Construction Quality Assurance Manager	Department Executive Management

STOP WORK NOTIFICATION (SWN) No. _____

This notice is hereby given to stop work activities until further notification for the following work activity.

Work Activity: _____

_____

_____

_____

Comments: _____

_____

_____

_____

_____

Authorized to Issue Stop Work Notification:

☐Project Manager ☐Quality Manager

☐Design Quality Assurance Manager ☐Design Manager

☐Construction Quality Assurance Manager ☐Traffic Engineer

☐Environmental Compliance Manager ☐ Department Staff

☐ Safety Manager

Date:_____ Time:___:____ Signature:_____

(Authorized staff only, please check role above)

Date:_____ Time: ___:____ Signature:_____

Project Manager

RESUME WORK ORDER

Comments: _____

_____

_____

_____

_____

Date:_____ Time:___:____ Quality Manager:_____

Date:_____ Time: ___:____ Construction Quality Assurance Manager:_____

Date:_____ Time: ___:____ Department Project Manager:_____

Draft

STOP WORK NOTIFICATION (SWN) LOG

SWN No.	Date Issued	Description	Status or Resolution	Date Closed

Draft

Request for Information

RFI No.: _____
Date of Issuance:_____

Action Requested by:

☐ Owner ☐ Contractor ☐ Consultant ☐ Construction Coordinator ☐ Other _____ (please identify)

Reference:		
Drawing:		Detail:
Calculation:		
Specification Section:	Article:	Paragraph:

Description of the Request:

Request From:	**Respond by:**
By:	

The above question and subsequent reply does not relieve the Contractor of any contractual responsibilities to Owner under the Construction Contract. If the Contractor contends that an increase in contract sum or time is involved, the Contractor must notify the Owner in writing, for issuance of a Field Order or Proposal Request.

Reply:

Reply From:	**Reply Date:**
By:	

Reply From Construction Coordinator:	**Reply Date:**
By:	

REQUEST FOR INFORMATION (RFI) LOG

RFI No.	Date Issued	Description	Status or Resolution	Date Closed

Draft

NOTICE OF DESIGN CHANGE

TO:
FROM:
DATE:
NDC No.:

REASON FOR THE CHANGE:

DESCRIPTION OF CHANGE:

DRAWINGS AND/OR SPECIFICATIONS TO BE REVISED:

DATE REVISED DRAWINGS AND/OR SPECS WILL BE AVAILABLE:

RECEIVED BY CONTRACTOR:

PROJECT MANAGER DATE

cc: Department

Draft

NOTICE OF DESIGN CHANGE (NDC) LOG

NDC No.	Date Issued	Description	Anticipated Completion Date	Date Closed

Subject: PRE-ACTIVITY MEETING AGENDA (Example)

Date: Time:
To: Location:
From:
Subject:

1. **INTRODUCTIONS**
2. **PROJECT OVERVIEW**
3. **HEALTH & SAFETY**
4. **ENVIRONMENTAL MANAGEMENT**
5. **QUALITY MANAGEMENT**
6. **UTILITIES**
7. **SCHEDULE/COORDINATION**
8. **PROJECT ITEMS**

Draft

SIGN-IN SHEET

	NAME	REPRESENTING	PHONE/EMAIL
1			
2			
3			
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7			
8			
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31			
32			

Draft

Subject: Pre-Activity Meeting Minutes (Example)

Date: <DATE>
To: All attendees
From:
Subject: <SUBJECT>

Time: < > AM / PM
Location: Project Office

9. INTRODUCTIONS

10. PROJECT OVERVIEW

- Building Demolition as per the RFC'd Demolition Plans.

11. HEALTH & SAFETY

- Project safety, environmental, and quality training is needed for all personal working on the project.

12. UTILITIES

- Utility disconnects will be done prior to demolition work.

13. SCHEDULE/COORDINATION

- Work will start Monday March 6th.

14. PROJECT ITEMS

- It was reported that the notice of intent was faxed to the MPCA for all planned building demolition work. Conformation of this approval is needed.
- The Design-Builder wants to take the clean concrete to the proposed project fill areas. All other materials will be handled to approved landfills.
- Rodent removal is required prior to demolition.
- Any treated lumber needs to be taken to a different landfill site than normal demolition material.

NO.	DATE	SUBJECT	ITEMS COVERED		
1			☐SAFETY	☐QUALITY	☐ENVIRONMENT
2			☐SAFETY	☐QUALITY	☐ENVIRONMENT
3			☐SAFETY	☐QUALITY	☐ENVIRONMENT
4			☐SAFETY	☐QUALITY	☐ENVIRONMENT
5			☐SAFETY	☐QUALITY	☐ENVIRONMENT
6			☐SAFETY	☐QUALITY	☐ENVIRONMENT
7			☐SAFETY	☐QUALITY	☐ENVIRONMENT
8			☐SAFETY	☐QUALITY	☐ENVIRONMENT
9			☐SAFETY	☐QUALITY	☐ENVIRONMENT
9			☐SAFETY	☐QUALITY	☐ENVIRONMENT
10			☐SAFETY	☐QUALITY	☐ENVIRONMENT
11			☐SAFETY	☐QUALITY	☐ENVIRONMENT
12			☐SAFETY	☐QUALITY	☐ENVIRONMENT
13			☐SAFETY	☐QUALITY	☐ENVIRONMENT
14			☐SAFETY	☐QUALITY	☐ENVIRONMENT
15			☐SAFETY	☐QUALITY	☐ENVIRONMENT
16			☐SAFETY	☐QUALITY	☐ENVIRONMENT
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42			☐SAFETY	☐QUALITY	☐ENVIRONMENT
43			☐SAFETY	☐QUALITY	☐ENVIRONMENT
44			☐SAFETY	☐QUALITY	☐ENVIRONMENT
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49			☐SAFETY	☐QUALITY	☐ENVIRONMENT
50			☐SAFETY	☐QUALITY	☐ENVIRONMENT
51			☐SAFETY	☐QUALITY	☐ENVIRONMENT
52			☐SAFETY	☐QUALITY	☐ENVIRONMENT
53			☐SAFETY	☐QUALITY	☐ENVIRONMENT
54			☐SAFETY	☐QUALITY	☐ENVIRONMENT

DRAFT

PROJECT QUALITY ASSURANCE CHECKLIST (Draft)

Project Name: XXXX Design-Build Project

Start Date:

Project Number:

Completion Date:

Project Manager:

Principal-in-Charge:

QAM Element or Clause	REQUIRED QA AND QC ACTIVITIES	Applicable	Compliance	Deficiency	Comments	Correction Date	Verification Date
	Establish Project Central File	*					
	Prepare Project Quality Assurance File Folder	*					
	Review Proposal/Contract, obtain approval in accordance with the Auth. & Resp matrix and annotate (Negotiations Correspondence, memos, etc.)	*					
	Prepared Project Quality Assurance Plan, obtain approval from Principal-in-Charge, include in Project Management Plan (Exhibit 2.2-1)	*					
	Prepare Project Criteria Document, include in Project Management Plan	*					
	Prepare/Review procurement document, obtain approval from Office Manager (subcontracting agreement)						
	Prepare Project Management Plan, obtain approval from Principal-in-Charge (Exhibit 2.2-2)	*					
	Conduct Project Kick-off Meeting						
	Work Product Output (Work Product Directives)						
	Changing the Work Product						
	Document and Data Control (Exhibit 5.1-1)	*					
	Controlling Client-Supplied Products						
	Prepare Computer Program Log (Exhibit 4.7-9)						
	Prepare/Check Computer Program Verification, if required (Exhibit 4.7-8)						
	Include Report Disclaimers						

	Use procedures to prepare and detail-check calculations, using guidelines of Exhibit 4.7-1 (Exhibit 4.7-2)						
	Complete Calculation Cover Sheet (Exhibit 4.7-2)						
	Use procedures to prepare and detail-check drawings, using the guidelines of Exhibit 4.7-4 (Exhibits 4.7-3 and 4.7-5)						
	Use procedures to prepare and detail-check specifications, using the guidelines of Exhibit 4.7-6 (Exhibit's 4.7-3 and 4.7-5)						
	Review Draft Study/Report (Exhibit's 4.7-3 and 4.7-5)						
	Review Draft Estimate (Exhibit 4.7-7)						
	Client Feedback (Exhibit 4.2-1)						
	Evaluate/Verify/Accept Subconsultant's Services						
	Conduct Independent Technical Review of Contract Deliverables	*					
	Complete ITR Report (Exhibits 2.2-3 and 2.2-4)	*					
	Conduct Coordination Review, if more than one technology, office, subconsultant, etc. on the project						
	Complete Coordination Review Report (Exhibits 2.2-3 and 2.2-4)						
	Identify and trace product (product tags; product records)						
	Use procedures to identify & report nonconformances (Exh. 13.2-1, 13.2-2)						
	Use procedures to correct & prevent nonconformances (Exh 14.1-1, 14.1-2)						
	Use procedures to handle, store, package, preserve and deliver products						
	Use procedures to store quality records						
	Conduct QA Audits	*					
	Complete QA Audit and Findings Report, and Audit Check List (Exhibits 17.1-1, 17.1-2, and 17.1-3)						

Legend: * = always applicable

Required documentation

AUDIT SUMMARY

Auditor: _____ **Date:** 26-Jan 2010 **Audit No.:** AUD001

Package: Environmental Management Plan

Audit Stage: Prior to Department Submittal

Discipline: Environmental Compliance

CORE DISCIPLINES	SUPPORT DISCIPLINES	TECHNICAL SUPPORT	MANAGEMENT	CONTRACTOR
Design PM		**IT/CADD**	**Design Team Mgt**	**Exec. Management Committee**
		Lead	Co – PM	
			Co – PM	
			Design Mgr	
Roadway	**Roadway – WALLS**	**Document Management**	**Quality**	**Management and Reviewers**
Lead	Lead	Lead	**Quality Assurance**	**PM**
ITR	ITR		QM	CR – STR
			CQAM	CR – RDY
			DQAM	
			Quality Control	CR – DRG
			CM	CR – UTY
				CR – TRF
				CR – SVY
CADD				CR – Electric
CADD				
				Doc Mgt
Drainage	**Aesth./Visual Quality**	**Survey – Field**		**Staff**
Lead	Lead	Lead		
ITR	ITR			
Structures	Geotech	**Public Involvement**		**Department**
Lead	Lead	Lead		**PM**
ITR	ITR			Construction Lead
	ITR			Roadway Lead
	ITR			
				Drainage Lead
				Structure Lead
				Geotech Lead
CADD				Public Relations
CADD				
CADD				
Traffic/ITS	**Env. Compliance**			
Lead	Lead			
ITR	ITR			
	Wetlands			
	Erosion/vege			
CADD				
CADD				
Utilities	**Survey – Office**			
Lead	Lead			
ITR				

Package Audited: Environmental Management Plan
0
0
Environmental Compliance

Audit Stage: Prior to Department Submittal

Audit No.: AUD001

☐ The design package listed above has been audited for conformance with the Quality Management Plan (QMP)

☐ QMP checking and review processes have been followed

☐ Audited findings will be incorporated in future design packages (not allowed for RFC packages

☐ Findings carried over from previous audits have been resolved

☐ All audited findings have been resolved (required for RFC packages)

Design Manager:_____ Date: 26-Jan - 2010

	# of sheets		Date of Check
☐ Detail Check #1	_____	Sheets	_____
☐ Detail Check #2	_____	Sheets	_____
☐ Detail Check #3	_____	Sheets	_____
☐ Detail Check #4	_____	Sheets	_____
☐ Final Plan Set	_____	Sheets	_____
☐ Department Review Form		Date:	_____
☐ IDR			
☐ ITR			
☐ CR			
☐ Previous Audit Form No.:		#	_____
☐ RFC Form		Dated	_____
☐ Rerelease Form		Dated	_____
☐ RFI Form		RFI #	_____
☐ NDC Form		NDC #	_____

☐ Special Provisions
☐ Report
☐ Technical memo

☐ Management Plan
☐ Work Plan

☐ Geotech Report
☐

☐ Calculations
☐ Independent Calcs

Additional Audit Comments

CORRECTIVE AND PREVENTATIVE ACTION PROCESS (CAP)

TO BE COMPLETED BY THE DESIGN QA MANAGER:

CAP Control No.	***CAP TITLE:***
CAP Assignee Name:	Design Production Manager or Section Design Manager

TO BE COMPLETED BY THE ORIGINATOR:

Originator Name:	***ORIGINATOR LOCATION:***
SUBMITTAL DATE:	
Area(s) Involved:	
Problem Description: *Note NCR control number if addressing non conformance procedure.*	

TO BE COMPLETED BY THE CAP ASSIGNEE:

CAUSE:
Corrective Action Plan:

TO BE COMPLETED BY THE DESIGN QA MANAGER AND ASSIGNEE:

VERIFICATION OF EFFECTIVENESS:

This CAP is closed and no further action is necessary.

Design Quality Manager: Date:

cc: CAP Assignee
Design Manager
Design Quality Manager
Document Control Department

WORKER-IDENTIFIED OPPORTUNITY FOR IMPROVEMENT (WI-FI)

TO BE COMPLETED BY THE QUALITY MANAGER:

WI-FI Control No.	***WI-FI TITLE:***
CAP Assignee Name:	Design Task Manager or Superintendent

TO BE COMPLETED BY THE WORKER:

Worker Name:	***WORKER LOCATION:***
SUBMITTAL DATE:	
Discipline or Construction Area(s) Involved:	
Description of suggestion, concern, or opportunity for improvement: *Note NCR control number if addressing non conformance.*	

TO BE COMPLETED BY THE PROJECT MANAGER OR DESIGN MANAGER:

RESOLUTION:

- ☐ Address through CAP process
- ☐ Gather additional information and reassess
- ☐ Implement informally
- ☐ Other (describe)

Quality Manager: Date:

cc: CAP Assignee
Design Manager / Project Manager
Quality Manager
Document Control Department

Design-Build Demonstration Program

Volume II Construction Quality Assurance Inspection and Testing Plan

Draft

California Department of Transportation

TABLE OF CONTENTS – ALL PLANS

Vol	Description	Latest Rev. No.
I	QUALITY MANAGEMENT PLAN	1
II	CONSTRUCTION QUALITY ASSURANCE INSPECTION & TESTING PLAN	1
III	MATERIALS CONTROL SCHEDULE	3
IV	DOCUMENT MANAGEMENT PLAN	1

The Design-Builder shall update this Table of Contents based on the plans developed for the project.

Draft

The information presented in this document defines the Materials Control Schedule that meets the project requirements.

Approved:

NAME, Construction Quality Assurance Manager

Approved:

NAME, Department Contract Manager

Approved:

NAME, Contractor Project Manager

Draft

TABLE OF CONTENTS – PROCEDURES AND FORMS

Document No.	Description	Tab No.	Latest Rev. No.	Rev. Date
CQP001	Table of Contents		0	
CQP002	Construction Quality Assurance Inspection and Testing Plan	1	0	
CQP003	Frequency of Inspection		0	
PROCEDURES	**Quality Testing**	**2**		
CQP010	Dust Control		0	
CQP012	Construction Area Traffic Control Devices		0	
CQP016	Clearing and Grubbing		0	
CQP017	Watering		0	
CQP018	Dust Palliative		0	
CQP019	Earthwork		0	
CQP020	Erosion Control and Highway Planting		0	
CQP022	Finishing Roadway		0	
CQP024	Lime Stabilization		0	
CQP025	Aggregate Subbases		0	
CQP026	Aggregate Bases		0	
CQ027	Cement Treated Bases		0	
CQP028	Lean Concrete Bases		0	
CQP029	Treated Permeable Bases		0	
CQP037	Bituminous Seals		0	
CQP039	Asphalt Concrete		0	
CQP040	Portland Cement Concrete Pavement		0	
CQP041	Pavement Subsealing and Jacking		0	
CQP042	Groove and Grind Pavement		0	
CQP049	Piling		0	
CQP050	Prestressing Concrete		0	
CQP051	Concrete Structures		0	
CQP052	Reinforcement		0	
CQP053	Shotcrete		0	
CQP054	Waterproofing		0	
CQP055	Steel Structures		0	
CQP056	Signs		0	
CQP059	Painting		0	
CQP070	Miscellaneous Facilities		0	
CQP072	Slope Protection		0	
CQP073	Concrete Curbs and Sidewalks		0	
CQP080	Fences		0	
CQP082	Markers and Delineators		0	

Document No.	Description	Tab No.	Latest Rev. No.	Rev. Date
CQP083	Railings and Barriers		0	
	Quality Assurance	**3**		
CQP086	Signals Lighting and Electrical Systems		0	
CQP088	Engineering Fabrics		0	
CQP090	Portland Cement Concrete		0	
FORMS		**4**		
CEM-3101	Notice of Materials to be Used		0	
CEM-4501	Resident Engineer's Daily Report		0	
CEM-4601	Field Inspector Daily Report		0	
CEM-4701	Drainage System Summary		0	
CEM-4801	Quantity Calculation Sheet		0	
11-C-101	Daily Extra Work Tentative Agreement		0	
LA-16	Product, Material, or Method Report		0	
DS-C73	Concrete Pour Record		0	
CQP081FA	Field Verification Report		0	

Draft

Subject: Construction Quality Assurance Inspection and Testing Plan

PURPOSE

To provide a plan that outlines the construction quality assurance checks to be performed during the Project.

SCOPE

This plan applies to all Work performed on the Project.

RELATED DOCUMENTS

RFP
Special Provisions
Contract Plans
Volume I – Quality Management Plan
Volume III – Materials Control Schedule
Volume IV – Document Management Plan
Design-Builders Quality Program

RESPONSIBILITIES

The Design-Builder shall produce a detailed Quality Assurance Inspection and Testing plan as part of the Quality Management Plan.

Construction Quality Assurance Inspections and Testing shall be under the direction of the Quality Manager **(QM)** and Construction Quality Assurance Manager **(CQAM).** The Quality Manager (**QM)** is responsible for reviewing and analyzing inspection and testing data produced by the Construction Quality Assurance Inspection and Testing Plan.

It is the responsibility of the **CQAM** to implement the Quality Assurance Inspections and Testing plan and to review and analyze the information from the inspections and tests.

Critical Activity Point Managers **(CAPM)** working under the direction of the CQAM, shall be responsible for ensuring that the proper tests and inspections have been performed for the Critical Activity Point activities, collecting inspection and testing forms required for the Critical Activity Point sign-off, and verifying that the test and inspection data meets Contract requirements. CAPM will sign off on the Critical Activity Point once this information is in place.

The **CAPM(s)** shall be registered Professional Engineers in the State of California and shall have the applicable Department Technical Certification for the work performed under the Critical Activity Point.

Quality Staff / Lines of Authority

TITLE/ ROLL-RESPONSIBILITY	AUTHORITY
1. Construction Quality Assurance Manager (CQAM)	Directive Over Construction Quality Assurance Staff and to stop the progress of the Work.
2. Critical Activity Point Manager(s) (CAPM)	Directive Over Construction Quality Assurance Staff
a. CQA Lead Roadway Inspector	Directive over Roadway Construction Quality Assurance Inspectors/Technicians(s)
b. CQA Lead Structure Inspector	Directive over Structure Construction Quality Assurance Inspectors/Technicians(s)
c.	

PLAN

Quality Assurance Inspection and Testing

Quality Assurance inspections and tests will be performed during the production of the work, as materials arrive on the Project Site, and as materials are incorporated into the Work. Inspections and tests will be performed by a combination of contractor staff, inspectors and testers, and subcontractor and supplier quality assurance personnel.

Suppliers will perform tests on materials as they are produced. Prior to the material arriving on the Project Site, testing information will be forwarded to the CQAM demonstrating the material meets requirements. The CQAM will also audit selected suppliers to assure they are following a quality management system and to review the Project requirements with the supplier. The supplier's quality management system will be reviewed, along with test records from previous production and reporting of quality data during production will be established. For more information regarding contract requirements for sampling and testing materials, please reference the Materials Control Schedule (MCS) for Design/Build Projects

When materials arrive at the Project Site, receiving personnel will document receipt of the material in accordance with the appropriate procedure. Quality Assurance Inspection (QAI) will be performed on materials arriving on site to verify that the material meets Contract requirements. Some materials, such as concrete, will require physical tests as received and will be sampled to determine their conformance. The Work will be conducted following the proper test procedure and documented on the proper form.

During construction, various elements will be checked and compared to the requirements set forth in the RFP, Special Provisions, and the Materials Control Schedule for Design Build (Volume III). These checks will be performed following the appropriate procedure and documented on the proper form. Testing will be preformed

to the Project minimums stated in the Materials Control Schedule. Additional tests will be performed as needed. Estimated annual quantities of materials will be used to determine the approximate number of tests and inspections needed annually.

Quality Assurance staff has the authority to stop any and all Work that does not meet the Contract requirements.

Construction Quality Inspection Plans (CQIP's)

The Design-Builder will develop Construction Quality Inspection Plans (CQIP's) for all the work detailed and designed for construction.

The CQIP's documents provided in Volume II - Construction Quality Inspection and Testing Plan shall serve as a guide to the Design-Builder on the minimum expectations of Quality Assurance performance of the work. Additional CQIP's shall be developed by the Design-Builder for all work not encompassed by the CQIP documents provided in Volume II.

Frequency of Quality Assurance Inspections

The type of inspection will vary and depend on the type of work being performed, and will be defined at these three basic levels:

Benchmark Inspection – Inspection or review at the completion of pre-determined stages of the work. Stages are agreed to with the Design-Builder or as specified in the specifications. No work can proceed beyond each stage until approved by the Department.

Intermittent Inspection – Inspection or review of the work as often a necessary to assure contact compliance.

Continuous Inspection – Continuous or full time inspection or review of the work.

Critical Activity Points

Critical Activity Points will be established to ensure that the proper inspection and testing has been performed prior to starting, or before proceeding to the next stage or activity of that particular construction activity.

Critical Activity Points are hold points at which proper inspection, testing and verification is performed prior to proceeding to the next activity or next stage of that particular item of Work. These Critical Activity Points shall be formally accepted by the Construction Quality Assurance Manager, the Critical Activity Point Manager and the Department.

Critical Activity Points will also be held when a material is used on the Project for the first time on the Project. Quality inspectors will collect material certifications and any other documentation for the material, and perform the required Quality Inspection (QI)

per the Materials Control Schedule. All documentation, including certifications of the material will be forwarded to the Critical Activity Point Manager for sign-off, prior to the material being incorporated into the Project.

Critical Activity Points will be held at the operations detailed in the Construction Quality Testing and Inspection Plans **(CQIP's)** in Volume II, and as designated by the Design-Builder as part of the Quality Organization.

Critical Activity Points Procedures:

1. At a defined Critical Activity Point, the CAPM will review the Construction Quality Inspection and Testing Plan to determine the testing and/or inspection procedures and documentation that is required for that Critical Activity Point.

2. The CAPM will ensure that the required tests and/or inspections have been performed and provide passing data, according to the Project requirements.

3. The CAPM will collect the required documentation (inspection and/or testing forms) and ensure that the required signatures have been made on the forms.

4. The CAPM will invite a Department inspector to be present for Verification that the work has been performed to the requirements of the Project, and to verify that the required work has been completed in order to move on to the next activity.

5. Once it has been determined that the work meets the Project requirements, the proper inspection and testing has been performed, the required documentation has been completed and signed by the Construction Quality Assurance Manager **(CQAM)** in charge of the activity, the Department, the Critical Activity Point Manager will sign the required testing and/or inspection forms, and sign off on the Critical Activity Point.

6. Once the CAPM and the Department has signed off at the Critical Activity Point, work may proceed to the next activity.

Independent Assurance Sampling and Testing (IAST)

The quality teams will have all testers perform the required IAST tests. These tests will be done on an annual basis for any quality personnel that have performed a material test for the Project in that year. The CQM will keep records verifying completion of the required IAST tests.

DISPOSITION

Inspection reports, completed test forms, and material receipt forms will be provided to Department through Document Control Work Plan.

FIGURES AND FORMS

Form XXXX Critical Activity Point Release Form

Subject: Design-Builder Quality Assurance Inspection Frequency Checklist

PURPOSE:

To define the minimum frequency for quality assurance inspection of construction activities and items.

SCOPE:

Under the terms of the project contract, the Design-Builder

RELATED DOCUMENTS:

The following documents are referenced in this Quality Assurance Procedure:

1. Construction Policy Bulletin (CPB)
2. Construction Program Directives (CPD)
3. Caltrans Special Provisions
4. Caltrans Standard Specifications
5. California Test Methods
6. Caltrans Construction Manual
7. Inspection Checklist
8. SWPPP Manual

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of dust control operations. The Lead Inspector or selected representative will be onsite during dust control operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with dust control operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Caltrans by 0900 am the next business day.

PROCEDURE:

ACTIVITIES:

CONSTRUCTION ITEMS - QA

C = CONTINOUS INSPECTION - CONTINOUS OR FULL TIME INSPECTION; ONE PERSON OR MORE ASSIGNED TO ONE OPERATION;
I = INTERMITTENT INSPECTION - AS OFTEN AS NECESSARY TO ASSURE CONTRACT REQUIREMENTS ARE MET; ONE PERSON ASSIGNED TO TWO-THREE OPERATIONS
B = BENCHMARK INSPECTION - BENCHMARK OR MILESTONE INSPECTION; INSPECTION OR REVIEW AT THE COMPLETION OF PREDETERMINED STAGES OF WORK AS AGREED WITH THE CONTRACTOR, NO WORK CAN PROCEED UNTIL APPROVED BY CALTRANS

ITEM WORK DESCRIPTION	C	I	B
STRUCTURAL SECTION			
AC PAVING	X		
TACK COAT		X	
TREATED PERMEABLE BASE	X		
LEAN CONCRETE BASE	X		
GRADE & FORM CHECK & OIL		X	
PCC PAVING (FORM OR SLIP)	X		
PERMEABLE BLANKET		X	
CHIP SEAL		X	
SLURRY SEAL		X	
AGGREGATE BASE		X	
CHECK GRADES		X	
SUBGRADE preparation		X	
SLAB REPLACEMENT	X		
RAMP TERMINI REPLACEMENT OR NEW	X		
DOWELS			X
TIE BARS			X
PROFILOGRAPH			X
HIGHWAY ITEMS			
CLEAR AND GRUB			X
MISC DEMOLITION AND REMOVAL		X	

ITEM WORK DESCRIPTION	C	I	B
HIGHWAY ITEMS			
ROADWAY EXCAVATION		X	
IMPORTED BORROW & BACKFILL		X	
CHECK SUBGRADE		X	
FINISHING ROADWAY		X	
CONCRETE ITEMS			
MEDIAN BARRIER GRADE & FORM		X	
MEDIAN BARRIER POUR/SLIP	X		
MEDIAN BARRIER REBAR			X
CIP CONCRETE PIPE	X		
DRAINAGE STRUCTURES FORM			X
DRAINAGE STRUCTURES POUR	X		
FORM CURB, GUTTER, SIDEWALK			X
POUR CURB, GUTTER, SIDEWALK	X		
DRAINAGE			
CULVERTS/PIPES TRENCH & EXCAVATION		X	
CULVERTS/PIPES INSTALLATION			X
CULVERTS/PIPES BACKFILL		X	
EDGE DRAINS INSTALLATION			X
EDGE DRAINS TEST	X		
DOWN DRAINS			X
MISC DRAINAGE FACILITIES			X
TRAFFIC ITEMS			
TRAFFIC CONTROL ETC	X		
PLACE K-RAIL & CRASH CUSHION		X	
STRIPING (PAINT/THERMO)		X	
PAVEMENT MARKERS		X	
STRIPING, MARKING, MARKERS REMOVAL		X	
ROADSIDE SIGN INSTALLATION			X

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ITEM WORK DESCRIPTION	C	I	B
TRAFFIC SIGNAL AND LIGHTING			
TRENCH/EXCAVATION			X
CONDUIT & PULLBOXES INSTALLATION		X	
FOUNDATIONS POUR	X		
FOUNDATIONS FORM, REBAR & STRIP		X	
SIGNAL & LIGHTING POLE INSTALLATION	X		
LOOP DETECTOR INSTALLATION	X		
CONDUCTOR INSTALLATION			X
FUNCTIONAL TEST			X
TEMP INSTALLATION		X	
AWIS		X	
TMS AND COMMUNICATION SYSTEM			
TRENCH/EXCAVATION		X	
BACKFILL AND PAVING	X		
CAMERA ASSEMBLY		X	
CMS ASSEMBLY		X	
COMMUNICATION CABLE	X		
COMMUNICATION EQUIPMENT			X
SPLICING AND CONNECTION	X		
SYSTEM TESTING		X	
MISCELLANEOUS ITEMS			
COLD PLANE		X	
GRIND & GROOVE PAVEMENT		X	
PLACE AC DIKE AND MISC AC		X	
PRF INSTALLATION		X	
GEOGRIDS INSTALLATION		X	
IRRIGATION TRENCH, INSTALL & BACKFILL		X	
IRRIGATION PRESSURE TEST	X		

ITEM WORK DESCRIPTION	C	I	B
MISCELLANEOUS ITEMS			
CONSTRUCTION AREA SIGNS			X
REM/SALVAGE/RELOC/MOD EXISTING FACILITIES		X	
INSTALL MBGR		X	
SWPPP/WPCP BMP IMPLEMENTATION		X	
CHAINLINK FENCES			X
EXTRA WORK		X	
GSRD INSTALLATION		X	
PROJECTWIDE ROUTINE SAFETY REVIEW			X

STRUCTURES CONSTRUCTION ITEMS – QA

The "Inspection Priority Chart" below is a listing of construction items normally encountered on structure construction contracts. The items are matched with both a recommended type of activity and a priority.

The type of activity and explanation of each are as follows:

Bench Mark (B): Inspect up to 20% of the time work is in progress. Operation can proceed without inspection until complete, or until a predetermined bench mark has been achieved, either final or a clear milestone. The structure representative must work closely with the Contractor to ensure success of bench mark inspections. The Contractor must anticipate when a milestone is going to be reached, and notify the structure representative in a timely manner for inspection, before beginning work on subsequent stages.

Intermittent Inspection (I): Inspect 30-70% of the time work is in progress with assistant(s) assigned to two or three operations simultaneously.

Continuous Inspection (C): Inspect 80-100% of the time work is in progress with assistant(s) assigned only to one operation.

The types of activity are listed from left to right in an order reflecting manpower availability. For example, bench mark indicates a minimum level of job staffing and inspection or review can only be maintained at predetermined stages of work. Whereas proceeding to the far right, continuous represents the maximum level where adequate manpower is available to inspect more items on a full time basis.

Intermittent and continuous activities have priorities, increasing from left to right. The intent being that the structure representative can use this chart to determine the priorities of each day's activities and make appropriate staff assignments to best cover the work.

STRUCTURES CONSTRUCTION ITEMS – QA
PRIORITIES (1 HIGH 5 LOW)

	Bench Mark	Intermittent					Continuous		
PRIORITIES (1 HIGH 5 LOW)		5	4	3	2	1	3	2	1
STRUCTURE EXCAVATION	B								
Pile Footings		I							
Spread Footings		I							
Pier Shafts	B								
DRIVEN PILES (Bridge)									
Steel									C
Precast Concrete									C
CIDH PILES (Bridge)									
Drilling						I			
Rebar/Prepour				I					
Pour								C	
Wet Pour									C
FOOTINGS									
Rebar/Prepour		I							
Pour									C
COLUMNS									
Guying System	B								
Rebar/Prepour				I					
Pour									C
ABUTMENTS									
Forms		I							

STRUCTURES CONSTRUCTION ITEMS – QA
PRIORITIES (1 HIGH 5 LOW)

	Bench Mark	Intermittent					Continuous		
PRIORITIES (1 HIGH 5 LOW)		5	4	3	2	1	3	2	1
ABUTMENTS									
Rebar/Prepour				I					
Pour									C
STRUCTURE BACKFILL									
Material	B								
Placement/Compaction					I				
STEM AND SOFFIT									
Form Design	B								
Falsework Inspection				I					
Falsework Erection/Removal over or near traveled way							C		
Form Construction		I							
Form Dimensions			I						
Clean out	B								
Rebar				I					
Bracing/Ties		I							
Layout/Lost Deck Dowels						I			
Strip/Cure			I						
Pour									C
BARRIER RAIL (Bridge)									
Profile Grades	B								
Rebar/Prepour				I					
Pour							C		
BARRIER RAIL (median)				I					
PRESTRESSING									
Hardware/Ducts				I					
Strands									C

STRUCTURES CONSTRUCTION ITEMS – QA
PRIORITIES (1 HIGH 5 LOW)

	Bench Mark	Intermittent					Continuous		
PRIORITIES (1 HIGH 5 LOW)		5	4	3	2	1	3	2	1
PRESTRESSING									
Stress and Grout									C
DECK CONSTRUCTION	B	I	I	I	I	I	C	C	C
Overhang Construction				I					
Overhand Line and Grade					I				
Lost Deck Grade						I			
Lost Deck Construction			I						
Rebar				I					
Finish Machine Set Up							C		
Clean Up		I							
Pour									C
Cure		I							
Profilograph	B								
STRUCTURAL STEEL									
Erect/Weld/Bolt						I			
JOINT SEALS									
Saw Cut		I							
Place Seal				I					
PAINT									
Acquire As Builts	B								
Steam Clean				I					
Spot/Full Blast				I					
Paint				I					
Paint Quantities	B								
BUILDINGS									
Submittals	B								
Construction (varies)						I			

STRUCTURES CONSTRUCTION ITEMS – QA PRIORITIES (1 HIGH 5 LOW)									
	Bench Mark	Intermittent					Continuous		
PRIORITIES (1 HIGH 5 LOW)		5	4	3	2	1	3	2	1
SOUNDWALLS									
Piles/Foundations						I			
Barriers						I			
Block						I			
Grouting							C		
PUMP PLANTS									
Shop Plans	B								
Construction				I					
MISCELANEOUS									
Emergency Work									C
MSE WALLS									
Panel Installation			I						
Backfill			I						

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with contractor
   - Hours worked by personnel and equipment
   - Data for Force Account payment

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/File – Weight slips, dilution records.

4. Test records and daily diaries shall be submitted to the Caltrans by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

Section 10: Dust Control

PURPOSE:

To define the method required for performing dust control.

SCOPE:

Under the terms of the project contract, the Design-Builder must control dust. The Design-Builder must maintain such control whether payment is included in the prices paid for the various items of work involved or whether payment is made separately.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Assurance Procedure:

9. Construction Policy Bulletin (CPB)
10. Construction Program Directives (CPD)
11. Caltrans Special Provisions
12. Caltrans Standard Specifications
13. California Test Methods
14. Caltrans Construction Manual
15. Inspection Checklist
16. SWPPP Manual

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of dust control operations. The Lead Inspector or selected representative will be onsite during dust control operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with dust control operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES:

1. General

- Observe dust conditions

- Determine adequacy of control
- Monitor weather forecast for windy conditions

2. Water

- Determine adequacy of water supply
- Examine watering equipment
- Determine corrosive effects of additives

3. Dust Palliative

- Determine necessity for use
- Decide on locations, amounts
- Obtain samples, send to METS
- Determine corrosive effects
- Decide on rates of dilution, application; advise Design-Builder
- Obtain weight slips – weigh back, stab tank (if necessary)
- Record actual weather conditions

CRITICAL ACTIVITY POINTS:

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Hours worked by personnel and equipment
- Data for Force Account payment

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/File – Weight slips, dilution records.

4. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

Section 12: Construction Area Traffic Control Devices

PURPOSE:

To define the method required for performing Construction Area Traffic Control Devices.

SCOPE

Furnishing and installing construction area traffic control devices for the sole convenience and direction of public traffic.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

17. Construction Policy Bulletin (CPB)
18. Construction Program Directives (CPD)
19. Caltrans Special Provisions
20. Caltrans Standard Specifications
21. California Test Methods
22. Caltrans Construction Manual
23. Inspection Checklist
24. California Manual for Uniform Traffic Control Devices (MUTCD)
25. Caltrans traffic manual

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Construction Area Traffic Control Devices operations. The Lead Inspector or selected representative will be onsite during Construction Area Traffic Control Devices operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Construction Area Traffic Control Devices operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Determine what signs must be placed before work begins for the entire project
- Determine the methods and equipment the contractor will use for closing lanes, ramps, and roadways, and for flagging and controlling one-way traffic
- Note the various traffic control devices specified to be used. Some of these devices will require certificates of compliance. Signage and delineation materials listed in the special provisions must be listed in the Department list of approved traffic products and must be covered by certificates of compliance.
- Visually inspect all traffic control devices to ensure conformity with the specifications. If you approve the devices for use, record the approval in the
- Review site
- Meet with Design-Builder to discuss traffic control plan
- Request lane closures from Department TMC

ACTIVITIES DURING CONSTRUCTION:

- Ensure advanced warning signs are in place
- Ensure proper utilization of CMS and Stationary signs
- Ensure proper site distances are maintained
- Ensure all traffic control devices are installed and in good working condition.
- Ensure timely reporting of 10-97,10-98 and 10-99 to TMC
- Contractors should maintain all traffic control devices in good working order throughout the project's life.
- During operations requiring traffic control systems, engineers should ensure that all traffic control devices are correctly located and functioning properly.

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment

- Ordered changes in cement content
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Inspector Daily Report - Form

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 16: Clearing and Grubbing

PURPOSE:

To establish required Construction Quality procedures for inspection and reporting requirements for clearing and grubbing operations preformed on the project.

SCOPE

Clearing and Grubbing shall consist of removing objectionable material from within the highway right of way, bridge construction areas, road approaches, material sites within the right of way, areas through which ditches and channels are to be excavated, and other areas as may be specified in the special provisions. Clearing and grubbing shall be performed in advance of grading operations and in accordance with the requirements specified in these specifications

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

26. Construction Policy Bulletin (CPB)
27. Construction Program Directives (CPD)
28. Caltrans Special Provisions
29. Caltrans Standard Specifications
30. California Test Methods
31. Caltrans Construction Manual
32. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained inspectors/technician's are assigned to perform required observations, testing and documentation of Clearing and Grubbing operations. The Lead Roadway Inspector or selected representative will be onsite during Clearing and Grubbing operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the roadway inspector.

CQAM is responsible for random spot checks and quality audits associated with Clearing and Grubbing operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

4. Prior to work, a pre-construction meeting will be initiated to ensure that clearing and grubbing will be performed in accordance with Caltrans Standard Specifications for Construction and the applicable Special Provisions.
5. Prior to work, quality control technicians and inspectors will verify all erosion control devices are in place per NPDES, SWPPP, and the approved erosion control plans and specifications.
6. The Lead Roadway Quality Inspector or his representative will observe all cleared and grubbed subgrades for compliance with Caltrans Standard Specifications for Construction and the applicable Special Provisions. Questionable subgrade areas identified will be referred to the CQCM.
7. Proper filling and compaction of stump holes, cut areas or depressions resulting from clearing and grubbing as outlined in Caltrans Standard Specifications for Construction and the applicable Special Provisions**.**
8. The Design-Builder will adhere to the Tree Preservation Plan.
9. Disposal of the trees, brush, stumps, roots and other debris is in accordance with Caltrans Standard Specifications for Construction and the applicable Special Provisions.
10. Caltrans Specifications and the applicable Special Provisions are used for guidelines on temporary protective methods for any trees or other vegetation that are to be saved.
11. All materials testing will be done in a manner that is consistent with standard procedure, and at the rate directed by the Schedule of Materials Control for that material and complete the applicable Department forms as required.
12. Ensure that clearing and Grubbing only in areas where the Design-Builder is scheduled to work during the rainy season per the approved baseline schedule. Avoid clearing areas that will be exposed to rain before any construction work begins.

ACTIVITIES BEFORE WORK:

- Review existing facilities
- Review project documents
- Review environmental reports, commitments, mitigation, and measures
- Make field inspection
- Mark items to be preserved
- Go over project site with Design-Builder
- Ensure that disposal within project limits will meet all requirements
- Ensure that burning, blasting and disposal are in order

- Obtain water pollution control plan
- Take pre-construction photographs
- Review agency permits for any constraints.
- Review baseline schedule for Design-Builders sequence of work
- Review the right of way maps
- Review utility drawings

ACTIVITIES DURING CONSTRUCTION:

- Observe clearing activities – proper limits, preservation, stump removal or cut-off, root grubbing
- Review safety – public; traffic control
- Burning – Fire fighting equipment
- Blasting – radio transmission, over – shooting, storage of explosives
- Check dust control
- Observe disposal methods
- Be alert for hazardous material, previous waste areas

Record data for force account payment - Daily Extra Work Tentative Agreement - Form 11-C-101

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Notes on spreading, waste
   - Ordered changes in cement content
   - Notes on measurements, deficient thicknesses
   - Circumstances regarding rejected material
   - Limits of work

- Records for force account payment (if any)
- Stoppages and resumption of daily pours
- Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

Include in the Assistant Resident Engineer Daily Report - Form HC-10A

- Instructions and/or significant discussions with Design-Builder
- Hours worked by personnel and equipment
- Notes on your inspections

Measure and/or calculate quantities - complete Quantity Calculation Sheet, Form CEM-4801

DRAWING, FIGURES AND FORMS:

CEM-4601 Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

HC-10A Assistant Resident Engineer Daily Report

11-C-101 Daily Extra Work Tentative Agreement

Draft

Section 17: Watering

PURPOSE:

To define the method required for performing Watering.

SCOPE

This work shall consist of developing a water supply and furnishing all water required for the work and applying all water.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

33. Construction Policy Bulletin (CPB)
34. Construction Program Directives (CPD)
35. Caltrans Special Provisions
36. Caltrans Standard Specifications
37. California Test Methods
38. Caltrans Construction Manual
39. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained inspectors/technician's are assigned to perform required observations, testing and documentation of Watering operations. The Lead Roadway Inspector or selected representative will be onsite during Watering operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the roadway inspector.

CQAM is responsible for random spot checks and quality audits associated with Watering operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Establish a water source. If a fire hydrant is to be used a meter must be obtained from the respective agency.

- Determine the quality of the water
- Determine if the contractor intends to use chemical additives in water
- If the contract requires, ensure that mobile watering unit is available on the project at all times.
- Ensure all necessary watering equipment is of the type specified.

ACTIVITIES DURING CONSTRUCTION:

- Ensure that the water application is adequate (not too little not too much)
- Water quality
- Prevent Trucking to the roadway.
- Determine whether the water supply can supply the project
- If the contractor uses a fire hydrant, ensure that proper arrangements have been

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Notes on spreading, waste
   - Ordered changes in cement content
   - Notes on measurements, deficient thicknesses
   - Circumstances regarding rejected material
   - Limits of work
   - Records for force account payment (if any)
   - Stoppages and resumption of daily pours
   - Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 18: Dust Palliative

PURPOSE:

To define the method required for performing Dust Palliative.

SCOPE

This work shall consist of applying a dust palliative for the prevention of dust nuisance.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

40. Construction Policy Bulletin (CPB)
41. Construction Program Directives (CPD)
42. Caltrans Special Provisions
43. Caltrans Standard Specifications
44. California Test Methods
45. Caltrans Construction Manual
46. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Dust Palliative operations. The Lead Inspector or selected representative will be onsite during Dust Palliative operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Dust Palliative operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Registered engineer to review and approve submittal on the type of palliative and equipment to be used.
- Confirm palliative application rate.

- Determine whether a dust palliative should be applied in lieu of other methods of dust control.

ACTIVITIES DURING CONSTRUCTION:

- Advise the contractor of the rate of dilution for binders that are miscible in water.
- Make sufficient observations or checks to verify that the contractor obtained the required binder and that it was diluted properly.
- Advise the contractor of the desired rate, number, and limits of the application.

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Notes on spreading, waste
   - Notes on measurements, deficient thicknesses
   - Circumstances regarding rejected material
   - Limits of work
   - Records for force account payment (if any)
   - Stoppages and resumption of daily pours

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 19: Earthwork

PURPOSE:

To define the method required for performing earthwork.

SCOPE:

Earthwork includes operations connected with roadway excavation, blasting, structure excavation, backfill, ditch excavation, compaction, embankment construction, and borrow excavation.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Assurance Procedure:

47. Construction Policy Bulletin (CPB)
48. Construction Program Directives (CPD)
49. Caltrans Special Provisions
50. Caltrans Standard Specifications
51. California Test Methods
52. Caltrans Construction Manual
53. Structures Construction Records and Procedures
54. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of earthwork operations. The Lead Inspector or selected representative will be onsite during earthwork operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with earthwork operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

1. Review Project Document

- R/W obligations
- Utility permits and notices – status of permit work, utility relocation
- Borrow or disposal requirements and/or agreements
- Stage construction
- Traffic control plan
- Environmental reports
- Railroad approvals
- Review soils report. Review Design-Builders equipment vis-à-vis soils report.

2. Review Staking
   - Apparent discrepancies
   - Special details
   - Location of drainage structures – verify as staked, need relocation, data for quality calculations
   - Discuss with Design-Builder
   - Data adequate for quantity determination
   - Obtain trenching and shoring plans
   - Obtain water pollution control plans
   - Review materials reports
   - Review Design-Builder's code of safe practices and accident prevention program

ACTIVITIES DURING WORK:

1. General
   - Observe safety factors – public traffic (vehicular and pedestrian) Design-Builder's personnel and equipment, and your safety
   - Observe hauling – weight limitations, spillage, dust control, removal of mudon truck tires.
   - Check slopes – correctly started, slope rounding, within tolerance, timely erosion control
2. Roadway Excavation
   - Check for unsuitable material – advise Design-Builder of extent, disposal, corrective measures; decide on suitable backfill; record data for force account payment if applicable - Form CEM – 4601.

- Blasting – ensure safety; warming signs for radio transmission; observe storage of explosives; review staking with blasting foreman; observe blasting; require that over-shooting be stopped, other violations identified in Standard Specifications Section 25.
- Obtain certificate of compliance, weight slips for fiber – keep records for payment.
- Confirm final destination of off-haul material. Ensure indemnification of owner.
- Slides and Slipouts – examine slopes for potential problems, decide on corrective work, disposal of material; advise contractor; record data for force account payment if applicable (Form 11-C-101 - Daily Extra Work Tentative Agreement); consider taking before and after photographs.
- Surplus of Deficiency of Material – (see Const. Man. 6-19).
- Selected Material – determine proper use; decide on stockpiling; (See Class 5 aggregate Subbase, Std. Specs. Section 25).

3. Structure Excavation & Backfill
   - Review data for quantity measurements
   - Observe for compliance with approved sloping or shoring plans
   - For culverts, provide data for camber
   - Inspect excavations, require removal of spongy material, rock
   - Record data for force account payment if applicable (Form 11-C-101 - Daily Extra Work Tentative Agreement)
   - Ensure proper bedding for culverts - shaped sand bedding, soil cement
   - Check culvert bracing and strutting
   - Approve backfilling - observe for proper type; pervious, impervious, slurry cement, concrete
   - Sample structure backfill - test for grading, sand equivalent; obtain certificate of compliance and load slips for concrete backfill
   - Ensure approved backfill methods - specified layers, sequence, ponding and jetting
   - Test for compaction
4. Embankment Construction
   - Examine foundation
   - Install settlement platforms (when required) - enforce settlement periods

- Observe embankment placement - check for layer thickness, oversize material, benching into existing material, cross fall, slope within tolerance, erosion control
- Require drying of material containing excessive moisture
- Designate the test area measure compaction

5. Borrow Excavation

- Local borrow - Designate the locations and limits, ensure availability of quantity measurement data
- Imported borrow - ensure availability of quantity measurement data; if paid by weight, decide on weight slips or certified daily summary weigh sheets; check scales, spot-check weighing procedures, obtain samples and determine moisture content

CRITICAL ACTIVITY POINTS:

Notify underground Service Alert

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Hours worked by personnel and equipment
- Data for Force Account payment
- Hours worked by personnel and equipment

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/File – Weight slips, dilution records.

4. Structure Summary - Form CEM-4701 (for drainage structures

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-4601 Force account payment

HC-10A Record data for force account payment

CEM-4701 Drainage System Summary

11-C-101 Daily Extra Work Tentative Agreement

Section 20: Erosion Control and Highway Planting

PURPOSE:

To define the method required for performing erosion control and highway planting.

SCOPE:

Erosion control and highway planting are applied to roadside and median areas where erosion control is necessary and where planting may or may not, be done in the future. Highway planting (landscaping) involves preparing areas for planting, furnishing, and planting plants, and performing plant establishment work. Such landscaping is sometimes combined with erosion control. Irrigation systems are installed to apply water to highway planting.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Assurance Procedure:

55. Construction Policy Bulletin (CPB)
56. Construction Program Directives (CPD)
57. Caltrans Special Provisions
58. Caltrans Standard Specifications
59. California Test Methods
60. Caltrans Construction Manual
61. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of erosion control and highway planting operations. The Lead Inspector or selected representative will be onsite during erosion control and highway planting operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with erosion control and highway planting operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE CONSTRUCTION:

1. Determine source of material - Notice of Materials to be Used, - Form CEM 3101
2. Check availability of State-furnished material
3. Review agreements for water, electric service - timely placement of orders
4. Examine proposed sources for topsoil - good weed growth, low soluble salt, friable, loamy, organic
5. Review Design-Builder's schedule for seed germination, plant survival
6. Obtain approval for detours
7. Review maintenance of existing irrigation systems - consult with Design-Builder and State maintenance
8. Obtain working drawings for irrigation system wiring - check for required data
9. Designate plant locations - direct Design-Builder's placement of stakes or markers; adjust locations as necessary; consider future growth, other facilities.

ACTIVITIES DURING CONSTRUCTION:

1. General

- Observe traffic handling - safety, convenience, proper signs
- Observe safety - in accordance with Code of Safe Practices
- Observe topsoil placement - uniformly spread, required depth, properly loosened
- Determine method of payment for topsoil; volume or weight - measure in vehicle or obtain certified summary scale sheets; obtain samples for moisture determination (if measurement by weight)
- Observe cultivation - decide on extent of rock removal, disposal of rock; advise Design-Builder; keep records for force account payment - Form 11-C-101 - Daily Extra Work Tentative Agreement)
- Check packages of fertilizer and soil amendments for specified composition
- Ensure that fertilizer and/or soil amendments are incorporated at specified rates during cultivation
- Measure cultivation areas, count sacks/ packages of fertilizer and soil amendment - keep records for
- Check straw - proper material; wheat, oat, barley; clearance from County Agricultural Commission.
- Observe straw placement - required rate, adequate incorporation into soil, proper equipment, specified payment timing

- Obtain weight certificates for straw - test for moisture, keep records for payment Check seed and fertilizer - labeled properly
- Obtain written evidence of seed purity and germination - calculate adjustments for application
- Ensure inoculation for legumes Measure rates of seed application
- Observe hydro seeding - mixing, number and timing of applications, temperature; check fiber, test for moisture
- Review the SWPPP plan on the temporary erosion control measures.
- Obtain certificates of compliance, weight slips for fiber – keep records for payment

2. Highway Planting

- Observe roadside clearing - preservation of existing plants or facilities; removal of stumps, roots, weeds
- Obtain Design-Builder's plans for use of pesticides - submit to district specialist for review, compliance with specifications
- Submit CCO's for pesticides not included in special provisions
- Advise Design-Builder of approval and/or changes in use of pesticides
- Observe mixing and use of pesticides - obtain the "Report of Chemical Spray
- Operations" for each week's application
- Observe preparation of planting areas, rock removal
- Observe construction of planting holes - ensure proper ingredients and methods of backfill, measure quantities
- Examine plants - proper size, variety, proper hauling, storage, root structure
- Observe planting methods - handling, watering, staking, mulching
- Measure/count plants, ground cover areas
- Require timely replacements
- Observe watering - proper methods, adequate amounts
- Ensure proper operation of sprinklers
- Monitor plant-establishment work - watering, weeding, fertilizing, need for replacements; keep Design-Builder advised
- Measure and calculate quantities

3. Irrigation Systems

- Check backflow preventer - location away from traffic, installation per local codes
- Locate existing cross-overs - place temporary and/or permanent markers
- Observe installation of pipes and conduits- proper workmanship; reaming, cutting, joining, specified backfilling, placement of rock
- Observe installation of controller and conductors - obtain maintenance and operation manuals, ensure inclusion of wiring diagrams
- Observe pressure testing of water lines, record results in the Field Inspector Daily Report - Form CEM-4601
- Observe operation of entire system - order necessary revisions
- Ensure replacement of disturbed planting
- Measure items - calculate quantities
- Report new products and/or methods to Landscape Architecture - Form LA-16

CRITICAL ACTIVITY POINTS:

- Provide evidence that material complies with project specifications. Prior to incorporation into the work.

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports, Report of Chemical Spray

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

11-C-101 - Daily Extra Work Tentative Agreement

LA-16 New Landscape Architecture products and methods

Draft

Section 22: Finishing Roadway

PURPOSE:

To define the method required for performing finishing roadway.

SCOPE:

The contract item, finishing roadway provides payment for the final cleanup operation so that the completed project, upon acceptance, will be neat, presentable, and functional, as required by the Standards Specifications. This contract item does not require any specific construction work to be performed, but it does involve the performance of numerous small details.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

62. Construction Policy Bulletin (CPB)
63. Construction Program Directives (CPD)
64. Caltrans Special Provisions
65. Caltrans Standard Specifications
66. California Test Methods
67. Caltrans Construction Manual
68. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of finishing roadway operations. The Lead Inspector or selected representative will be onsite during finishing operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with finishing roadway operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

- Provide Design-Builder a list of items to be finished

- Pavements cleaned of loose or extraneous material, joints in P.C.C. free of foreign material
- Slopes, ditches, material sites - dressed; free of debris, rock larger than 2-1/2 inches
- Entire R/W - free of stakes, lath, temporary construction items
- Drainage structures, culverts - free of dirt, other obstructions or debris
- Old roads, detours, haul roads - obliterated
- Concrete structures, curbs, sidewalks cleaned of extraneous markings
- Observe finishing operations - no damage to completed facilities
- Final SWPPPP inspection.

CRITICAL ACTIVITY POINTS:

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Section 24: Lime Stabilization

PURPOSE:

To define the method required for performing lime stabilization.

SCOPE:

Lime stabilization increases the stability of native materials. It is particularly effective for materials containing a large percentage of clay particles. Lime stabilization results from spreading lime over the native material and thoroughly mixing it in place. The specifications also allow offsite mixing. The special provisions specify the amount of lime to be added to the native material. If necessary, to achieve the compressive strength designated in the special provisions, the resident engineer may order an adjustment in the percentage of lime to be used.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

69. Construction Policy Bulletin (CPB)
70. Construction Program Directives (CPD)
71. Caltrans Special Provisions
72. Caltrans Standard Specifications
73. California Test Methods
74. Caltrans Construction Manual
75. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of lime stabilization operations. The Lead Inspector or selected representative will be onsite during lime stabilization operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with lime stabilization operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE PLACEMENT:

- Obtain samples of in-place material - submit to lab for % of lime to be used; advise Design-Builder.

ACTIVITIES DURING WORK:

- Observe preparation of material - scarified, broken up to proper depth
- Remove oversize - prepare CCO, record data for force account payment - Form HC-10A
- Check ambient temperature
- Obtain certificate of compliance for lime - sample line, send to lab
- Obtain weight slips
- Check lime spread rate, control length of spread
- Observe mixing - test for uniformity with phenolphthalein, require remixing if necessary; complete within time limit
- Check layer thickness
- Obtain samples - test for lime content, re- quire additional lime and remixing if necessary
- Examine rolling equipment - specified types
- Ensure final compaction within 36 hours
- Establish test area - measure compaction
- Require surface to be kept moist
- Measure finished surface - within tolerance
- Observe construction joints - transverse, longitudinal; trimmed, vertical
- Curing seal - advise Design-Builder of rate of application, check rate spread, obtain certificate of compliance for asphalt, sample asphalt and send to lab, obtain weight slips
- Review and approve equipment to be used and application method.
- Determine the rate of water to be applied to activate lime.

CRITICAL ACTIVITY POINTS:

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Daily times of mixing, completion of compaction

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 25: Aggregate Subbase

PURPOSE:

To define the method required for performing aggregate subbases.

SCOPE:

Aggregate subbase is designed by class. The Standard Specifications describe the requirements for each class, and the contract will specify the class of aggregate subbases to be used.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

76. Construction Policy Bulletin (CPB)
77. Construction Program Directives (CPD)
78. Caltrans Special Provisions
79. Caltrans Standard Specifications
80. California Test Methods
81. Caltrans Construction Manual
82. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of aggregate subbase operations. The Lead Inspector or selected representative will be onsite during aggregate subbase operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with aggregate subbase operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE PLACEMENT:

- Obtain initial samples - test for grading, sand equivalent, R-value

- Observe condition of material underlying the grading plane, test for R-value, compaction
- Spot-check stakes
- Review payment method - measure the grading plane accordingly
- Obtain Supplemental Materials Site
- Agreement from Design-Builder if required

ACTIVITIES DURING PLACEMENT:

- Sample deposited material, test for grading, sand equivalent, moisture (if measurement is by weight)
- Observe operations at the source - same material as represented by initial samples
- Review weighing procedures (if payment is by weight) - collect weight slips and/or certified summary scale sheets; check for overloads
- Observe spreading, proper layer thickness, no significant segregation or waste
- Establish test area - measure compaction
- Measure finished surface - within tolerance
- Provide compaction test results
- Provide spread shet showing actual finished grades

CRITICAL ACTIVITY POINTS:

- Sign off that Subgrade has been accepted per plan both vertically and horizontally

Subbase grades and compaction

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

Provide data on actual final grades vs. design grades.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 26: Aggregate Bases

PURPOSE:

To define the method required for performing aggregate bases.

SCOPE:

The contract will define the class of aggregate base to be used, the dimensions to which it is to be placed, and the specific unit of measurement. The requirements for sampling and testing aggregate base which include the frequency of testing.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

83. Construction Policy Bulletin (CPB)
84. Construction Program Directives (CPD)
85. Caltrans Special Provisions
86. Caltrans Standard Specifications
87. California Test Methods
88. Caltrans Construction Manual
89. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of aggregate base operations. The Lead Inspector or selected representative will be onsite during aggregate base operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with aggregate base operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE PLACEMENT:

- Obtain initial samples - test for grading, R-value sand equivalent, durability index
- Observe condition of material underlying the grading plane, test compaction, check for deterioration

- Spot-check stakes
- Review payment method - measure the grading plane accordingly
- Obtain "Supplemental Materials Site Agreement" from Design-Builder, if required.
- Review and approve material to be used.

ACTIVITIES DURING PLACEMENT:

- Sample deposited material, test for grading, sand equivalent, optimum moisture and moisture (if measurement is by weight)
- Observe operations at the source - same material as represented by initial samples
- Review weighing procedures (if payment is by weight) - collect weight slips and/or certified summary scale sheets.
- Check for overloads
- Observe spreading, uniform mixtures, proper layer thickness, proper moisture, no significant segregation or waste
- Establish test area - measure compaction
- Measure finished surface - within tolerance
- Confirm compliance with design water content, grades and cross sections.

CRITICAL ACTIVITY POINTS:

- Sign off that grade has been accepted per plan both vertically and horizontally.

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 27: Cement Treated Bases

PURPOSE:

To define the method required for performing cement treated bases.

SCOPE:

Cement-treated base (CTB) is composed of a mix of aggregate, Portland cement and water. CTB, specified as either Class A or Class B, is generally used only with asphalt pavements and can be either plant mixed on road mixed. However, plant mixed is most common. CTB can be spread by three allowable methods. The special provisions will specify the class, mix method, and possibly the spreading method.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

90. Construction Policy Bulletin (CPB)
91. Construction Program Directives (CPD)
92. Caltrans Special Provisions
93. Caltrans Standard Specifications
94. California Test Methods
95. Caltrans Construction Manual
96. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of cement treated base operations. The Lead Inspector or selected representative will be onsite during cement treated base operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with cement treated base operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE PLACEMENT:

- Obtain initial samples - depending on type of C.T.B., test for: grading, sand, equivalent, potential compressive strength, R-value (before and after adding cement)
- Review test results - decide on % of cement
- Observe condition of material underlying the grading, plane - compaction, within tolerance for elevation
- Examine mixing equipment and proposed method of application.

1. Road-mix
   - Examine mixer - bottom pan, provision for metering water, adequate capacity, general condition
   - Check cement spreader - method of metering
2. Plant-mixers
   - Check proportioning devices for aggregate, cement, water
   - Check timing devices
   - Check condition of mixer blades
   - Ensure safe sampling facilities
   - Observe testing of scales

ACTIVITIES DURING WORK:

1. Road-mixing
   - Observe spreading of aggregate - proper metering, sizing, combining windrows before adding cement
   - Observe spreading of cement - flattened windrow, uniform spread, proper rate, proper timing
   - Observe mixing - addition of water, proper pick-up of windrow, uniform mixture
2. Plant-mixing
   - Observe mixing operation - blending of aggregates, cement feed, mixing time, moisture content, uniformity
   - Observe hauling - covering loads
   - Observe depositing - uniform spread, proper quantity; no spotting picking- up, shifting
3. Road-mixing and Plant-mixing
   - Check ambient temperature

Draft

- Obtain aggregate samples - test for grading, sand equivalent
- Obtain cement samples, certificates of compliance, weight certificates when necessary
- Obtain C.T.B. samples - test for optimum moisture, moisture content, compressive strength
- Observe spreading - proper method for each type, subgrade moistened, proper spread widths, location of longitudinal joints, time lapse between spreads, layer thickness
- Ensure immediate compaction
- Designate test areas - measure compaction
- Verify operation time is within requirements, keep records - Form CEM-4601
- Measure finished surface - check tolerance, keep records - Form CEM-4601
- Check construction joints - end of day, operational delays, vertical cuts on longitudinal joints
- Check excess material - proper disposal, measurement of quantity
- Ensure moist surface until curing seal in place
- Decide on rate of spread for curing seal - advise Design-Builder
- Ensure proper curing material - obtain weight certificates, certificates of compliance, samples; weigh back or stab tanks when necessary
- Check curing seal spread rate
- Ensure protection of completed C.T.B.. Area that received the CTB must be sealed before the end of the work shift.

CRITICAL ACTIVITY POINTS:

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste

- Ordered changes in cement content
- Notes on measurements, deficient thicknesses

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 28: Lean Concrete Base

PURPOSE:

To define the method required for performing lean concrete base.

SCOPE:

Lean concrete base is normally used under portland cement pavement and is more rigid and less erodible than cement-treated base. The quality of aggregates for both sides is similar. The Design-Builder must proportion the aggregate so that it meets the specified grading requirements. The engineer determines the cement content to be used.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

97. Construction Policy Bulletin (CPB)
98. Construction Program Directives (CPD)
99. Caltrans Special Provisions
100. Caltrans Standard Specifications
101. California Test Methods
102. Caltrans Construction Manual
103. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of lean concrete base operations. The Lead Inspector or selected representative will be onsite during lean concrete base operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with lean concrete base operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE PLACEMENT:

- Determine the Design-Builder's proposed source of aggregate and cement
- Obtain Design-Builder's proposed grading
- Obtain initial aggregate samples - test for grading, sand equivalent, potential compressive strength; advise lab of Design-Builder's proposed grading
- Determine cement content - advise Design-Builder
- Observe condition of material underlying the grading plane - review tolerance, identify low areas; test compaction, check for deterioration
- Spot-check stakes
- Examine equipment and tools - side forms, slip form equipment, mixers
- Observe slip-form paver demonstration
- Examine aggregate storage areas - separation of sizes, no contamination
- Examine proportioning system - safe and suitable sampling facilities, weighing and proportioning system tested, interlocks working, separate cement feed, automatic timing device, mixers clean, blades not worn out; moisture meter, batch counter
- Examine truck mixers - revolution counters, meters
- Perform strength test.

ACTIVITIES DURING WORK:

- Check ambient temperature, check sub grade - not frozen, uniformly moist
- Sample aggregate - see that it is from the tested source; test for grading, sand equivalent
- Sample cement, obtain certificates of compliance, ship to lab
- Observe concrete - adequate mixing, no segregation
- Sample plastic concrete - check penetration, air content, cement content. Collect cylinder samples and perform break test.
- Observe construction of weakened planes - proper dimensions, vibration of concrete
- Ensure construction contact joints, moisture barriers
- Check screeding, vibrating (proper depth - all units working)
- Check texturing - rough or smooth, depending on overlying surfacing
- Examine curing material - properly labeled and packaged, obtain samples

- Observe curing - material properly agitated, completely mixed; check timing and spread rate
- Decide on fogging, advise Design-Builder, keep force account records - Form CEM-4601
- Require second application of curing seal (for P.C.C. pavement overlay)
- Measure finished surface check against tolerance - record low areas, ensure grinding of high areas, reapplication of curing seal
- Ensure protection of completed base.

CRITICAL ACTIVITY POINTS:

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Engineer Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Section 29: Treated Permeable Bases

PURPOSE:

To define the method required for performing Treated Permeable Bases.

SCOPE

This work shall consist of constructing an asphalt treated permeable base or a cement treated permeable base to the required lines, grades, and dimensions.

Asphalt treated permeable base shall consist of a mixture of aggregate and asphalt binder.

Cement treated permeable base shall consist of a mixture of aggregate, Portland cement and water.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

104. Construction Policy Bulletin (CPB)
105. Construction Program Directives (CPD)
106. Caltrans Special Provisions
107. Caltrans Standard Specifications
108. California Test Methods
109. Caltrans Construction Manual
110. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Treated Permeable Bases operations. The Lead Inspector or selected representative will be onsite during Treated Permeable Bases operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Treated Permeable Bases operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Verify the stakes
- Registered engineer to review and approve mix design
- Confirm proposed equipment s fit for purpose especially the compaction roller(s)
- Check grades and confirm compaction
- Review plans and specifications
- Obtain samples
- Examine the contractor's plant and storage areas
- Review compaction tests of the subgrade
- Determine if the material underlying the grading plane meets compaction requirements. Ensure that the grading plane is firm and stable.
- Determine that the subgrade is free of loose or extraneous material
- Spot-check areas both between stations where stakes are set.
- Verify that filter fabric meets specifications.
- Review planned locations of cross-drain interceptors.
- Ensure the interceptors are properly located to prevent
- Inspect the placement of filter fabric.
- Examine spreading and compacting equipment
- Determine that the atmospheric temperature meets the specified minimum before spreading begins.
- Determine that the subgrade is uniformly moist before spreading cement treated permeable material (CTPB).

ACTIVITIES DURING CONSTRUCTION:

- Check and monitor temperature, segregation, water content etc.
- Confirm that the right mix is used
- Take samples
- Prevent traffic from driving over ATPB
- Collect ATPB truck tags
- Ensure excess material is properly disposed. Measure quantity.
- Determine which compaction method the contractor plans to use.
- Check the temperature of the asphalt-treated permeable base (ATPB)

- Take samples of the completed mix from trucks at the plant or from the mat behind the paver.
- Verify that filter fabric is placed on the high side of the ATPB blanket in accordance with the plans and specifications.
- Verify that the contractor meets the time and temperature requirements for mixing and transporting.
- Reject any segregated or nonuniformly mixed CTPB.
- Observe rolling to determine that compaction meets specifications.
- Determine that the base is cured as specified.
- Verify that filter fabric is placed on the high side of the CTPB blanket in accordance with the plans and specifications.
- During placement, ensure the cement does not plug the openings in the edge drains.

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)
- Stoppages and resumption of daily pours

- Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 37: Bituminous Seals

PURPOSE:

To define the method required for performing bituminous seals.

SCOPE:

Bituminous seals of the Standard Specifications cover seals coats and slurry seals. In addition, bituminous seals are used to maintain existing asphalt concrete pavement. Generally limited to new work performed on fog seal on asphalt concrete dikes, miscellaneous areas, and shoulders.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

111. Construction Policy Bulletin (CPB)
112. Construction Program Directives (CPD)
113. Caltrans Special Provisions
114. Caltrans Standard Specifications
115. California Test Methods
116. Caltrans Construction Manual
117. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of bituminous seals operations. The Lead Inspector or selected representative will be onsite during bituminous seals operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with bituminous seals operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE APPLICATION:

1. General

- Obtain initial samples of aggregates-test for grading, % of crushed particles (screenings), soundness, film stripping, cleanness
- Examine surface to be sealed - clean, dry, no loose particles
- Decide on traffic handling, temporary delineation, safety, convenience, one-way controls, operating time limits; advise Design-Builder
- Decide if weather conditions are suitable
- Check temperatures - ambient, surface
- Examine distributor trucks, spreaders, rollers - proper types and number
- Decide on added water (emulsion)
- Decide on spread rates - (test small area if necessary), advise Design-Builder
- Remove traffic strip prior to seal application.

ACTIVITIES DURING APPLICATION

1. Fog Seal
   - Obtain test reports, certificates of compliance, weight slips for asphaltic emulsion; weigh-back and/or stab tank when necessary
   - Sample asphaltic emulsion (prior to adding water) - send to lab
   - Observe spreading - check spread rate; check surface for uniformity, sufficiency; if tacky, require sprinkling with water
2. Seal Coats with Screenings
   - Ensure that adjacent fog seals have been placed
   - Ensure that screenings are at the site
   - Obtain test reports, certificates of compliance, weight slips for asphaltic emulsion; weigh-back or stab tank when necessary
   - Sample asphaltic emulsion - send to lab
   - Sample screenings - test for grading, cleanness; ensure material is from source represented by initial samples; ensure that chips are surface damp at time of application
   - Measure temperature of asphalt just prior to spreading
   - Ensure use of building paper for start and cut-off of spread
   - Observe spreading of asphalt - check for proper rate, uniformity
   - Ensure immediate coverage with screenings (before asphalt sets) - required equipment, proper speed, uniform application
   - Observe rolling - proper timing, required coverage; limit spread as required

- Ensure traffic control by flaggers and pilot cars, regulate speed as required
- Ensure redistribution, and/or removal of loose screenings, brooming at specified intervals
- Decide on disposition of excess screenings - advise Design-Builder, make deductions for stockpiled screenings not used

3. Slurry Seal

- Decide on proportions of aggregate, asphaltic emulsion and water - advise Design-Builder
- Obtain test reports and certificates of compliance for asphaltic emulsion
- Sample asphaltic emulsion - send to lab
- Ensure that aggregates are from sources represented by initial tests - sample and test for grading, sand equivalent
- Sample the mixture - test for uniformity of asphalt distribution
- Observe placing - proper width, thickness, approved equipment, proper rate
- Obtain weight certificates for completed mixture

4. Parking Area Seal Coat

- Sample coal tar pitch emulsion - send to lab
- Sample aggregate - test for grading and sand equivalent
- Ensure 30-day waiting period before treating new surfacing
- Obtain weight slips for aggregate
- Measure coal tar pitch (by the gallon) keep daily records - Form HC-10A
- Observe required washing on new surfacing, cleaning of old surfaces
- Observe mixing of slurry - proper proportioning of ingredients, mixing times
- Check application - dampened surface, number and rate of applications, time between applications
- Ensure exclusion of traffic - 24 hours
- Ensure any loose aggregate is removed from the roadway prior to opening to traffic.

CRITICAL ACTIVITY POINTS:

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- -Instructions and/or significant discussions with Design-Builder
- -Data for progress payments
- -Notes on your inspections
- -Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

HC-10A Assistant RE Daily Report

Draft

Section 39: Asphalt Concrete

PURPOSE:

To define the method required for performing asphalt concrete paving-street operation.

SCOPE:

Under the terms of the project contract, the Design-Builder shall perform asphalt concrete paving street operation according to the approve plans.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

118. Construction Policy Bulletin (CPB)
119. Construction Program Directives (CPD)
120. Caltrans QC/QA Manual for AC Production and Placement
121. Caltrans Special Provisions
122. Caltrans Standard Specifications
123. California Test Methods
124. Caltrans Construction Manual
125. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of asphalt concrete paving-street operations. The Lead Inspector or selected representative will be onsite during asphalt concrete paving-street operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with asphalt concrete paving-street operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE PLACEMENT:

- Review special provisions
- Review Construction Handbook No. 2, Asphalt Concrete Paving, Street Operations
- Examine subgrade - check compaction, no deterioration; require leveling of existing uneven pavements, filling holes and depressions, removal of loose material, mark areas requiring additional A.C. for thin base
- Decide on prime coat and paint binder -when to use, areas to be covered, rates of application, advise Design-Builder
- Decide on traffic handling, temporary delineation, safety, convenience, access to property, one-way controls, signing, flaggers, drop-off at pavement edge
- Examine asphalt distributors - pressure type, full circulating, insulated, proper length of spray bar, equipment for determination of spread rate and quantities used, thermometer
- Examine spreading equipment - motor graders; proper size and condition; paving machine; self-propelled, proper width, adjustable screed, rollers or tampers
- Examine rollers - proper number and types, pads, water systems, approval of alternative types, check tire pressures on pneumatic tires
- Establish communication with asphalt plant
- Advise district of reduced roadway clearances
- Registered engineer to review and approve traffic plan
- Registered engineer to review and approve mix design.

1. General
   - Observe traffic handling - working according to approved plan
   - Measure ambient and/or pavement temperature
2. Prime coat or paint binder
   - Obtain refineries' reports, certificates of compliance, weight slips; weigh-back and/or stab tank when necessary; sample the material, send to lab
   - Observe spreading - proper equipment, material, specified temperature, proper spray bar adjustment (overlap), all nozzles working uniformly

- Check spread rate, limit coverage ahead of paving

3. Pavement reinforcing fabric
   - Rate of application of paving asphalt binder - advise Design-Builder
   - Obtain refinery's test report, certificate of compliance, weight slips for binder
   - Check spread rate, width of binder
   - Obtain certificates of compliance for fabric
   - Observe placement of fabric - required widths, proper laps, no wrinkles; no unnecessary equipment on fabric
   - Sample binder and fabric; ship samples to lab
   - Look for overlap

ACTIVITIES DURING WORK:

1. Asphalt Concrete
   - Observe delivery - proper equipment; balance dumping with paver capacity, no spotting, picking up, shifting, segregation
   - Obtain weight slip for each load
   - Sample the mixture - test for extraction, moisture, grading
   - Measure temperature - maximum, minimum for proper compaction
   - Observe spreading - proper widths, location of longitudinal joints, thickness; calculate spread rate, compare with theoretical; advise Design-Builder of adjustments
   - Observe compacting - proper numbers and types of rollers, used in accordance with qualifying conditions; required number of coverage at proper temperature; proper sequence and direction
   - Ensure proper joints - trimming, vertical faces
   - Measure finished surface, profilograph if specified; identify areas to be corrected, advise Design-Builder
   - Determine necessity for fog seal
   - Measure dikes and miscellaneous areas
   - Confirm correct mix design is being used especially the size of rock
   - Confirm depth of material application
   - Ensure proper cleanup of all loose materials prior to opening to traffic
   - Use straight edge to ensure proper conform to bridge approach slab

- Place temporary pavement delineation
- Perform profilograph test and grind/fill bumps

CRITICAL ACTIVITY POINTS:

- Verify the mix design is approved prior to the start of work.

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

- Asphaltic emulsion
- Liquid asphalt
- Pavement reinforcing fabric
- Asphalt concrete
- Dikes
- Misc. areas

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 40: Portland Cement Concrete Pavement

PURPOSE:

To define the method required for performing Portland cement pavement.

SCOPE:

Portland cement concrete pavement operation includes placing, furnishing, curing of the concrete pavement. Also, the specified equipment used during operation.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

126. Construction Policy Bulletin (CPB)
127. Construction Program Directives (CPD)
128. Caltrans Special Provisions
129. Caltrans Standard Specifications
130. California Test Methods
131. Caltrans Construction Manual
132. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Portland cement concrete pavement operations. The Lead Inspector or selected representative will be onsite during Portland cement concrete pavement operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Portland cement concrete pavement operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE PAVING

- Determine proposed source of aggregate - Form CEM-3101
- Decide on necessity of freeze-thaw testing (four months in advance).

- Obtain Design-Builder's proposed gradation of primary aggregates.
- Require Design-Builder to furnish initial coarse aggregate samples - test for soundness and/or durability, cleanness.
- Require Design-Builder to furnish fine aggregate samples - test for organic impurities, mortar strength, sand equivalent.
- Obtain recommended cement content from District lab.
- Review traffic handling - necessity for pavement crossings of new pavement, use of Type III cement; lane closures.
- Examine paving equipment and tools - for side forms, check composition, weight, dimensions, rigidity, cleanness; for slip-form method observe the required demonstration, screeds, spreaders, tampers, vibrators, grade controls; all working properly.
- Check the accuracy of final grade stakes - spot-check side forms or control wires for proper placement (sight along wires).
- Inspect the subgrade - compaction within tolerance; identify low areas, keep records.
- Determine curing method - examine curing equipment.
- Determine joint-construction method, examine joint-construction equipment.
- Ensure availability of lighting equipment for night paving, lane closures.
- Establish communication between the mixing facility and the paving operation.
- Review safety requirements, lane closures.
- Registered engineer to review and approve traffic plan.
- Registered engineer to review and approve mix design.
- Review proposed spreading equipment.

ACTIVITIES DURING PAVING

- Ensure that samples are being taken (see "Portland Cement Concrete Production Operations" of this Checklist) cast beams for flexural strength tests.
- Check ambient and/or concrete temperatures -availability of protective measures.
- Observe delivered concrete - adequately mixed, no segregation, test if necessary
- Obtain ticket for each load of ready-mixed concrete - note time mixing started total revolutions.
- Sample concrete - test for temperature, penetration, air content, yield, cement factor, unit weight, modulus of rupture.

- Observe placement - spreading, vibrating, tamping, screeding, no water added; proper timing, construction of joints
- Ensure protection of existing or previously placed pavement - check for cracking or other damage
- Observe construction of contact joints - normal to surface, angle to centerline, moisture barrier
- Observe construction of weakened-plane joints (insert method) - normal to surface, proper longitudinal placement, proper angle and spacing for transverse joints; measure tolerance with 4-foot straightedge
- Ensure proper dimensions and timing for sawed joints - relocate for volunteer cracks
- Observe final finishing - rounded edges (prior to texturing), burlap drag or broom, spring steel tining device
- Ensure that concrete surface is kept moist
- Check curing compounds - proper labeling and packaging
- Observe curing - specified method, timing, moistened surface, all exposed surfaces covered; material agitated, applied to sawed joints
- Sample curing compound - send to lab
- Check spread rate of curing compound

ACTIVITIES AFTER PAVING

- Ensure adequate protection, determine modulus of rupture - exclude traffic and equipment, protect from freezing
- Measure finished surface with 12-foot straightedge, obtain profilograph (both within 10 days of final finishing)
- Measure finished surface for coefficient of friction (after 7 days; before traffic)
- Arrange for thickness measurements, designate areas to be excluded
- Ensure that all loose material is cleaned up prior to opening roadway to traffic.
- Place temporary pavement delineation

CRITICAL ACTIVITY POINTS:

- Ensure that dowel bars, tie bars, and dowel baskets are inspected and released.

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)
- Stoppages and resumption of daily pours

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 41: Pavement Sub-sealing and Jacking

PURPOSE:

To define the method required for performing Pavement Sub-sealing and jacking.

SCOPE:

Under the terms of the project contract, the Design-Builder must review contracted plans and special provisions.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

133. Construction Policy Bulletin (CPB)
134. Construction Program Directives (CPD)
135. Caltrans Special Provisions
136. Caltrans Standard Specifications
137. California Test Methods
138. Caltrans Construction Manual
139. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained inspectors/technician's are assigned to perform required observations, testing and documentation of Pavement Sub-sealing and jacking operations. The Lead Roadway Inspector or selected representative will be onsite during Pavement Sub-sealing and jacking operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the roadway inspector.

CQAM is responsible for random spot checks and quality audits associated with Pavement Sub-sealing and jacking operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK

- Review traffic control plans - decide on traffic handling, discuss with Design-Builder
- Review Design-Builder's code of safe practices

- Review planned work at the site - consider changes, advise Design-Builder
- Determine source of material - Notice of Materials To Be Used, Form CEM-3101
- Obtain proposed gradation of primary aggregate nominal sizes (Repair Corner Breaks)
- Obtain initial coarse aggregate samples (Repair Corner Breaks) - test for soundness and/or durability, cleanness
- Obtain initial fine aggregate samples (Repair Corner Breaks) - test for organic impurities, mortar strength, sand equivalent
- Examine grouting and jacking equipment (Pavement Sub-sealing and Jacking) - ability to maintain pressures, adequate mixing and proportioning
- Test proposed grout to check against specified grout efflux times (Pavement Sub-sealing and Jacking)
- Check ambient temperature

ACTIVITIES DURING WORK

1. Report Corner Breaks

- Ensure that public traffic is controlled as planned - observe traffic flow; safe, no excessive delays
- Determine areas of unsound concrete - check by sounding, mark removal areas, measure for quantity determination
- Check sawing along longitudinal joint - 0.5-foot below surface or to bottom of keyway
- Check sawing where no joints exist - 0.25-foot depth; keep records for payment (Form CEM-4601, extra work)
- Ensure proper cutting of shoulder pavement - outline 0.25-foot depth
- Ensure that material for temporary roadway structural section is at the job site
- Observe excavation - proper depth, material disposal; no damage to pavement to remain in place
- Check remaining base - graded uniformly, watered, compacted, no high sub-grade
- Ensure placement of bond-breaker at adjacent slab
- Observe removal of unsound concrete from face of break - blast-clean the surface, place epoxy resin (immediately prior to placement of new concrete)
- Check forms - rigid, smooth, oiled or moistened; set to proper grade

- Review concrete requirements with Design-Builder - cement content, type of cement (depends on placement temperature), calcium chloride (advise Design-Builder of exact rate) (adjust w/c ratio for liquid calcium chloride)
- Observe delivered concrete - adequately mixed, no segregation
- Obtain load ticket (transit-mixed) - note time mixing started, number of revolutions
- Sample concrete - test for penetration, yield, cement content
- Observe concrete placement - vibration, adequate consolidation
- Check completed surface - proper elevation, within straightedge tolerance, texture
- Check curing compound - proper labeling and packaging, specified type
- Observe curing - proper method, timing, equipment; check rate of spread
- Examine finished patch - test for coefficient of friction if necessary
- Repair Spalled Joints
- Ensure that public traffic is controlled as planned - observe traffic flow; safe, no excessive delays
- Determine areas of unsound concrete - check by sounding, mark areas for removal, measure for quantity determination
- Determine the location of the working crack
- Observe removal of unsound concrete - outline sawed 1-1/2 inches deep, no damage to adjacent areas, surface blast cleaned
- Determine type of patching concrete - for P.C.C., observe mixing, test for penetration
- Check epoxy adhesive (P.C.C.), - proper type, placed on dry surface
- Ensure placement of bond-breaker - patch must not cross a working crack
- Observe placement of patching material - compacted, finished
- Check curing - P.C.C., curing compound, 4 hours; magnesium phosphate, no compound, 1 hour; high alumina cement, check manufacturer's instructions

2. Pavement Sub-sealing and Jacking

- Ensure that public traffic is controlled as planned - observe traffic flow; safe, no excessive delays
- Consider test grouting - possible elimination of some areas
- Observe drilling of holes - proper depths, pavement protected, 2 slabs ahead of grouting, properly cleaned (washed or blown out)

- Count holes for payment purposes
- Check for proper identification of fly ash and cement
- Keep adequate records for payment of grout - sack counts, weigh slips
- Observe mixing of grout - proportions as specified, proper efflux time; used within one hour
- Check grout pump pressure
- Observe slab movements, cracks, escape of grout - keep records of waste
- Ensure temporary plugging of holes
- Check for proper removal of grout from holes and filling with mortar
- Check final surface elevation for tolerance, corrective grinding or replacement

3. Seal Joints

- Ensure that public traffic is controlled as planned - observe traffic flow; safe, no excessive delays
- Mark random cracks to be sealed
- Observe cutting of joints - required dimensions, cut in one pass
- Ensure proper cleaning of joints - sand blast, air blast; no loose material remaining
- Obtain certificate of compliance, storage and heating instructions for sealant; check with lab if necessary
- Observe placement of sealant - joints dry, sealant heated, placed to required dimensions
- Edge Drains (See "Subsurface Drains" this Checklist)

CRITICAL ACTIVITY POINTS:

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment

- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)
- Stoppages and resumption of daily pours

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Filed Inspector Daily

CEM-4810 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 42: Groove and Grind Pavement

PURPOSE:

To define the method required for performing Groove and Grind Pavement.

SCOPE

Groove and Grind Pavement shall consist of grooving the surface of asphalt concrete or Portland cement concrete pavement and bridge decks.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

140. Construction Policy Bulletin (CPB)
141. Construction Program Directives (CPD)
142. Caltrans Special Provisions
143. Caltrans Standard Specifications
144. California Test Methods
145. Caltrans Construction Manual
146. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Groove and Grind Pavement operations. The Lead Inspector or selected representative will be onsite during Groove and Grind Pavement operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Groove and Grind Pavement operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Registered engineer to review and approve traffic plan
- Review proposed equipment
- Review the contract plans and specifications
- Discuss traffic handling with the contractor

- Ensure the contractor's equipment meets specified requirements
- Before the grooving or grinding operation, inspect and locate any existing detector loops
- Check local noise ordinances and review specified noise requirements.
- Verify that the required water pollution control plan is approved and in place.

ACTIVITIES DURING CONSTRUCTION:

- Check for depth and distance between grooves
- Ensure proper sound abatement/control
- Implement all SWPPPP measures
- Remove all loose and excess material prior to opening roadway to traffic
- Observe the operation to ensure that equipment and noise levels comply with specifications.
- Ensure that the handling of residue and dust from the operation meets specifications.
- Ensure that the grooved or ground widths meet specifications.
- Ensure the portland cement concrete is picked up by means of a vacuum device and not allowed to flow across the pavement or enter the storm drain inlets.

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Notes on spreading, waste
   - Ordered changes in cement content
   - Notes on measurements, deficient thicknesses
   - Circumstances regarding rejected material

- Limits of work
- Records for force account payment (if any)
- Stoppages and resumption of daily pours
- Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 49: Piling

PURPOSE:

To define the method required for performing Piling.

SCOPE

Piling shall consist of furnishing and drilling for or driving foundation piles for structures, includes placing concrete in drilled holes.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

147. Construction Policy Bulletin (CPB)
148. Construction Program Directives (CPD)
149. Caltrans Special Provisions
150. Caltrans Standard Specifications
151. California Test Methods
152. Caltrans Construction Manual
153. Inspection Checklist
154. Foundation manual
155. BCR&P

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained and certified inspectors/technician's are assigned to perform required calculations, inspection, testing and documentation of Piling operations. The Lead Inspector or selected representative will be onsite continuously during Piling operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the construction quality assurance inspector.

CQAM is responsible for contract compliance of the work performed through but not limited to random spot checks and quality audits associated with Piling operations and tests in accordance with appropriate guidelines.

Test records, pile logs, and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Check Pile layout

- Check footings at proper elevation
- Approve Cast In Drilled Hole (CIDH) Mix – pre qualify if necessary
- Review and approve pile driving submittal - placement/drilling plan/mix design/guying plan/blow counts/stress analysis/ check points pile placement plans (CIDH, wet holes, dry holes, Precast/Prestressed (PC/PS) piles shop drawings, Cast In Steel Shell (CISS) piles), pile driving hammer data, rebar cage handling plans, Storm Water Pollution Prevention Plan (SWPPP), Dewatering plans, shoring and excavation plans.
- Verify materials and assemblies (rebar cages, PCC materials, precast compiles, steel piles) are in compliance.
- Ensure full time blow count monitoring.
- PCC placement inspection.
- Monitor load tests.
- Material and plant inspection/certificates and material properties
- Testing of raw material (steel).
- Consider potential for killing fish.
- Obtain approval and consider limitations from resource agencies.
- Prepare/update/review Code of Safe Practices.
- Review project documents (plans, specials, standards, foundation reports, Log Of Test Boring (LOTB), etc).
- Review and approve appropriate concrete mix designs, for wet and dry holes if CIDH, and for PC/PS concrete piles for driven piles.
- Verify necessary permits are acquired.
- If required, perform pile load testing early on, contact Geotech if testing sites can be changed if obstructions prevent testing at particular location
- Review staking notes and pile layout.
- Find out if Overhead (OH) restrictions (power lines, structures, etc) will be in conflict with pile driving or placement.
    - Rebar splices pre qualifications if required.

FROM SECTION 51

1. Piling

- Ensure predrilling of holes for piling to be driven through new embankments - proper diameter, proper filling after driving, proper length of predrilled hole.

- Examine pile driving equipment - proper hammer for type of piling
- Check for required driving heads - no damage to piling, use of cushion blocks
- Check for proper restraint from lateral movement during driving of piling
- Ensure that precast concrete piles are not driven until 14 days after casting; timber piles driven within 6 months after treatment
- Examine piling - proper evidence of inspection, no damage during shipment
- Maintain "Pile Quantity & Driving Record" and "Log Record" (or "Drilling Record") - calculate blow count, check specified tip; observe placement of reinforcing and concrete
- Perform load tests - maintain records for payment
- Ensure that steel pile splicing is performed as specified - welder qualified
- Check holes for cast-in-place concrete piles - proper dimensions, alignment, de-watering
- Ensure predrilling of holes for piling to be driven through new embankments - proper diameter, proper filling after driving
- Examine pile driving equipment - proper hammer for type of piling
- Check for required driving heads - no damage to piling, use of cushion blocks
- Check for proper restraint from lateral movement during driving of piling
- Ensure that precast concrete piles are not driven until 14 days after casting; timber piles driven within 6 months after treatment
- Examine piling - proper evidence of inspection, no damage during shipment
- Maintain "Pile Quantity & Driving Record" and "Log Record" (or "Drilling Record") - calculate blow count, check specified tip; observe placement of reinforcing and concrete
- Perform load tests - maintain records for payment
- Ensure that steel pile splicing is performed as specified - welder qualified
- Check holes for cast-in-place concrete piles - proper dimensions, alignment, de-watering

ACTIVITIES DURING CONSTRUCTION:

- Monitor blow counts; dynamic testing (stress analysis)
- Energy/blow; equipment down time; test for set up in clay
- Monitor pile plumbness and location

- Ensure proper tip and top elevation
- Ensure cleanliness of pile bottom and construction joints
- Concrete tremie pour – depth of tremie pipe versus height of concrete
- If CIDH piles: Verify pile layout
    - Determine whether wet or dry holes are present
    - Determine whether the appropriate concrete mix design is being used
    - Wet holes: Make sure approved water displacement or slurry displacement method is being used
        - Slurry displacement method require slurry's manufacturer be present during first use of slurry
        - Determine water or slurry storage available and in working order
        - Verify that standby equipment is present
        - Inspect tremie pipe for size and length and presence of backflow preventer
        - Inspect rebar cage and inspection pipe locations. Make sure the inspection pipes have no kinks in them.
        - Make sure dobies are placed correctly per plans
        - Observe placement of rebar cage and make sure path is clear down to the bottom of the hole.
        - If not, do not force rebar cage in, likely that a cave in occurred
        - Redrill and clean out the hole before rebar placement again.
    - If dry hole: Verify depth of hole
        - Verify that the hole sides are stable and the bottom cleaned with a clean out bucket.
        - Concrete is not allowed to free fall more than 8' unless directed in the center of the hole where it would not hit any obstructions
        - Make sure rebar cage does not displace upwards
        - Vibrate the top 15' of the pile

- Driven piles: Hammer data and blow count tables
    - Make sure PC piles properly released and at least 14 days old
    - Verify the right pile size is being used (type and length)

- Make sure mat foundations are being used if ground is weak
- Make sure pile rebar is of correct length and size and not damaged.
- Make sure proper blocking is used.
- Verify piles are plumb
- Verify piles are in correct location
- Verify blow counts are correct noting hammer drop
- At least for two piles in one footing location or one pile every 5 or 10 piles in a row the blow counts are taken from ground level down to tip.
- Take notes and notice discrepancies from LOTB
- Compare actual blow counts with required ones at tip elevation
- If blow count too high consider hammer energy output, whether still operating at required capacity or not, consider local obstructions. Collect data and contact designer and geotechnical engineer for possible revision to tip elevation.
- Make sure the correct CISS pile size is being used.
- If any, make sure welding follows the approved Welding Quality Control Plan and certified welders for the welding process in use are being utilized.
- Make sure appropriate non-destructive testing is being done by certified welding inspectors and testing inspectors.
- Notice any damage to pile as a result of driving and stop driving if any damage is noticed.
- Inspect the inside of the pile full length once installed to make sure the walls have not collapsed.
- When placing backfill or concrete, make sure the proper elevations for either are used.
- Follow same procedure for dry hole concrete placement.
- Make sure proper pile embedment in the footing is per plans.

CRITICAL ACTIVITY POINTS

For driven piles: Approval of Pile driving equipment and handling plan, and Approved Pile driving acceptance criteria.

CIDH

CIDH Pile placement plan

Pre placement inspection sign off, After hole drilled prior to rebar

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Pile Logs, Drilling Logs
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Notes on spreading, waste
   - Ordered changes in cement content
   - Notes on measurements, deficient thicknesses
   - Circumstances regarding rejected material
   - Limits of work
   - Stoppages and resumption of daily pours
   - Report of Completion (Structures) - include list of materials, quantities,

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance;

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Section 50: Prestressing Concrete

PURPOSE:

To define the method required for performing Prestressing Concrete.

SCOPE

Prestressing Concrete shall consist of prestressing precast or cast-in-place concrete by furnishing, placing, and tensioning of prestressing.

Prestressing Concrete shall include the furnishing and installation of any appurtenant items necessary for the particular prestressing system to be used, including but not limited to ducts, anchorage assemblies and grout used for pressure grouting ducts.

For cast-in-place prestressed concrete, the term "member" shall be considered to mean the concrete which is to be prestressed.

Prestressing shall be performed by either pretensioning or post-tensioning methods unless the plans show only pretensioning details. If the plans show only pretensioning details, the use of a post-tensioning system will be allowed only if complete details of any necessary modifications are approved by the Engineer.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

156. Construction Policy Bulletin (CPB)
157. Construction Program Directives (CPD)
158. Caltrans Special Provisions
159. Caltrans Standard Specifications
160. California Test Methods
161. Caltrans Construction Manual
162. Inspection Checklist
163. Caltrans pre-stress manual
164. BCR&P manual

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Prestressing Concrete operations. The Lead Inspector or selected representative will be onsite during Prestressing Concrete operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Prestressing Concrete operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Review and approve pre-stress drawings. Includes verification of elongations, Pat, As – Area of steel, etc
- Obtain registered design engineer's approval of shop drawings
- Verify jack equipment calibration with charts that document gauge pressure tom load.
- Ensure full time inspection
- Set up load cell and load readout box
- Monitor/compare gauge pressure/load reading box/elongation for consistency.
- Adjust lock off gauge pressure

Moisture block powder approvalStressing procedure (single/double end stressing; order of stressing – ensure no trapped air)

- o Make sure a safety section for prestressing is added to project's Code of Safe Practices.

ACTIVITIES DURING CONSTRUCTION:

- Full time grout operation inspection.
- Verify duct paths
- Monitor strands for slippage
- Verify proper anchorage system is tested and released
- Verify the correct size of system and components
- Verify ducts are not punctured or otherwise damaged

- Inspect prestressing strands for pits or rust, make sure corrosion protection is per contract if required. Record lot number on package and other information.
- Inspect and verify proper duct alignment and path according to contract plans. Verify ducts are secure and make sure there are not kinks at the location where ducts terminate in anchor heads.
- Make sure grillage is at correct location
- During concrete placement make sure ducts are not displaced.
- After concrete placement make sure ducts are clean by running a “rabbit” through.
- Make sure there is no standing water in the ducts.
- Prevent moisture from entering the ducts when the strands are being placed.
- Verify proper jacking alignment and proper marking on the strands for elongation measurements.
- Follow the jacking sequence in the approved plans.
- Measure and record strand elongation and compare against calculated values.
- Consult with designer if discrepancies exist.
- Monitor the jacking operation and the load cell to determine proper tensioning.
- Take note of any strand slippage or failure and contact designer immediately.
- At the completion of jacking operation, verify grout mixture is per specifications.
- Monitor grout flow at the opposite port and look for steady stream to determine completion of grouting operation.

- Notice any loss of grout pressure or excessive usage. It may indicate failure at some point.

FROM SECTION 51

2. Prestressing

- Check placement of ducts for prestressing steel - proper material, placement, clearances, mortar-tight, securely fastened; vents of proper size and located as specified
- Examine prestressing steel - properly packaged, free of excessive rust or other damage, required evidence of inspection (TL-0624 or other markings)
- Obtain Design-Builder's jack data, calibration charts

- Calculate required elongation of prestress steel - adequate concrete strength before stressing
- Observe prestressing - proper sequence and loading
- Observe grouting - check for proper material, grout efflux time; valves installed and operated as specified

CRITICAL ACTIVITY POINTS

- Approval of Prestess shop drawings
- Sign off of duct placement, vents, bearing plate alignment, and rebar prior to completing formwork for stems.
- Testing of duct being cleared Prior to concrete placement
- Testing of duct being cleared, free from water prior to prestress strand installation.
- Calibration certs for prestress equipment reviewed and approved including gages.
- Approval of prestress elongation calculations.

RECORDS:

1. Include in the Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)
- Stoppages and resumption of daily pours
- Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 51: Concrete Structures

PURPOSE:

To define the method required for performing concrete structures.

SCOPE:

Under the terms of the project contract, the Design-Builder must perform the concrete structures. The Design-Builder must maintain such control whether payment is included in the prices paid for the various items of work involved or whether payment is made separately.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

165. Construction Policy Bulletin (CPB)
166. Construction Program Directives (CPD)
167. Caltrans Special Provisions
168. Caltrans Standard Specifications
169. California Test Methods
170. Caltrans Construction Manual
171. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of concrete structure operations. The Lead Inspector or selected representative will be onsite during concrete structure operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with concrete structure operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 (9:00 am) the next business day.

PROCEDURE:

ACTIVITIES BEFORE CONSTRUCTION:

- Review structure locations - compatibility with planned locations, existing conditions, utilities; ready for stakes (rough graded)
- Prepare 4-scale drawings (major bridge structures) - falsework, abutment, bent, deck and rail grades
- Obtain Design-Builder's "Request For Construction Staking" - order stakes
- Check engineer's stakes - lines, offsets, references, elevations, grades, adequate for quantity measurements, conform with existing curbs, inlets, pavement; review with Design-Builder
- Review Design-Builder's progress schedule - compatibility with water pollution control plan
- Registered Design Engineer to review and approve Design-Builder's falsework drawings, design calculations, Design-Builder's certificate for use of manufactured assemblies (when used) - advise Design-Builder when approved
- Registered Design Engineer to review and approve Design-Builder's trench shoring and sloping data - advise Design-Builder when approved; remind him of DOSH excavation permit requirement
- Determine whether the Design-Builder has submitted prestress working drawings - advise Design-Builder when approved (obtain microfilms at end of job)
- Ensure that railroad insurance is in order
- Review the Design-Builder's code of safe practices and accident prevention program
- Report impaired clearances - notify district office, local agencies
- Obtain the Notice of Materials To Be Used, Form CEM-3101 - review, send to METS
- Obtain initial samples, tests (see Portland Cement Concrete - Production Operations, of this Checklist)
- Look for potential overloads - increase structural capacity
- Examine forming system - request data on design and materials (if necessary)
- Examine pile driving equipment - proper types, capacities, other specified attributes.
- Layout edge of deck, establish deck grades, provide camber strip measurements.

ACTIVITIES DURING CONSTRUCTION:

3. Safety

- Review lane closures - advise maintenance, local agencies, CHP
- Be safety conscious
- Observe operations - comply with code of safe practices; hard hats worn, work areas clean, railings in place, ladders used properly, scaffolding O.K., overhead wires noted, safety belts used, proper clothing worn, safety meetings
- Note imminent hazards, dangerous conditions - discuss with Design-Builder, take action

4. Excavations, Foundations
   - Observe excavations - sloping, benching, shoring as required
   - Examine foundations - firm, stable, adequate bearing capacity (field test as necessary)
   - Call USA underground
   - Confirm to Cal OSHA requirements – notification of excavation, air monitoring in confined spaces etc
5. Piling
   - Ensure predrilling of holes for piling to be driven through new embankments - proper diameter, proper filling after driving
   - Examine pile driving equipment - proper hammer for type of piling
   - Check for required driving heads - no damage to piling, use of cushion blocks
   - Check for proper restraint from lateral movement during driving of piling
   - Ensure that precast concrete piles are not driven until 14 days after casting; timber piles driven within 6 months after treatment
   - Examine piling - proper evidence of inspection, no damage during shipment
   - Maintain "Pile Quantity & Driving Record" and "Log Record" (or "Drilling Record") - calculate blow count, check specified tip; observe placement of reinforcing and concrete
   - Perform load tests - maintain records for payment
   - Ensure that steel pile splicing is performed as specified - welder qualified
   - Check holes for cast-in-place concrete piles - proper dimensions, alignment, de-watering
   - When PCC placed under, sample slurry
6. Falsework and Forms

- Observe falsework construction - compliance with DOSH Section 1717, continuous inspection during erection, during and after concrete pour; proper member location and quality, adequate foundation
- Examine form material - rigidity, smoothness, cleanliness, proper grade of plywood
- Observe placement - mortar-tight, braced, provision for utilities; proper dimensions, lines, grades; triangular fillets in place, weep holes in, forms oiled, expansion joints and joint keys provided
- Ensure proper placement of electrical facilities, drainage features, cathodic protection, falsework supports
- Ensure proper erection procedure. Maintain stability throughout.
- Monitor F/W settlement during concrete pour.

7. Reinforcing
   - Obtain certificates of compliance
   - Check wire mesh - wire size, mesh size
   - Examine bars - proper grade, free of grease, excessive rust or scale; proper hook dimensions, no kinks or cracks
   - Observe placement - compare with plans; proper size and shape, spacing, length, clearance; securely held in place; chairs, anchors, spacers, stirrups, wiring
   - Ensure proper splicing - wired laps, welding, mechanical; properly staggered
   - Consult with TransLab for splice testing, certification of welders
   - Maintain Bar Reinforcing Steel Placing Record, Form-DS-C76 (major structures)
   - Ensure compliance with splice restrictions.
8. Prestressing
   - Check placement of ducts for prestressing steel - proper material, placement, clearances, mortar-tight, securely fastened; vents of proper size and located as specified
   - Examine prestressing steel - properly packaged, free of excessive rust or other damage, required evidence of inspection (TL-0624 or other markings)
   - Obtain Design-Builder's jack data, calibration charts
   - Calculate required elongation of prestress steel - adequate concrete strength before stressing
   - Observe prestressing - proper sequence and loading

- Observe grouting - check for proper material, grout efflux time; valves installed and operated as specified

9. Placing Concrete

- Examine forms and reinforcing - clean up chips, sawdust, foreign matter; dewater
- Ensure proper construction joints - sandblasted, moistened
- Check ambient and/or concrete temperatures - availability of protective devices
- Ensure that embedded fixtures are in place - anchor bolts, pipes, sleeves, metal inserts, weep holes, drains, electrical, restrainer components
- Establish communication with concrete production facility
- Ensure that compressive strength concrete is prequalified, production and materials in accordance with prequalification
- Obtain load slips for ready-mixed concrete - check mixer revolutions, time limits, cement content
- Observe concrete placement - no retempering; proper use of pipes, tubes, belts; no excessive drops, no segregation; adequate vibration within time limit, proper sequence for vertical and horizontal members; tremie for underwater placement
- Sample concrete - test for temperature, penetration, air content, yield, cement factor; fabricate test cylinders, identify, cure and store properly; send to lab with required paperwork
- Observe curing method - forms in place, exposed surfaces moist continuously or curing compound applied; proper curing material
- Ensure that forms and/or falsework remain in place as specified - length of time, results of compressive strength tests, prestressing steel tensioned
- Measure surface of bridge decks - within straightedge tolerance, profilograph, surface crack intensity, coefficient of friction
- Ensure proper sequence of falsework removal - adequate protection for public traffic (detour if necessary)
- Check surface finishing, ordinary, Class 1, Class 2 - holes filled, rock pockets repaired, fins removed, matching color, uniform texture
- Maintain Concrete Pour Record, Form DS-C73 (major structures)
- Joint Seals – must match saw cut width to bridge temperature.
- Expansion joints
- Observe installation - proper methods, proper materials and workmanship
- Coordinate holdpoints . Ensure everything is acceptable before placement of concrete.

- Make sure drilled holes for drill and bond are clean and moistened, use proper bonding whether mortar, grout or epoxy.

CRITICAL ACTIVITY POINTS

- Approved Falsework Drawings prior to falsework erection
- Falsework Engineer's sign off and punchlist completed prior to loading.
- Departments Falsework punchlist completed prior to loading.
- Concrete, and rebar checklists signed prior to pours.
- Passing Skid test, and profilograph prior to opening to traffic.

RECORDS:

1. Include in the Field Inspection Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)
- Stoppages and resumption of daily pours
- Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Complete Drainage System Summary - Form CEM-4701; (minor structures);

4. Retain/file - weight slips and/or daily summary sheets, test reports,

5. Operations, certificates of compliance; labels from plants, fertilizer, etc.

6. Deck protection reports

7. Railroad Reports

8. Microfilms of shop drawings

9. As built plans

10. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Filed Inspection Daily

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

CEM-4701 Drainage System Summary

DS-C73 Concrete Pour Record

DS-C76 Bar Reinforcing Steel Placing Record

Draft

Section 52: Reinforcement

PURPOSE:

To define the method required for performing Reinforcement.

To establish required Construction Quality procedures for testing, inspecting, documenting and reporting for Reinforcing Steel.

SCOPE

Reinforcement shall consist of furnishing and placing reinforcement of the shape and required dimensions.

This procedure covers Reinforcing Steel as defined as deformed billet steel bars specified as reinforcing steel on the contract drawings. Reinforcing Steel Epoxy and Galvanized Coatings, Cold-drawn Steel Wire, Tie Wire and Bar Supports are also included in this procedure.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

172. Construction Policy Bulletin (CPB)
173. Construction Program Directives (CPD)
174. Caltrans Special Provisions
175. Caltrans Standard Specifications
176. California Test Methods
177. Caltrans Construction Manual
178. Inspection Checklist
179. Schedule of Materials Control

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Reinforcement operations. The Lead Inspector or selected representative will be onsite during Reinforcement operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Reinforcement operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

Reinforcing steel incorporated into the project will conform to and be handled and installed in accordance with the Department Standard Specifications for Construction and the applicable Special Provisions requirements.

ACTIVITIES BEFORE WORK:

- BLANK

Include in the Assistant Resident Engineer Daily Report - Form HC-10A

- Instructions and/or significant discussions with Design-Builder
- Hours worked by personnel and equipment
- Notes on your inspections
- Review for conflict with pre-stress, shear pipe and beams.
- Material certification/qualifications for splices and people doing splices
- Review contract plans and specifications as well as Bridge Construction Records and Procedures manual relevant sections.
- Obtain QC plans for headed reinforcement.
- Perform testing and certification for ultimate butt splices and operators qualifications.

ACTIVITIES DURING CONSTRUCTION:

- Verify concrete structure section
- Verify size, spaling, placement, splicing clearance prior to concrete placement.
- Proper hooks, assemblies, couplers
- Verify “ultimate” coupler testing and compliance.
- Material certificates of compliance
- Check size, length, tails, hooks and grade of steel
- Check placement, splicing, alternation hook position/orientation and stagger of splices
- Ensure epoxy rebar is tied off with epoxy tie wire
- Check clearance from forms/cover dimensions

- Ensure form saver couplers are tight and secured against forms
- Check for excessive rust/scale
- Remove old concrete from rebar at construction joints
- Protect epoxy coating from UV light/salt/scrapes once in place
- Place safety caps over protruding rebar
- Conform to rebar welding requirements (if allowed)
- Verify correct bar sizes and configurations
- Make sure storage is appropriate and not directly on the ground
- Make sure safety requirements are observed when erecting rebar cages
- Make sure rebar does not get bent or otherwise damaged
- Verify correct rebar clearances exist. Do not allow use of wood for clearance.
- If temperature is high, cool rebar down before concrete is placed.
-

  FROM SECTION 51

10. Reinforcing

- Obtain certificates of compliance
- Check wire mesh - wire size, mesh size
- Examine bars - proper grade, free of grease, excessive rust or scale; proper hook dimensions, no kinks or cracks
- Observe placement - compare with plans; proper size and shape, spacing, length, clearance; securely held in place; chairs, anchors, spacers, stirrups, wiring
- Ensure proper splicing - wired laps, welding, mechanical; properly staggered
- Consult with TransLab for splice testing, certification of welders
- Maintain Bar Reinforcing Steel Placing Record, Form DS-C76 (major structures)
- Ensure compliance with splice restrictions.

CRITICAL ACTIVITY POINTS

- Certificate of compliance received prior to unloading rebar at jobsite or incorporation into work with heat, mill cert, and testing data attached.
- Approval of splice prequalification report, and splice submittal.
- Approval of critical pick plans prior to lifting loads next to traffic.
- Crane certifications on record prior to lift.

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Circumstances regarding rejected material
   - Limits of work
   - Records for force account payment (if any)
   - Stoppages and resumption of daily pours
   - Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Caltrans by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

HC-10AC Assistant Resident Engineer Daily Report

DS-C76 Bar Reinforcing Steel Placing Record

Section 53: Shotcrete

PURPOSE:

To define the method required for performing shotcrete (air blown mortar).

SCOPE

Shotcrete is concrete pneumatically projected onto a surface. Shotcrete may be used for lining ditches and channels, paving slopes, and constructing warped sections.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

180. Construction Policy Bulletin (CPB)
181. Construction Program Directives (CPD)
182. Caltrans Special Provisions
183. Caltrans Standard Specifications
184. California Test Methods
185. Caltrans Construction Manual
186. Inspection Checklist
187. BCR& P MANUAL
188. Caltrans Shortcrete Manual

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Shotcrete operations. The Lead Inspector or selected representative will be onsite during dust control operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Shotcrete operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Obtain initial samples of aggregate - test for organic impurities, mortar strength, grading, sand equivalent
- Examine foundation - firm, evenly graded, compacted, moist
- Check reinforcement, gaging wires - firmly in place
- Check weepholes, cut-off walls, keyways, sacked pervious backfill
- Test, verify and approve nozzleman qualifications
- Registered design engineer to review and approve mix design
- Obtain shotcrete test panels for coverage, density, consistency, rebound and aesthetics
-

ACTIVITIES DURING CONSTRUCTION:

- Check safety - Design-Builder's code of safe practices; hard hats, safety glasses, clothing
- Observe proportioning - ratio of cement to fine aggregate; coloring agent (if required), % of rebound used
- Obtain certificate of compliance for cement - sample, send to lab
- Sample aggregate - test for grading, sand equivalent
- Check equipment - proper working pressures, air, water
- Ensure use of mixed material within time limits
- Straight-edge finished surface - reasonably smooth, proper grade, thickness
- Observe curing - proper material, rate of spread
- Test samples – obtain cores and samples for testing
- Verify test samples, attain required stresses and properties
- Check for excessive rebound
- Make sure spreading is even and not overdone at some locations
- Prepare test panels for coring

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder

- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)
- Stoppages and resumption of daily pours
- Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used.

Draft

Section 54: Waterproofing

PURPOSE:

To define the method required for performing Waterproofing.

SCOPE

Waterproofing shall consist of furnishing and applying asphalt membrane waterproofing or dampproofing to the surface of the concrete. Asphalt membrane waterproofing consists of a coating of primer and a firmly bonded membrane composed of 2 layers of saturated glass fabric and 3 moppings of waterproofing asphalt. Dampproofing consists of a coating of primer and 2 moppings of waterproofing asphalt.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

189. Construction Policy Bulletin (CPB)
190. Construction Program Directives (CPD)
191. Caltrans Special Provisions
192. Caltrans Standard Specifications
193. California Test Methods
194. Caltrans Construction Manual
195. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Waterproofing operations. The Lead Inspector or selected representative will be onsite during Waterproofing operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Waterproofing operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Review and approve submitted manufacturer's data
- Obtain certificates of compliance and required material test results

ACTIVITIES DURING CONSTRUCTION:

- Monitor placement for compliance with manufacturer's recommendation and designer's specs
- Ensure Design-Builder has a plan that allows for backfill within a relatively short time
- Ensure surfaces are clean

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Filed Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Notes on spreading, waste
   - Ordered changes in cement content
   - Notes on measurements, deficient thicknesses
   - Circumstances regarding rejected material
   - Limits of work
   - Records for force account payment (if any)
   - Stoppages and resumption of daily pours
   - Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 55: Steel Structures

PURPOSE:

To define the method required for performing Steel Structures.

SCOPE

Steel Structures shall consist of constructing steel structures.

The Design-Builder shall furnish, fabricate and erect the structural steel or metalwork, construct and remove the temporary construction and do all work required completing the bridge or bridges.

Details of connections for highway bridges selected for use by the Design-Builder shall conform to the AASHTO LRFD Bridge Design Specifications with Department Amendments.

Details of design selected by the Design-Builder, fabrication and workmanship, for steel railway bridges shall conform to the requirements of the Specifications for Steel Railway Bridges, for Fixed Spans Not Exceeding 400 Feet in Length of the American Railway Engineering and Maintenance-of-Way Association (AREMA).

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

196. Construction Policy Bulletin (CPB)
197. Construction Program Directives (CPD)
198. Caltrans Special Provisions
199. Caltrans Standard Specifications
200. California Test Methods
201. Caltrans Construction Manual
202. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Steel Structures operations. The Lead Inspector or selected representative will be onsite during Steel Structures operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Steel

Structures operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Registered engineer review and approve welding QCP and other related welding submittals
- Registered engineer to review and approve structural steel shop drawings
- Registered engineer to review and approve temporary support drawings and related submittals
- Registered engineer to review and approve temporary support drawings and erection plan.

ACTIVITIES DURING CONSTRUCTION:

- Verify material documentation
- Perform required bolt testing
- Monitor/assure proper production - bolt torque installations etc.
- Ensure welding QCP compliance
- All welding to be performed under continuous inspection, review and approval by a certified welding inspector (CWI)
- Verify proper manufacturing procedures are being followed
- Verify proper storage
- Verify Falsework and other temporary supports are secured and to grade
- Ensure safety protocols are being followed and according to erection plans
- Ensure lateral supports of erected members are in place and members are secure before releasing erection cables.
- Ensure holes in members are constructed according to specifications, no torching is allowed.
- Verify that proper hole sizes are present
- Ensure fastening assemblies undergo proper installation tension testing and rotational capacity testing at the jobsite
- Perform tension verification testing of fastener assemblies once installed.
- Ensure welding is performed according to specifications and perform QC and QA testing of welds.

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Notes on spreading, waste
   - Ordered changes in cement content
   - Notes on measurements, deficient thicknesses
   - Circumstances regarding rejected material
   - Limits of work
   - Records for force account payment (if any)
   - Stoppages and resumption of daily pours
   - Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Section 56: Signs

PURPOSE:

To define the method required for performing signs.

SCOPE:

Sign and sign structures are of various types, from simple roadside signs to complicated sign bridges containing changeable message signs. The resident engineer must apply the correct inspection to ensure the Design-Builder installs signs and sign structures to function properly.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

203. Construction Policy Bulletin (CPB)
204. Construction Program Directives (CPD)
205. Caltrans Special Provisions
206. Caltrans Standard Specifications
207. California Test Methods
208. Caltrans Construction Manual
209. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of sign operations. The Lead Inspector or selected representative will be onsite during sign operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with sign operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE CONSTRUCTION:

- Determine source of material (Notice of Material To Be Used, Form CEM-3101)

- Obtain erection plans for sign structures - review, advise Design-Builder when approved
- Ensure submission of equipment lists and shop drawings
- Ensure availability of State-furnished material - check with district office; review requisitions, orders; compare with plans
- Obtain Design-Builder's Request For Construction Stakes - order stakes
- Field-check locations - slopes, sight distances, right-of-way, utilities, bridges, minimum vertical clearance, clearance from overhead wires and E.P.; requirements of local agencies, bus stops, pedestrians, fire hydrants, power poles; consult with district traffic
- Ensure that anchoring devices for bridge- mounted signs have been tested
- Where piling is required, confirm to Section CQP049-Piling
- Review and approve welding QCP and other related welding submittals
- Registered engineer to review and approve structural steel shop drawings
- Registered engineer to review and approve temporary support drawings and related submittals.
- Review and approve steel sign structures shop drawings (designer)
- Ensure foundations are complete and bolt patterns and anchorage are per plans
- Ensure overhead obstructions are removed
- Review and approve erection plans. Take note of how close is site to power lines, determine whether de-energizing is required.
- Obtain crane certification
- Verify Steel sign structures are properly released by the lab
- Verify size and grade of steel used
- Verify welding is complete and according to required specifications, collect NDT reports and perform QA testing.
- Verify steel is not damaged during shipment or handling
- Verify that rotational capacity for high strength fasteners are complete before shipment to jobsite.
- Verify galvanizing or painting complete according to specifications
- Ensure that anticipated vertical clearances are sent to Permits before scheduled erection.
-

ACTIVITIES DURING CONSTRUCTION:

Written by:	Revised by: <xxxxx>	Approved by: <xxxxx>
Date: < xx xx xx >	Date: < xx xx xx >	Date: < xx xx xx >

- Check delivery of materials - evidence of inspection (TL-0624 or other markings); no damage during shipment (including State-furnished material)
- Observe foundation construction - specified dimensions, materials; size, position, alignment of anchor bolts; installation of electrical conduit
- Obtain certificates of compliance for laminated wood posts - examine for damage, proper storage at project
- Ensure proper field welding - certified welders, tests (consult with Materials Engineering and Testing Services (METS)).
- Observe installation of sign structures - traffic handling, bolted connections tightened, high-strength bolts where specified
- Advise Design-Builder of required direct tension indicator gaps - witness bolt tightening
- Check whether posts are plumb within tolerance
- Examine all members for damage - repair paint or galvanizing
- Ensure proper installation of sign panels - repair chips, touch up hardware, bolt heads
- Ensure that sign location agrees with message on sign
- Check for proper height, angle for reflection (no glare), sign lighting
- Observe installation of roadside signs - proper location; proper post size, placed to required depth, backfilled, field cuts treated; corrosion resistant barriers installed
- Check hardware on electrolier-mounted signs - straps tight, double straps when required
- Arrange for performance tests (where specified) - Division of Structures engineers, district specialists, maintenance personnel
- Where piling is required, confirm to Section CQP049 - Piling
- Verify material documentation
- Perform required bolt testing
- Monitor/assure proper production - bolt torque installations etc
- Ensure welding QCP compliance
- All welding to be performed under continuous inspection, review and approval by a certified welding inspector (CWI)
- Measure overhead clearance. Take clearance measurements and send information immediately to Permits office

- Drill holes for break points in wood posts
- Do not remove existing signs until new signs and lighting are operational
- Ensure post is slightly slanted backwards for cantilevered sign structures.
- Ensure lighting assemblies are in proper order.

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Section 59: Painting

PURPOSE:

To define the method required for performing Existing Highway facilities.

SCOPE

Painting shall consist of painting new installations and repainting existing installations.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

210. Construction Policy Bulletin (CPB)
211. Construction Program Directives (CPD)
212. Caltrans Special Provisions
213. Caltrans Standard Specifications
214. California Test Methods
215. Caltrans Construction Manual
216. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Painting operations. The Lead Inspector or selected representative will be onsite during Painting operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Painting operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Review and approve painting material documentation
- Obtain and test painting material samples
- Review and approve lead compliance plan, lead containment plans, including provisions for air monitoring and disposal
- Obtain the necessary permits for disposal of blasting residue and paint.

- Obtain the necessary training for lead exposure
- Verify cleaning facilities are provided

ACTIVITIES DURING CONSTRUCTION:

- Assure atmospheric conditions within manufacturer's specs
- Assure proper surface preparation
- Perform required acceptance tests – mil thickness, adhesion, pull tests on various layers etc
- Verify containment structures are constructed per plans and tight
- Make sure workers are all trained and have necessary protective devices
- Verify that workers are using cleaning facilities
- Monitor weather conditions for high wind or high humidity
- Verify surfaces are clean

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)
- Stoppages and resumption of daily pours
- Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 70: Miscellaneous Facilities

PURPOSE:

To define the method required for performing Miscellaneous Facilities.

SCOPE

Miscellaneous Facilities shall consist of furnishing and installing concrete, plastic or metal flared end sections; concrete or metal pipe energy dissipators, pipe inlets, pipe manholes, pipe risers and pipe reducers; drainage gates; and welded steel pipe required for drainage and transmission facilities.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

217. Construction Policy Bulletin (CPB)
218. Construction Program Directives (CPD)
219. Caltrans Special Provisions
220. Caltrans Standard Specifications
221. California Test Methods
222. Caltrans Construction Manual
223. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Miscellaneous Facilities operations. The Lead Inspector or selected representative will be onsite during Miscellaneous Facilities operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Miscellaneous Facilities operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- Understand scope of work especially what facilities are considered miscellaneous
- Review and approve all materials before incorporated in the work.

ACTIVITIES DURING CONSTRUCTION:

BLANK

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Notes on spreading, waste
   - Ordered changes in cement content
   - Notes on measurements, deficient thicknesses
   - Circumstances regarding rejected material
   - Limits of work
   - Records for force account payment (if any)
   - Stoppages and resumption of daily pours
   - Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Section 72: Slope Protection

PURPOSE:

To define the method required for performing Slope Protection.

SCOPE

Slope protection consists of rock, concrete, concreted-rock or slope paving.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

224. Construction Policy Bulletin (CPB)
225. Construction Program Directives (CPD)
226. Caltrans Special Provisions
227. Caltrans Standard Specifications
228. California Test Methods
229. Caltrans Construction Manual
230. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained inspectors/technician's are assigned to perform required observations, testing and documentation of Slope Protection operations. The Lead Inspector or selected representative will be onsite during Slope Protection operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Slope Protection operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

BLANK

ACTIVITIES DURING CONSTRUCTION:

BLANK

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Notes on spreading, waste
   - Ordered changes in cement content
   - Notes on measurements, deficient thicknesses
   - Circumstances regarding rejected material
   - Limits of work
   - Records for force account payment (if any)
   - Stoppages and resumption of daily pours
   - Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Inspector Daily Report - Form

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Section 73: Concrete Curbs and Sidewalks

PURPOSE:

To define the method required for performing concrete curbs and sidewalks.

SCOPE:

Constructing concrete curbs and sidewalks the Design-Builder shall refer to the details in the contracted plans and special provisions.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

231. Construction Policy Bulletin (CPB)
232. Construction Program Directives (CPD)
233. Caltrans Special Provisions
234. Caltrans Standard Specifications
235. California Test Methods
236. Caltrans Construction Manual
237. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of concrete curb and sidewalk operations. The Lead Inspector or selected representative will be onsite during concrete curb and sidewalk operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with concrete curb and sidewalk operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE PLACEMENT:

- Obtain Design-Builder's "Request For Construction Staking" - examine area to be staked; rough graded, ready to receive stakes; order stakes, review staking for gutter depressions, driveways, curb ramps, drainage inlets; review with Design-Builder

- Review Design-Builder's plan for handling public traffic - convenient access to adjacent property
- Examine subgrade - firm and stable, compacted (if required), stabilize spongy areas, dampened before pouring concrete
- Check forms - proper placement, rigid, smooth, oiled, proper dimensions
- Examine extrusion machine (if used) - automatic grade controls, vibrators
- Obtain Design-Builder's proposed concrete aggregate grading (or provide written waiver)
- Completed grade and slope should be approved before pour begins.
- Confirm if fixed forms are allowed for the concrete curbs
-

ACTIVITIES DURING PLACEMENT:

- Ensure proper placement of joints - proper material and/or construction methods
- Check anchoring to existing pavement - dowels or anchors, mortared, properly spaced; adhesives, pavement cleaned proper material, adequately mixed
- Obtain concrete supplier's certificate of compliance (if necessary)
- Obtain load tickets for ready-mixed concrete - check mixer revolutions, time limits
- Observe concrete placement - proper aggregate size, homogeneous mixture, consolidated, no extensive patching necessary; use of 10-foot float
- Observe removal of forms - proper timing, troweling of front face
- Observe slip-form - proper curb or sidewalk dimension, adequate consolidation
- Observe curing - material, timing, adequate coverage
- Check that finished product is within tolerance - test with water if necessary
- Inspector should review and understand scope of work
- PCC mix design to be submitted before work begins.
- Inspect should check grades before PCC pour.
- Ensure proper consolidation/compaction.
- Ensure that concrete side walk are in compliance with the Americans For Disabilities Act (ADA)
- Design-Builder should provide MSDS for curing compound used to finish curbs and sidewalk.

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Complete structure summary sheets Form CEM-4701

5. Operations, certificates of compliance; labels from plants, fertilizer, etc.

6. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

CEM-4701 Drainage System Summary

Section 80: Fences

PURPOSE:

To define the method required for performing fences.

SCOPE:

Under the terms of the project contract, the Design-Builder must review the plans, special provisions, and right-of-way agreements for any special details.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

238. Construction Policy Bulletin (CPB)
239. Construction Program Directives (CPD)
240. Caltrans Special Provisions
241. Caltrans Standard Specifications
242. California Test Methods
243. Caltrans Construction Manual
244. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of fence operations. The Lead Inspector or selected representative will be onsite during fence operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with fence operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE CONSTRUCTION:

- Obtain Design-Builder's proposed source for material - Form CEM-3101 - review for accuracy, completeness

- Review field location - compatibility with terrain, gates, driveways, drains; compare field location of underground utilities with those shown on plans, advise Design-Builder of discrepancies
- Obtain Design-Builder's Request For Construction Stakes - order stakes, review with Design-Builder
- Determine placement of fence - on or off R/W
- Determine on which side fabric or wire is to be placed - advise Design-Builder
- Registered engineer to review and approve PCC mix design for corner posts installation.

ACTIVITIES DURING CONSTRUCTION:

- Observe clearing and grading for fences - no excessive clearing
- Consider minor grading - minimize breaks in short lengths
- Examine fence materials - evidence of inspection (TL-624 or other markings), no damage
- Check placement of posts - proper depths, spacing, plumb
- Ensure line posts, pull posts, corner posts at proper locations
- Check bracing, electrical grounding of fence with wood posts, fastening methods
- Ensure proper tension in wire, fabric
- Confirm that the staking is correct.
- Verify limits of fence installation, type of fence to be installed

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses

- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Complete Drainage System Summary Form CEM-4701

5. Operations, certificates of compliance; labels from plants, fertilizer, etc.

6. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

CEM-4701 Drainage System Summary

Draft

Section 82: Markers and Delineators

PURPOSE:

To define the method required for performing Markers and Delineators.

SCOPE

Markers and Delineators shall consist of furnishing and installing markers and delineators.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

245. Construction Policy Bulletin (CPB)
246. Construction Program Directives (CPD)
247. Caltrans Special Provisions
248. Caltrans Standard Specifications
249. California Test Methods
250. Caltrans Construction Manual
251. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Markers and Delineators operations. The Lead Inspector or selected representative will be onsite during Markers and Delineators operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Markers and Delineators operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- BLANK
- Review the delineation plan prior to beginning the work.
- Review and approve samples of markers to be used.

- Completed Notice of Material to be used form to be submitted.

ACTIVITIES DURING CONSTRUCTION:

- BLANK
- Ensure that the correct type of epoxy is used.
- Keep accurate count on markers and delineators used.
-

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Notes on spreading, waste
   - Ordered changes in cement content
   - Notes on measurements, deficient thicknesses
   - Circumstances regarding rejected material
   - Limits of work
   - Records for force account payment (if any)
   - Stoppages and resumption of daily pours
   - Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 83: Railings and Barriers

PURPOSE:

To define the method required for performing railings and barriers.

SCOPE:

Railings and barriers are used to reduce the severity of run-off road accidents, to prevent out-of-control vehicles from crossing the median, and to decelerate errant vehicles

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

252. Construction Policy Bulletin (CPB)
253. Construction Program Directives (CPD)
254. Caltrans Special Provisions
255. Caltrans Standard Specifications
256. California Test Methods
257. Caltrans Construction Manual
258. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of railings and barrier operations. The Lead Inspector or selected representative will be onsite during operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with railings and barrier operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE CONSTRUCTION:

1. General

- Read the general discussion, Construction Manual. Section 6-83

- Review the Design-Builder's plan for traffic handling - signs, lane closures
- Obtain the Notice of Materials To Be Used, Form CEM-3101; review for accuracy, completeness; send to TransLab.
- Make a field review - check for obstructions; utility facilities, culverts, highway facilities; consider changes in lengths, flares; advise Design-Builder
- Obtain the Design-Builder's Request For Construction Stakes - order stakes, review with Design-Builder; provide adjustments for irregularities in existing structures
- Obtain Design-Builder's plans for anchor bolt layout for metal railing

2. Concrete Barriers

- Obtain the Design-Builder's proposed primary aggregate grading (or provide written waiver)
- Obtain certificate of compliance for minor concrete (if necessary)
- Provide Design-Builder with adjustments to compensate for camber and dead load deflection of new bridges
- Examine concrete production and placing equipment - slip forms adjustable, offset grade line and pointer
- Examine forms (if used) - (see Concrete Structures - this Checklist)
- Registered engineer to review and approve concrete mix design.
-

ACTIVITIES DURING CONSTRUCTION:

1. General

- Obtain evidence of inspection, TL-0624 or other markings
- Examine delivered material - properly fabricated, no damage to galvanizing, no kinks, twists or bends, radius of curvature marked on backs of rail elements, wood posts and blocks proper size, treated
- Ensure all materials at job site before beginning work
- Observe placement of posts - proper spacing; placed or driven to required depth, or properly anchored; plumb; space around post backfilled
- Observe installation of blocks and rail elements - blocks toe nailed (when required), bolt holes filled with grease; bolts, nuts, washers in proper order
- Ensure that rail elements are placed at specified clearance from ground; laps not exposed to traffic, full bearing at joints
- Examine connections to bridges, retaining walls, other flat surfaces - bolts properly installed, high strength (if required)

- Check anchor assemblies - proper hardware, cable clips installed in proper direction, breakaway type as specified
- Examine anchor footings - dimensions, reinforcing, concrete
- Ensure proper coating of buried anchor rods, tensioning of cables
- Ensure that existing median barriers are not removed more than 500 feet in advance of new barrier
- Ensure that removed median barriers are reinstalled or K-rail used to close gaps as required
- Check installation of glare screen - proper material, tension wires tied to posts
- Stake finish grade elevations at the toe of the barrier to ensure proper height of the barrier.

2. Concrete Barriers

- Observe installation of reinforcement - number of bars, spacing, clearance
- Obtain load tickets for ready-mixed concrete - proper timing, mixing
- Observe placement of concrete - properly compacted, no excessive surface pits, no slump
- Sample concrete - test for gradation, penetration, cement content
- Ensure that finishing is performed as required - soft brush, abrasive blast finish within 7 days; Class 1 where required
- Observe curing - proper material, required rate of application
- Check finished surface with 10-foot straightedge
- Ensure proper backfill for type 50E barriers
- Ensure that blunt end of the barrier is not facing traffic.

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections

- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Complete Drainage System Summary Form CEM-4701

5. Operations, certificates of compliance; labels from plants, fertilizer, etc.

6. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

CEM-4701 Drainage System Summary

Draft

Section 86: Signals, Lighting and Electrical Systems

PURPOSE:

To define the method required for performing signals, lighting and electrical systems.

SCOPE:

Under the terms of the project contract, the Design-Builder shall review contracted plans and special provisions for details.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

259. Construction Policy Bulletin (CPB)
260. Construction Program Directives (CPD)
261. Caltrans Special Provisions
262. Caltrans Standard Specifications
263. California Test Methods
264. Caltrans Construction Manual
265. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of signals, lighting and electrical system operations. The Lead Inspector or selected representative will be onsite during signals, lighting and electrical system operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with signals, lighting and electrical system operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE CONSTRUCTION:

- Review plans, special provisions - discuss special features with Design-Builder
- Consult with the district electrical specialist

- Determine inspection assignments for various system components - field construction, manufacturing, installation
- Ensure that orders for all State-furnished materials have been placed - controllers, lamps
- Obtain Design-Builder's equipment list and drawings - review, send to district traffic
- Discuss maintenance of existing systems with the responsible agency - State, City, County

ACTIVITIES DURING CONSTRUCTION

1. General
   - Observe safety factors - Design-Builder's operations, your safety
   - Review traffic handling, lane closures, day, night - existing signals working, lighting working, delineation adequate
2. Materials And Installation
   - Observe removal of improvements - sidewalks, curbs, pavement; all cut to neat lines
   - Observe replacement of improvements - proper material (concrete, asphalt concrete, base), properly compacted; lawns, plants, replanted
   - Check excavations for foundations - proper depth, other dimensions; proper elevation
   - Ensure proper placement and types of anchor bolts - high strength, galvanized, evidence of inspection (TL-0624)
   - or other markings)
   - Check placement of conduit in foundations; proper size, sloped toward hand holes, proper bend radius, firmly held in place
   - Observe placement of concrete (Class B) - forms or soil moistened, poured neat (where required), exposed surfaces finished
   - Examine conduit - proper sizes at proper locations, no damage, evidence of inspection (TL-0624, UL label or other markings), ends reamed, cuts square
   - Observe conduit installation; conduit ends butted, no threads exposed, damage from wrenches repaired, ends covered; expansion fittings across joints in structures, conduit properly wrapped through abutments
   - Ensure placement of required sand bedding and backfill - non-metallic or plastic coated conduit
   - Measure conduit depths - 18 inches sidewalk areas, 30 inches other areas

- Approve any changes in conduit routing - maintain as-built plans
- Observe cleaning of existing conduits
- Check installation of pull wires/ropes.
- Inspect pull boxes (prior to installation of conductors) - set to grade, sumps installed, mortar placed, metallic conduit bonded, boxes properly spaced, covers marked
- Examine standards, steel pedestals, posts, slip bases - no damage, evidence of inspection (TL-624 or other markings), proper sizes at proper locations
- Observe assembly of bases - high strength bolts, proper torque, proper orientation
- Decide on repair of existing standards - dents removed, shafts straightened; advise Design-Builder
- Observe installation of standards and posts - concrete foundations set at least 7 days; slip bases properly installed; nuts and washers in required order, properly torqued; pole raked as required, all parts properly bonded and grounded, mortar placed under base plate
- Examine conductors - proper wire size, proper insulation thickness, color coded
- Sample conductors (when necessary), obtain certificate of compliance for 5000-volt, series lighting conductors
- Observe conductor installation - required number (include spares), lubricated, pulled by hand, required slack at standards, pull boxes
- Ensure that splicing is done only where permitted - properly joined, insulated, fused splice connectors where required
- Examine all systems for required bonding and grounding - metallic sheaths, metal pull box covers, metal conduit, equipment grounding conductors, ballast and transformer cases, service equipment, sign switches, anchor bolts, metal poles and pedestals
- Examine service installations - conduit size, meter, circuit breakers, specified equipment enclosures; obtain approval for alternates
- Check installation of wood service poles - size, treated, placed to specified depth, backfilled
- Obtain Design-Builder's written request for service - arrange for connection by utility company.
- Examine sign illumination disconnects - locked enclosures, fused switches
- Observe field painting - cleaning, washing, pre-treatment vinyl wash primer, number of coats; number on lighting standards

- Examine traffic signal heads and mounting equipment, pedestrian signals - evidence of inspection (TL-0624 or other identification), no damage; correct equipment at correct location
- Observe signal head installation - all other equipment in place; signal heads turned or covered until placed in service
- Examine luminaries, soffit and wall luminaries, and lamps - evidence of inspection (TL-0624 or other identification) - no damage; installation as specified
- Ensure correct photoelectric control type and installation - advise Design-Builder of desired orientation
- Examine vehicle detectors - evidence of inspection (TL-0624 or other identification) - specified type
- Observe placement of detectors, lead-in cables - proper material, splicing, installation in roadway; holes and slots blown out and dried; specified epoxy sealant or asphalt rubber.

3. Field Testing

- Observe testing (field personnel or district specialist) - continuity, ground, insulation resistance; functional testing; signal and lighting systems, flashing beacons, count stations and ramp metering
- Consider activities for other forms or work such as (CMS) system, extinguishable message sign, (EMS) system, highway advisory radio (HAR) system, closed circuit television (CCTV) camera system, etc

ACTIVITIES AFTER CONSTRUCTION:

- Review entire system, include night check of all signals and lights
- Notify district office of dates systems are placed in service or removed from service
- Obtain warranties, guarantees, instruction sheets - notice placed in control cabinets, special provisions to district maintenance
- Ensure that Form TL-6024 is placed in control cabinet
- Complete Form TL-6025 - mail to lab

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses
- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Complete Drainage System Summary Form CEM-4701

5. Operations, certificates of compliance; labels from plants, fertilizer, etc.

6. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

CEM-4701 Drainage System Summary

TL-6024

TL-6025

Section 88: Engineering Fabrics

PURPOSE:

To define the method required for performing Engineering Fabrics.

SCOPE

Engineering fabrics consisting of pavement reinforcing fabric, filter fabric and rock slope protection fabric shall conform to the provisions in this Section 88, "Engineering Fabrics."

Engineering fabrics shall be placed in accordance with the various sections of these specifications requiring the use of an engineering fabric or as specified in the special provisions.

A Certificate of Compliance for each kind of engineering fabric used on the project shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance."

Engineering fabrics shall be furnished in protective covers capable of protecting the fabric from ultraviolet rays, abrasion and water.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

266. Construction Policy Bulletin (CPB)
267. Construction Program Directives (CPD)
268. Caltrans Special Provisions
269. Caltrans Standard Specifications
270. California Test Methods
271. Caltrans Construction Manual
272. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Engineering Fabrics operations. The Lead Inspector or selected representative will be onsite during Engineering Fabrics operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with

Engineering Fabrics operations and tests in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE WORK:

- BLANK

ACTIVITIES DURING CONSTRUCTION:

- BLANK

CRITICAL ACTIVITY POINTS

BLANK

RECORDS:

1. Include in the Inspector Daily Report - Form CEM-4601
   - Instructions and/or significant discussions with Design-Builder
   - Data for progress payments
   - Notes on your inspections
   - Hours worked by personnel and equipment
   - Notes on spreading, waste
   - Ordered changes in cement content
   - Notes on measurements, deficient thicknesses
   - Circumstances regarding rejected material
   - Limits of work
   - Records for force account payment (if any)
   - Stoppages and resumption of daily pours
   - Report of Completion (Structures) - include list of materials, quantities, costs, utility report, joint seal report, paint records

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Operations, certificates of compliance; labels from plants, fertilizer, etc.

5. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

Draft

Section 90: Portland Cement Concrete

PURPOSE:

To define the method required for performing Portland cement concrete production operation.

SCOPE:

Under the terms of the project contract, the Design-Builder shall review contract plans and special provisions.

RELATED DOCUMENTS:

The following documents are referenced in this Quality Procedure:

273. Construction Policy Bulletin (CPB)
274. Construction Program Directives (CPD)
275. Caltrans Special Provisions
276. Caltrans Standard Specifications
277. California Test Methods
278. Caltrans Construction Manual
279. Inspection Checklist

RESPONSIBILITIES:

The CQAM is responsible for ensuring that properly trained certified inspectors/technician's are assigned to perform required observations, testing and documentation of Portland cement concrete production operations. The Lead Inspector or selected representative will be onsite during Portland cement concrete production operations.

The quality assurance tests shall be performed under the appropriate guidelines. Tests will be performed by, or under the supervision of, the inspector.

CQAM is responsible for random spot checks and quality audits associated with Portland cement concrete production operations in accordance with appropriate guidelines.

Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

PROCEDURE:

ACTIVITIES BEFORE PRODUCTION

1. Materials and Tests
   - Determine class or strength of PCC

- Determine proposed source of material - Form CEM-3101
- Decide on necessity of freeze-thaw testing (four months in advance) - advise Design-Builder
- Registered Design Engineer to review and approve Design-Builder's mix proportions and proposed gradation for primary aggregate nominal sizes (pavement concrete)
- Determine cement content, (pavement concrete) - aggregate samples to lab 60 days in advance
- Obtain initial coarse aggregate samples - test for soundness and/or durability, cleanness
- Obtain initial fine aggregate samples - test for organic impurities, mortar strengths, sand equivalent
- Ensure proper water quality
- Determine use of admixtures - chemical, air-entraining, calcium chloride, mineral
- Registered Design Engineer to review and approve on method of cooling during hot weather
- Ensure METS's prior approval of proposed admixtures
- Ensure proper cement - Type IP (MS) Modified, Type II Modified or other per special provisions
- Observe test procedures on trial batches (compressive strength concrete)

2. Proportioning and Mixing

- Check for safe sampling facilities
- Observe aggregate storage areas - physical separation (no intermingling), no contamination, degradation, segregation
- Check cement storage - weather protection, separated from other types, adequate and safe sampling facilities, separated from aggregate
- Check admixtures - weather protection, separate storage, access for inspection
- Check proportioning devices - interlocks tested, scales tested or County Sealer, meters tested; liquid admixtures; calibrated dispensers, sampling devices, warning systems, proper sequencing; mineral admixtures; separate weigh hoppers, interlocks; cement; separate hopper, separate scales (structure concrete, paving concrete); proper charging sequence, no leakage
- Check mixers - drums clean, blades not worn, timing devices working, batch counters (for pavement or base), plates with manufacturer's data for truck mixers; capacity, uses, drum speeds; revolution counters (truck mixers); continuous registering, conveniently mounted; moisture meter (pavement concrete)

- Check hauling equipment - capacity not exceeded, no leakage, self-cleaning, protection during hauling, backing signal

ACTIVITIES DURING PRODUCTION

- Observe safety measures - review Design-Builder's accident prevention program, be safety conscious
- Sample cement - ensure proper type, send to lab, obtain certificates of compliance
- Sample coarse aggregate - test for cleanness, grading; compare with design grading
- Sample fine aggregate - test for sand equivalent, grading, moisture; compare with design grading
- Check aggregate source - same as represented by initial samples
- Sample admixtures - send to lab, obtain certificates of compliance
- Observe proportioning - scales working properly, set to design quantities; check zero balance periodically, interlocks working; proper charging sequence; admixtures properly dispensed
- Ensure adequate mixing - minimum revolutions at mixing speed for transit mixers
- Ensure concrete discharge from truck is within the allowable time limit and revolutions

CRITICAL ACTIVITY POINTS

- Mix design approval prior to use.
- Plant certification prior to use.

RECORDS:

1. Include in the Field Inspector Daily Report - Form CEM-4601

- Instructions and/or significant discussions with Design-Builder
- Data for progress payments
- Notes on your inspections
- Hours worked by personnel and equipment
- Notes on spreading, waste
- Ordered changes in cement content
- Notes on measurements, deficient thicknesses

- Circumstances regarding rejected material
- Limits of work
- Records for force account payment (if any)

2. Measure and/or calculate quantities - complete Quantity Calculation Sheet, - Form CEM-4801

3. Retain/file - weight slips and/or daily summary sheets, test reports,

4. Complete Drainage System Summary - Form CEM-4701

5. Operations, certificates of compliance; labels from plants, fertilizer, etc.

6. Test records and daily diaries shall be submitted to the Department by 0900 am the next business day.

DRAWING, FIGURES AND FORMS:

CEM-4601 Field Inspector Daily Report

CEM-4801 Quantity Calculation Sheet

CEM-3101 Notice of Materials to be Used

CEM 4701 Drainage System Summary

Draft

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

RESIDENT ENGINEER'S DAILY REPORT

ASST. RESIDENT ENGINEER'S DAILY REPORT

CEM-4501 (REV 11/2006) CT# 7541-3506-1

JOB STAMP

☐ RESIDENT ENGINEER'S DAILY REPORT

☐ ASST. RESIDENT ENGINEER'S DAILY REPORT

REPORT NUMBER	DATE S M T W T F S (Circle Day)
SHIFT HOUR: START MAX	TEMPERATURE MIN MAX
WEATHER	

PRINT NAME	SIGNATURE	TITLE

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

ASSISTANT RESIDENT ENGINEER'S DAILY REPORT

CEM 4601 (REV 4/1999) CT# 7541-3504-6

JOB STAMP

Report No. _____

Date _____

S M T W T F S Circle Day

Shift Hours Start _____ Stop _____

ASSISTANT RESIDENT ENGINEER'S DAILY _____ **REPORT**

Location and Description of Operation _____

HOURS - ITEM NO.

WEATHER

EQUIPMENT AND LABOR:

EQUIPMENT NO.	NO. PERSONS	DESCRIPTION (Equipment or Labor)									IDLE OR DOWN	REMARKS (Reason for idleness or other remarks)

PRINT NAME	SIGNATURE	TITLE

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STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

DRAINAGE SYSTEM SUMMARY

CEM-4701 (REV 5/2001) CT# 7541-3521-2

(SEE REVERSE FOR PAGE 2)

JOB STAMP

DRAINAGE SYSTEM NUMBER

PLAN. STA.	"AS BUILT" STA.

PROGRESS RECORD

STAKED: BY:

ITEM NUMBER										
DATE	ENGR.									REMARKS

ESTIMATE OF WORK COMPLETED

ITEM NUMBER																		
				REF.		REF.		REF.		REF.		REF.		REF.		REF.		REF.
PLAN Q																		
#																		
#																		
#																		
#																		
#																		
#																		
#																		
ADJUST Q																		
ACTUAL Q																		

DRAINAGE SYSTEM SUMMARY

CEM-4701 (REV 5/2001) CT# 7541-3521-2

(SEE REVERSE FOR PAGE 1)

PIPE STATION	ROD	GROUND ELEV.	GRADE ELEV.	CUT / FILL	PAY DEPTH

STAKED:

PARTY:

STAKING PLAN

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STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

DAILY EXTRA WORK TENTATIVE AGREEMENT

11-C-101 (REV 7/2001)

CCO # _____

DATE _____

M T W T F S S Circle Day

LOCATION, DESCRIPTION OF E.W.

EQUIP NO.	EQUIPMENT	ST	OT	# OF MEN	NAME	ST	OT

MATERIALS

"ACCEPTABLE FOR PROGRESS ESTIMATE PURPOSES"

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STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

PRODUCT, MATERIAL, OR METHOD REPORT
(For Highway Planting or Erosion Control)

LA - 16 (REV 04/2001)

Purpose of Report: _____

LOCATION	DISTRICT	COUNTY	ROUTE	P.M. OR STA. AT EACH LOCATION
INSTALLED BY	CONTRACT NUMBER		MAINTENANCE OR OTHER	
DATE INSTALLED	COSTS		PLANS ATTACHED ☐ YES ☐ NO	

Evalution and Comments: _____

FINANCIAL SAVINGS	ADDITIONAL EVALUATION REQUIRED ☐ YES ☐ NO

If yes, state reason: _____

INITIATED BY	DEPARTMENT	PHONE
REVIEWED BY	DEPARTMENT	PHONE

Send copy to: California Department of Transportation
Office of State Landscape Architecture, MS 28
Standards Branch
1120 N Street, Sacramento, CA 95814

DATE

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 263-2041 or TDD (916) 263-2044 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814

STATE OF CALIFORNIA . DEPARTMENT OF TRANSPORTATION

CONCRETE POUR RECORD

DS-C73 (REV 4/2009)

Sheet No. _____ of _____

File No. _____

File Category - Item # - Payment #

File Category _____

Item Number _____

Pour # _____

Bridge Identification _____

Job Stamp

Bridge Name _____ Bridge No. _____

Item No. and Description _____

Date _____ Mix No. _____ Cert. Of Compliance No. _____

Pour Location _____

Admixture Used _____ Amount _____

Air Entrainment Agent _____ Amount _____ % Air Required _____

Pour Inspected By _____ Samples Taken By _____

Sample Numbers _____

Time	Load No.	Truck No.	Air Tem.	Conc Tem.	Individual Penet. Readings	Aver. Penet.	% Air	Tests By	Remarks

Remarks: _____

WASTE OUTSIDE FORMS - EXPLAIN	WASTE INSIDE FORMS - SUBSTANTIATE

Plan Pay Quant. - This Item - This Br. _____ Cy

+ or - Due to CCO's _____ Cy

Final Pay Quant. - This Item - This Br. _____ Cy

Quant. Prev. Paid - This Item - This Br. _____ Cy

Pay Quantity - This Pour _____ Cy

Total Quant. To Date - This Item - This Br. _____ Cy

Quantity Delivered _____ Cy

Quantity Rejected _____ Cy

Waste in Forms _____ Cy

Waste Outside Forms _____ Cy

Net - Pay Quant.

This Pour _____ Cy

Pour Record Info Entered By _____

Sheet No. _____

Line No. _____

Date _____

By _____

Department of Transportation

BAR REINFORCING STEEL PLACING RECORD

DS-C76 (Rev.08/08)

SHEET NO: 48 -
File Category - Item # - Sheet # - Bridge ID

JOB STAMP

Bridge Name _____ Bridge No. _____

Item No. and Description _____

Location of In-Place Reinf Steel _____

Certificate of Compliance #s _____

In-Place Reinforcing Steel Inspected By _____ Date _____

Reinforcing Steel Factor (# Reinf Steel/CM Conc) _____

Calculation or Other Substantiation For Pay Quantity _____

(List the Location-Description-#s of steel) _____

Tot Qty of Reinforcing Steel for locations noted above _____ lb

(A)	Amount Paid This Estimate	0	lb
(B)	Amount Paid up to Previous Estimate		lb
(C)	Total Amount Paid To Date (A)+(B)		lb
(D)	Planned Pay Amount for this Item		lb
(E)	+ or - due to CCO's		lb
(F)	Total CCO Adjusted Planned Pay Amount (D)+(E)		lb

CCO # _____

Information Above was entered by: _____

Posted By: _____ *Posted TO: Page:* _____
Date: _____ *Line:* _____

FIELD VERIFICATION REPORT

RECORD NO.: **DATE (S)**
ITEM CHECKED:
LOCATION:

OFFICE WORK PREPARED BY::

Sign and Print Name | Date

FIELD WORK COMPLETED BY:

Sign and Print Name | Date

Field Book Audit Performed:

☐ No
☐ Yes

(Name of field Book/Specific Activity Audited)

DESCRIPTION/FINIDING (S):

COMMENTS:

CONFORMANCE:	YES	NO	N/A
1. **WITH DESIGN INTENT**			
2. **WITH SPECIFICATIONS**			

ACTION TAKEN BY SURVEYOR:

RESOLUTION OF ABOVE FINDING:

The CQA signature below certifies the requirements of Section 7B (Construction Surveying QA) of the QMP have been fulfilled.

(Responsible Surveyor (Sign & Print Name) | Date

Supplemental Documentation Attached: ☐ Yes ☐ No

DISTRIBUTION:

Construction Surveyor
CQAM
Document Control

Design-Build Demonstration Program

Volume III Materials Control Schedule

Draft

California Department of Transportation

TABLE OF CONTENTS – ALL PLANS

Vol	Description	Latest Rev. No.
I	QUALITY MANAGEMENT PLAN	1
II	CONSTRUCTION QUALITY ASSURANCE INSPECTION & TESTING PLAN	1
III	MATERIALS CONTROL SCHEDULE	3
IV	DOCUMENT MANAGEMENT PLAN	1

The Design-Builder shall update this Table of Contents based on the plans developed for the project.

Draft

The information presented in this document defines the Materials Control Schedule that meets the project requirements.

Approved:

NAME, Construction Quality Assurance Manager

Approved:

NAME, Department Project Manager

Approved:

NAME, Contractor Project Manager

Draft

Materials Control Schedule (MCS) for Design/Build Projects

This Materials Control Schedule (MCS) outlines roles and responsibilities for sampling and testing of materials. Some items are covered by Standard Special Provisions and may not be shown on the MCS. For more information regarding contract requirements for sampling and testing, please reference Standard Specifications and the Quality Program (QP), including but not limited to the Construction Quality Inspection and Testing Plan.

The MCS covers sampling and testing that will be performed by both parties, Design-Build Contractor and the Department, to ensure that all work conforms to the contract requirements. This sampling and testing serves the purpose of assuring and verifying that all materials, equipment and elements of the work will perform satisfactorily in service and meet the requirements of the contract documents.

The MCS defines the minimum Construction Quality Assurance Testing (QAT) to be performed by the Design-Builder for commonly used test methods. The Department will perform Contract Acceptance Testing (CAT) and Independent Assurance Sampling and Testing (IAST) for the project as shown below in the MCS.

Quality Control is the act of planning, examining, witnessing, inspecting, checking, testing, and when necessary, revision of the in progress or completed work to determine conformity with contract documents. The Design-Builder is responsible for providing all Quality Control, including but not limited to necessary Construction Quality Control Testing (QCT), in accordance with Section 6-3, “Control of Material - Testing” of Standard Specifications.

Quality Assurance is the total effort of development, documentation, implementation of policies, definition of roles and responsibilities and procedures to achieve and verify quality in accordance with contract documents. The Design-Builder is responsible for providing all Quality Assurance in accordance with the requirements of the Quality Program (QP), including but not limited to the Construction Quality Inspection and Testing Plan and Quality Organization. The Design-Builder is responsible for performing Quality Assurance Testing (QAT) in accordance with the MCS. The Design-Builder’s sampling and testing program for the project shall, as a minimum, consist of Chapter 6 (Sampling and Testing) of the Department’s Construction Manual and the MCS. The minimum required frequencies of QAT to be performed by the Design-Builder shall be that identified as “Acceptance Testing” in Table 6 of Chapter 6-1 in the Construction Manual. The testing rates listed in the MCS are the minimum rates for passing tests only based on quantity of material incorporated into the project. Testing is intended to be performed throughout the production phase and during incorporation of the materials into the project.

The Design-Builder shall ensure that the QCT and QAT equipment and personnel and testing laboratories are completely independent from each other. QCT staff can work

directly for the Design-Builder. However, both QAT staff and all inspection staff shall work under the direction of the Design-Builder Construction Quality Assurance Manager and be independent from production staff or production influence.

Contract Acceptance Testing (CAT) will be performed by the Department in accordance with the MCS (20 percent of the number of the Design-Builder's QAT or as determined necessary by the Department). The Department will also perform IAST and source inspection as outlined in the Department Construction Manual. The IAST tests are intended to be split samples run by both IAST and QCT/QAT in order to validate the QCT/QAT sampling and testing processes and procedures on the project.

Following is the Attachment XX-X, Chapter 6-1 (Sampling Types and Frequencies), Chapter 6-2 (Acceptance of Materials and Sampling Methods), and Chapter 6-3 (Field Tests), of the Construction Manual which is made part of the QP as described above.

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Responsible Parties for Material Sampling and Testing

CA TEST NO.	TITLE OF TEST METHOD	Standard Specifications Reference	Chapter 6 Construction Manual Reference (Page No.)	D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)	The Department CAT frequencies at 20% of QAT, or as determined necessary by Department	The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department
105	Calculations Pertaining to Gradings and Specific Gravities	27-1.02 ,28-1.02, 37-2.02C, 39-2.02	6-1.16, 6-1.18, 6-1.20, 6-1.24	100%	20%	100%
109	Method Testing of Material Production Plants	9-1.01(2X), 37-2.04 (2X), 39-3.03B	6-2.4 (3X), 6-3.6, 6-3.7 (3X)	100%	--	100%
110	Calibration of Compaction Test Equipment		6-3.3	100%	20%	100%
115	Calibration of Pressure Type Air Meters		6-3.2	100%	20%	100%
121	Use of Nuclear Gauges		6-3.6	100%	20%	100%

CA TEST NO.	TITLE OF TEST METHOD	Standard Specifications Reference	Chapter 6 Construction Manual Reference (Page No.)	D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)	The Department CAT frequencies at 20% of QAT, or as determined necessary by Department	The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department
125	Sampling Highway Materials and Products Used in the Roadway Structural Sections	90-2.01(2X)	6-1.10, 6-1.13, 6-1.15, 6-1.17, 6-1.20, 6-1.21, 6-1.23, 6-1.25, 6-2.6 (2X), 6-2.7, 6-2.10, 6-2.11	100%	20%	100%
202	Sieve Analysis of Fine and Coarse Aggregates	27-1.02, 28-1.02, 37-2.02C, 39-2.02	6-1.9, 6-1.11, 6-1.14, 6-1.15, 6-1.16, 6-1.17, 6-1.18, 6-1.20, 6-1.21 (2X), 6-1.22 (2X), 6-1.24(4X), 6-1.25, 6-3.2, 6-3.3 (3X)	100%	20%	100%
205	Determining Percentage of Crushed Particles	37-1.02,	6-1.16, 6-1.121, 6-1.22, 6-1.24	100%	20%	100%
206	Specific Gravity and Absorption of Coarse Aggregate		6-1.9, 6-1.10, 6-1.11, 6-1.13, 6-1.14, 6-1.15, 6-1.16, 6-1.25 (2X)	100%	20%	100%

CA TEST NO.	TITLE OF TEST METHOD	Standard Specifications Reference	Chapter 6 Construction Manual Reference (Page No.)	D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)	The Department CAT frequencies at 20% of QAT, or as determined necessary by Department	The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department
207	Specific Gravity and Absorption of Fine Aggregate		6-1.9, 6-1.10, 6-1.11, 6-1.13, 6-1.14, 6-1.15	100%	20%	100%
208	Apparent Specific Gravity of Fine Aggregates		6-1.16	100%	20%	100%
211	Abrasion of Coarse Aggregate by Use of the Los Angeles Rattler Machine		6-1.8, 6-1.11, 6-1.13, 6-1.14, 6-1.16, 6-1.21 (2X), 6-1.22, 6-1.24	100%	20%	100%
213	Organic Impurities in Concrete Sand		6-1.8, 6-1.10, 6-1.13, 6-1.11, 6-1.14	100%	20%	100%
214	Soundness of Aggregates by Use of Sodium Sulfate	90-2.02	6-1.9, 6-1.11, 6-1.14, 6-1.15	100%	20%	100%
216	Relative Compaction of Untreated and Treated Soils and Aggregates	24-1.07, 26-1.06	6-1.20, 6-1.22 (2X). 6-1.23 (4X), 6-1.25	100%	20%	100%

CA TEST NO.	TITLE OF TEST METHOD	Standard Specifications Reference	Chapter 6 Construction Manual Reference (Page No.)	D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)	The Department CAT frequencies at 20% of QAT, or as determined necessary by Department	The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department
217	Sand Equivalent	90-2.02B	6-1.8, 6-1.11,6-1.14, 6-1.16, 6-1.18, 6-1.20, 6-1.22 (2X), 6-1.24 (2X), 6-1.25	100%	20%	100%
223	Surface Moisture in Concrete Aggregates by the Displacement Method (Field Method)		6-1.9, 6-1.11, 6-1.14	100%	20%	100%
226	Determination of Moisture Content by Oven Drying	9-1.01, 20-2.07, 24-1.07 (2X), 26-1.06, 27-1.04B, 27-1.05A, 95-1.04	6-1.9, 6-1.11, 6-1.14, 6-1.22	100%	20%	100%
227	Evaluating Cleanness of Coarse Aggregate	90-2.02A	6-1.8, 6-1.11, 6-1.14, 6-1.21 (2X), 6-1.22, 6-1.24	100%	20%	100%
229	Durability Index	90-2.02	6-1.8, 6-1.11, 6-1.14, 6-1.22, 6-1.24 (2X), 6-1.25	100%	20%	100%

CA TEST NO.	TITLE OF TEST METHOD	Standard Specifications Reference	Chapter 6 Construction Manual Reference (Page No.)	D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)	The Department CAT frequencies at 20% of QAT, or as determined necessary by Department	The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department
231	Relative Compaction of Untreated/TreatedSoils and Aggregates (Area Concept Utilizing Nuclear Gauges)	24-1.07	6-1.20, 6-1.22 (2X), 6-1.23 (4X), 6-3.6 (2X), 6-1.25	100%	20%	100%
301	Resistance "R" Value of Treated and Untreated Bases, Subbases and Basement Soils (Stabilometer)		6-1.20, 6-1.22 (2X), 6-1.23	100%	20%	100%
302	Method of Test for Film Stripping		6-1.16, 6-1.21, 6-1.24 (2X)	100%	20%	100%
303	CKE		6-1.16	100%	20%	100%
305	Swell of Bituminous Mixtures		6-1.17	100%	20%	100%
307	Moisture Vapor Susceptibility of Bituminous Mixtures		6-1.17	100%	20%	100%

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CA TEST NO.	TITLE OF TEST METHOD	Standard Specifications Reference	Chapter 6 Construction Manual Reference (Page No.)	D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)	The Department CAT frequencies at 20% of QAT, or as determined necessary by Department	The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department
310	Determination of Asphalt and Moisture Contents of Bituminous Mixtures by Hot Solvent Extraction	29-1.04A, 37-2.04, 39-3.02	6-1.17 (2X), 6-1.21	100%	20%	100%
312	Designing and Testing Classes "A" and "B" Cement Treated Bases (Test method is currently inactive - refer to contact for further information)	27-1.02, 27-1.04B, 27-1.05A, 27-1.07	6-1.20, 6-3.3	100%	20%	100%
338	Determination of Cement or Lime Content in Treated Aggregate by the Titration Method	27-1.04B, 27-1.05A	6-1.20, 6-1.23, 6-3.3	100%	20%	100%
339	Field Test for the Determination of Distributor Spread Rate	37-1.05	6-1.24	100%	20%	100%
362	Determining Asphalt Content in Bituminous Mixtures by Vacuum Extraction		6-1.17, 6-1.21	100%	20%	100%
366	Stabilometer Value		6-1.17	100%	20%	100%

CA TEST NO.	TITLE OF TEST METHOD	Standard Specifications Reference	Chapter 6 Construction Manual Reference (Page No.)	D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)	The Department CAT frequencies at 20% of QAT, or as determined necessary by Department	The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department
367	Recommending Optimum Bitumen Content (OBC)	39-2.01, 39-2.02, 39-3.03	6-1.17 (2X)	100%	20%	100%
370	Determining Moisture Content of Asphalt Mixtures or Mineral Aggregate Using Microwave Ovens	39-3.02	6-1.17	100%	20%	100%
373	Unconfined Compressive Strength of Lime Treated Soils and Aggregates	24-1.03	6-1.23	100%	20%	100%
375	Determining the In-Place Density and Relative Compaction of AC Pavement		6-1.17 (2X)	100%	20%	100%
379	Determining Asphalt Content of Bituminous Mixtures (Troxler Nuclear Gauge Model 3241)	29-1.04A, 39-3.04	6-1.17	100%	20%	100%
405	Chemical Analysis of Water		6-1.9, 6-1.12, 6-1.15, 6-1.18, 6-1.20, 6-1.21	100%	20%	100%

CA TEST NO.	TITLE OF TEST METHOD	Standard Specifications Reference	Chapter 6 Construction Manual Reference (Page No.)	D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)	The Department CAT frequencies at 20% of QAT, or as determined necessary by Department	The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department
417	Soils and Waters for Sulfate Content	83-2.02D(l), 90-2.03 (2X), 90-2.03	6-1.9, 6-1.12, 6-1.15, 6-1.18, 6-1.20, 6-1.21	100%	20%	100%
422	Testing Soils and Waters for Chloride Content	90-2.03 (2X)	6-1.9, 6-1.12, 6-1.15, 6-1.18, 6-1.20, 6-1.21	100%	20%	100%
471	Chlorides, Sulfates in water		6-1.18	100%	20%	100%
504	Determining Air Content of Freshly Mixed Concrete by the Pressure Method	90-4.06, 90-4.07	6-1.10, 6-1.12, 6-1.15, 6-1.19, 6-3.2, 6-3.4	100%	20%	100%
515	Relative Mortar Strength of Portland Cement Concrete Sand		6-1.8, 6-1.11, 6-1.14	100%	20%	100%
518	Unit Weight of Fresh Concrete	90-1.01 (2X), 90-11.01	6-1.10, 6-1.12, 6-1.13, 6-1.15, 6-3.4	100%	20%	100%

CA TEST NO.	TITLE OF TEST METHOD	Standard Specifications Reference	Chapter 6 Construction Manual Reference (Page No.)	D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)	The Department CAT frequencies at 20% of QAT, or as determined necessary by Department	The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department
521	Compressive Strength of Molded Concrete Cylinders	90-9.01		100%	20%	100%
523	Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)	90-8.03	6-1.10,	100%	20%	100%
524	Method of Test For Flexural Strength of Rapid Set Concrete			100%	20%	100%
526	Operation of California Profilograph and Evaluation of Profiles	40-1.10 (2X)	6-3.3	100%	20%	100%
528	Freeze-Thaw Resistance of Aggregates in Air-Entrained Concrete (Powers Procedure)		6-1.9, 6-1.10, 6-1.11, 6-1.13, 6-1.14, 6-1.15	100%	20%	100%
529	Proportions of Coarse Aggregate in Fresh Concrete	90-6.01	6-1.10, 6-1.12	100%	20%	100%

CA TEST NO.	TITLE OF TEST METHOD	Standard Specifications Reference	Chapter 6 Construction Manual Reference (Page No.)	D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)	The Department CAT frequencies at 20% of QAT, or as determined necessary by Department	The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department
531	Determining Length of Drilled Concrete Cores	40-1.135	6-1.10	100%	20%	100%
533	Test for Ball Penetration in Fresh Portland Cement Concrete	63-1.02, 90-6.01, 90-6.06	6-1.10, 6-1.12, 6-1.15, 6-1.19, 6-3.4	100%	20%	100%
540	Making, Handling, and Storing Concrete Compressive Test Specimens in the Field	90-9.01 (4X)	6-1.15, 6-3.4 (2X), 6-3.6 (2X)	100%	20%	100%
541	Flow of Grout Mixtures (Flow Cone Method)	41-1.02, 50-1.09	6-1.13	100%	20%	100%
548	Evaluation of Aggregate for Lean Concrete Base (LCB)	28-1.02	6-1.18	100%	20%	100%

Notes: The Design-Builder is responsible for all Quality Control Testing as described in Section 6 of the Standard Specifications. The Design-Builder will perform Quality Assurance and QAT in accordance with the requirements of the Quality Program, including but not limited to Quality Organization and the Material Control Schedule.

(1) The minimum required percentage of QAT tests to be performed by the Design-Builder shall be at the frequencies specified for "Acceptance Testing" in Table 6 of Chapter 6 of the Construction Manual.

	ASTM Tests Methods listed in Chap 6 of Construction Manual			CONTRACTOR QC MODELResponsible Party (Who Performs Test)		
ASTM Test No.	**TITLE OF TEST METHOD**	**Standard Specifications Reference**	**Chapter 6 Construction Manual Reference (Page No.)**	**D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)**	**The Department CAT frequencies at 20% of QAT, or as determined necessary by Department**	**The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department**
ASTM C1293 or ASTM C1260	Alkali Silica Reactivity		6-1.8, 6-1.11	100%	100%	100%
ASTM C260	AIR ENTRAINING AGENT Air entraining properties, chloride identification		6-1.9, 6-1.12, 6-1.15, 6-1.18	100%	20%	100%
ASTM C494	W ATER REDUCERS OR SET RETARDERS Claimed properties, chloride identification		6-1.9, 6-1.12, 6-1.15, 6-1.18	100%	20%	100%

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ASTM Test No.	TITLE OF TEST METHOD	Standard Specifications Reference	Chapter 6 Construction Manual Reference (Page No.)	D/B Contractor QAT at min frequencies for "Acceptance Testing" shown in Chapter 6 Construction Manual) (1)	The Department CAT frequencies at 20% of QAT, or as determined necessary by Department	The Department IAST frequencies as shown in Department's Independent Assurance Manual and/or as determined necessary by Department
ASTM C143	Slump (When Concrete placed under water)		6-1.12, 6-1.15	100%	20%	100%
ASTM C172, 540	Compressive Strength		6-1.12, 6-1.15	100%	20%	100%
ASTM D173, ASTM D449, ASTM D41	W ATER-PROOFING MATERIALS		6-1.27	100%	20%	100%

Notes: The Design-Builder is responsible for all Quality Control Testing as described in Section 6 of the Standard Specifications. The Design-Builder will perform Quality Assurance and QAT in accordance with the requirements of the Quality Program, including but not limited to Quality Organization and the Material Control Schedule.

1) The minimum required percentage of QAT tests to be performed by the Design-Builder shall be at the frequencies specified for "Acceptance Testing" in Table 6 of Chapter 6 of the Construction Manual.

Design-Build Demonstration Program

Volume IV Document Management Plan

Draft

California Department of Transportation

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II	CONSTRUCTION QUALITY INSPECTION & TESTING PLAN	1
III	MATERIALS CONTROL SCHEDULE	3
IV	DOCUMENT MANAGEMENT PLAN	1

The Design-Builder shall update this Table of Contents based on the plans developed for the project.

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The information presented in this document defines a Document Management System that meets the project requirements.

Approved:

NAME, Contractor Document Manager

Approved:

NAME, Department Project Manager

Approved:

NAME, Contractor Project Manager

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1.0 PURPOSE

1.1 GENERAL

This Document Control Work Plan (DCWP) defines procedures and establishes the document control requirements and responsibilities for Design-Build Team on the Project.

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2.0 SCOPE

2.1 GENERAL

This procedure is applicable to all of the Design-Build Team Members. The Project Document Control (PDC) as described within this document is maintained at the design-builder project office. The PDC receives, logs, captures, and files correspondence, documents, and library reference materials that are generated and/or received as outlined by this plan from project initiation through closeout. The PDC generates or captures all incoming and outgoing project related documentation. The Design-Builder establishes and will maintain the Design-Builder's tracking software as our collaborative web-based document control system (DCS).

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3.0 ACRONYMS

DBTM Design-Builder Design Build Team Member
CDL Controlled Document Log
CQAM Construction Quality Assurance Manager
DCAF Document Control Audit Form
DCM Document Control Manager
DCL Document Control Lead
DCPF Document Control Processing Form
DCS Document Control System
DCSOF Document Control Sign Out Form
DCWP Document Control Work Plan
DIN Document Identification Number, unique number assigned by the DCS software
DQAM Design Quality Assurance Manager
PDC Project Document Control
QAO Quality Assurance Organization

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4.0 SYSTEM GOALS AND OVERVIEW

The goal of the document control systems defined by this DCWP is to provide a thorough and consistent method of controlling the Design-Builder's documentation associated with Department' Design-Build Project. The PDC system has both a paper (hard copy) component and an electronic component. Documents are either generated in, and printed from, or scanned and uploaded into the document control system, herein after referred to as the Design-Builder's tracking software.

Users of the Design-Builder's tracking software are able to search for any document on a variety of search criteria, to open and view a scanned image of the document, and to print it out if desired. This electronic approach reduces the frequency with which project staff needs to remove hard copies from the project files, which in turn increases the level of control and security on the documents. However, if the hard-copy/original version of the document is needed for some reason, the user can easily determine from the document control software where it is located in the project files or document control library.
The following items are also addressed in this Plan:

• Responsibilities
• Specific procedures for getting various document types into the document control system
• (including email)
• Information on how the electronic document control software is used on this project
• Electronic file organization and management
• Project library
• Location of, access to, and maintenance of the project files and library
• DCS backup and recovery
• Submittal Log in DCS

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5.0 RESPONSIBILITIES

5.1 DOCUMENT CONTROL LEAD

The Document Control Lead (DCL), (Insert individual's name) is responsible for:
• Organizes, maintains, and manage records and documents pertinent to QA
• Organizes, maintains, and manage electronic Document Control System
• Monitoring the DCS system for compliance with QMP requirements.
• Responsible for documenting the specific guidelines
• Establishment and maintenance of a sign-out system for the project files and library.
• Establishment and maintenance of a listing and directory of all materials stored in the project library.
• Responsible for training Construction Design-Build team members on utilizing DCS

5.2 DOCUMENT CONTROL MANAGER

The Document Control Manager (DCM), (Insert individual's name) is responsible for:
• Complete processing of project documents as indicated by project staff, including electronic logging, scanning, and storage of all incoming and outgoing documents and attachments in the DCS database.
• Filing and storage of all physical documents such as paper documents, manuals, books, CDs, etc., in the project files and library.

5.3 DESIGN_BUILD TEAM MEMBERS

All Design-Build Team Members are responsible for:

• Submitting to the DCM all relevant incoming and outgoing Project documents (See Section 6.2) for processing and entry into DCS, including all attachments and email.
• Knowledge and consistent use of file codes on all relevant project documents.
• Requesting Document Identification Number (DINs) and including them in outgoing correspondence and other documents.
• Familiarity and compliance with the formats and preparation requirements for documents as defined in this DCWP.
• Following established procedures for access to and removal of hard-copy documents from the project files or library, and for their prompt return.
• Familiarity and compliance with procedures defined in this Plan for management of electronic files.

6.0 PROCEDURE

6.1 DOCUMENT CODING

For each document received by PDC, which is NOT generated in the Design-Builder's tracking software, a Document Control Processing Form (DCPF), included in Attachment 2, must be thoroughly completed (either by hand or electronically) and attached to the document before being sent to the DCM for processing. In accordance with Sections 6.2.1 and 6.2.2 below, the DCPF allows for a file number (DIN) to be listed for the document. In addition, each document is assigned a single document type. The available document types are identified in the Document Type List included in Attachment 1. A current electronic version of the Document Type List is also maintained on the DCS server.

6.2 GETTING DOCUMENTS TO AND INTO DOCUMENT CONTROL

6.2.1 Incoming Documents

Incoming project-related documents, which were NOT generated in the Design-Builder's tracking software, are received and processed as follows:

- For **incoming emails** (that is, emails generated by someone other than Design-Builder), the recipient prints out the email and follows the steps listed below. If there is more than one recipient within Design-Builder's organization, the first recipient alphabetically (last name) is responsible for printing and processing the email. For incoming paper documents received by any means (US Mail, overnight mail, hand delivery, fax, meeting handout, or any other method of transmittal), the addressee proceeds with the steps listed below.
- The addressee fills out a Document Control Processing Form (DCPF; see Attachment 2) by indicating information as appropriate. The addressee then forwards the document and DCPF to the DCM for processing.
- The DCM date stamps the document (if not already stamped), scans it, and logs the document into the Design-Builder's tracking software to obtain a DIN. The DCM files the original document in the project files or library, with the DCPF attached to the back. The entire original document, including any attachments, is filed by the DIN listed on the DCPF.

Outgoing Documents

Outgoing project documents originated by the Design-Builder's staff, and NOT created in the Design-Builder's tracking software, are also sent to PDC and entered into DCS as follows:

- The author attaches a DCPF to a copy of the document and fills it out by indicating the Document Type, Date, and other information as appropriate. The author then forwards the document and attached DCPF to the DCM for processing.
- The DCM date stamps the document, scans and logs it into the Design-Builder's tracking software to obtain a Document Identification Number (DIN). The DCM labels the document with the DIN and files the document in the project files or library, with the DCPF. The entire document, including any attachments, is filed by DIN.
- The DCM will distribute the document as shown on the DCPF.

Insert Here – Project Document Control Flow Chart.

6.3 DOCUMENT CONTROL SYSTEM

6.3.1 General Information

Project documents are either created by or logged into The Design-Builder's tracking software to allow for control, tracking, and paperless retrieval (unless hard copies or originals are required for some reason). Document Control Index containing location of electronic files within our DCS, is stored in The Design-Builder's tracking software.

The database is located on a secure document control server. The ability to create, edit, send, view, and search documents will be available to personnel based on authorized access levels.

The following information (as applicable) is entered into the document control database for each document, and document searches can be performed on any of these fields:

- File Number, auto generated unique number, (DIN)
- To Company
- To Name
- From Company
- From Name
- Schedule Activity
- Subject (or title of document)
- Date on the document

- Document Type
- Additional Subject Information or Keywords (Description)
- Author of DCPF

6.3.2 Submittal Naming

All submittal packages shall have a unique identifying number. The numbering system used in the DCS follows:

- If the submittal is a Design Submittal, it shall start with DESN and followed by 0001 (or the next submittal number).
- If the submittal is a Construction Submittal the numbering shall start with WXYZ and followed by 0001(or the next submittal number)
- Subcontractor submittal numbering is based on the first four letter of the company name, followed by 0001 (or the next submittal number for that company) ex: ABC Drilling = ABCDXXXX or Guardrail R US = GRRU0001

In addition to the numbering if the Design Submittals are sets of plans. The submittal should include in the subject line if the package is conceptual (abbreviated as Concept), Intermediate (abbreviated Interm.), Final, or RFC following the unique identifying number. After indicating what stage the package is at, discipline and if applicable location should be indicated in the subject line. Ex: DESN0003 Prelim Survey South Run A Muck Parkway.

6.3.3 Document Scanning

As part of the document capture process, documents NOT generated in Design-Builder's tracking software will be scanned and the resulting *.pdf* files uploaded into Design-Builder's tracking software to allow project staff to view documents electronically.

6.3.4— Access Rights

The DCM will have administrative rights to Design-Builder's tracking software. Other members of the Design-Builder's organization and Department will have create, read, edit, view, search permissions based on what types of documents they need to access/create.

6.4 DOCUMENT CONTROL LIBRARY

Certain documents are more suitably stored in a library arrangement rather than in the project files. These documents are generally thick or oversized documents that are used and referenced on an ongoing basis by the project staff. These documents are logged in the document control database, similar to other project documents, but with a notation that they are stored in the document control library. Each document receives a

file number, and the documents in the library are organized alphanumerically by file number. The DCM keeps a log of all library contents in the document control database.

6.5 DOCUMENT CONTROL – GENERAL INFORMATION

6.5.1 Physical Location

The project files and project library are kept at the Design-Builder's project office.

6.5.2 Access Restrictions

The project files (physical files) are kept in the Design-Builder project office, and access by project staff must be cleared through the DCM. Access to the project library is unrestricted. However, the sign-out sheet (Attachment 3) must be filled out whenever documents are removed from the immediate area and when they are returned.

6.5.3 Maintenance Responsibilities

The DCM has primary responsibility for filing and for maintenance and upkeep of the project files and library. The DCM performs monthly audits of the library contents to verify that all documents are accounted for and shelved correctly. The DCM also performs monthly audits of the project files to verify that no folders are missing or misfiled. These audits are documented on the Document Control Audit Form (Attachment 4), which are printed out; signed by the DCM, Project Manager, DQAM, and CQAM; attached to the monthly invoice; and filed in document control.

6.6 CONTROLLED DOCUMENTS

Certain documents are used or referenced by various members of the project team on an on-going basis, and it is imperative that copies being used are up-to-date at all times. The DCM is responsible for the distribution of copies and the tracking of approvals and revisions of all "controlled documents" that are prepared by the Design-Builder.

Once a controlled document has been approved and the electronic distribution list prepared, the DCMwill maintain a controlled hard copy set in the document control library and will be responsible to transmit changes to the distribution list electronically through the DCS.

A list of Project controlled documents is included as Attachment 5. The Controlled Document Log format is included as Attachment 6.
Documents prepared by other entities on the project team (e.g. Department) are controlled in accordance with the requirements of that entity's document control plan.

6.7 VERBAL CORRESPONDENCE

Significant face-to-face and telephone conversations by and between the Design-Build team members and any other parties are documented in writing by a Telecon Form (see Attachment 7) or a memorandum addressed to the file and copied to PDC and uploaded as detailed in Section 6.2.

6.8 DOCUMENT RETENTION

All project documents will be stored and maintained as defined in this Plan through the completion of construction and Final Owner Acceptance (FOA). Throughout the term of the contract, project documents will be retained and archived in accordance with these procedures. After completion of the contract, the PDC project documents are delivered to Department after the final estimate.

6.9 MANAGEMENT OF ELECTRONIC FILES

6.9.1 Scanned Documents

Per Section 6.3.2, above, documents are scanned and the resulting files uploaded into the program. All documents are stored on a secure server and are saved redundantly at the time of entry. In addition, a complete tape backup of all data in the system is performed once daily. These are the final, official record electronic files for project documents.

6.9.2 System Backups

The **DCS server,** where all project files are located (including the document control database, document files in their native format, and scanned image files that are linked to the database), is backed-up in accordance with the following rules:

1. A full backup of all electronic data is performed nightly to tape
2. Monthly backups are preformed and kept permanently.
3. The alternate week daily backups along with the weekly and monthly archives are all stored in a secured off site facility

6.10 SUBMITTAL LOG

Submittal log is stored in the DCS, and can be view and/or printed.

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7.0 ATTACHMENTS

7.1 GENERAL

1. Document Type List
2. Document Control Processing Form (DCPF)
3. Library/Document Control Sign-out Form (DCSOF)
4. Document Control Audit Form (DCAF)
5. List of Controlled Documents
6. Controlled Document Log (CDL)
7. Telecon Record

7.2 DOCUMENT TYPE LIST

The following is the list of Document Types that may be assigned to a document to facilitate document searches in the document control database. A current electronic version of the Document Type List is also maintained on the server. (Also see discussion in Section 6.1 of the body of this Document Control Work Plan.)

Only one document type may be assigned to a document package. Therefore, choose the document type that best suits the majority of the documents within a package.

Audit Non-conformance Report
Audit Report
Calculations
Contract/Agreement
Drawings/Plans
Email
Exhibit
Fax
File
Invoice/Progress Payment
Letter
Materials Receiving Report
Meeting Minutes
Memorandum
NCR—Non-conformance Report
NDC—Notice of Design Change
Permit
Proposal
Report
RFI—Request for Information
RFI –Log

NDC –Log
NCR –log
Stop Work Notification –Log
Project Computer Program -Log
Schedule
Specifications
Subcontract
Telecon
Other

All the documents listed in construction manual chapter 5.102 Organization of Project Documents.

7.3 DOCUMENT CONTROL PROCESSING FORM

The Document Control Processing Form (DCPF) is included at the end of this attachment. This is the vehicle for providing document information to the DCM.

DCPF guidelines:

- Enter the File Number (this is to be done by the DCM after the documents and/or files have been uploaded).
- Accuracy is extremely important when listing File Numbers. If a code is missing a zero, the document will not be a match in a database search.
- “To Company” is generally the original addressee’s company.
- “To Name” is generally the original addressee.
- “From Company” is generally the company of the original author of the document.
- “From Name” is generally the original author of the document.
- “Date Received” is the date the document was received.
- Up to eight different “Activity Codes”, from the Schedule, may be given to any document.
- “Subject” is generally the title, name, or subject line of the document.
- “Document Date” is the date of the original document.
- “Document Type” is chosen from the list provided in **Attachment 1**. Only one document type may be used per DCPF package. Therefore, choose a document type that best suits the majority of the documents within the package.
- Under “Additional Subject Information or Keywords” give a brief description of the document contents and/or a list of all words or phrases that could logically be used for a search for the document. The DCM will enter this information in the “Description” field.

- "Author" is the name of the responsible for filling out the DCPF and sending the document(s) to document control. This name should be printed legibly or typed so that they can be contacted if the DCM has any questions regarding the document.
- "Distribution" lists to whom copies were/are to be sent.
- "Attachments" indicates if the document has attachments with it.

The Design/Builder needs to develop their versions of the following:

Attachments

1. Document Type List (refer to section 7.1)
2. Document Control Processing Form (DCPF) (refer to section 7.2)
3. Library/Document Control Sign-out Form (DCSOF)
4. Document Control Audit Form (DCAF)
5. List of Controlled Documents
6. Controlled Document Log (CDL)
7. Telecon Record

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8.0 AUDITS

8.1 Refer to the Quality Management Plan for audit requirements.

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9.0 PROCEDURES

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Subject: <Title of Procedure>

Table of Contents, if necessary

PURPOSE:

SCOPE:

RELATED DOCUMENTS:

RESPONSIBILITIES:

PROCEDURE:

DISPOSITION:

DRAWING, FIGURES AND FORMS:

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Subject: <Title of FORM>

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