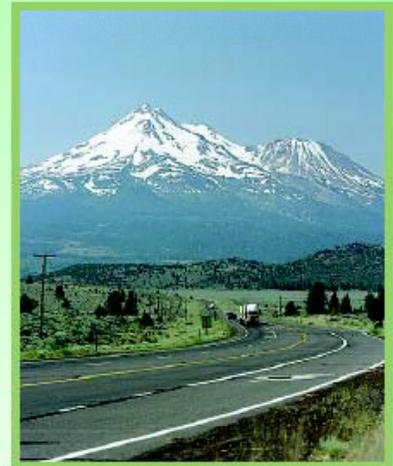


# North Region Quality Management Plan



District 1



District 2

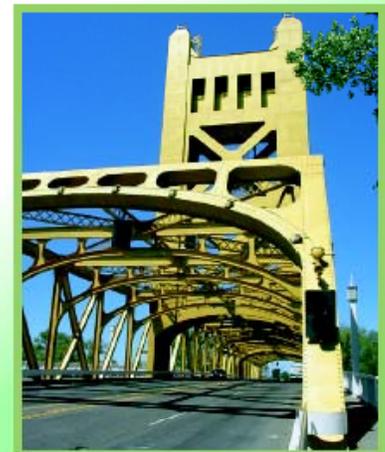


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District 3



Sacramento



December 2005

## Executive Summary

The North Region Quality Management Plan (NR QMP) is a multi-functional approach to ensure Project Quality. Project Quality is comprised of the following elements: Technical Quality, Cost Effectiveness, Schedule/Delivery and Stakeholder Expectations. Change to any of these elements can have a positive or negative effect on the remaining elements, as well as the overall Project Quality. This plan is a product oriented quality roadmap that will be applied from Project Initiation through Ready-To-List (RTL).

The latest Caltrans RTL Guidelines require that the Project Engineer (PE) and Design Engineer (DE) certify that a project is RTL. By developing Plans, Specifications and Estimates (PS&E) following this NR QMP, the PE is provided assurance that the functional units have certified the quality of their individual products, appropriate reviews have been conducted and the product meets expectations for RTL.

Technical Quality Assurance is provided throughout the project development process by a team of NR personnel with a wide range of specialties and experience. The preparation of approval documents (PSR, PR, etc.) in accordance with the NR QMP, assures management that appropriate quality checks have been completed, and all documents and supporting data have been thoroughly reviewed. The effort of all members of the PDT in fulfilling their roles and responsibilities through participation and communication is critical to the success of Project Quality.

All of the functional units that directly contribute towards PS&E deliverables have developed their own Project Specific Quality Control Plans. These plans document the Quality Control Elements and Quality Milestones needed to instill Technical Quality in their individual products. A separate Project Quality Matrix (PQM) should be completed for each phase of the project. Also included in the plans are anticipated Task Management activities as well as programmatic tools available to their staff. The plans for each functional unit are presented in the attachments.

In order to measure the effectiveness of the NR QMP, second level managers will evaluate the products at the end of the PID, PA&ED, Draft PS&E and RTL phases. To facilitate the evaluation process, the PQM will be provided to show what quality steps were accomplished during that phase.

The long-term goal in the North Region is for all projects to achieve Service Level 2 Delivery. Service Level 2 is DES-Office Engineer's (Headquarters – Office Engineer) reduced level of service, which provides delegation for the Districts to process RTL.

To facilitate the use of the NR QMP, trained leaders from each functional unit will be available to project delivery staff in the North Region to assist in developing the QMP for their projects and answer questions. A QMP Implementation Team will remain organized not only to provide support during the first two years of implementation but also to assess individual project and overall progress of the QMP and make adjustments to the plan as necessary.

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## Glossary of Terms

### ***Project Quality***

Project Quality is a composite of Technical Quality, Cost Effectiveness, Schedule/Delivery and Stakeholder Expectations.

**Technical Quality** - Policies, Processes and Procedures of the Department are met.

**Schedule/Delivery** - Meet agreed schedule commitments.

**Cost Effectiveness** - Stay within Capital and Support Budget.

**Expectations** - Delivery of products that meet Stakeholder's needs.

### ***Quality Control (QC)***

The process, practices and activities performed at the project team level, during the project delivery process, providing the foundation for Quality Assurance.

### ***Quality Assurance (QA)***

The sum of all Quality Controls completed during the project delivery process that provide confidence that the project team has followed the established Project Specific Quality Control Plan.

### ***Project Specific Quality Control (PSQC) Plan***

The project specific plan, developed and managed by the PDT, is comprised of individual Functional Quality Control Plans and the interactions between them.

#### **Functional Quality Control (FQC) Plan**

Each functional unit's specific plan comprised of Quality Milestones and their associated Quality Control Elements that provide the foundation for Functional Quality Assurance.

#### **Quality Milestone (QM)**

Intermediate checkpoint to document progress of the Functional Quality Control Plan.

#### **Quality Control Elements (QCEs)**

The individual procedures and processes that each Functional Unit defines in their Functional Quality Control Plan. A determination that the sum of the QCE's from PID to RTL will result in a PS&E package that is complete and clear of constraints, and is ready for advertising and bidding.

### ***Project Specific Quality Assurance (PSQA)***

The sum of the Project Specific Quality Control Plans selected and documented during the project delivery process that provide confidence that the project team has participated.

#### **Functional PS&E**

Complete Functional PS&E's (Structures, Electrical, Signing and Striping, Landscape Architecture, etc.) are submitted to the Project Engineer along with that unit's documentation of Functional Quality Assurance.

#### **Functional Quality Assurance (FQA)**

Each functional unit's documentation at Functional PS&E that their Quality Control Plan has been followed.

**RTL Certification**

Design's certification that all applicable design, right of way, environmental, regulatory, and statutory conditions have been addressed in the PS&E such that the project is RTL.

***Programmatic Quality Controls (PQC)***

Departmental guidance and tools, outside of the Project Specific Quality Control Plan, which contribute to the overall quality for all projects. Some examples:

- Policies and Procedures
- Directives
- Process and Quality Checklists
- Training

***Project Quality Matrix (PQM)***

The PQM is a template designed to document decisions and activities made throughout each project phase and allow the PE to plan and track requests, tasks and deliverables from other functional units. It is also used by PEs for documenting Quality Control Elements that lead to Quality Milestones. The PQM is initiated at the beginning of a new project phase (PID, PA&ED, PS&E and RTL) and completed at the end of that particular phase. At the beginning of the next project phase the previous PQM will be reviewed by the PDT for initiating the PQM for the new project phase.

## Introduction

The North Region Quality Management Plan (NR QMP) is a multi-functional approach to ensure Project Quality. Project Quality is comprised of the following elements: Technical Quality, Cost Effectiveness, Schedule/Delivery and Stakeholder Expectations. Change to any of these elements can have a positive or negative effect on the remaining elements, as well as the overall Project Quality. This plan is a product oriented quality roadmap that will be applied from Project Initiation through Ready-to-List (RTL).

This plan recognizes that the majority of the projects developed by Caltrans are produced with the Division of Design as the lead unit, with various functional units contributing components relative to their specialty (Surveys, Environmental, Right of Way, etc). This plan is also valid for those projects where Maintenance, Hydraulics, Landscape Architecture, Traffic, Engineering Service Center or another Division is the lead unit and provides the Engineer of Record.

Technical Quality is provided throughout the project development process by a team of NR personnel with a wide range of specialties and experience. The preparation of approval documents (PSR, PR, etc.) in accordance with the NR QMP, assures management that appropriate quality checks have been completed, and all documents and supporting data have been thoroughly reviewed. The effort of all members of the PDT in fulfilling their roles and responsibilities through participation and communication is critical to the success of Project Quality.

Schedule/Delivery and Stakeholder Expectations are identified during the Project Initiation phase and reviewed at subsequent PDT meetings as the project scope is refined. Cost estimates are updated as better project information becomes available and reported on an annual basis. Management is assured that Cost Effectiveness, Schedule/Delivery and Stakeholder Expectations are being met through regularly scheduled Delivery Hour and Status Meeting presentations.

When changes to any of the quality elements are proposed, they will be fully evaluated by the project development team (PDT). The PDT is tasked with evaluating project changes and documenting their decisions using the Project Quality Matrix (PQM). When the PDT fails to reach consensus, or the scope of change is outside of their authority, the issues will be raised through Management for a timely decision.

Quality risks are inherent to the Project Development process. The QMP includes the use of the PQM to document efforts to instill quality and identify risks due to intrinsic project constraints.

The true quality of a transportation improvement project is measured subjectively by the individual stakeholders as well as by those administering the construction contract. However, in order to measure the effectiveness of the NR QMP, it is proposed to have second level managers will evaluate the products at the end of each phase (PID, PA&ED, and RTL). During the Management Review circulation, second level managers will evaluate the products for quality from their own perspectives. To facilitate the evaluation/feedback process, the updated project specific Project Quality Matrix (PQM) should be provided to show what quality steps were accomplished during that phase.

## Need and Purpose

In an effort to process projects in a more efficient and timely fashion, the Division of Engineering Services - Office Engineer (DES-OE) has replaced the existing PS&E procedures with the Ready to List Guidelines. As part of this revision Service Level 1 and Service Level 2 Ready to List processes were created.

Service Level 1 follows the previous DES-OE PS&E process. Service Level 2 is DES-OE's reduced level of service, currently only available for projects eligible under the Authority to Advertise District Delegation (AADD). These are the current California Transportation Commission (CTC) delegated projects: Minor A (less than \$1 million) and Maintenance projects, and Safety projects (201.010(HB1)) less than \$2 million.

Once the Department adopts a Quality Management Program and the Region implements a Quality Management Plan, projects of any size may be processed by the District or Region utilizing Service Level 2 to certify Ready to List with DES-OE concurrence.

Whether Service Level 1 or 2 is used for PS&E processing, according to the new Ready to List Guidelines the Design Engineer (DE) and Project Engineer (PE) are responsible for certifying that the project is RTL. By signing the RTL Certification, they are assuring the Technical Quality of the PS&E package, that all the necessary permits have been approved, and right-of-way and other constraints are cleared. This QMP identifies Quality Control Elements and Quality Milestones to aid the lead unit in not only instilling quality throughout the process but also maintaining responsible charge through Office Engineer activities.

A quality PS&E will have less rework, will be easier to review, will be more consistently biddable and buildable and will be easier to administer during construction.

## Methodology

The NR Quality Management Plan has been separated into four phases for managing quality: Project Initiation Document (PID), Project Approval and Environmental Document (PA&ED), Draft PS&E and RTL. The PID corresponds to the "K phase" for EA charging; PA&ED corresponds to the "0 phase"; Draft PS&E and RTL correspond to the "1 and 2 phases". Other activities necessary for project development and construction include a pre-PID phase for identifying and sponsoring a project, an Advertisement phase for processing addendums, advertising and receiving bids, and a Construction phase for administering the contract and providing construction engineering. Quality management for activities during these phases is outside the scope of this document, but need to be addressed by another team.

The QMP is comprised of the following three components:

- Project Specific Quality Control (PSQC) Plan
- Project Specific Quality Assurance (PSQA)
- Programmatic Quality Control Tools (PQCT)

The Hierarchical Diagram (see Figure 1 on page 7) illustrates the relationship between the three components as well as the interaction between the lead unit and functional units. Each functional

unit is responsible for the quality of their product. Their FQC Plan identifies the QCE's to be put in place to ensure that their product adheres to quality standards and meets expectations. The functional units will provide FQA for their product and documentation that it was prepared in accordance with their unique quality control procedures.

The PSQC Plan consists of each functional unit's plan identifying the Quality Control Elements and Quality Milestones anticipated for a specific project. The lead unit PSQC Plan also identifies the interaction points between the functional units and the lead unit as Quality Control Elements. The PSQC Plans for the various functional units are presented in Appendices A thru M.

The Quality Control Elements identified in the PSQC Plans are tasks that provide quality controls to the project. These elements can be specific to a functional unit like peer reviews or Preliminary Geometric Approval, or can be multi-functional like assembling the PDT or reviewing the Project Report prior to circulation for District review.

Specific Quality Control Elements build to a Quality Milestone. The Quality Milestones in the PSQC Plans were identified throughout the project development process to provide cumulative quality assurance. Successfully reaching these milestones provides the project stakeholders assurance that the appropriate quality checks have been made and provides an opportunity to document both the level of quality elements applied, as well as level of risk associated with those not implemented.

Project quality assurance is provided at points along the project development process. The Project Study Report (PID phase) and the Project Report (PA&ED phase) are presented to management for approval. By preparing these documents in accordance with the PSQC Plan, management is assured that appropriate quality checks have been done, and that the documents and supporting data have been thoroughly reviewed both by the PDT and by district reviewers not directly involved with the project.

Cumulative quality assurance for the overall project is provided through the review and/or approval of documents that complete each phase. A Project Study Report or Project Scope Summary Report is approved at the end of the PID phase. The Environmental Document and Project Report are approved at the end of the PA&ED phase. Constructability and safety reviews (also held during PID and PA&ED phases) are conducted near the end of the Draft PS&E phase. Finally, the project is certified Ready to List at the end of the RTL phase.

The success of developing and using a PSQC Plan can be tied to three key areas: the empowerment of the PDT, continuous and effective communication, and the documentation of the tools and elements utilized along with their impacts on project deliverables. The following should be emphasized when developing a PSQC Plan:

- Coordinate Functional Unit Needs - The PDT develops a collaborative understanding of the project parameters and what information is required to produce each functional unit's deliverables.
- Submit to Functional Unit - The lead unit develops the required information and provides it to the functional units such that they can produce their deliverable within the parameters agreed to by the PDT.

- Follow-up with Functional Unit - Consistent follow up should occur between the lead and functional units to assure that the provided information meets the overall expectations agreed to by the PDT and Functional Unit.

A PQM will be used to document the PSQC Plan and track the individual elements/milestones. The PE would initially develop the PQM, with input from the PDT, at the beginning of a project for the needs and issues relevant and appropriate to the specific project. A PQM template has been developed for the PE's use. The PQM would be reviewed and approved by the PDT. The PQM is a living document that will be finalized at the end of each project phase. The PQM shall be updated based on information and experience gained during that phase and the anticipated needs of future project phases.

On some projects there is a time lag between completing one phase and beginning the next phase. Also project development staff occasionally changes between phases. For these reasons, at the start of each subsequent phase, the PQM, including PDT membership, will be reviewed and updated as needed.

## **Roles and Responsibilities**

A variety of NR personnel with a wide range of specialties and experience contribute to the development of the RTL throughout the project development process. The effort of all members in fulfilling their roles and responsibilities through participation and communication is critical to the success of the PDT effort and quality of the final RTL. Each member of the PDT is committed to accomplish the work with the quality promised in a timely and cost effective manner. Each member of the PDT is accountable for meeting their commitments.

### ***Project Engineer***

The Project Engineer (PE) is the Engineer of Record and is in responsible charge of the project. The PE provides work assignments and technical direction to the design staff assigned to the project as well as requesting support from functional units. The PE is responsible for the project information provided to the functional units for which they base their work, and integrating the functional unit product into the overall project. At RTL the PE certifies that the project meets the project development requirements, is clear of constraints, and has the necessary permit approvals.

### ***Design Engineer***

The Design Engineer (DE) of the lead unit is ultimately responsible for the technical quality of the project and is also the Task Manager of various Work Breakdown Structure (WBS) activities. The DE supervises the PE as well as other design staff assigned to the project. The DE tracks the progress of the project and the technical decisions made. They review the project design at various milestone points to assure the quality of the design effort prior to information being sent to functional units or District reviews. The DE approves the project as developed by the PE including the cost estimate and any required design exceptions. The DE approves the PE's certification that the project is RTL.

**Functional Specialist**

The Functional Unit technical specialist develops that unit's product for Functional PS&E. They understand how their specific product fits into the overall project, and are responsible for the quality of their individual product.

**Functional Manager**

The Functional Manager supervises the technical specialist as well as other functional unit staff assigned to the project. They approve the direction of the functional unit effort and assure the quality of the product delivered to the lead unit.

**Project Manager**

The Project Manager has the responsibility, delegated from the District Division Chief for Program and Project Management, to produce the results that were intended, meet schedules, stay within budget and keep the sponsors and customers satisfied. The Project Manager retains these responsibilities over the entire life of the project, and is the primary point of contact for the project sponsor. The Project Manager will exercise an active role in coordinating with the PDT members to assist with development of overall project quality.

**Task Manager**

The Task Manager participates in the development of the Project Management Plan and provides expert knowledge and analysis for the preparation of project scope, schedule and resources. The Task Manager commits to the scope, schedule and resource estimates of their portion of the Project Management Plan, as well as to delivery of their portion of the project workplan.

The Task Manager is responsible for resolving resource and schedule conflicts between the functional units. This allows for timely and informed decisions to be made at the lowest level, improving the efficiency and quality of the project. Any unresolved conflicts will be brought to the PM's attention for resolution.

For more information on the North Region Task Management Plan and Directive, please see: <http://northregion/ProgProjMgmt/NR/TaskMgtWeb/index.htm>

**Executive Management**

Support from Executive Management is critical to the successful implementation of the North Region QMP. This support includes:

- Timely decisions on unresolved issues elevated by the PDT
- Assess and accept/reject risk as identified in the PQM
- Dedicating adequate resources to update policies, procedures and directives
- Provide sufficient staffing levels for QMP implementation and future Service Level 2 delivery on all projects in the North Region
- Provide adequate training and tools for staff
- Evaluation of projects to provide feedback on process

## Implementation & Follow-up

Except for Minor B Projects, all projects (on-going and future) in the North Region will utilize the Quality Management Plan to develop their deliverables at the start of a new Project Development phase. The long-term goal in the North Region is for all projects to achieve Service Level 2 Delivery. Service Level 2 is DES-Office Engineer's reduced level of service, which provides delegation for the Districts to process RTL.

To facilitate the use of the NR QMP, representatives from each functional unit will be available to project delivery staff in the North Region to assist in developing the QMP for their projects and answer questions. A QMP Implementation Team will remain organized not only to provide support during the first two years of implementation but also to assess individual project and overall progress of the QMP and make adjustments to the plan as necessary.

Figure 1: Hierarchical Diagram

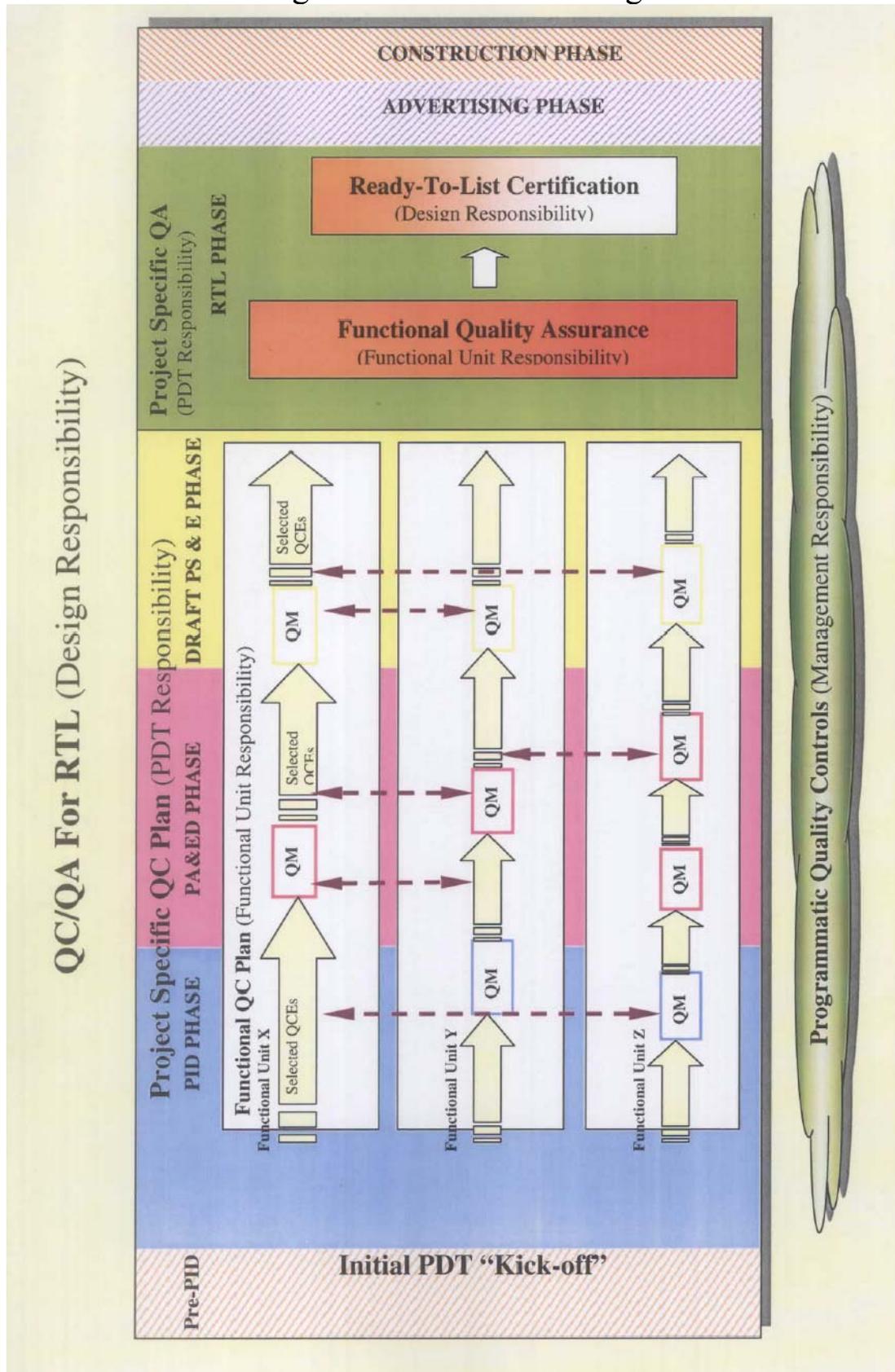


Illustration of the relationship between Quality Control and Quality Assurance and for the PID, PA&ED, Draft PS&E and RTL phases, and the interaction between the Lead Unit and Functional Units

## **Appendix A Lead Unit (Project Engineer) Project Specific Quality Control Plan**

The Lead Unit PSQC Plan addresses instilling quality throughout the various phases that make up the project development process from project identification through RTL. For each phase, a specific Quality Milestone (QM) is discussed followed by the Quality Control Elements (QCE) that build to that QM. Following the narrative are diagrams of the lead unit's PSQC Plan showing the interaction between the QCEs and the QMs for each of the four phases.

### **Project Initiation Document Phase**

**Begin Functional Unit Task:** Achieving this milestone provides a quality assurance that the project has been defined and that the Local Agencies and PDT understand and agree with its definition. The needs for specific functional unit products have been identified and requests have been initiated. The functional unit confirms that the request has been received and reviewed for completeness. The PE and technical specialist are both in agreement as to the product required. This milestone occurs at various times during the PID process; some requests will occur at the start of the phase (traffic forecast, accident analysis), and some later in the process (structural section, TMP data sheets). Each request initiates a cycle of coordinating specific needs, submitting the request/information and following up to ensure the appropriate information was relayed and received.

**PDT Kickoff Meeting:** The PDT meets to kick-off the PID phase. The PM, with input and concurrence from the project sponsor, Design Engineer (DE) or Advance Planning Engineer and PE will identify the appropriate Functional Units and local agencies for representation on the initial PDT and document the members selected. The Program Advisor, PM and DE will develop an initial document or charter covering expectations for scope, need & purpose, plus a preliminary workplan for presentation at the kickoff meeting. The initial PDT members will then discuss the project's scope, cost, schedule, and assigned resources to provide feedback.

**Organize PDT:** With input from the kickoff meeting, the PM will identify additional Functional Units and local agencies for representation on the team and document all PDT members selected. A schedule for future PDT meetings, whether held monthly, quarterly, or at other intervals, is established (usually at the kick-off meeting). A field review is conducted to familiarize the PDT with the project features. New members to the PDT, both internal and external, are brought up to date on the project status at the regularly scheduled PDT meetings.

**Set Baseline Project Quality Matrix (PQM):** The PQM is initially developed by the PE, with concurrence from the DE. The PQM should address the initial expectations of the project charter and is tailored to the type of project, the anticipated issues (environmental, structures, traffic, etc), and the experience level of personnel assigned. The PQM is presented to the PDT for their review and approval. The PQM would specifically cover the activities planned during the PID phase; activities anticipated during subsequent phases could also be identified and added to the PQM.

**PDT Concurrence:** The PDT confirms the customer's expectations for the project. The PDT understands and concurs with the project scope, cost, schedule, and resources.

**Local Agency Concurrence:** Prominent project features are presented to Local Agency representatives to confirm concurrence with project scope, cost, schedule, and resources/participation. Local agencies typically include the project stakeholders: the Regional Transportation Planning Agency, and cities and counties within the project limits. Regulatory agencies, local developers, and major traffic generators/destinations may also be involved depending on the type of project and funding sources.

**Initiate Functional Unit Task Requests:** The PE, or delegated staff, prepares a request to the functional unit specifying the product desired. The PQM lists the numerous functional unit requests that could be necessary during this phase. Prior to submitting the request, the DE reviews not only the request but also the project design to date that is the basis of the information in the request. The number of requests made prior to Management Concurrence varies with the size, type and complexity of the project being developed. Initiation of tasks will be proportionate to the information required to prepare for and present to management for concurrence, while some tasks will be requested after Management endorsement.

**Management Concurrence:** Achieving this milestone provides a quality assurance that the appropriate staff resources are assigned to this phase of the project; the project staff are familiar with the project features and issues, and are empowered to provide direction relative to their specialty; the PQM has been developed by the PE and reviewed and approved by the rest of the PDT; and the project stakeholders concur with the project's purpose, need and associated scope. This milestone provides an opportunity for Executive Management to confirm project viability and endorse further development.

**Coordinate/Follow-up with Functional Unit Needs:** Lead Unit staff discusses with the individual functional unit the specific information that it needs from the lead unit, and how that information will be used. Most functional units have developed request forms to elicit the information that they require. At a minimum, the PE should insure that the latest version of the request form is being used. Typically additional mapping accompanies the request. The PE should coordinate with the functional unit specialist to ensure the mapping is produced in a format and scale usable by the specialist. After requests are submitted, the PE follows up with the Functional Unit technical specialist to confirm that the information in the request is sufficient and there is a clear understanding of the product requested.

**Ensure Local Agency Involvement:** Proposed Changes to or addition of items that involve or impact agreements/participation of Local Agencies should be shared and documented to maintain their concurrence.

**Conduct Scheduled PDT Meetings:** The PDT should use their meetings to keep everyone informed of the status of the project, as well as introduce potential changes or new issues that need resolution. The Lead Unit can also call unscheduled meetings when the PE or Functional Senior feels they are warranted.

**Ensure All Preliminary Issues Are Documented/Addressed:** The PE, with corroboration of the DE, TM, and the PM, confirms that all preliminary issues and risks have been considered and presented in the draft PID such that it acts as a tool for Management to make an informed decision on viability and further development.

**Updated Project Presentation For Management Endorsement:** The Lead Unit and the PM will present the project to Management for concurrence. This can range from a sit down meeting with key decision makers to a formal presentation to all of Executive Management and is dependant on the project type, complexity and priority.

**Draft Circulation and Review:** Achieving this milestone provides a quality assurance that the draft Project Initiation Document contains the appropriate information to allow project stakeholders to decide whether to approve the project. The project assumptions have been reviewed and validated. The design elements have been reviewed and approved for conformance with design standards. The functional unit product delivered to the Lead Unit meets the project's needs and conforms to scope, cost and schedule. Delivery includes a quality assurance statement in the transmittal memo from the Functional Manager indicating that the product conforms to their QC/QA plan.

Achieving this milestone also provides a quality assurance that most, if not all functional deliverables have been received, that they have been reviewed both during development and at delivery and have been incorporated into a final draft that is ready for circulation. Prior to district circulation, a PE peer review, Branch & Office Chief review, PDT review, Safety and Constructability Review as appropriate are completed as outlined in the Baseline PQM. Finally, Local Agencies will have completed a review to assure that agreements outlined in the document match their expectations.

**Complete Functional Unit Requests/Review Draft Functional Deliverables:** The PE should confirm that all Functional Unit requests have been made and continue with ongoing reviews of draft deliverables to ensure they meet requirements set forth in the request.

**Preliminary Geometric Approval Drawings (GAD):** The proposed roadway geometrics are reviewed and approved. The PE has completed the design checklist included in Design Information Bulletin (DIB) 78-01. The PE has reviewed the design with the Headquarters Traffic Liaison, the Design Reviewer, and the Design Coordinator. Exceptions to design standards and ADA standards have been prepared and approved.

**Storm Water Data Report (SWDR) Review and Approval:** A SWDR for the PID phase is prepared identifying the Best Management Practices (BMP) proposed or required for permanent treatment of storm water, as well as the temporary BMPs proposed to be employed during construction. Cost estimates for these BMP have been developed. The concepts in the SWDR are discussed with representatives from the appropriate Regional Water Quality Control Board for their concurrence. The SWDR is reviewed and approved by the District Storm Water Coordinator, the Project Manager and representatives from Landscape Architecture and Maintenance.

**Value Analysis (VA) Study:** If appropriate, a VA Study is conducted to provide an independent review of the proposed alternatives. Additional alternatives that provide cost savings or performance enhancements are suggested. After concurrence by the stakeholders, the PDT incorporates the new alternatives.

**Assemble Draft for Review:** A draft version of the PID is prepared for a number of different reviews. The first is a peer review done by an experienced PE. This is followed by reviews by the Branch Chief and Office Chief, or their designates. A PDT review by all members follows, focusing on how the elements related to their specific specialty fit with the project as a whole. A Safety Review is completed, followed by the District/Constructability Review. With each review, comments and their resolution should be documented and placed in the project files.

**Local Agency Review:** Proposed improvements are presented to Local Agency representatives for their comments and ultimately their concurrence. Preliminary cost estimates and construction schedule are provided. Impacts to local facilities and proposed mitigation are discussed, including issues requiring maintenance by the Local Agency. Improvements requiring a Cooperative Agreement are identified. Conceptual Cooperative Agreements, Maintenance Agreements, and Utility Sharing Agreements are included.

**Document Approval and Signature:** Achieving this milestone provides a quality assurance that the document is complete, has gone through a number of quality assurance reviews, that Local Agency concerns have been addressed, comments have been documented and resolved, that a Management Circulation has been completed and final comments have been addressed. Circulation for signature provides an approved document that is ready for distribution.

**Finalize Outstanding Functional Unit Deliverables:** Any deliverables that have not been completed must be finalized before document approval and signature.

**Address Local Agency concerns:** Concerns raised during review must be resolved prior to document approval and signature.

**Incorporate Comments and Document Decisions with Comment Resolution Table:** Again, all comments should be addressed and their resolution documented by the PE. A comment resolution table (or similar documentation) is distributed to the reviewers for their information and satisfaction.

**Circulate for Management Review/Complete Final Comment Resolution:** Management should be presented with a document for final review prior to signature circulation. Any comments should be resolved and a final document prepared for signature.

**Circulate Document for Signature:** The District Director should be presented with a completed document and a summary of major issues resolved during review.

**Project Initiation Document (PID):** Achieving this milestone provides a quality assurance that the PID identifies alternatives and improvements that fully meet the project's purpose and need at a reasonable cost. The project's potential effects on the environment have been identified and possible mitigation determined.

**Update Project Quality Matrix (PQM):** The matrix, prepared at the start of the PID phase and tracked during the phase, is reviewed for performance and applicability during the PID phase. The plan is updated as necessary.

**Circulate Approved Copies:** Approved copies of the report should be distributed to the appropriate recipients. A list is maintained by the District Advanced Planning unit.

**Forward Project Binders & Updated PQM to Responsible Design Unit:** If a design unit has not been identified, Advanced Planning retains all records until a unit is assigned.

**PID Complete:** This completes the PID phase of the Project Development process.

## **Project Approval & Environmental Document Phase**

**Management Concurrence:** Achieving this milestone provides a quality assurance that the appropriate functional units are represented on PDT. Any new staff assigned to the project have been introduced. The PQM has been updated for the PA&ED phase based on information learned during the PID phase. The current project stakeholders concur with the project's purpose, need and associated scope.

**Organize PDT:** The PDT meets to kick-off the PA&ED phase. The PDT membership is reviewed to assure continued representation by all functional areas involved. New members to the PDT are introduced and their role discussed. The project's scope, cost, schedule and planned resources are reviewed. The PDT meeting schedule is established and a field review scheduled.

**Validate Project Quality Matrix (PQM):** The PQM developed during the PID Phase is reviewed for validity and updated, at a minimum, for activities planned during the PA&ED Phase.

**PDT Concurrence:** The PDT confirms the customer's expectations for the project. The PDT understands and concurs with prior commitments for the project scope, cost, schedule, and resources. Potential changes shall be evaluated by the PDT.

**Local Agency Concurrence:** The proposed improvements are presented to Local Agency representatives to confirm concurrence with the proposed scope, cost, schedule and resources. Occasionally new local representatives are elected, or new regulations are adopted by an agency with jurisdiction over a component of the project. In these instances, renewed concurrence with the project features is critical for quality.

**Begin Functional Unit Task:** Achieving this milestone provides a quality assurance that the request and appropriate supporting information has been transmitted to the functional unit. As with the PID phase, this milestone occurs at various times during the PA&ED phase.

**Coordinate Functional Unit Needs:** The PE and functional unit specialist need to communicate prior to the request being prepared/submitted. Typically request made during the PA&ED phase require more detail to be provided to the functional units. Good coordination ensures that the appropriate needed information is identified and submittal formats and scales are acceptable. The PQM includes a listing of possible functional unit requests as prompts for the PE.

**Submit Functional Unit Task:** The PE prepares the request to the functional unit specifying the product desired. The design to date, which is the basis for the detailed information provided to the functional units, must be reviewed by the Functional Manager prior to the request being submitted.

**Follow-up:** Similar to the QCE in PID phase, good communication between the PE and the functional unit specialist is essential for quality.

**Complete Functional Unit Task:** Achieving this milestone provides a quality assurance that the functional unit product delivered to the lead unit meets the project's needs and conforms to the scope, cost and schedule. The product will be delivered with a quality assurance statement from the Functional Manager indicating that the product conforms to their QC/QA plan. As with the PID phase, this milestone occurs at various times during the PA&ED phase.

**Review Draft Functional Unit Task:** The PE reviews a draft version of the product for conformance with the request and the project's scope.

**Receive Functional Unit Deliverable:** The PE receives the final product from the functional unit, with any previously requested revisions included. After reviewing deliverables received the PE incorporates the functional unit's deliverable into the overall project.

**Ready to Circulate:** Achieving this milestone provides a quality assurance that the Project Report (or Draft Project Report) contains the appropriate information to allow project stakeholders to decide whether to advance the project to the design and construction phases. The report is complete, and contains the necessary supporting data developed by the functional units. The report and supporting information has been reviewed by the PDT. The intermediate approvals (VA implementation, design exceptions) have been obtained, as needed. The cost estimate captures the items of work and includes contingencies appropriate for the estimate's level of detail.

**Geometric Approval Drawings:** The proposed roadway geometrics developed during the PA&ED phase are reviewed and approved. The PE has reviewed the updated geometrics with the Headquarters Traffic Liaison, the Design Reviewer, and the Design Coordinator. Any additional exceptions to design standards and ADA standards have been prepared and approved.

**Storm Water Data Report Review and Approval:** A SWDR for the PA&ED phase is prepared. The information and assumptions contained in the PID version of the SWDR are reviewed and updated. Cost estimates for the proposed BMP are updated. Any significant changes to the previously approved concepts are discussed with representatives from the appropriate Regional Water Quality Control Board for their concurrence. The SWDR is reviewed and approved by the District Storm Water Coordinator, the Project Manager and representatives from Landscape Architecture and Maintenance.

**Value Analysis Study:** If appropriate, a VA Study is conducted to provide an independent review of the proposed alternatives.

**Draft Cooperative Agreement Conceptual Approval:** Project features which will require a Cooperative Agreement, a Maintenance Agreement, or a Freeway Agreement are identified. These features are discussed with the affected agency and an agreement-in-principle negotiated. A draft agreement, as appropriate, is prepared for inclusion in the Project Report.

**Reviews:** A draft version of the Draft Project Report or Project Report (depending on the type of environmental document prepared) is reviewed by the lead unit and the PDT prior to circulation. The first review is a peer review done by an experienced PE. This is followed by reviews by the DE and Office Chief, or their designates. Finally, the PDT members review the document, focusing on how the elements related to their specific specialty fit with the project as a whole.

**Comment Resolution:** Comments received during the reviews are documented by the PE along with their proposed disposition. This comment resolution table is distributed to the reviewers for their information and satisfaction.

**Project Approval/Environmental Document (PA&ED):** Achieving this milestone provides a quality assurance that the Project Report identifies improvements that fully meet the project's purpose and need at a reasonable cost. The project's effects on the environment have been evaluated in accordance with applicable environmental regulations and potential adverse impacts, where unavoidable, have been mitigated to an acceptable level. The project roadway geometrics have been reviewed and any necessary exceptions approved. Project staging issues have been resolved and an updated cost estimate prepared. The right-of-way needs and utility impacts, along with their associated costs, have been identified.

**Reviews:** A draft version of the report and the preliminary plans are distributed for concurrent review. Constructability review is conducted as well as a districtwide review.

**Comment Resolution:** Comments received during the reviews are documented by the PE along with their proposed disposition. This comment resolution table is distributed to the reviewers for their information and satisfaction.

**Update Project Quality Matrix (PQM):** The PQM, updated at the start of the PA&ED phase and tracked during the phase, is reviewed for performance and applicability during the PA&ED phase. The plan is updated, if necessary.

### **Draft Plans Specifications & Estimate Phase**

**Management Concurrence:** Achieving this milestone provides a quality assurance that the appropriate functional units are represented on PDT. Any new staff assigned to the project have been introduced. The PQM has been updated for the PA&ED phase based on information learned during the PID phase. The current project stakeholders concur with the project's purpose, need and associated scope.

**Organize PDT:** The PDT meets to kick-off the design phase. New members to the PDT are introduced and their role discussed. The project's scope, cost, schedule and planned resources are reviewed. The PDT meeting schedule is established and a field review scheduled.

**Validate Project Quality Matrix (PQM):** The PQM updated during the PA&ED Phase is reviewed for validity and updated, at a minimum, for activities planned during the design Phase.

**PDT Concurrence:** The PDT confirms the customer's expectations for the project. The PDT understands and concurs with the project scope, cost, schedule, and resources.

**Local Agency Concurrence:** The proposed improvements are presented to Caltrans Management and Local Agency representatives to confirm concurrence with the proposed scope, cost, schedule and resources.

**Begin Functional Unit Task:** Achieving this milestone provides a quality assurance that the request and appropriate supporting information has been transmitted to the functional unit. As with the PID & PA&ED phases, this milestone occurs at various times during the Design phase.

**Coordinate Functional Unit Needs:** The PE and functional unit specialist need to communicate prior to the request being prepared/submitted. Request made during the design phase are typically for products to be inserted directly into the plan set (electrical plans, signing and striping plans). The PQM includes a listing of possible functional unit requests as prompts for the PE.

**Submit Functional Unit Task:** The PE prepares the request to the functional unit specifying the product desired. The design to date, which is the basis for the detailed information provided to the functional units, must be reviewed by the DE prior to the request being submitted.

**Follow-up:** Good communication between the PE and the functional unit specialist is essential for quality.

**Intermediate Checkpoints:** Achieving this milestone provides a quality assurance that the proposed design features have been reviewed and approved and that quality plan production is under way. The preliminary plans from the functional units have been reviewed for conformance with the overall product. Preliminary staging plans have been developed to sufficient detail to verify constructability. Utility conflicts have been identified and conflict maps sent to the affected utility companies. The preliminary plans and cross sections (60% plans) have been reviewed and the comments resolved.

**Review Functional Unit Progress:** The functional units provide a preliminary version of their final product to design for review. Some functional units product final plans, and others prepare contract documents or acquire permits. The PE reviews the functional unit's preliminary product to ensure conformance with the overall project.

**Final Geometric Approval Drawings:** The final proposed roadway geometrics are reviewed and approved. The PE has reviewed the updated geometrics with the Headquarters Traffic Liaison, the Geometric Reviewer, and the Project Development Coordinator. Any additional exceptions to design standards and ADA standards have been prepared and approved.

**Execute Cooperative Agreement:** The Cooperative Agreement, if required, is prepared and reviewed by Caltrans and the local agency. Comments are resolved and the agreement is executed. Any other agreements that are required, a Maintenance Agreement or a Freeway Agreement, are prepared and approved.

**Reviews:** The preliminary plans and cross sections are reviewed by the lead unit and the PDT prior to circulation. The first review is a peer review done by an experienced PE. This is followed by reviews by the DE and Office Chief, or their designates. Finally, the PDT members review the document, focusing on how the elements related to their specific specialty fit with the project as a whole. After the PDT review, the comments are resolved. The plans and cross sections are circulated for concurrent safety and constructability reviews.

**Comment Resolution:** Comments received during the reviews are documented along with their disposition proposed by the responsible party. This comment resolution table is distributed to the reviewers for their information and satisfaction.

**Functional Unit Delivery:** Achieving this milestone provides a quality assurance that the functional units have completed their work and delivered their product to the lead unit. Accompanying the delivery is their quality assurance certification. The PE has reviewed the draft product prior to delivery, and any comments have been resolved by the functional unit. The PQM has been updated.

**Review Draft Functional Unit Delivery:** The PE reviews a draft version of the functional unit final product. The PE ensures that the product conforms to the scope and cross checks with the other plan sheets. The draft permits contains provisions that are buildable and appropriate for the project. The functional units resolve the comments.

**Functional Unit Delivery Meeting:** A meeting is held with the various functional units providing a product for the RTL phase. The components of the various products are discussed to ensure that the individual pieces fit together.

**Update Project Quality Matrix (PQM):** The PQM, updated at the start of the design phase and tracked during the phase, is reviewed for performance and applicability during the design phase. The plan is updated, if necessary.

## Ready to List Phase

**Initiate North Region Office Engineer (NROE):** Achieving this milestone provides a quality assurance that a complete, quality set of plans and estimates, reports, specialty specifications, and supporting information is delivered to NROE.

**Incorporation of Functional Unit Delivery:** The PE incorporates the functional unit's product into the overall plans. The PE reviews the plans as a whole, ensuring consistency and continuity between the design plans and the various functional unit products. The required permits have been secured, or conditionally approved pending paperwork by the regulatory agency. Final Utility Plans have been received from the utility companies and all conflicts resolved. The right-of-way contracts are signed and any required temporary easements cover

the anticipated construction period. The PE reviews the special provisions prepared by the functional units for conformance with the project scope.

**Storm Water Data Report (SWDR) Review and Approval:** The final SWDR is prepared. The information and assumptions contained in the PA&ED version of the SWDR are reviewed and updated. Cost estimates for the proposed BMPs are updated. Any significant changes to the previously approved concepts are discussed with representatives from the appropriate Regional Water Quality Control Board for their concurrence. The SWDR is reviewed and approved by the District Storm Water Coordinator, the Project Manager and representatives from Landscape Architecture and Maintenance. The PE signs and seals the final report.

**Reviews:** The preliminary plans, estimate and cross sections are reviewed by the lead unit and the PDT prior to submittal to NROE. The first review is a peer review done by an experienced PE. This is followed by reviews by the DE and Office Chief, or their designates. Finally, the PDT members review the document, focusing on how the elements related to their specific specialty fit with the project as a whole.

**Comment Resolution:** Comments received during the reviews are documented along with their disposition proposed by the responsible party. This comment resolution table is distributed to the reviewers for their information and satisfaction.

**Validate Project Quality Matrix (PQM):** The PQM updated during the design phase is reviewed for validity and updated for activities planned during the RTL phase.

**Complete Functional Unit tasks:** Achieving this milestone provides a quality assurance that all of the functional unit components are completed. The package has been reviewed by the lead unit and the PDT for conformance with the project scope and cost.

**Reviews:** The first review is a peer review done by an experienced PE. This is followed by reviews by the DE and Office Chief, or their designates. Finally, the PDT members review the document, focusing on how the elements related to their specific specialty fit with the project as a whole.

**Comment Resolution:** Comments received during the reviews are documented along with their disposition proposed by the responsible party. This comment resolution table is distributed to the reviewers for their information and satisfaction.

**Draft PS&E Circulation:** Achieving this milestone provides a quality assurance that complete, quality draft plans, specifications and estimate are ready for circulation to the district for final reviews. The plans are complete and in agreement with the estimate. The specifications include all of the nonstandard items as well as the specifications prepared by functional units. The draft permits and Right of Way (R/W) certification indicate that constraints are cleared or almost cleared. The PE has reviewed the draft specifications, permits and R/W certification to assure consistency and continuity.

**Reviews:** The first review is a peer review done by an experienced PE. This is followed by reviews by the DE and Office Chief, or their designates. Finally, the PDT members review

the document, focusing on how the elements related to their specific specialty fit with the project as a whole.

**Comment Resolution:** Comments received during the reviews are documented along with their disposition proposed by the responsible party. This comment resolution table is distributed to the reviewers for their information and satisfaction.

**Review Draft Permits:** The draft permits are reviewed by the PDT for conformance with the plans, specifications and estimate. Proposed permit requirements and restrictions are reviewed to ensure that the requirements are contained in the PS&E and are biddable and buildable.

**Review R/W Certification:** The R/W Certification is reviewed by the PE for conformance with the plans, specifications and estimate. The R/W contracts are reviewed to verify that any commitments made to property owners have been included in the PS&E.

**RTL Certification:** By certifying that the project is ready to list, the lead unit is assuring that the PS&E was prepared in accordance with the NR QMP, that the project estimate conforms to the programmed amount, and that the project is biddable, buildable, and cleared of all constraints. The draft PS&E was distributed for reviews, and the comments resolved. The final PS&E produced and readied for transmittal to headquarters for advertisement.

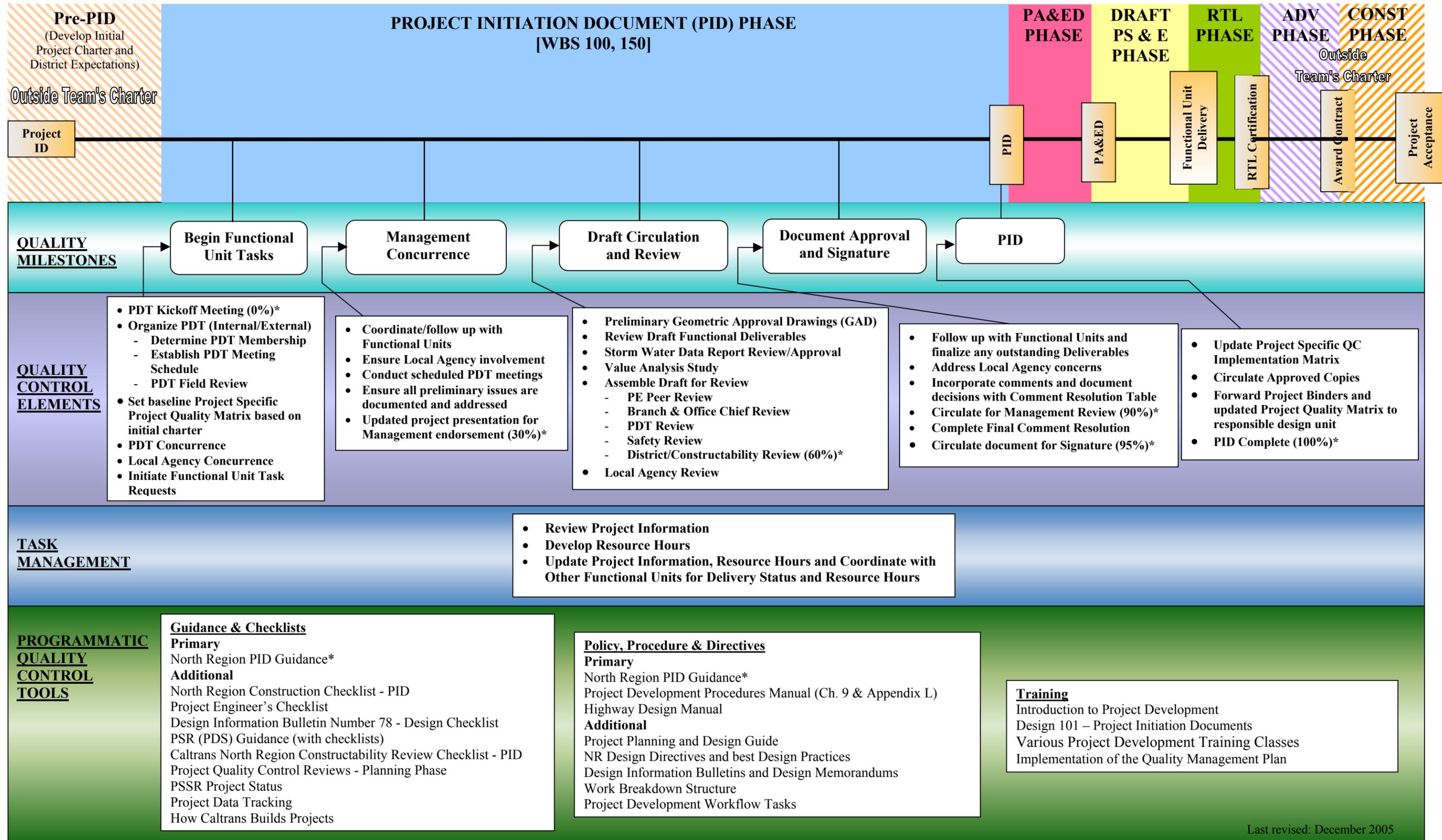
**Reviews:** The draft PS&E is distributed for concurrent review. Safety reviews and constructability reviews are conducted as well as a districtwide review.

**Comment Resolution:** Comments received during the reviews are documented by the PE along with their proposed disposition. This comment resolution table is distributed to the reviewers for their information and satisfaction.

**Complete Project Quality Matrix (PQM):** The PQM that was begun at project initiation is completed. The PDT meets to review the completed PQM and evaluates the level of quality ultimately instilled into the project. Decisions where opportunities to instill quality were redirected based on decisions made by the PDT, input from Executive Management, etc., are identified to provide lessons learned. The completed PQM is converted to an electronic format and a link to it is provided on a website (to be determined). The completed PQM's can be used as examples for future projects.

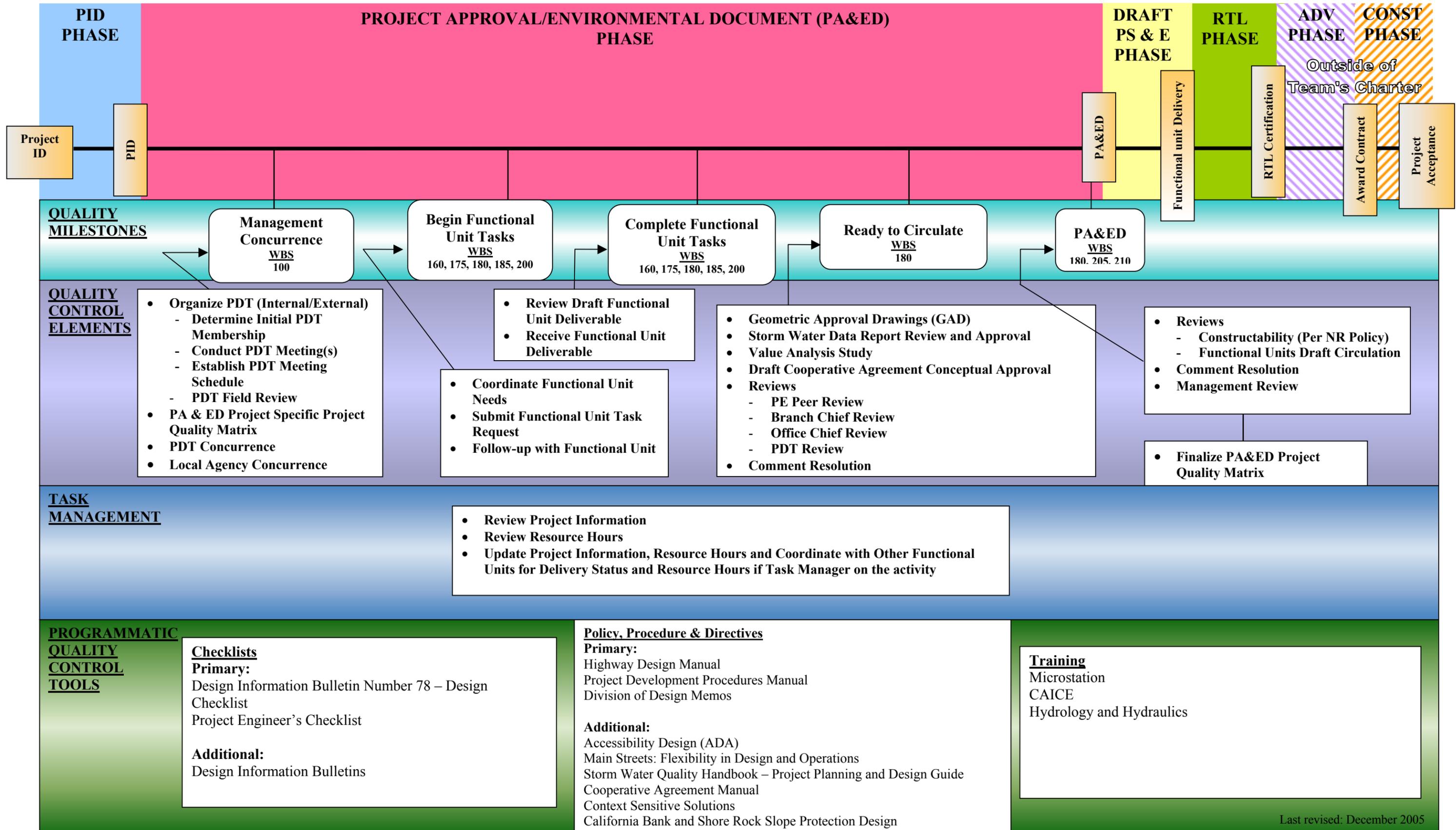
# NORTH REGION QUALITY MANAGEMENT PLAN

## Lead Unit Project Specific Quality Control Plan -PID PHASE-



# NORTH REGION QUALITY MANAGEMENT PLAN

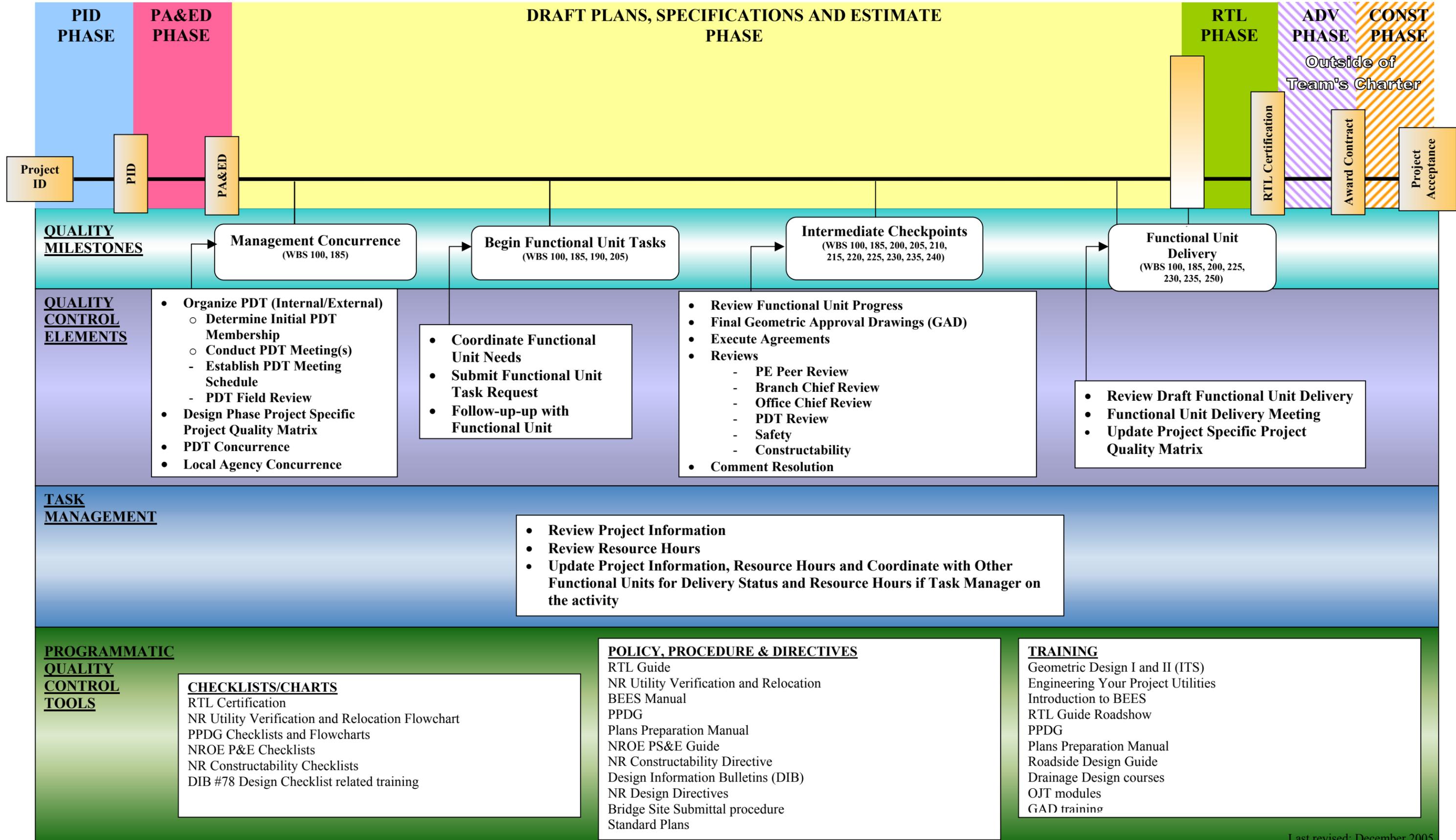
## Lead Unit Project Specific Quality Control Plan -PA&ED PHASE-



# NORTH REGION QUALITY MANAGEMENT PLAN

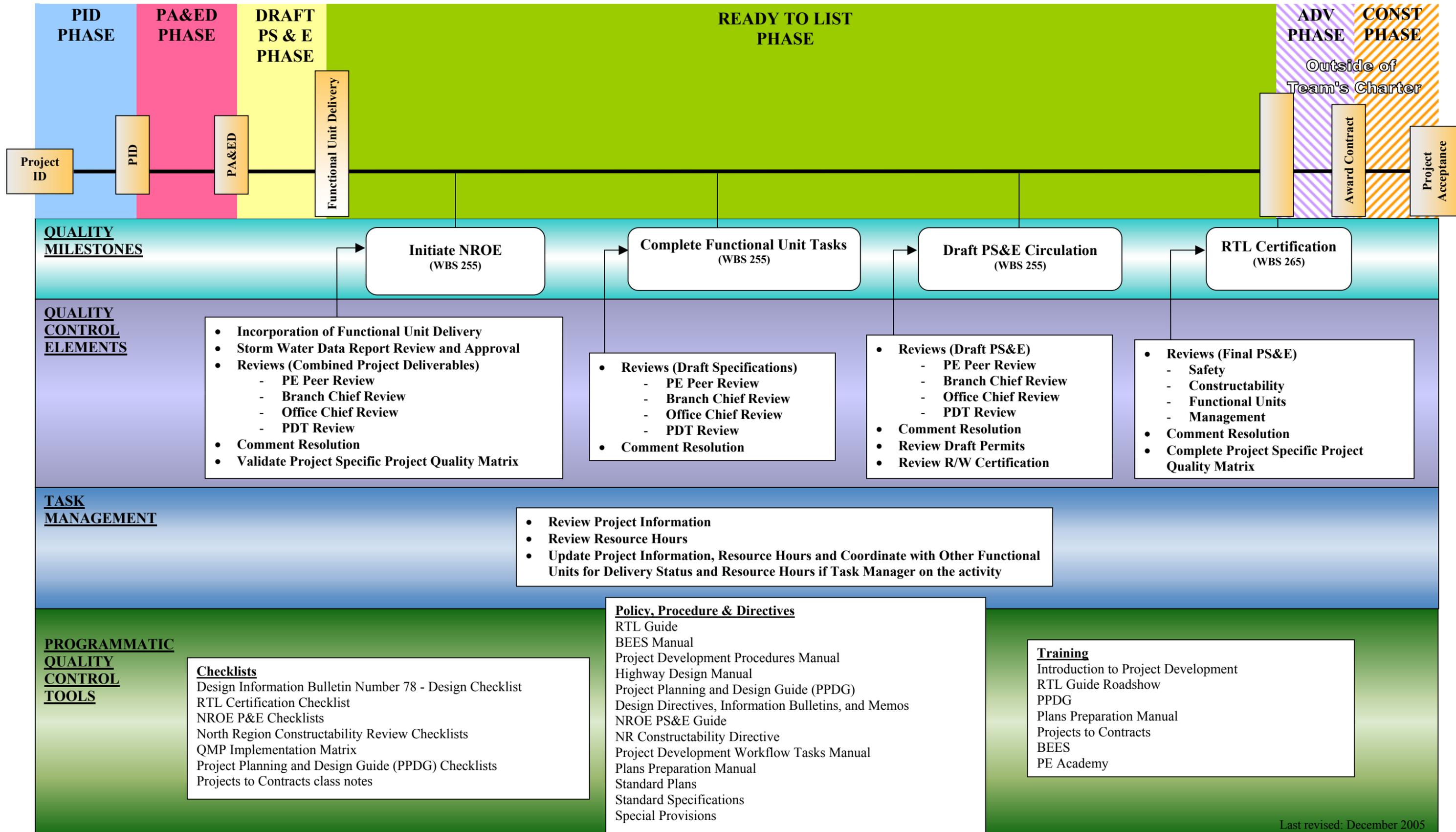
## Lead Unit Project Specific Quality Control Plan

-DRAFT PS & E PHASE-



# NORTH REGION QUALITY MANAGEMENT PLAN

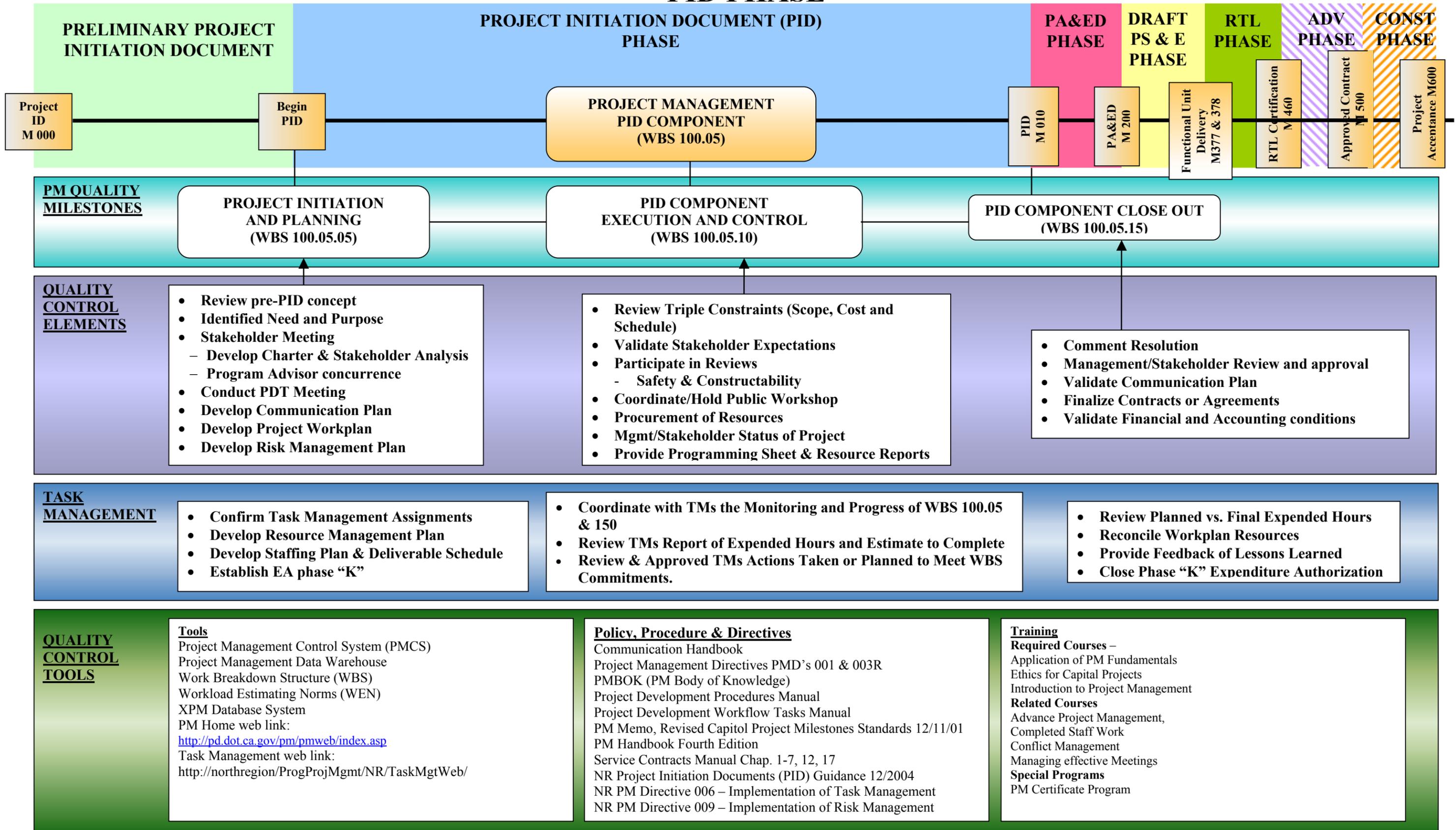
## Lead Unit Project Specific Quality Control Plan -RTL PHASE-



# NORTH REGION QUALITY MANAGEMENT PLAN

## PROJECT MANAGEMENT QUALITY CONTROL PLAN

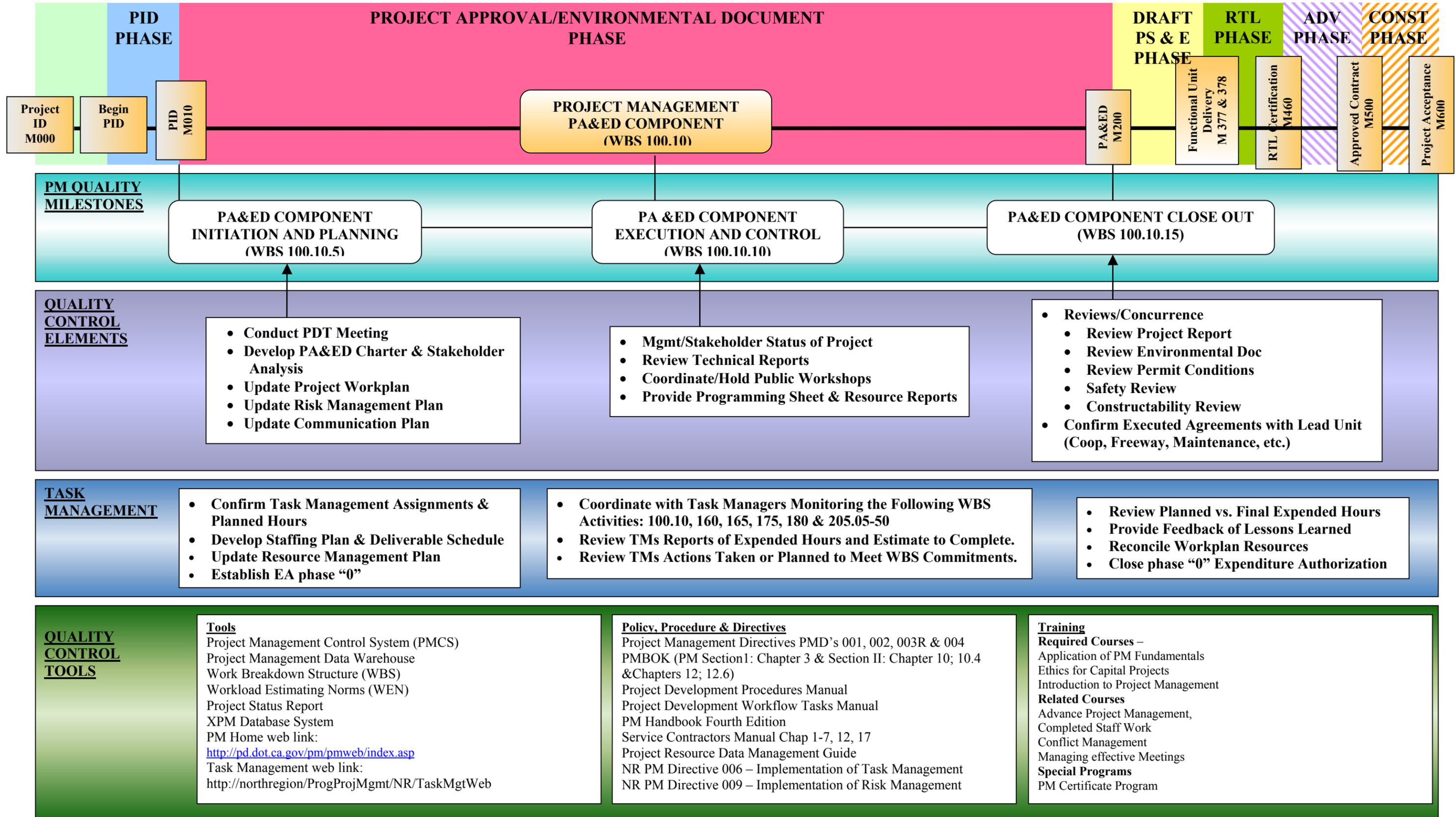
### PID PHASE



# NORTH REGION QUALITY MANAGEMENT PLAN

## PROJECT MANAGEMENT QUALITY CONTROL PLAN

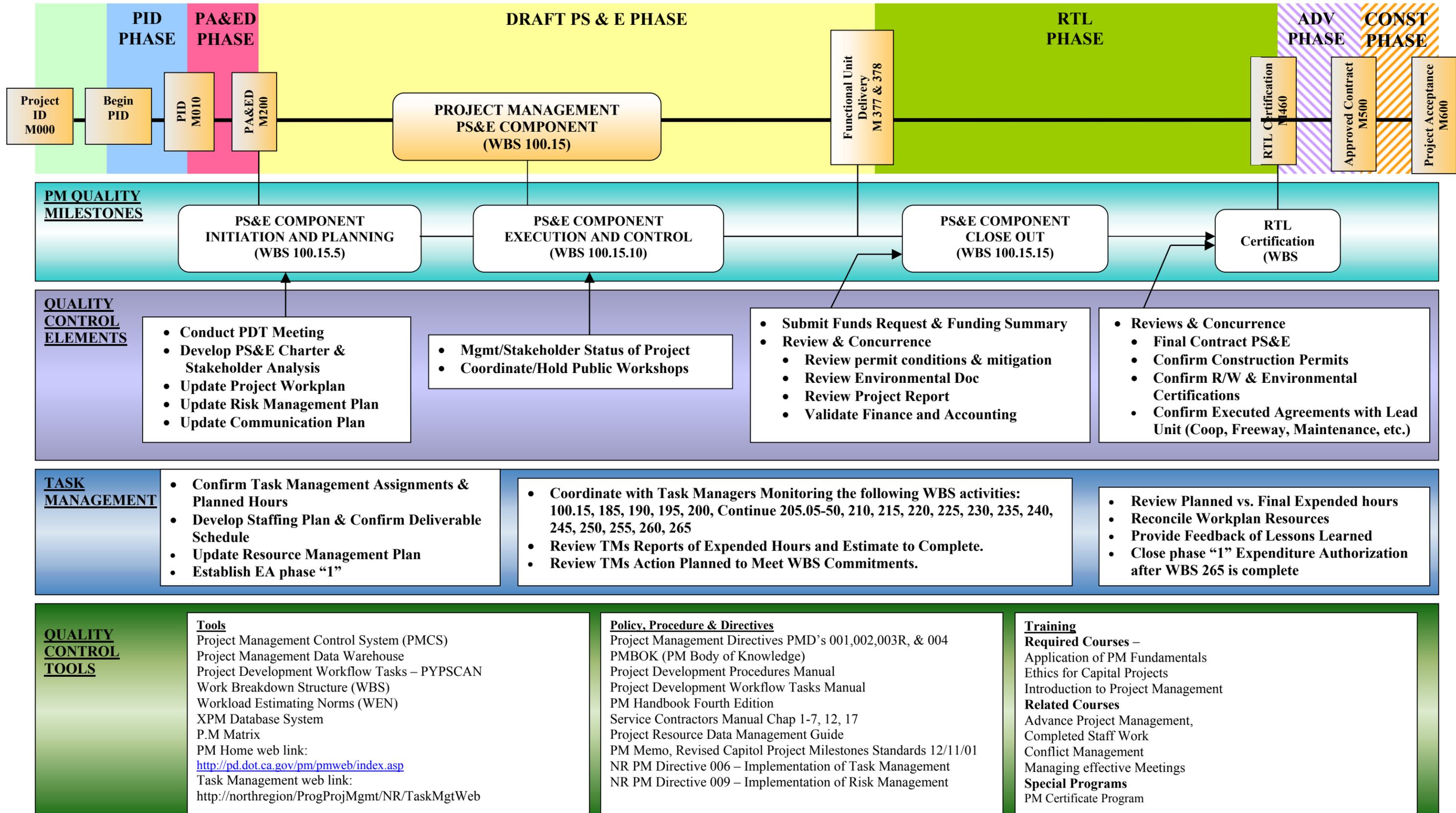
### PA&ED PHASE



# NORTH REGION QUALITY MANAGEMENT PLAN

## PROJECT MANAGEMENT QUALITY CONTROL PLAN

### DESIGN AND RTL PHASE



## Quality Control Plan – North Region Environmental

### **Introduction**

This section of the Quality Management Plan addresses the milestones, elements, and tools utilized by Environmental Management to assist in a quality Ready to List (RTL)/Plans, Specifications, and Estimates (PS&E) package.

### **Flowchart**

A Quality Control Plan flowchart for North Region Environmental has been developed to include the key milestones and corresponding elements and tools, which Environmental utilizes to accomplish project delivery leading to RTL. The contents of the flowchart are described below.

#### **Project Initiation Document Phase**

During the Project Initiation Document (**PID**) Phase, preliminary environmental

studies begin when the Design Unit submits the Environmental Study Request (**ESR**)<sup>1</sup>. The kick-off Project Development Team (**PDT**) meeting is an important tool to assist environmental staff in becoming familiar with the initial project scope and team members.

A Preliminary Environmental Analysis Report (**PEAR**) is a key milestone and assists in anticipating the probable environmental impacts, mitigation, studies and documentation required to satisfy State and Federal regulations and laws. The PEAR recommends possible changes to reduce project impacts. The Hazardous Waste Unit also conducts an Initial Site Assessment (**ISA**) to determine possible hazardous waste issues within the project area. A Preliminary Site Investigation (**PSI**) may be necessary if the project is at higher risk for encountering hazardous waste issues. The hazardous waste preliminary assessment will be identified in the PEAR.

In this phase, the tools<sup>2</sup> utilized are identified in the PEAR and include estimates of staff resource hours, mitigation costs, and milestones.

#### **Project Approval/Environmental Document Phase**

During the Project

Approval/Environmental Document (**PA/ED**) Phase, another ESR is submitted by the Design Unit, which provides a refined project scope. This scope should be of sufficient detail to perform the environmental studies needed to determine the environmental impact of the project and the preparation of the Environmental Document (**ED**). A critical aspect of the ESR is accurate mapping and project scope (refer to the ESR Directive signed by Kome Ajise, dated February 20, 2004), which provides guidance and procedures for the ESR

<sup>1</sup> The ESR serves multiple purposes throughout project delivery.

<sup>2</sup> Many of the tools described can be located at <http://www.dot.ca.gov/ser>.

contents/attachments. The milestones necessary to move forward with project delivery are the Draft Environmental Document (**DED**) and final **ED**, or the completed Categorical Exclusion (**CE**). The elements of completing either an ED or CE (excluded from developing an ED for public circulation) include conducting studies/assessment, resource agency coordination, document preparation, peer review, functional review, FHWA approval, and public circulation.

In this phase, the tools utilized include the North Region Environmental Document Quality Control Plan for **IS/EAs** and **EIS/EIRs** (included in this section). This Plan involves steps to ensure the quality of the final document. The EIS Review Procedures Flowchart (also included in this section) identifies the critical steps necessary to ensure completion and quality of the ED. The Standard Environmental Reference (**SER**) provides statutory and regulatory requirements for environmental documents and technical studies, as well as procedures for processing environmental documentation for both local assistance and Caltrans projects. The SER sets forth document content and format, as required by law or regulation, and recommended format, if not specified by law or regulation.

### **Design Phase**

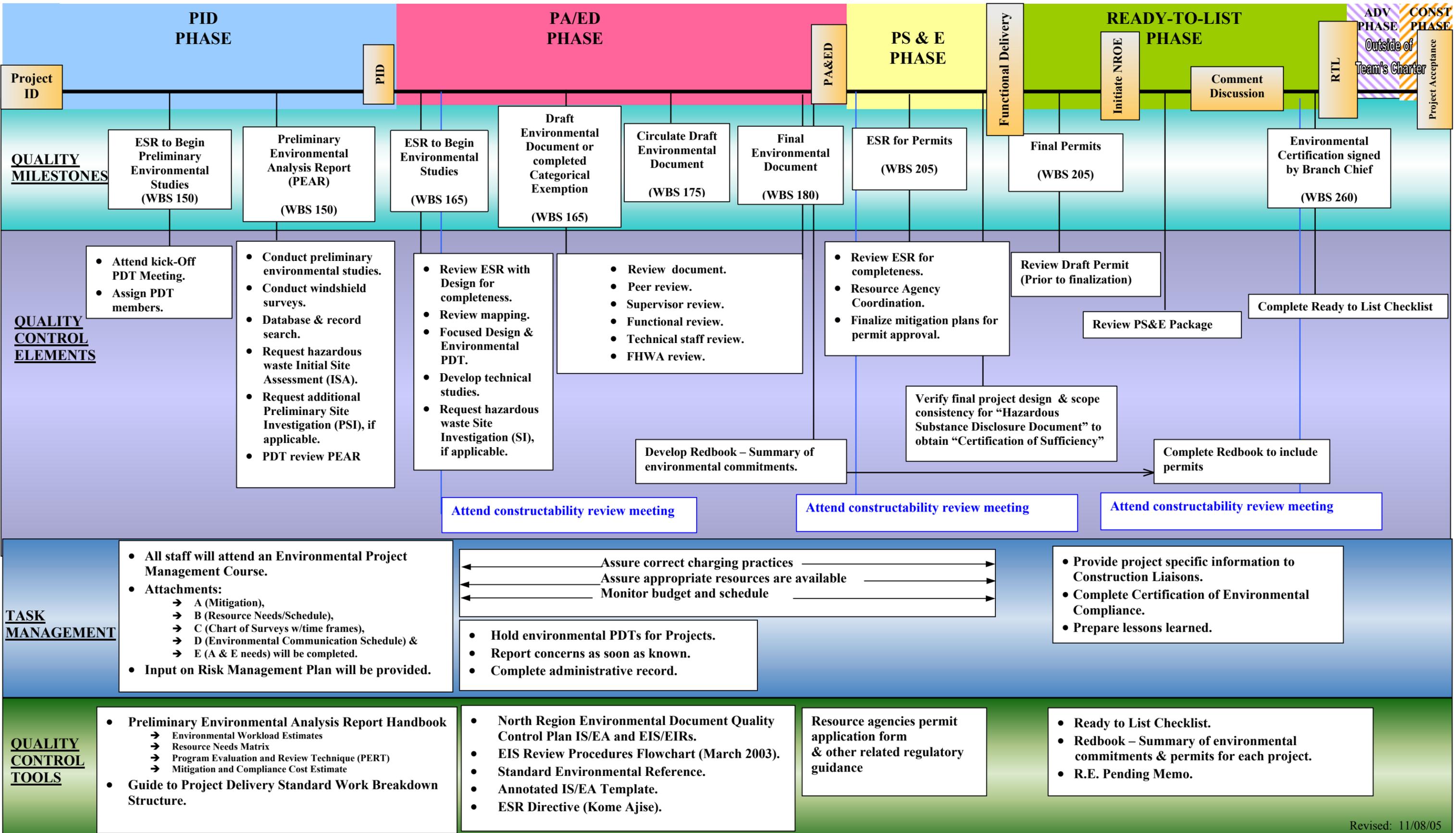
During the Design Phase, the Design Unit will submit an ESR for permits, if applicable to the project. The ESR and accompanied information is reviewed for completeness prior to submittal to the resource/permitting agency. Final mitigation plans are developed during this phase. Permit applications are completed and submitted to applicable resource agencies for review.

The project scope is reviewed and verified for final project design so that the Hazardous Substance Disclosure Document can be completed by Hazardous Waste Unit for Certification of Sufficiency.

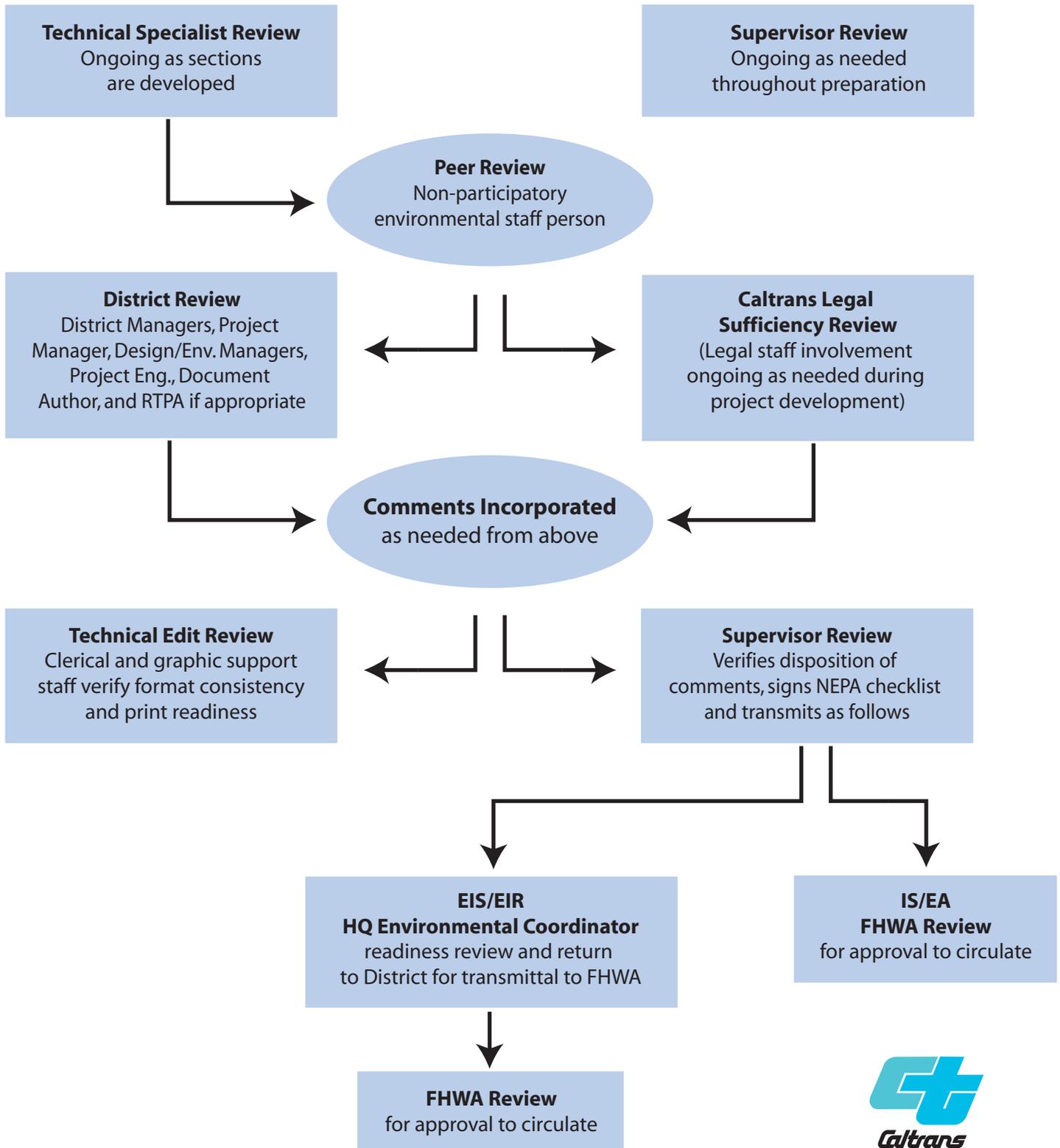
### **Ready to List**

During the RTL Phase, functional units will review the draft permit(s) for accurate project scope and conditions and the Project Manager will sign the final permit(s) along with the resource agency signature. When the PS&E package is circulated for functional review, all environmental commitments, mitigation, and monitoring requirements will be reviewed to ensure they are contained within the package.

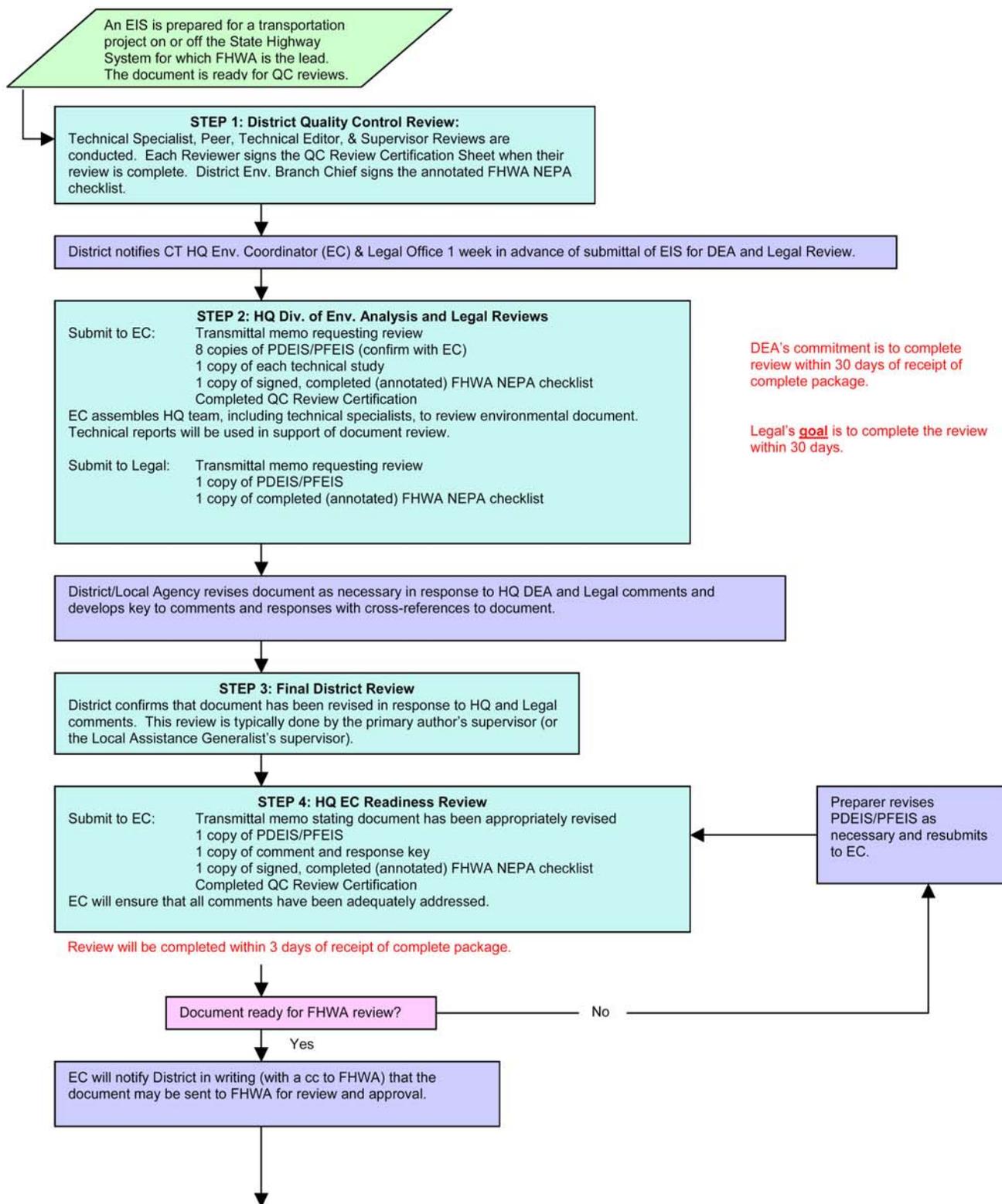
In this phase, the tools utilized include the Ready to List Checklist (included in this section) which assists in the completion of the Environmental Certification (included in this section) and is signed by the Environmental Branch Chief. The Environmental Certification is a required element of the RTL certification and verifies that environmental commitments, mitigation and permits are complete and are included in the project PS&E. Other tools include the “Redbook”, a summary of environmental commitments and permits for each project, or the Resident Engineer (**RE**) Pending Memo for less complex projects.



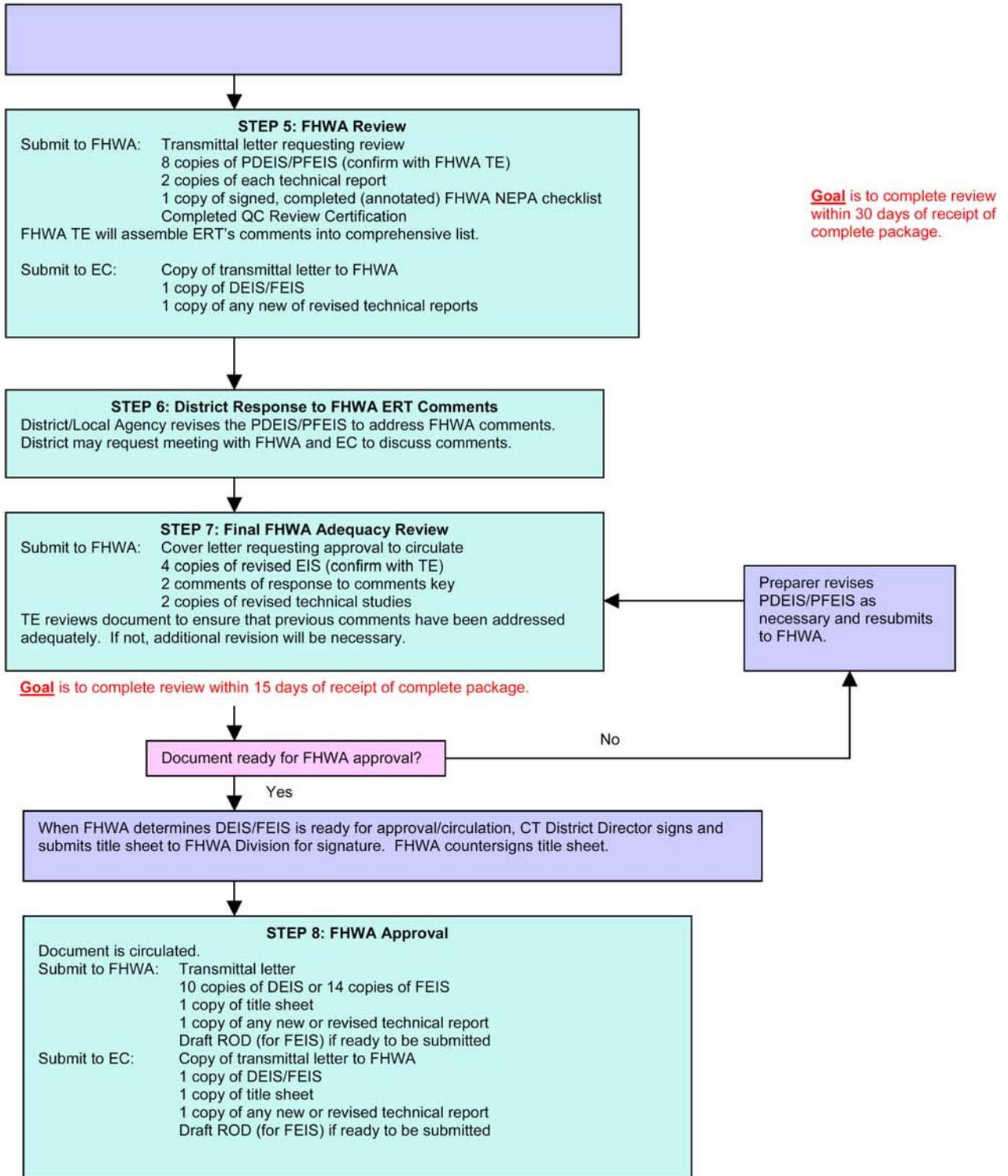
# NORTH REGION ENVIRONMENTAL DOCUMENT QUALITY CONTROL PLAN IS/EAs and EIS/EIRs



## Revised EIS Review Procedures March 2003



Revised EIS Review Procedures  
March 2003

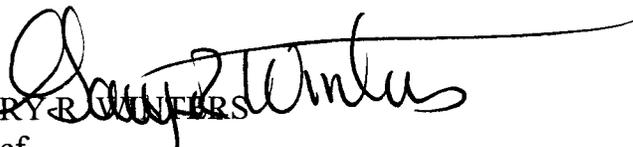


# Memorandum

*Flex your power!  
Be energy efficient!*

To: DISTRICT DIRECTORS  
DEPUTY DISTRICT DIRECTORS  
Environmental Analysis, Design,  
Project Management, Construction  
DIVISION CHIEFS  
Engineering Services, Design,  
Project Management, Construction

Date: June 21, 2004

From:   
GARY R. WINTERS  
Chief  
Division of Environmental Analysis

Subject: Environmental Certification

On May 3, 2004, John McMillan, Division of Engineering Services sent out the new Office Engineer's RTL Guide which defines state, federal and policy requirements for PS&E and Construction Contract Advertisement and Award. The new guidelines' RTL Certification Form now requires an Environmental Certification (memo and forms attached).

The Environmental Certification was developed to ensure environmental commitments are properly incorporated into PS&E, construction contracts, and activities on the ground. The Certification is intended to assist the Department in meeting project specific environmental commitments made in project environmental documents, agency consultations, and permit negotiations.

By signing the Environmental Certification form the Environmental Office Chief:

- Certifies that all environmental commitments that belong in the project PS&E are included;
- Certifies that all actions in the PS&E are covered in the approved environmental documentation and that the documentation remains valid for the project as defined by the PS&E;
- Identifies the environmental document type and date plus the outcome of any necessary environmental re-evaluation;
- Lists environmental permits and agreements for the project;
- Identifies whether environmental construction windows are necessary for the project.

DISTRICT DIRECTORS, et al  
May 21, 2004  
Page 2

Environmental Certification will be implemented simultaneously with implementation of the new RTL Guide and RTL Certification. The Environmental Certification Form **must** be signed before RTL Certification can be completed.

To assist districts in reviewing PS&E packages for Environmental Certification, a review checklist has been developed for your use (attached). The checklist is designed to remind planners of typical items in the PS&E that need to be reviewed against environmental commitments from the environmental document, agency consultations, permits, or other agreements.

If you have any questions about Environmental Certification, the PS&E Review checklist, or their use, please contact me, or call Cindy Adams at (916) 653-5157.

#### Attachments

c:   DEA Office Chiefs  
      DEA Coordinators  
      Environmental Program Supervisors and Seniors Statewide  
      District Office Engineers

**M e m o r a n d u m***Flex your power!  
Be energy efficient!*

**To:** DISTRICT DIRECTORS  
DEPUTY DISTRICT DIRECTORS  
Project Management, Design, Construction, Right of Way,  
Maintenance and Operations, Environmental Analysis,  
Local Assistance  
DIVISION CHIEFS  
Engineering Services, Transportation Planning, Administration,  
Accounting, Budgets, Design, Construction, Right of Way,  
Maintenance and Operations, Environmental Analysis, Local Assistance

**Date:** May 3, 2004

**From:** JOHN C. McMILLAN *JCM*  
Deputy Division Chief  
Division of Engineering Services - Office Engineer

**Subject:** Distribution and Implementation of Ready To List and Construction Contract Award Guide (RTL Guide)

The first edition of the Division of Engineering Services - Office Engineer's RTL Guide is ready for use. The RTL Guide defines state, federal and policy requirements for Plans, Specification and Estimate (PS&E) preparation, and Construction Contract Advertisement and Award. Districts and Divisions should distribute this document to staff responsible for production of PS&E, project funding and preparation of contract documents. Phased implementation will begin May 10, 2004. After full implementation, the RTL Guide will supersede the PS&E Guide.

Phase implementation will be as follows:

<u>May 10, 2004</u>	References used for preparation of PS&E will switch from the PS&E Guide to the RTL Guide.
<u>July 1, 2004</u>	Districts to begin submitting projects to DES-OE using the new Cover memorandum and RTL Certification process.
<u>October 1, 2004</u>	Districts will submit all projects to DES-OE in accordance with the RTL Guide.

Due to budgetary constraints, the RTL Guide will be published in electronic format only. ([http://www.dot.ca.gov/hq/esc/oe/specifications/rtl\\_guide](http://www.dot.ca.gov/hq/esc/oe/specifications/rtl_guide)) Districts and Divisions are responsible for reproducing and distributing their own hard copies.

DES-OE will provide training and assistance on RTL Guide requirements upon request. Please contact Brian Lee at (916) 227-6270 or by e-mail.

cc: District Office Engineers  
Fardad Falakfarsa, Chief, Office of Federal Resources  
DES Executive Management

# Ready to List (RTL) Certification Form

Draft (No.)	1
Final (✓)	

<b>1 Project Identification:</b>	District-Co.-Rte.-KP: _____	Primary/Combined EA: _____	
	FHWA (State Authorized/Full Oversight) _____	Secondary EA: _____	

## RTL Certification

<b>2 Right of Way:</b>	<i>All right of way clearance, utility, and railroad work has been completed or all necessary arrangements have been made as required for proper coordination with the construction schedules. (23CFR635)</i> Project has "R/W Certification" for advertisement when one of the following Certifications has been checked.		
<input type="checkbox"/> 2a Cert. 1	All property has been acquired.		
<input type="checkbox"/> 2b Cert. 2	All property has been acquired and/or the State has the right to occupy or use.		
<input type="checkbox"/> 2c Cert. 3W	Right of way process is in order, but acquisition or Orders for Possession will not be completed until __/__/__. A work around has been approved to avoid unanticipated owner-caused delays.		
<input type="checkbox"/> 2d Cert. 3	Right of way process is in order, but acquisition or Orders for Possession will not be completed until __/__/__. Project cannot bid open until certified at the 1, 2, or 3W Level.		
Project has railroad facility and Railroad Clearance when the following box has been checked.			
<input type="checkbox"/> 2e	Railroad Clearance Required:	Company: _____	Date: _____
		Amount: _____	
	Construction & Maintenance Agreement/Service Contract No. _____		

<b>3 Environmental:</b>	PS&E fulfills environmental documents requirements. (23CFR771 and Title 13 PRC § 21000 et seq.)		
<input type="checkbox"/> 3a	Environmental Certification is attached and dated __/__/__.		

<b>4 Design:</b>	The Department shall determine the kind, quality, and extent of all highway work done under its control, and may prepare and approve all plans, specifications, and estimates for all such work. (S&HC 137). Project has "Design Standard Approval" when one of the following boxes is checked.		
<input type="checkbox"/> 4a	Design equals or exceeds minimum mandatory and advisory standards		
<input type="checkbox"/> 4b	Design does not equal or exceed minimum mandatory and/or advisory standards and has approved exceptions for nonstandard features. Date of FHWA approval if project is full oversight: __/__/__		
<input type="checkbox"/> 4c	Project has "Statewide Design Policy Compliance" when the following applicable boxes are checked.		
<input type="checkbox"/>	A+B Bidding Policy Exception required and included. (Guidelines for Use of A + B Bidding Provisions)		
<input type="checkbox"/>	Buy America "Foreign Material" Waiver required and included. (23 CRR 635.410)		
<input type="checkbox"/>	Constructability Reviews Compliance: (Guidance on Constructability Reviews)		
<input type="checkbox"/>	Cross-section Policy Exception required and included. (Guidance on Creation of Cross Sections)		
<input type="checkbox"/>	Experimental or Research Design Features included: Design approved and work-plan funded. (Guidelines for Construction Evaluated Experimental Feature Program)		
<input type="checkbox"/>	Hazardous Waste identified and cleanup completed or project has an exception to include cleanup in the work. (PDPM CH. 18)		
<input type="checkbox"/>	High/Low Risk Utilities Policy Certification. (Policy on High and Low Risk Underground Facilities)		
<input type="checkbox"/>	Information Handouts required and included. (SSP S5-280, "Project Information")		
<input type="checkbox"/>	Pedestrian Facilities involved and comply. (DIB-82)		
<input type="checkbox"/>	Storm Water Data Report updated and approved on __/__/__. (Storm Water Quality Handbook)		
<input type="checkbox"/> 4d	Project has serious or critical water shortage and a water source commitment when the following applicable boxes are checked.		
<input type="checkbox"/>	Water source has provided written commitment to supply water for construction of the project.		
<input type="checkbox"/>	Water source has provided written commitment for new planting and irrigation work.		
<input type="checkbox"/> 4e	Project requires Agency Agreement(s).		
	1st Agency: _____	2nd Agency: _____	3rd Agency: _____
	Issue Date: _____	Issue Date: _____	Issue Date: _____
	\$ Amount: _____	\$ Amount: _____	\$ Amount: _____

<b>5 FHWA Approval</b>	Project requires and has appropriate FHWA approval when one of the following boxes is checked.		
<input type="checkbox"/>	Project meets all Federal requirements pursuant to stewardship and delegation agreements (PDPM Chapter 2, Section 7).		
<input type="checkbox"/>	Public Interest Finding (PIF) Approval – Project includes items that require and have FHWA approval.		

<b>6 Plans, Specifications, &amp; Estimate:</b>	Plans, Specifications, & Estimates are full, complete, and accurate. (PCC 10120) Project is "Draft Contract Ready" when all of the following boxes are checked.		
<input type="checkbox"/> 6a	Plans prescribe the details for completion of the work, including details for items not covered by the Standard Plans.		
<input type="checkbox"/> 6b	Plans conform to Plans Preparation Manual.		
<input type="checkbox"/> 6c	Specifications prescribe the details for the construction, completion, and payment of the work.		
<input type="checkbox"/> 6d	Specifications conform to Specification Preparation Guidelines.		
<input type="checkbox"/> 6e	Estimates submitted in Basic Engineering Estimating System (BEES).		
<input type="checkbox"/> 6f	Estimates prescribe all the details for the construction, completion, and payment of the work.		

RTL Certified by:	
Project Engineer _____	Date _____
RTL Approved by:	
Design Engineer or Manager _____	Date _____

*Affix or attach registration seal here.*

1. Projects submitted with draft RTL Certification will not be assigned until:  
 (a) District PS&E is complete or  
 (b) District Project Manager has an approved Concurrent Processing Service Agreement.



## PLANS, SPECIFICATIONS AND ESTIMATES (PS&E) / READY TO LIST REVIEW TOOL

Specifications	<i>Yes</i>	<i>No</i>	<i>Not Applicable</i>
Work windows / hours correctly identified for:			
Sensitive Species			
Clearing and Grubbing			
Community Impacts			
NPDES			
Other			
Check "Maintaining Traffic" specification. Does it comply with community impacts assessment and ED?			
Check areas for contractor's use, including borrow, fill and staging areas. Do they match ED?			
Check "Order of Work" section. Are potential conflicts with other environmental or construction contracts identified?			
Monitoring Specifications included for:			
Sensitive species			
Cultural sites (including Native American concerns)			
Paleontology			
Permits and Approvals Identified and Referenced			
Biological and Permit-related SSPs and NSSPs included			
Plant and/or duff salvage			
Preventative netting, fencing, etc.			
Work Windows			
Water Pollution Control / Erosion Control in compliance with ED			
Check the WPCP or SWMP language			
Check erosion control seed mixes for potential conflicts with biological concerns.			
ESA specification included			
Check also temporary fence specification			
Hazardous waste / material handling specification included			
Environmental document type identified and referenced			
Check the funding sources identified to make sure the ED type (fed / state v. state-only) is still correct			
If project is a landscaping project, check irrigation, seed mix, and plant establishment specifications. Do they match the ED?			
Check color treatment and textural treatment for fences, walls, dikes and structures. Do they match the ED?			
Check "sound control requirements." Do they comply with community impact assessment and other documents?			

<b>Plans</b>	<b>Yes</b>	<b>No</b>	<b>Not Applicable</b>
Do the project limits on Index Sheet of plans match project limits from the ED? Check both begin and end construction as well as begin and end work.			
On the project layout sheets:  1. Are the ESAs correctly depicted on the plans? 2. Check the general locations of walls, culvert and other structures. Do they match what was described in the ED? 3. Do the limits of cut and fill slopes match the limits shown in the ED? 4. Have all construction easements/construction access been assessed in the ED? 5. If borrow, fill, or staging areas are shown, do they match the ED?			
Check the Typical Cross Section sheets. Do the dimensions match what was stated in the ED?			
Check the layouts, typical cross sections and profiles for changes in the vertical and/or horizontal alignment of the roadway. Are there changes in the alignment that necessitate a revised noise analysis?			
Check Water Pollution Control Plans, are the BMPs shown in compliance with environmental commitments? Check for conflicts with ESAs.			
If project is a landscaping project, does the plant list match what was described in the ED? Are there any conflicts with biological or NPDES concerns?			
Check irrigation, utilities and electrical plans. Is all the work, including areas of trenching, within the project limits described in the ED?  Have all the areas of ground disturbance been evaluated for potential impacts to cultural and paleontological resources? Hazardous waste / materials?			
Structures Plans 1. Check the profile and typical cross-section sheets. Do the dimensions of the structures match the ED? 2. Is the drainage for bridge structures in compliance with the ED? (Is water treated before discharge?)			
Are all the project features shown on the layout, electrical and signage plans in compliance with the ED? (e.g. CCTVs, maintenance pull-outs, CMSs, ramp meters)			
Check location of rip-rap or other drainage features on the drainage plan sheets and/or the layout sheets. Are the locations in compliance with the ED?			
Check construction detail sheets for items such as median barriers, guard rail, etc. Are they in compliance with the ED?			
Check detour plans. Are vehicular, pedestrian and bicycle access addressed as applicable?			
Check construction staging plans. Are they consistent with ED and CIA requirements?			
Are there separate grading plans? If so, do the grading limits and contours match the ED?			

<b>Estimate</b>	<i>Yes</i>	<i>No</i>	<i>Not Applicable</i>
Are environmental mitigation costs included in the BEES (Engineers Estimate)? (If you are not given a copy, check with the PE or PM for the project.) Some items to look for include: <ol style="list-style-type: none"> <li>1. Highway Planting</li> <li>2. Erosion Control</li> <li>3. Plant Establishment</li> <li>4. Fencing</li> <li>5. Netting</li> <li>6. Architectural treatments</li> <li>7. Bridge or rail aesthetics</li> <li>8. Monitoring costs</li> </ol>			

<b>FOR READY TO LIST REVIEW--ENVIRONMENTAL DOCUMENT, PERMITS AND OTHER APPROVALS</b>	<i>Yes</i>	<i>No</i>	<i>Not Applicable</i>
Environmental Document is Current and Does Not Need Reevaluation/Addendum			
Public Outreach Plan in Place			
CDFG 1601 Lake and Streambed Alteration Obtained			
Army Corps Section 404 Permit or Other Approval Obtained			
RWQCB Section 401 Water Quality Certification or Other Approval Obtained			
Coastal Development Permit or Other Coastal Approval Obtained			
USFWS Section 7 Biological Opinion or Other Approval Obtained			
NOAA Fisheries Section 7 Biological Opinion, EFH or Other Approval Obtained			
CDFG Incidental Take Permit or Other Approval Obtained			
Other Permits or Approvals (Specify: _____)			
Landscaping and Mitigation Site(s) Have Been or Will Be Programmed and Constructed			

*North Region Right of Way*



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# Quality Management Plan

**Prepared by:**

Lindy Lee/John Ballantyne

**Date:**

May 12, 2005

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# Quality Management Approach

The approach for managing quality includes the Quality Plan (this document) and the following three major processes. A project specific Quality Plan is completed during the planning phase to validate that the major deliverables are completed with an acceptable level of quality.

**Completeness and Correctness Criteria:** The project team and major stakeholders should agree up-front on when each major deliverable is complete and correct. The deliverables are then evaluated against these criteria before they are formally approved.

**Quality Assurance:** Quality assurance activities focus on the processes being used to manage and deliver the solution, and can be performed by a manager, business sponsor or a third-party reviewer.

**Quality Control:** Quality control activities are performed continually throughout a project to verify that project management and project deliverables are of high quality.

## Project Overview

*All transportation projects will have a Right of Way Certification.*

## Quality Standards

*Right of Way Certification will conform to the Title 23 of the Code of Federal Regulations (CFR) Subchapter H and Right of Way Manual Chapter 14.*

*The Right of Way Certification summarizes all Right of Way processes and procedures necessary to ensure a quality Right of Way delivery.*

## Quality Tools

*Various Right of Way tools are utilized in the delivery process. These tools are identified in the attached flowcharts along with their quality control elements.*

## Completeness and Correctness Criteria

### *Right of Way Certification*

*Overview: Right of Way Certification is a written statement summarizing the status of each right of way related matter pertaining to a proposed construction project. The Right of Way Certification documents that the construction project is ready for advertising. The document states that real property interests have been or are being secured, physical obstructions have been or will be removed and that right of way acquisition and relocation assistance requirements were conducted in accordance with applicable Federal and State requirements.*

## Quality Assurance Milestones

*Right of Way processes assure that all property rights are sufficient, all utility conflicts are avoided or mitigated, all clearance and demolition work are addressed and that control of the right of way is achieved within the cost, scope and schedule of the State's project.*

*Quality assurances are inherent in each Right of Way Quality Milestone identified in the Right of Way Quality Management Plan flowcharts attached as exhibit A of this document. Some highlighted quality assurances are identified here.*

### PID

*Right of Way will actively participate in working with the Project Development Team to develop a Right of Way schedule that meet the project's specific requirement.*

*Right of Way will provide an estimate of the proposed right of way elements as identified at this stage.*

*Right of Way will communicate anticipated right of way needs with design and environmental divisions to affect the location of the Environmental Study Limits (ESL).*

### PAED

*Right of Way will coordinate with design and utility owners to ensure accurate and timely verification of all utilities.*

*When the environmental draft is circulated, conflict plans will be finalized and utility relocation plans will be initiated in order to help ensure utility needs are not overlooked.*

*RW, Environmental, Geotech, and Design will confer when temporary access rights are needed (such as Permit to Enter for Environmental Studies or Temporary Construction Easements for drilling): ensures mapping reflects what the needs are.*

*RW will confer with design and environmental to complete Relocation Impact Studies in accordance with standard policies and procedures.*

### DESIGN

*Design provides RW with utility conflict maps. Design also provides design specifications to Right of Way Engineering indicating the type and area of right of way required for a transportation project. RW, RWE, and Design will confer—Milestone 224.*

*Right of Way Engineering translates design specifications to right of way maps that are then reviewed by the Project Engineering for completeness. They then prepare all maps, documents, and descriptions needed to acquire right of way and dispose of excess land. RW, RWE, and Design will confer prior to maps being submitted to RW and before initiation of Milestone 225.*

*Assurances are provided through a Certificate of Sufficiency (COS) that all identified right of way on the referenced mapping is required for construction of the project. The COS also affirms that parcels have been reviewed for Hazardous Waste contamination. Any findings from this review are noted along with a remediation plan if necessary. Exemptions from Headquarters Environmental are necessary when purchasing property rights on contaminated property. Proposed QM--COS should be completed between initial submittal of final maps and final submittal.*

*Right of Way maps are assigned for appraisal when each parcel has a Certificate of Sufficiency. Appraisal reports are generated to establish fair market value prior to acquiring right of way, leasing air space, and disposing of excess land. Both the Federal and State uniform Relocation Assistance and Real Property Acquisition Policies Acts contain basic requirements for the appraisal of real property for public project purposes.*

*Appraisals are assigned for acquisition. The acquisition agent and the appraiser review all appraisals, before a first written offer is made. The acquisition agent conducts all acquisition activities necessary to acquire the property rights needed to construct the transportation facility, including the condemnation process if necessary.*

## ***Quality Assurance Milestones – Continued***

*Railroad requirements and clearances are met.*

*Relocation of all people, personal property, and businesses is accomplished through full implementation of the Uniform Relocation Assistance and Real Property Acquisition Policies Act.*

*Utility Relocation conducts all activities necessary to adjust or relocate utility facilities that are in conflict with planned construction of the transportation facility*

*Property Management ensures all property is cleared for construction and manages the leasing of space for Resident Engineer offices as needed on construction projects.*

### **PS&E**

*Prior to RW Cert (Milestone 410), RW will compare final PS&E package with what is being certified to ensure nothing has been overlooked.*

## ***Quality Assurance Procedures***

The Right of Way Certification has the following quality assurance activities in the project workplan:

*A Certificate of Sufficiency (COS) is signed by the Project Engineer as a check that all requirements for land acquisitions are acceptable for acquisitions and that all land has been reviewed for hazardous waste.*

*Right of Way maps are assigned for appraisal when each parcel has a Certificate of Sufficiency.*

*Fair Market Value is established.*

*Appraisal Summary Statement relating to real property is completed.*

*Property rights are obtained.*

*Railroad Clearance is signed.*

*Utility Clearance is achieved. Notices to Utility owners are processed.*

*Relocation Assistance Program information and guidance is provided to impacted property owners and tenants.*

*Demolition contracts are processed.*

*Completion and signing of the Right of Way Certification is processed.*

## ***Quality Assurance Roles and Responsibilities:***

<b>Role</b>	<b>Quality Assurance Responsibilities</b>
Principal Right of Way Agent	Reviews and signs appraisals; signs condemnation documents; completes and signs right of way certification based on delegation.
Supervisor Right of Way Agent	Reviews and signs appraisals, signs right of way contracts and condemnation documents; completes and signs right of way certification based on delegation.
Right of Way Senior	Reviews and signs appraisals, signs right of way contracts and condemnation documents; completes and signs right of way certification based on delegation.
Right of Way Agent	Reviews and signs appraisals; signs right of way contact and condemnation documents.

## Quality Control

The following highlights are among those Quality Control Elements identified for each Quality Milestones addressed in the Right of Way Quality Management Plan flowcharts in exhibit A.

*Review by Project Engineer that all requirements for land acquisitions are acceptable.*

*Review by Environmental as to hazardous waste identification and remediation plans.*

*Review of Right of Way maps by Senior Right of Way Agent; maps assigned for appraisal when a Certificate of Sufficiency has been executed for each parcel.*

*Review of appraisal to verify content and calculations are accurate.*

*Senior Appraiser reviews the appraisal and comparable sales to ensure comparability and correctness; Senior Appraiser signs the Senior Field Review Certificate.*

*Reviewer, Appraisal Agent and Senior Appraiser sign appraisal Title page.*

*Certificate of Appraiser is signed.*

*Fair Market Value is established.*

*Appraisal Summary Statement relating to real property is completed.*

*Execution of Right of Way Contract or Acquisition document containing possession date.*

*Property Deeds are signed and recorded.*

*Relocation assistance is provided in accordance to State and Federal requirements.*

*Resolution documents are processed in condemnation cases. Deposits are made to the court and orders of possession are obtained, filed, and served.*

*Resident Engineer inspects Railroad work and Railroad clearance is signed.*

*Review of Liability performed by senior utility agent. Utility clearance is achieved and Notices to Utility Owners are processed.*

*Relocation claims are processed.*

*Demolition of improvements occurs resulting in cleared parcel ready for construction.*

*Right of Way Certification completed and signed.*

## ***Quality Control Procedures***

Right of Way Certification has the following quality control activities in the project workplan:

*Headquarters functional seniors will review files each year for compliance with the Right of Way Manual, Federal and State Laws. Right of Way will conform to Title 23 of the Code of Federal Regulations (CFR) Subchapter H and 49 Code of Federal Regulations part 24 and the Uniform Relocation Assistance and Real Properties Acquisition Policies Act of 1970 (as amended).*

*Federal Highway Administration will review all files for compliance of all Federal Regulations in relation to federal funded projects.*

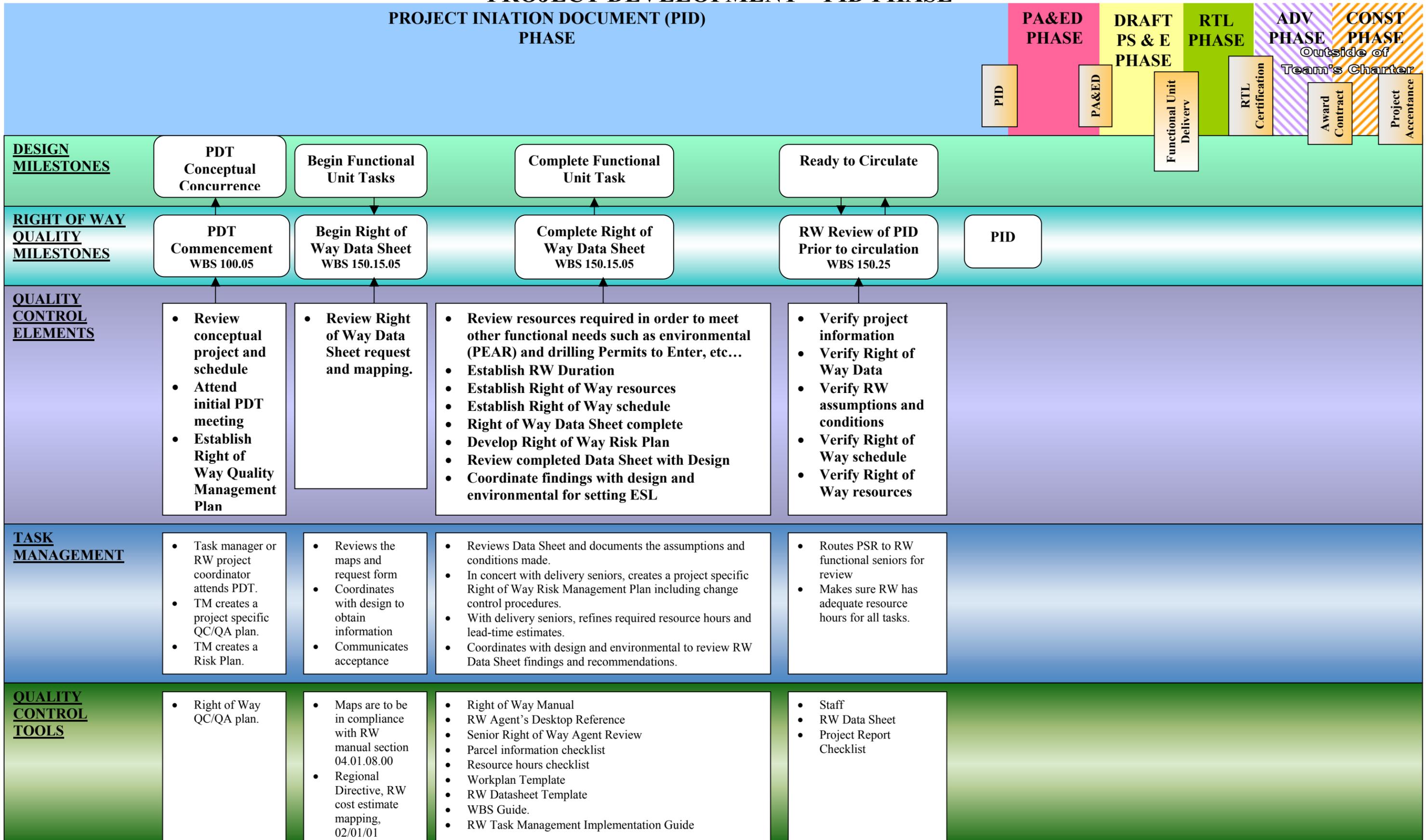
*Headquarters conducts Quality Joint Enhancement Reviews quarterly for compliance with the Right of Way Manual.*

## ***Quality Control Roles and Responsibilities:***

<b>Role</b>	<b>Quality Assurance Responsibilities</b>
Supervisor Right of Way Agent	Review of undelegated products.
Right of Way Senior	Review of all products.
Right of Way Agent	Review and completion of all products.

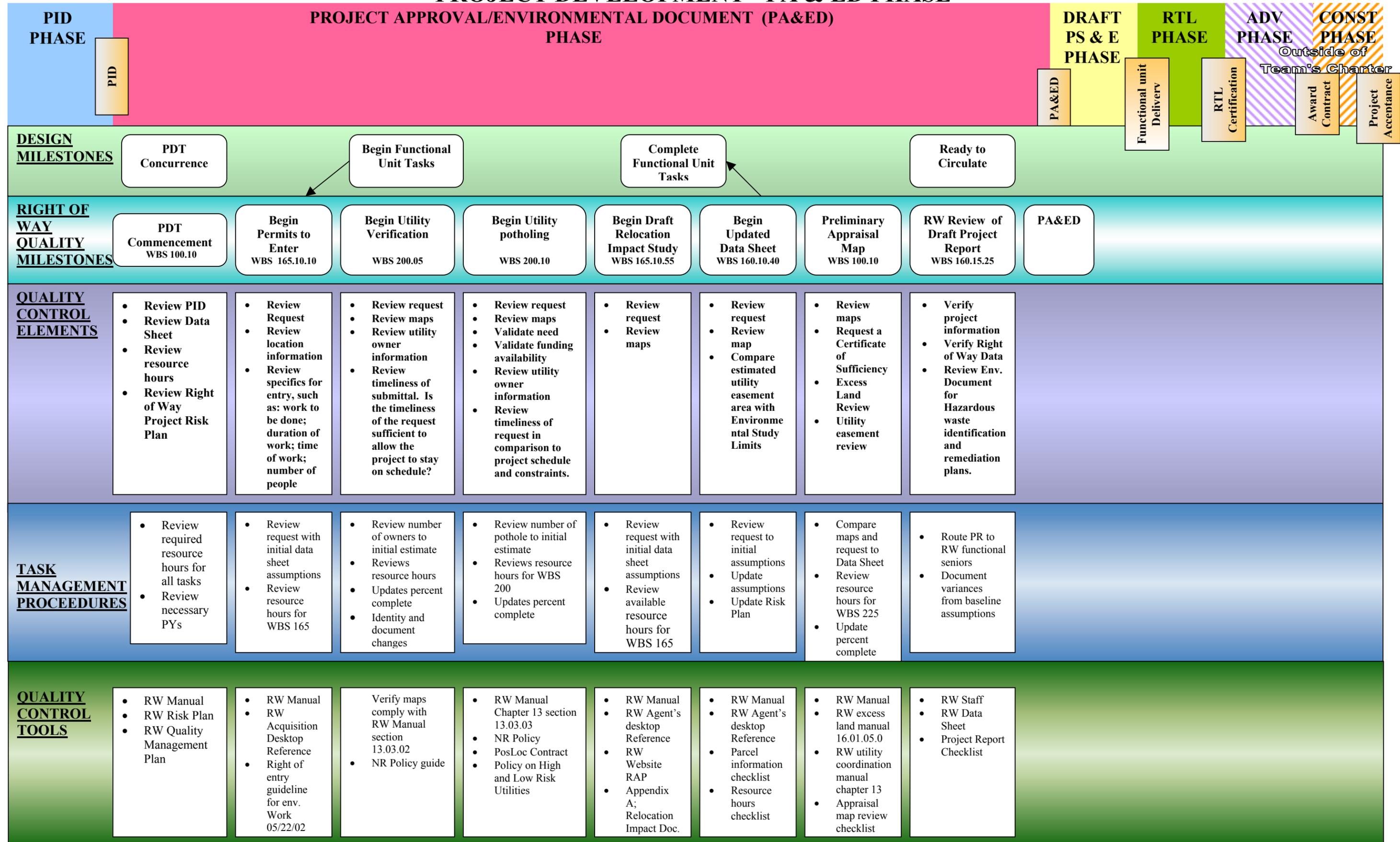
# RIGHT OF WAY QUALITY MANAGEMENT PLAN

## -PROJECT DEVELOPMENT – PID PHASE-



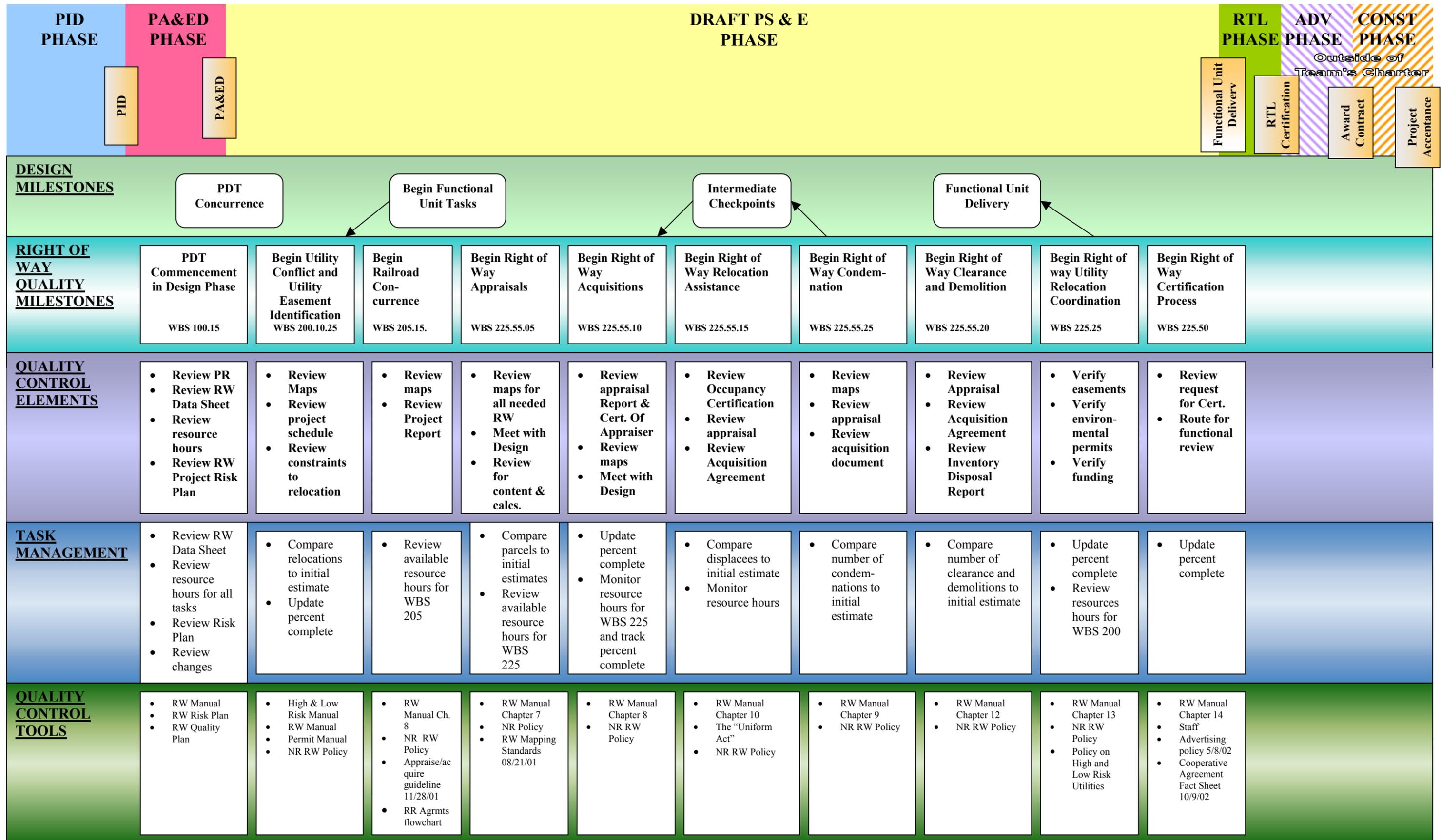
# RIGHT OF WAY QUALITY MANAGEMENT PLAN

## -PROJECT DEVELOPMENT - PA & ED PHASE-



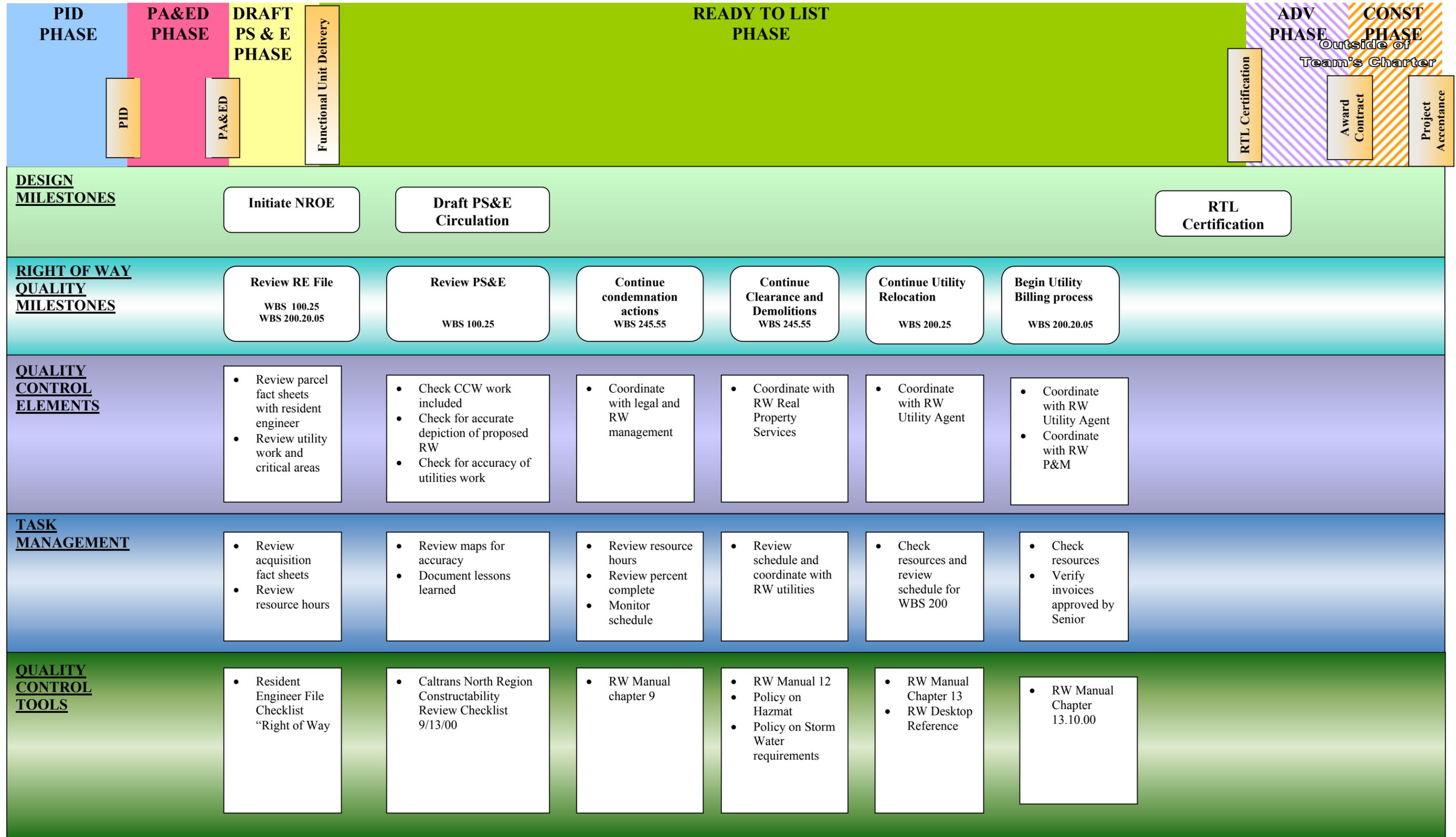
# RIGHT OF WAY QUALITY MANAGEMENT PLAN

## -PROJECT DEVELOPMENT – DRAFT PS & E PHASE-



# RIGHT OF WAY QUALITY MANAGEMENT PLAN

## -PROJECT DEVELOPMENT - RTL PHASE-



**Structures Plans Specifications & Estimate Product QC/QA**

This matrix does not include District **rev. 11/01/02** *Note: please insert comments in dark green colored text.*

**Acronyms:**

GEE: Geotechnical Earthquake	DES: Division of Engineering Services
GS: Geotechnical Services	BSS: Bridge Site Submittal ( <i>this is already in here</i> )
OSH: Structures Hydraulics	ESCOE: Engineering Services Office Engineer
BA: Bridge Aesthetics	SOQ: Statement of Qualifications
BC: Branch Chief	SOE: Structures Office Engineer
PE: Project Engineer	PI: Preliminary Investigations
GP: General Plan	ESCOE: Engineering Services Office Engineer ( <i>this is already in here</i> )
DRB: Dispute Review Board	RE: Resident Engineer
BEES: Basic Engineering Estimate	SR: Structures Representative
SD: Structures Design	MTD: Memos to Designers
DES: Division of Engineering Services	BDA: Bridge Design Aides
BSS: Bridge Site Submittal	BDD: Bridge Design Details

**Definitions:**

Milestone: The event and date when the completed and combined products are submitted/delivered.

Product: A component of a milestone that is a tangible paper element (and/or electronic file) that is submitted from one functional unit to another.

External Product: A product that leaves DES in a completed form not requiring additional staff work. The DES products are: APS packages, Structure & Bridge PS&E, Photo Mapping, Geotechnical Reports (roadway), Awarded & Approved Contracts, Built Structures, Lab and Field testing services.

Internal Product: Delivered to another Office within DES. Typically in a completed form where no additional staff work is required. Examples of Internal Products are: P&Q packages, Final Foundation Reports, General Plan Estimates, Final Hydraulic Reports.

Subproduct: A component of a product that is a tangible element that may or may not leave a functional unit. Typically subproducts require follow up staff work or staff work added by another unit. Examples of sub products are: unchecked details, preliminary foundation reports, checked details, draft specifications

Quality Task: An action performed on a product or subproduct to ensure quality.

Unit/Staff: Functional Unit or individual(s) that typically perform the quality task.

Quality Control (QC): QC is the operational processes, practices and activities performed by a product supplier to ensure that a product fulfills the intended requirements as defined by the customers & stakeholders. Quality Control is checking and reviewing specific project processes to determine if the results produce the products or deliverables that meet expectations. QC is used to identify ways to eliminate causes of unsatisfactory performance. QC is a technical function.

Quality Assurance (QA): QA is the system that provides confidence that project requirements (QC) and expectations (quality standards) are being fulfilled. QA is the method of evaluating overall project performance against quality standards. QA is the review/check of the QC Plan for completeness and conformance to quality standards. QA is verification that the QC Plan was followed through monitoring and sample auditing of the product. QA is a managerial function. QA should use much less than 10% of the overall project development support resources.

**Structures Advanced Planning Study (APS) Milestone (WBS 150)**

External Product	Internal Product	Sub-Product	Quality Task	Unit/Staff	Ref. DOC
<b>Advanced Planning Study</b>	APS Plans	APS Request Package (supplier is District, submittal includes "Checklist for Structures APS Request)	Review of APS request package for completeness and viability	PE, Structures TLE	MTD 1-8, Guidelines for Preparation of Advance Planning Study, Project Engineer Training #8, Standard Form (Checklist for APS Request)
		APS Maintenance Report (for widenings <u>OR</u> structural modifications)	Implement Maintenance Recommendations on APS	Structure Maintenance, PE	
		APS Geotechnical Report	Implement Geotechnical Recommendations on APS.	GS, PE	MTD 1-35
		APS Hydraulics Report	Implement Hydraulic Recommendations on APS.	OSH, PE	MTD 1-23, Hydraulics PE Training #6
		APS Seismic Report	Implement Seismic Recommendations on APS	GEE, PE	
	APS Estimate	APS Estimating Checklist (with quantities when required)	Review of Draft APS plan and "APS Estimate Checklist"	Designers, PE	MTD 1-8, BDA Sec. 10, Standard Form (Design Engineer Checklist for Advance Planning Study)
			Items, quantities and prices obtained from historical data and standard estimating charts. Review of items, quantities and costs	Estimator SOE Senior, Contractor Manager, BC, PE	BDA Section 11, Standard Form ( Advance Planning Study Estimate Checklist) Construction Statistics Annual Publication
	APS Resource and Duration Estimate		Predicts amount of Pys which will be required to complete design phase of proposed project	BC	
	APS transmittal form		Distribution to and review of APS by Internal Specialists and External Stakeholders. (per standard transmittal form)	PE	Standard Form (APS Transmittal Package Checklist)
	Revised/Updated Final Structures APS Package		Review of Comments from APS Distribution	PE	
		Incorporate new data	PE, SOE Estimator		

**Structures Type Selection Milestone (WBS 215)**

External Product	Internal Product	Sub-Product	Quality Task	Unit/Staff	
<b>General Plan</b>	Draft General Plan	Bridge Site Submittal (supplied by District)	Review BSS for completeness. Complete the survey of the bridge site. Verify accuracy and completeness of District site data.	PI, PE, BC	Standard Form (Bridge Site Data Submittal), PI internal Checklists, MTD Section 1
			Review structures scope, schedule and cost. Revise APS Resource and Duration Estimate.	Office Chief, BC, PI	
		Foundation Plan Sheet	Check for accuracy and conformance with standard manuals	PI, Designers	BDD Sec. 5
					BDD Sec. 1,2&3, MTD Sec 2&6, BDA Sec. 10, Bridge Design Academy "Bridge Layout," PE Training "Proportioning Structures"
		Project History File	Field Review: Verify Site Conditions. Locate all utilities and make measurements of pertinent site features. Produce a detailed Photographic Report, document all conclusions and assumptions.	PI, PE, Designers	
		Draft Hydraulics Report	Review report. Compare with project data and resolve issues with <b>OSH</b> .	OSH, PE, BC, Designers	MTD 1-23, PE Training #6, MTD 1-46
		Draft Geology Report	Review report. Compare with project data and resolve issues with <b>OGS</b> .	OGS, PE, BC, Designers	MTD 1-35, MTD Section 3, MTD Section 4
		Draft Seismic Data	Review report. Compare with project data and resolve issues with <b>OGEE</b> .	OGEE, PE, BC, Designers	
		Bridge Aesthetics Recommendations	Bridge Architect reviews recommendations for aesthetic content and consistency with BA Standards.	BA	MTD 1-30
			Branch Chief /PE reviews Aesthetic recommendation for constructability, maintainability, cost and impact on structural performance.	BC, PE	
	<a href="#">Draft General Plan</a>	Independent check of District horizontal and vertical alignment in vicinity of structure.	PE	Bridge Design Academy "Bridge Layout"	
		Use of standard manuals and design guidelines.	PE, Designer, Detailer		
	GP Estimate Checklist (with quantities when required)	Review for completeness.	PE, Estimator	BDA Sec.11, Standard Form (General Plan Estimate Checklist)	
	GP Estimate	Items, quantities and prices obtained from historical data and standard estimating charts. Review of estimate.	Estimator SOE Senior		
	Combined GP and GP Estimate Package	Review of GP Plan combined with the GP Estimate.	BC, PE, SOE Senior		
	Type Selection Report	Type Selection Meeting	DES Functional Units Meet and Review GP, Assure Standards are met for their area of expertise. <b>Confirm the scope of the project is still within the project limitations (both fiscally and technically).</b>	ESC Functional Specialists	MTD 1-29
		Type Selection Memo	Lists conclusions from Type Selection Meeting. Distribution to BC, OC, BA, SD Deputy and all Type Selection Meeting attendees.	PE	
		Revised General Plan	PE Addresses and Implements Type Selection Committee Recommendations	PE	
	GP Distribution Memo		List cost, design assumptions and outstanding issues. Distribution to and review of GP by Internal Specialists and External Stakeholders.	PE, BC PE	MTD 1-5
		Final General Plan	Address/incorporate GP Distribution comments	PE	

**DRAFT Structures PS&E Milestone (WBS 240)**

External Product	Internal Product	Sub-Product	Quality Task	Unit/Staff	Ref. DOC
Final Hydraulics Report	Final Seismic Recommendations	Hydraulic recommendations	Review, Comment and Approve	PE/ BC	PE Training #6, MTD 1-23
		Flood Plain Studies			
Final Foundation Recommendations	Final Foundation Recommendations	Scour recommendations	Review, Comment and Approve	PE/ BC	PE Training "Foundations," MTD 1-35
		Lateral analysis data			
Unchecked Details Package & Distribution	Unchecked Details Package & Distribution	Liquefaction/lateral spreading study	Design Procedure / Detail Development per SD Standards	PE/ Designers	MTD 1-37, MTD 1-38, SD Manual Suite, MTD 1-5
		Seismicity data			
Checked Details Package & Distribution	Checked Details Package & Distribution	LOTB's, driveability study, lab results, foundation type confirmation, foundation design information, field testing recommendations, constructability recommendations	Independent Check of the details	Checker	MTD 1-5
		Design file, Design Calculations, Sketches & Details			
Quantities Package	Quantities Package	Complete Set of Unchecked Plans for each Structure on the Project.	Independent Check of the design	Checker	MTD 1-5
		Redline of Unchecked Plan Set			
Plans and Quantities Package (submitted to Spec and Estimating Seniors)	Plans and Quantities Package (submitted to Spec and Estimating Seniors)	Check Calculations	Calculate Structure Quantities. Independent Check of Structure Quantities. Resolve final quantities within preset tolerances	PE, Designer, Checker	BDA Ch 11
		Check Calculations			
Structures Special Provisions	Structures Special Provisions	PE Review <a href="#">Sharon, this was in reference to LOTBs</a>	Review for completeness.	Geotechnical Services, PE	MTD 1-13, PS&E Guide
		Marginal Estimate Spreadsheet, two sets of independent quantity calculations and summary sheets.			
Structures Estimate	Structures Estimate	Use Manuals and Standards. Use Standard Special Provisions and Bridge Reference Specifications	Use Manuals and Standards. Use Standard Special Provisions and Bridge Reference Specifications	Specification Engineer	Standard Item Name and Code List, Standard Specifications, SOE Specifications and Estimates Manual, PS&E Guide, Memos to Designers, Bridge Design Aides. Bridge Design Specifications.
		Bridge Standard Special Provisions			
Working Days	Working Days	Bridge Reference Specifications	Internally generated and continuously updated standard specification for new or unusual work.	SOE Development Engineers	
		Item List			
Foundation Review	Foundation Review	Item List	Create independent list of items and compare with BEES	Specification Engineer, Estimator	Standard Specifications, SOE Specifications and Estimates Manual, PS&E Guide, Memos to Designers, Bridge Design Aides. Bridge Design Specifications.
		Draft Special Provisions			
Transmittal Letter	Transmittal Letter	Independent review of Special Provisions	Review pay clauses and special requirements for inclusion in Estimate	Independent Specification Engineer	
		Draft Special Provisions			
Reference Set of Plans ("rack set")	Reference Set of Plans ("rack set")	Use Manuals and Standards	Use Manuals and Standards	Estimator	Standard Specifications, Specifications and Estimates Manual, Memos to Designers. Annual Cost Data Report. Standardized estimating charts. Standard Cost Items (names and codes) available on Internet. Item Cost Data Bases available on Internet. PS&E Guide.
		Foundation Review meeting to check consistency of plans, specs, and estimate with Foundation Recommendations.			
RE Pending File	RE Pending File	Draft Structures Information Handout Table of Contents	Review content for application to Special Provisions	PE, Specification Engineer	
		PS&E submittal form			
RE Pending File	RE Pending File	Verification that all components of PS&E package are final	Compilation of comments to Draft PS&E on one single set of plans accessible for review.	Project Management, Specification Engineer	
		Compilation of comments to Draft PS&E on one single set of plans accessible for review.			

Draft Structure PS&E

**FINAL Structures PS&E (aka District PS&E or Expedite) Milestone (WBS 250)**

External Product	Internal Product	Sub-Product	Quality Task	Unit/Staff	Ref. DOC
<b>Final Structure PS&amp;E</b>	Plans (electronic)	CADD submittal form, Drafting Review Form and Drafting Checklist			MTD 1-35
		Paper copy of GP and any updated plan sheets.	Review print of GP with quantities and revised sheets for consistency with special provisions and estimate.	Specification Engineer and Estimator	
	Log of Test Borings (electronic)				
	Updates to Structures Specifications		Use Manuals and Standards. Use Standard Special Provisions and Bridge Reference Specifications	Specification Engineer and Estimator	
	Update to Structures Estimate		Use Manuals and Standards. Use Standard Special Provisions and Bridge Reference Specifications	Specification Engineer and Estimator	
	Revised Working Days				
	Structures Information Handout	Table of Contents	Review content for application to Special Provisions	PE, Specification Engineer	
	Transmittal Letter	Submittal checklist	Verification of complete submittal package	Specification Engineer	
	Combined District and Structures Plans and Special Provisions		Circulate and review and redline of combined PS&E. Structures revisions made internally. Potential District revisions returned to District. Particular attention is directed to safety, traffic, staging, order of work, and environmental issues. All revisions submitted to ESCOE prior to contract document print.	PE, Structures Construction, Specification Engineer, Estimator	MTD 1-13, MTD 1-38

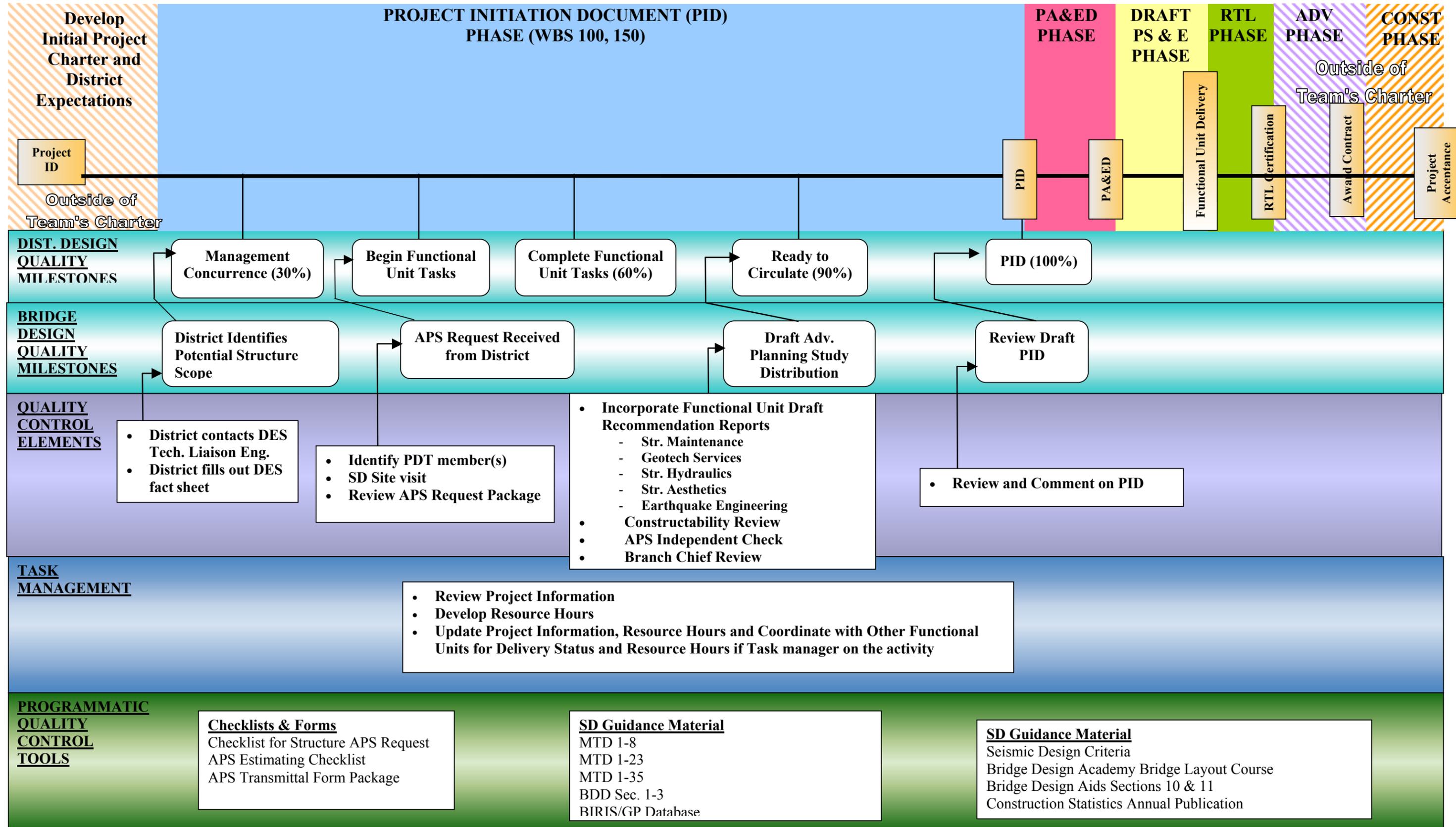
**Ready to List, Advertise and Award (WBS 265)**

External Product	Product	Sub-Product	Quality Task	Unit/Staff	Ref. DOC	
<b>Advertise Milestone</b>						
					<b>QA</b>	
	Response to Structures bidder inquiries		Review for completeness and approval	SOE Supervisor		
			Inquiries circulated to all Designers, Specification Engineers, and Estimators.	SOE staff	MTD 1-15	
	Structures Addendum Request Package	Addendum Plans	<a href="#">See "Draft Structures PS&amp;E" for process</a>		PE, Designer	PS&E guide
		Addendum Specifications	Use Manuals and Standards. Use Standard Special Provisions and Bridge Reference Specifications		Specification Engineer	Standard Item Name and Code List, Standard Specifications, SOE Specifications and Estimates Manual, PS&E Guide, Memos to Designers, Bridge Design Aides. Bridge Design Specifications.
		Addendum Estimate	Use Manuals and Standards		Estimator	Standard Specifications, Specifications and Estimates Manual, Memos to Designers. Annual Cost Data Report. Standardized estimating charts. Standard Cost Items (names and codes) available on Internet. Item Cost Data Bases available on Internet. PS&E Guide.
		Addendum Request Letter	Review for completeness and approval		SOE Supervisor	

Construction Milestone (WBS 270)						
External Product	Internal Product	Sub-Product	Quality Task	Unit/Staff	Ref. DOC	
Construction		Contract Plans, Specificaitns and Estimate, RE Pending File	Thorough Review of Plans, Specifications, Estimate and RE Pending File	SR		
			Pre Construction Meeting to discuss PS&E Package	SR,PE,RE		
			On Call Construction Support	PE	MTD 1-39	
			Review and Approval, if design or detailing is required an independent check must be completed. Specificaton engineer should be consulted for input. OSC Senior to review CCO Package and approve.	PE, SR Spec Engineer, OSC Senior	Construction Records and Procedures Manual	
			SR Records all deviations from PS&E Plans on a Set of As-Built Drawings to be Archived after completion of Construction		MTD 1-20	
		Working Drawings and Shop Plans (From Contractor)	Approved Working Drawings	Review and Approval	PE,SR,Technical Specialist	
		CCO <a href="#">Sharon, I think this is in the wrong row</a>			PE	
		As-Built Plans		<a href="#">Review of As-Built Changes to Contract Plans and submittal to OSMI for final Archiving.</a>		
		Response to DRB				
		Response to Claims				
		As Built Plans				
		Response to DRB				
	Response to Claims					

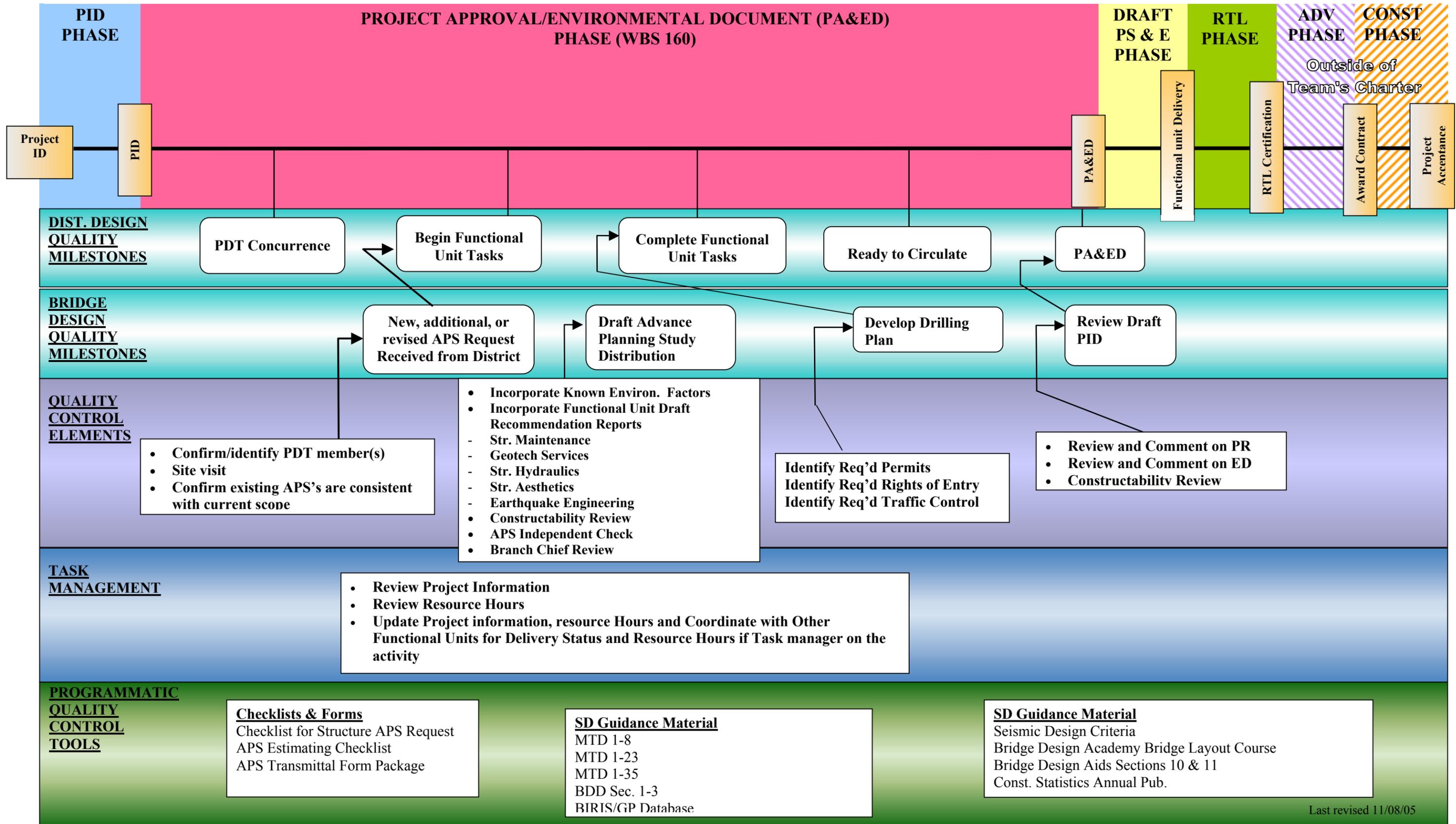
# NORTH REGION QUALITY MANAGEMENT PLAN

## DES Bridge Design North Project Specific Quality Control Plan -PID PHASE-



# NORTH REGION QUALITY MANAGEMENT PLAN

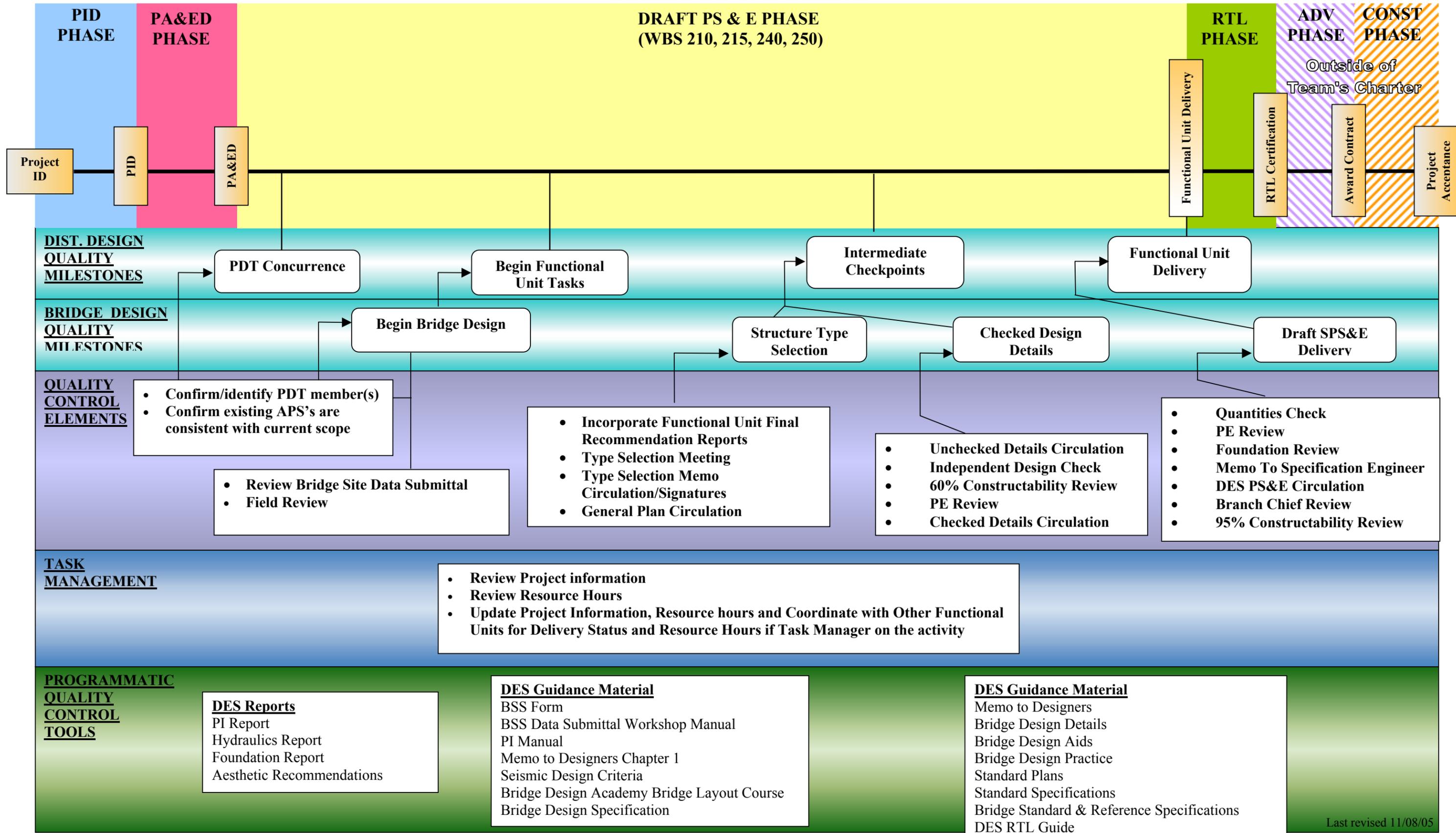
## DES Bridge Design North Project Specific Quality Control Plan -PA&ED PHASE-



# NORTH REGION QUALITY MANAGEMENT PLAN

## DES Bridge Design North Project Specific Quality Control Plan

### -DRAFT PS & E PHASE-



## **Appendix F - North Region Office Engineer Project Specific Quality Control Plan**

NROE's primary role in the North Region Quality Management Plan is to assist the PE with preparation of a project ready for advertisement that conforms to Caltrans policies, directives, and standards. We work together with PEs and the functional units to develop PS&Es that conform to Caltrans standards and are biddable. NROE is responsible for reviewing project plans and checking for their conformance with DES OE submittal standards, Plans Preparation Manual (PPM) requirements, developing standard specifications for contracts, assisting in the development of non-standard specifications, and reviewing project BEES estimates. Additionally, NROE provides Draft and Final PS&E peer review of project specifications developed for the contract documents. NROE checks that the PS&E deliverables required by the RTL Guide and RTL Certification Form are complete and achieve Office Engineer submittal standards.

Implementation of this Specific QMP requires additional PY resources for both RTL Guide, Service Level 1 and especially Service Level 2 projects. North Region Project Management needs to resource Service Level 2 in time for resources to be available at the Initiate NROE activity if this level of service is desired. Traditionally, DES OE has been resourced to work on RTL Guide, Service Level 1 projects after NROE District PS&Es projects. With this QMP and NROE processing RTL Guide, Service Level 2, the resources previously "work planned" need to be transferred to NROE. Please refer to the attached DES OE "Workload and Duration Estimating Tables for WBS Activities 260 and 265." All the hours in Activity 260, Cost Center 285, 59-OE01, and Activity 265, Cost Center 286, 59-OE02, and 291, 59-OE06 need to be transferred to NROE for RTL Guide, Service Level 2, processing of projects. In addition to these resources, supplemental work plan hours are needed since the QMP requires increased NROE participation in the project development process.

### **Intermediate PDT Checkpoints**

NROE is an integral part of the PDT. We participate in applicable PDT meetings. NROE is responsible for developing consensus on the best way to specify and pay for items of work in the contract documents. We work collaboratively and as an intermediary between the project specification owners, DES OE and members of the PDT. NROE coordinates non-standard specification approval.

CADD Manual and PPM standards reflect the importance of proper MicroStation project setup during the initial design phase of a project. Proper project setup facilitates work transfer between functional units and results in consistency between the various sections of the project plans. The initial clipping of project plan sheets on horizontal alignments, associated reference files, and details should be checked by Drafting Services prior to Design's transfer of plan sheets to PDT functional units for their use in the development of additional project plan sheets.

### **Initiate NROE**

After functional unit delivery of individual PS&Es to Design, Design checks the deliverables for compatibility, resolves conflicts with the roadway PS&E, and requests **Initiate NROE**. RTL Guide Service Level processing of the project is revisited and verified by Design, Project Management and NROE. Using the North Region PS&E Submittal Guide Design provides necessary information and deliverables to **Initiate NROE**.

NROE along with the PE checks the Draft Project P&E submittal for completeness with DES OE's RTL Guide. Information required by process, policy and directive is checked and verified. Complete Draft Project P&E submittals are assigned to a Specification Engineer/Technician for RTL processing.

Project plan MicroStation files are transferred to Drafting Services. At **Initiate NROE** Draft Plans are checked for CADD Manual and PPM standards. When the plans conform to standards they are copied into Drafting directories. If the plans do not meet standards a plan is developed by the PDT to resolve the problems. From **Initiate NROE** milestone onward changes to the project plan sheets are managed by Drafting Services either by redlines or resubmitted sheets.

The project BEES is reviewed and updated if necessary. Project specifications are pulled based upon BEES items. Functional unit and Structures PS&E's are combined with Roadway. NROE reviews the complete Draft PS&E and makes comments on inconsistencies and discrepancies to the PE for resolution prior to District circulation. After resolution of comments, NROE Peer Review of the Draft BEES and specifications package are performed. NROE Peer Review comments are resolved prior to Draft PS&E Circulation.

Because NROE is responsible for reviewing project plans, specifications, and estimates for conformance with relevant Departmental standards, deviations from PS&E standards will be elevated to the North Region Office Engineer. The North Region Office Engineer will prepare a fact sheet and present the issue to the Office Engineering Services Chief for resolution with the appropriate North Region Design Office Chief. If agreement cannot be reached between Design and Engineering Services Office Chief's, the Division of Design and Engineering Services Manager will resolve the issue prior to Draft PS&E Circulation.

## Draft PS&E Circulation

During District **Draft PS&E Circulation**, NROE performs a detailed PPM review of the plans and checks plan sheet quantities with BEES. NROE is available to participate in any functional unit review of the Draft PS&E. We attend the Constructability Review meeting. NROE collects the comments from **Draft PS&E Circulation**, reviews the comments, forwards them to the PE and works collaboratively with the PDT for comment resolution. During this time NROE puts together the Project Informational Handout.

## Final PS&E Circulation

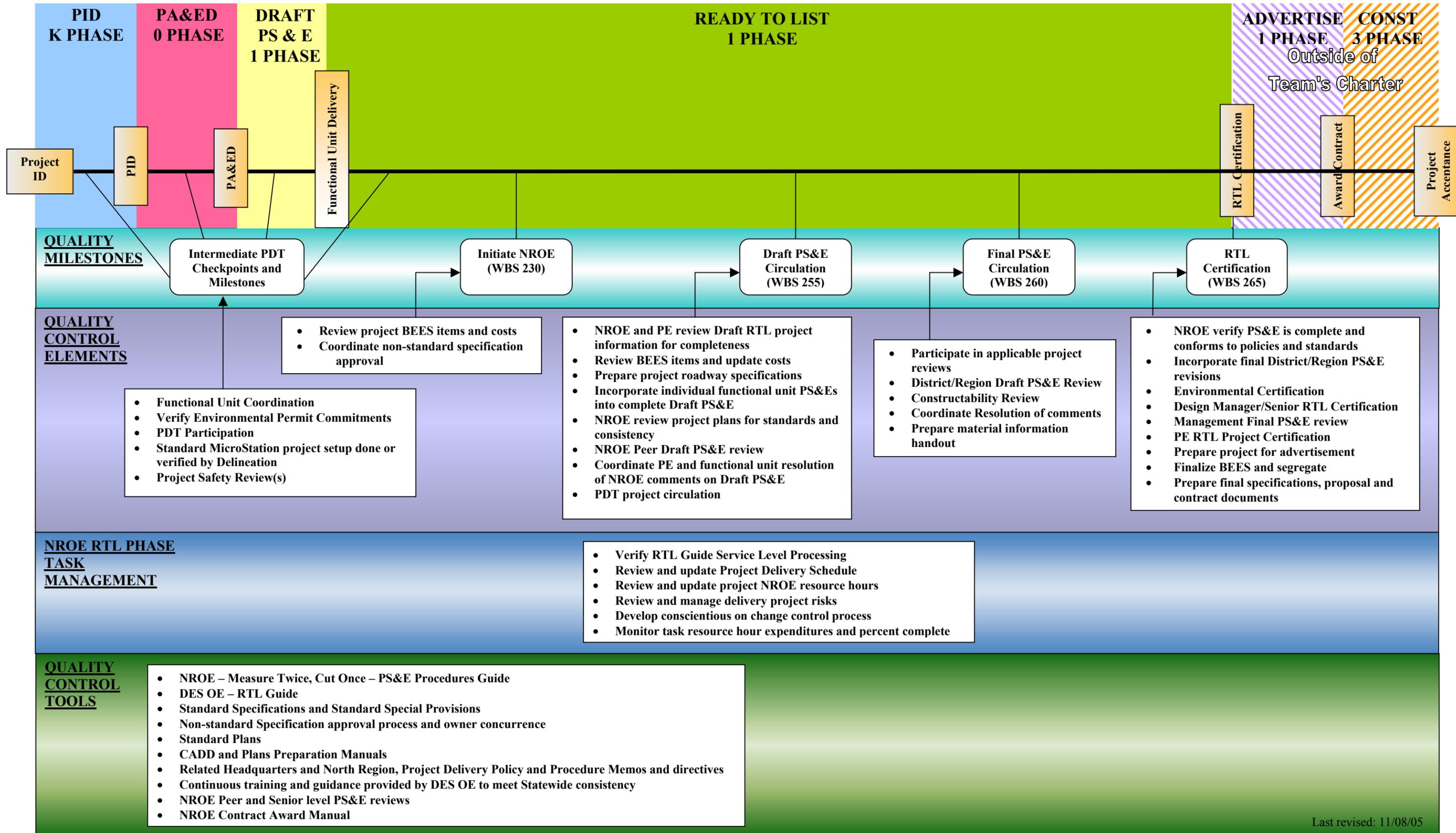
NROE verifies that the **Final PS&E** is complete and conforms to policies and standards. A second NROE Peer Review of the PS&E is performed. Final District revisions are incorporated into the PS&E. When the **Final PS&E** is complete, Environmental Certification of the package is requested. Additionally, the PS&E is circulated for Management Review. The Design Manager/Senior reviews the **Final PS&E** and when appropriate signs the RTL Certification form. When satisfied that the project is RTL, the PE signs the RTL Certification Form. At this point the Project is PS&E Ready/RTL.

## RTL Certification

After **Final PS&E Circulation** and **RTL Certification**, NROE inputs RTL Certification Form data in the DES OE database. Drafting Services prepares the RTL Guide CADD Submittal. The final BEES is prepared reflecting local funding and/or cooperative agreement segregations. The final specifications, boiler plate language, and proposal are created for the contract documents. The Project Manger prepares and delivers the project funds request. If appropriate the project is placed on the CTC agenda for a funding vote. Delegated Maintenance projects go directly to listing and advertisement.

# NORTH REGION QUALITY MANAGEMENT PLAN

## -Office Engineer Project Specific Quality Control Plan-



## Workload and Duration Estimating Tables for WBS Activities 260 and 265

Division of Engineering Services - Office Engineer

Version: 11-21-02

DURATIONS Project Type or Cost	Activity 260				RTL (Ready to List)	Activity 265	
	Standard		Qualified			Weeks	Days
	Weeks	Days	Weeks	Days			
AADD *	-	-	0	0		16	112
<\$1 Million	8	56	1	7		16	112
\$1-5 Million	10	70	2	14		16	112
\$5-25 Million	14	98	7	49		18	126
>\$25 Million	16	112	-	-		20	140

RESOURCES	Activity 100.15	Activity 260	
COST CENTER, RBS CODES	291, 59-OE03	285, 59-OE01	TOTAL
Project Type or Cost	Hours	Hours	Hours
AADD*	19	0	19
Qualified Minor A or Qualified Maintenance	19	48	67
<\$1 Million	19	72	91
\$1-5 Million	22	166	188
\$5-25 Million	26	295	321
>\$25 Million	35	838	873

Activity 265				
285, 59-OE01	286, 59-OE02	291, 59-OE03	302, 59-OE06	TOTAL
Hours	Hours	Hours	Hours	Hours
8	55	38	17	118
8	55	38	17	118
8	55	38	17	118
18	62	43	48	171
33	70	51	102	256
93	84	69	275	521

Notes:

Cost Center 285	Preparation of Draft Contract Documents and Addenda by Specification Engineers. PS&E Office
Cost Center 286	Contract Awards, Bidder Goals, Protests, Services, and Support
Cost Center 291	Project Scheduling, Contract Plans Counter, Bid Book Unit, Addenda, Docutech, Project Management Support
Cost Center 302	Project Plans Unit

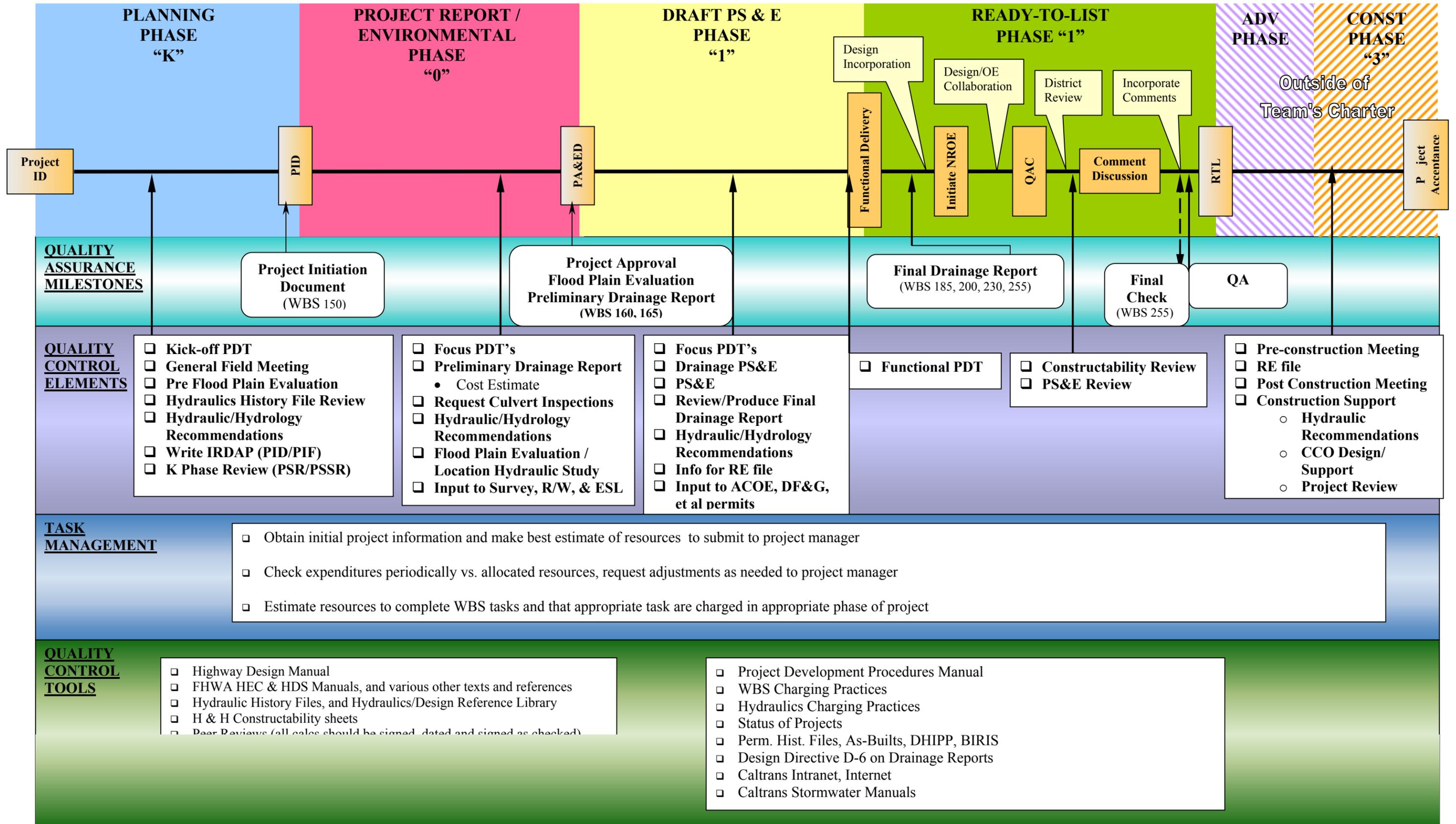
\* AADD = Authority to Advertise District Delegation Process

Please refer all questions to Hoosh Mehrshahi, DES-OE, (916) 227-6224, CALNET 8-498-6224.

11/21/2002

# HYDRAULICS DESIGN QUALITY MANAGEMENT PLAN

## -PROJECT DEVELOPMENT-



## North Region – Landscape Architecture QC/QA Outline for Activities Plan:

### Roadway Support Projects

### Highway Planting Projects

#### **Planning Phase:**

- ◆ Start with submittal of Landscape Architecture Assessment Sheet (LAAS) at PID phase.
- ◆ Prepare Visual PEAR information for Environmental.
- ◆ Senior and PM sign off on LAAS.
- ◆ Send copy of LAAS to Env. Coordinator, Biologist, Project Manager.
- ◆ Update WPS resources.

- ◆ Landscape Architecture develops PSR for HP project. PSR is reviewed by Senior and HQ Coordinator.
- ◆ Update WPS resources.

#### **PA&ED Phase:**

- ◆ LAAS is updated during the PR phase for alternatives and/or any design changes. Environmental sends request for Visual Impact Assessment (VIA) to be completed. Coordinate VIA with proposals in the LAAS for consistency. Senior and staff review PR drafts for Landscape Architecture components. Review SWDR for erosion control measures and BMP's.
- ◆ Coordination of permits, reveg., and mitigation requirements with Environmental.
- ◆ Coordinate with Structures on bridge aesthetics.
- ◆ Update WPS resources.

- ◆ Landscape Architecture develops PR that is reviewed by Senior & HQ Coordinator. Submittals for R/W Data Sheet, TMP Data Sheet, Utility conflict maps, locate as-builts from previous projects, etc. Coordinate planting concept with Maintenance.
- ◆ Update WPS resources.

## Roadway Support Projects

## Highway Planting Projects

### **Design Phase:**

- ◆ Establish a peer review process.
  - ◆ PS&E landscape component done by staff.
  - ◆ All staff attends OE training in ESC-OE.
  - ◆ Senior reviews PS&E plans by staff.
  - ◆ Would recommend hiring specific Landscape Associate to create staff position for internal review of landscape PS&E deliverables.
  - ◆ Senior and/or staff reviews Constructability, Safety, and draft PS&E packages from other Functional Units.
  - ◆ Submittal of 30% and 70% progress submittals on projects to ensure work is being done on plans.
  - ◆ Update WPS resources.
- ◆ Establish a peer review process.
  - ◆ Landscape Architecture develops PS&E for HP project. Senior and HQ coordinator review PS&E package. Landscape Architecture still wants a Service Level 1 review for all HP projects. Due to infrequency of HP projects a Level 1 review would ensure a better quality project for the North Region.
  - ◆ 30% and 70% reviews by Seniors ensuring progress is being made on plans.
  - ◆ Update WPS resources.

## Roadway Support Projects & Highway Planting Projects

### **Construction Phase:**

- ◆ Any changes to Landscape Architecture related items during construction needs to be reviewed and approved by the Project Landscape Architect or their Supervisor.
- ◆ Landscape Architecture shall be invited to the CT in-house pre-job meeting.
- ◆ Landscape Architecture shall be invited to the check and test (e) irrigation facilities portion of the project.
- ◆ Landscape Architecture to prepare the punch list for project landscape items.
- ◆ Landscape Architecture shall be invited to the final walk through.
- ◆ Landscape Architecture shall be invited to the post-job/close out meeting.

Roadway Support Projects & Highway Planting Projects

**Post - Construction Phase:**

- ◆ Ensure service contractor (Small business or Inter-Agency Agreement) commitments are met.  
(i.e. – Weed Control, Litter Removal, Watering, etc.).
- ◆ Meet commitments of Monitoring Plan prepared by Environmental.
- ◆ Peer review by Environmental Mitigation Liaison at appropriate progress milestone dates.

Functional Unit	Phase	Landscape Architecture Deliverables
Design or other functional project lead submits LAAS (Landscape Architecture Assessment Sheet) to Landscape Architecture. Environmental may request input into the PEAR regarding visual impacts.	<b>PID</b>	Landscape Architecture consults with Environmental Coordinator if any revegetation or mitigation work may be required. Landscape Architecture will reply to functional project lead with completed LAAS form for inclusion with the PSR to meet guideline requirements.
Design or other functional project lead submits LAAS (Landscape Architecture Assessment Sheet) to Landscape Architecture. Environmental Coordinator submits request for VIA (Visual Impact Assessment) to be performed by Landscape Architecture.	<b>PA&amp;ED</b>	Landscape Architecture prepares update of LAAS based on preferred alternative in the PSR and correspondence with project engineer and biologist. Landscape Architecture prepares the VIA and any accompanying visual simulations for public meetings and as requested /or determined by PDT, PM, or Agency approval.
Design or other functional project lead submits memo to Landscape Architecture to develop PS&E package for their project. This package should include mitigation requirements in addition to erosion control items.	<b>PS&amp;E</b>	Landscape Architecture prepares PS&E deliverables as requested by functional lead for project. Provides information on products used for design in the RE file for Construction and the contractor. Develop "Design Intent Statement" on highway planting projects.
Respond to bid inquiries and Construction requests for assistance in field on erosion control, planting, irrigation, details, plant establishment, and various other issues regarding landscape components on projects.	<b>Construction</b>	Landscape Architecture available to assist Construction in order to facilitate effective and timely solutions to issues that arise in the field.

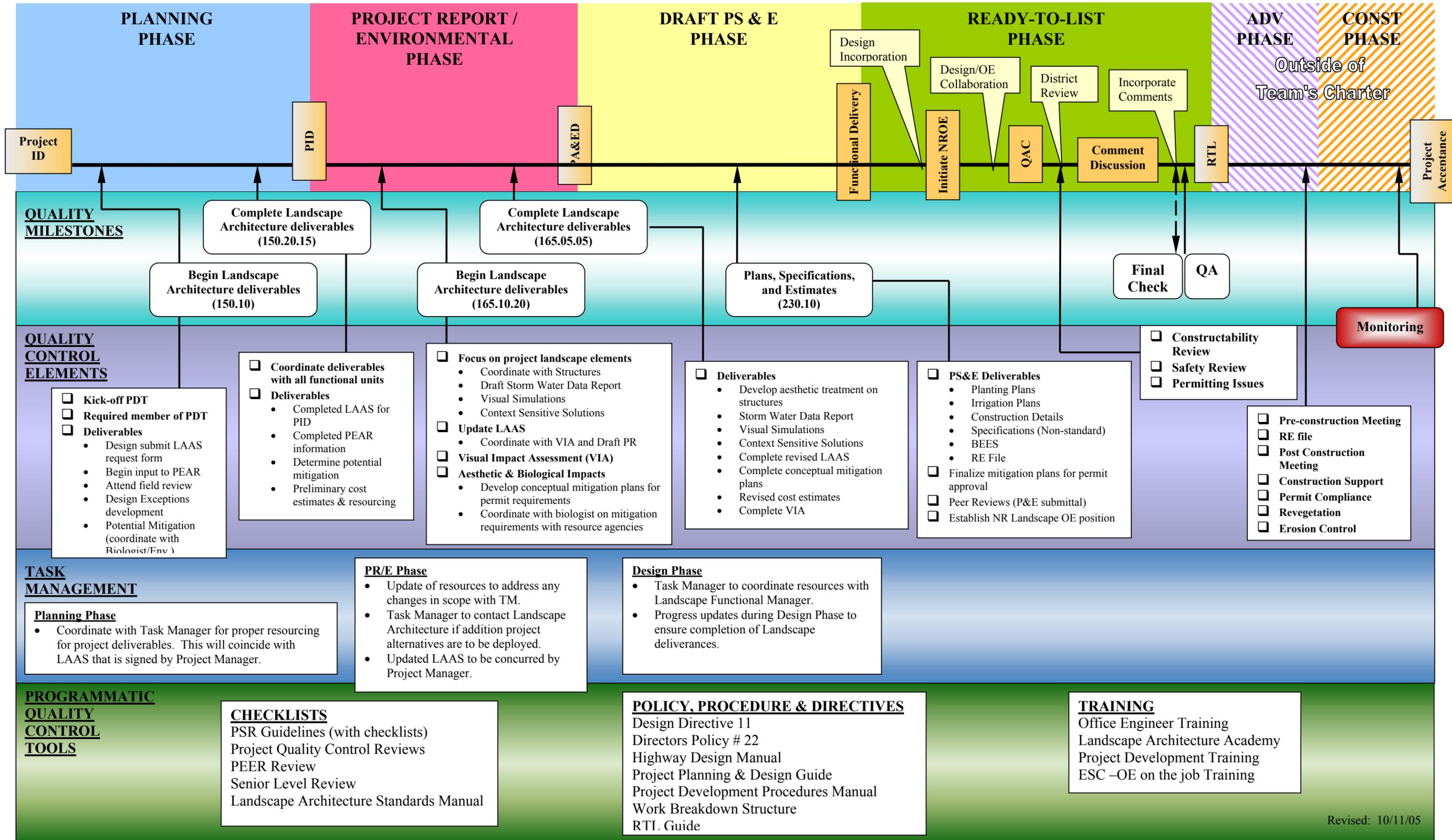
Upon completion and acceptance of the construction contract, Landscape Architecture will work with Environmental to begin the process of implementing the mitigation and planting for projects. This is only applicable when there is CCC/State furnished planting work involved on the project or separate EA.

**Monitoring**

Landscape Architecture will oversee the installation of mitigation planting and work with Environmental to monitor and ensure compliance with the permitting agencies based on commitments made.

# NORTH REGION QUALITY MANAGEMENT PLAN

## -LANDSCAPE ARCHITECTURE QUALITY CONTROL & QUALITY ASSURANCE PLAN-



## **Functional Quality Management Plan - - District 3 Traffic**

### **I. Introduction**

This Functional Quality Management Plan (FQMP) serves as a supplement to the North Region Quality Management Plan (NR QMP) by establishing a QMP necessary to Traffic Operations project delivery, not already contained in the NR QMP, or the Lead Unit Project Specific Quality Control Plan.

This FQMP is intended to provide guidance to project delivery staff, in Traffic Operations and other divisions, to assure the quality of Traffic's deliverables for each project, by providing a Functional Quality Control Plan (FQCP) and Functional Programmatic Quality Control Tools.

### **II. Functional Quality Control Plan**

Traffic Operation's Functional Quality Control (FQC) Plan describes Traffic's tasks and deliverables, as well as Traffic's Quality Milestones (QM) and Quality Control Elements (QCE) identified for each project delivery phase. The FQC Plan is to be customized for each project, and will be incorporated into each Project Specific Quality Control (PSQC) Plan.

#### **A. PID Phase**

##### **1. Tasks**

Traffic Operations will perform preliminary studies (operational analysis, safety analysis, signing & striping and electrical design review of project for deficiencies, TMP data sheet, TOS needs assessment, etc) during the PID phase to assist the PDT in determining scope and cost of project alternatives.

##### **2. Deliverables**

Traffic's deliverable for this phase is a Traffic Data Sheet (PID). Each assigned functional senior in Traffic will provide preliminary study results, preliminary scope and estimate of traffic items they are responsible for, estimated support resource needs, and a Quality Assurance Certification. The Traffic Data Sheet (PID) will summarize the results and recommendations of the preliminary studies; Preliminary scope of traffic items; Preliminary estimate of cost of traffic items; and estimated capital outlay support resource needs and assumptions.

##### **3. Quality Milestones and Corresponding Quality Control Elements**

- a. Begin Project Assignments
  - i. Assign Traffic's Project Team
  - ii. Attend PDT Kickoff Meeting
  - iii. Attend PDT Field Review
  - iv. Coordinate with Traffic Staff in Project's Source District
  - v. Create Traffic's Project Specific Functional Quality Control Plan

- b. Begin Preliminary Traffic Studies
  - i. Coordinate with Lead Unit Prior to Submittal of Traffic Data Sheet Request
  - ii. Determine Types of Traffic Studies Required
  - iii. Coordinate with Source District Staff Prior to Beginning Studies
  - iv. Perform Preliminary Traffic Studies
  - v. Determine Preliminary Scope and Cost of Traffic Items
  - vi. Perform Internal Peer and Senior Review
  - vii. Review Draft Studies, Scope and Cost with Source District Traffic Staff
  - viii. Review Draft Studies, Scope and Cost with Lead Unit and PDT
  - ix. Finalize Preliminary Traffic Studies, Scope and Cost
  - x. Deliver Finalized Studies, Scope and Cost to Source District
  
- c. Create Traffic Data Sheet (PID)
  - i. Summarize Results of Preliminary Studies
  - ii. Summarize Preliminary Scope of Traffic Items
  - iii. Summarize Preliminary Cost Estimate
  - iv. Identify Support Resource Needs and Assumptions
  - v. Perform Internal Peer/Senior Review of Draft TDS
  - vi. Update Draft TDS
  - vii. Perform Office Chief Review of Draft TDS and QA Certifications
  - viii. Finalize TDS for Office Chief Signature
  - ix. Review and Document Lessons Learned
  - x. Save Copies and Backup Data/Calculations
  - xi. Deliver Traffic Data Sheet (PID) and QA Certifications to Lead Unit
  
- d. Participate in and Respond to Comments Generated in Regional Reviews
  - i. Safety Review
  - ii. Constructability Review
  - iii. Draft PID Reviews (Functional and Management)

## **B. PA&ED Phase**

### **1. Tasks**

Traffic Operations will perform detailed traffic and engineering studies (operational analysis, safety analysis, signing & striping and electrical design review of project for scope and cost of traffic items, TMP data sheet, TOS needs assessment, etc) during the PA&ED phase to assist the PDT in determining scope and cost of project alternatives and to assist in selecting the preferred alternative.

### **2. Deliverables**

Traffic's deliverable for this phase is a Traffic Data Sheet (PA&ED). Each assigned functional senior in Traffic will provide complete study results, updated scope and estimate of traffic items they are responsible for, updated estimated support resource needs, and a Quality Assurance Certification. The Traffic Data Sheet (PA&ED) will summarize the results and recommendations of the completed studies; updated scope

of traffic items; updated estimate of cost of traffic items; and estimated capital outlay support resource needs and assumptions.

### **3. Quality Milestones and Corresponding Quality Control Elements**

- a. Update Project
  - i. Update Traffic's Project Team
  - ii. Review/Update Project Information
  - iii. Coordinate with Traffic Staff in Project's Source District
  - iv. Update Traffic's Project Specific Functional Quality Control Plan
  
- b. Begin Traffic Studies
  - i. Coordinate with Lead Unit Prior to Submittal of Traffic Data Sheet Request (PA&ED)
  - ii. Perform Traffic and Engineering Studies
  - iii. Update Scope and Cost of Traffic Items
  - iv. Perform Internal Peer and Senior Review
  - v. Review Draft Studies, Scope and Cost with Source District Traffic Staff
  - vi. Review Draft Studies, Scope and Cost with Lead Unit and PDT
  - vii. Finalize Traffic Studies, Scope and Cost
  - viii. Deliver Finalized Studies, Scope and Cost to Source District
  
- c. Create Traffic Data Sheet (PA&ED)
  - i. Summarize Results of Completed Studies
  - ii. Summarize Scope of Traffic Items
  - iii. Summarize Cost Estimate
  - iv. Update Support Resource Needs and Assumptions
  - v. Perform Internal Peer/Senior Review of Draft TDS
  - vi. Update Draft TDS
  - vii. Perform Office Chief Review of Draft TDS and QA Certifications
  - viii. Finalize TDS for Office Chief Signature
  - ix. Review and Document Lessons Learned
  - x. Save Copies and Backup Data/Calculations
  - xi. Deliver Traffic Data Sheet (PA&ED) and QA Certifications to Lead Unit
  
- d. Participate in and Respond to Comments Generated in Regional Reviews
  - i. Safety Review
  - ii. Constructability Review
  - iii. Draft PA&ED Reviews (Functional and Management)

## **C. Design Phase**

### **1. Tasks**

Traffic Operations prepares functional unit final plans, specifications, estimates and reports during the design phase.

## 2. Deliverables

Deliverables include Signing & Striping P&E; Electrical Design PS&E; and final Traffic Management Plans. Each assigned functional senior in Traffic will provide the final design products they are responsible for.

## 3. Quality Milestones and Corresponding Quality Control Elements

- a. Update Project
  - i. Update Traffic's Project Team
  - ii. Review/Update Project Information
  - iii. Coordinate with Traffic Staff in Project's Source District
  - iv. Update Support Resource Needs and Assumptions
  - v. Update Traffic's Project Specific Functional Quality Control Plan
  
- b. Begin Design Services
  - i. Coordinate with Lead Unit Prior to Submittal of Traffic PS&E Request
  - ii. Update Scope of Traffic Items
  - iii. Perform Signing & Striping and/or Electrical Design
  - iv. Prepare TMP
  - v. Update Cost of Traffic Items
  - vi. Prepare Specifications for Traffic Items
  - vii. Perform Internal Peer and Senior Review
  - viii. Review Final TMP, Signing & Striping P&E and/or Electrical PS&E with Source District Traffic Staff
  - ix. Review Final TMP, Signing & Striping P&E and/or Electrical PS&E with Lead Unit and PDT
  - x. Perform Final Internal Peer and Senior Review
  - xi. Finalize TMP, Signing & Striping P&E and/or Electrical PS&E
  - xii. Review and Document Lessons Learned
  - xiii. Save Copies and Backup Data/Calculations
  - xiv. Deliver complete TMP, Signing & Striping P&E and/or Electrical PS&E to Lead Unit

## D. RTL Phase

### 1. Tasks

Traffic Operations participates in the draft PS&E, constructability, and safety reviews during the RTL Phase. Traffic works with the lead unit to resolve all traffic-related issues and respond to comments raised during these reviews and the NROE and ESCOE reviews. Traffic updates the final TMP, Signing & Striping P&E, and Electrical PS&E as necessary. Traffic also finalizes all correspondence and information for the Resident Engineer, and forwards this to the lead unit for inclusion in the project's Resident Engineer files.

### 2. Deliverables

Traffic's deliverables for the RTL phase include assuring Signing & Striping PS&E, Electrical Design PS&E, and the Traffic Management Plans meet Ready to List quality standards.

### **3. Quality Milestones and Quality Control Elements**

- a. Participate in and Respond to Comments Generated in Regional Reviews
  - i. Safety Review
  - ii. Constructability Review
  - iii. Draft PS&E Review
  - iv. Review Any Changes with Source District Staff
- b. Deliver Completed Services
  - i. Deliver complete TMP, Signing & Striping P&E and/or Electrical PS&E to Lead Unit
  - ii. Review and Document Lessons Learned

### **III. Functional Programmatic Quality Control Tools**

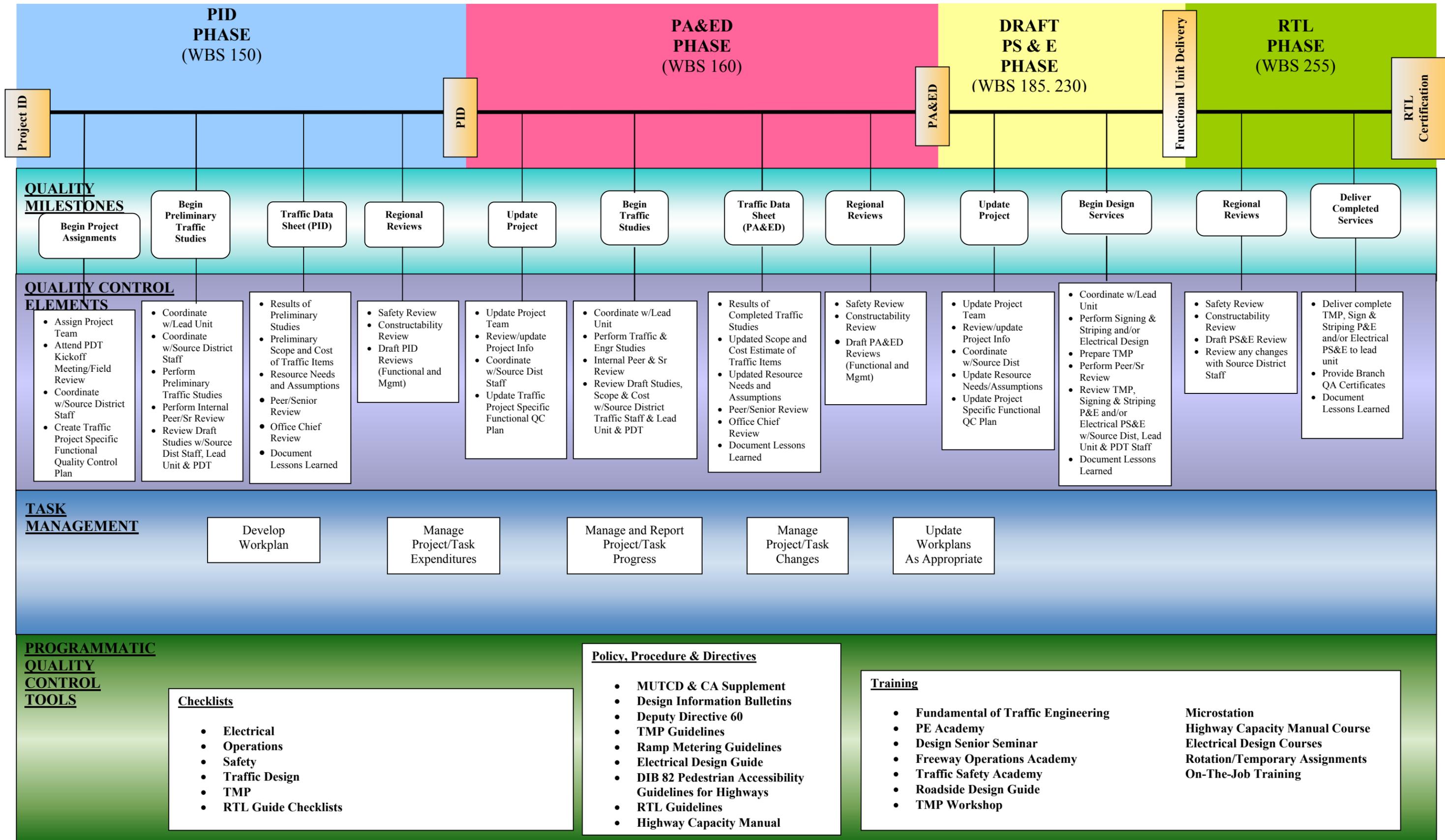
- A. Training**
- B. Checklists**
- C. Policies and Directives**

### **IV. Functional Quality Assurance**

Each unit within Traffic will provide Functional Quality Assurance (FQA) with each deliverable, as appropriate, certifying the PSQC Plan has been adhered to.

# NORTH REGION QUALITY MANAGEMENT PLAN

## -DISTRICT 3 TRAFFIC-



## Materials Project Specific Quality Control Plan

- Attend PDT Meetings.
- Review PID's and PR's to assure Materials issues are addressed and proper documentation such as deflection studies and materials recommendation have been incorporated. Materials recommendations (preliminary and final) may include Alternative Pipe Culvert recommendations and recommendations on potential borrow sites. Maintenance Engineering generally provides recommendations for potential disposal sites.
- Attend the 30%, 60% and 95% constructability reviews to insure that proper material considerations are incorporated into the PID's, PR's and PS&E.
- Review the draft PS&E package to assure Materials issues have been addressed. Provide Materials Information Handout when applicable.

# **NORTH REGION OFFICE OF SURVEYS**

## **QUALITY MANAGEMENT PLAN**

### **FOR RIGHT OF WAY ENGINEERING**

#### **INDEX:**

- 1. MISSION STATEMENT FOR NROS-RIGHT OF WAY ENGINEERING.**
- 2. OC/OA DESIGN BASED FLOWCHART FOR RWE.**
- 3. QC/QA FLOWCHART OUTLINE FOR RWE ("Right of Way Project Flowchart Outline").**
- 4. PROCESSES AND RELATED RIGHT OF WAY ENGINEERING PRODUCTS.**
- 5. THE RIGHT OF WAY ENGINEERING QUALITY ASSURANCE CHECK LIST.**
- 6. APPROVAL SHEETS FOR R/W APPRAISAL MAP COMPLETION.**
- 7. RIGHT OF WAY ENGINEERING TABLE OF CONTENTS, Chapter 6 of the RIGHT OF WAY MANUAL.**
- 8. RIGHT OF WAY ENGINEERING PROJECT RELATED ACTIVITIES, an alternative flowchart from RWE.**
- 9. COMBINED RWE & SURVEYS PROJECT WORK FLOW DIAGRAM**

NORTH REGION OFFICE OF SURVEYS:  
RIGHT OF WAY ENGINEERING (RWE)  
QUALITY MANAGEMENT PLAN

**NORTH REGION OFFICE OF SURVEYS (NROS)/RIGHT OF WAY ENGINEERING** is a product and customer satisfaction driven division. In its efforts to attain a high level of quality assurance it finds its quality control elements bound to the integrity of its employees, who initiate and maintain the quality of the product, the **RIGHT OF WAY MANUAL (CHAPTER 6)**<sup>1</sup>, the laws embodied in the **CALIFORNIA LAND SURVEYORS ACT, SUBDIVISION MAP ACT, STREETS AND HIGHWAY CODE STATUTES**, and its internal processes built with redundancies and checklists from field surveys through office processing.

**GENERAL GUIDELINES FOR QUALITY CONTROL  
AND QUALITY ASSURANCE (QC/QA)**

In broad scope, the NROS-RWE QC/QA program aims to ensure the following:

- That each task complies with the laws and regulations that govern the use of Federal, State, and local transportation funds;
- That each product meets the customer's needs and purposes, as defined in the **Task Order** and **Cost Estimate**;
- That a process for constructive feedback is implemented and contributes to satisfactory product delivery;
- And, that immunities established by law to protect the Department and its employees from liability are preserved.

These guidelines apply to all **Right of Way Engineering Tasks** including participation in the preparation of the Project Initiation Document (PID); and interactions with the other Caltrans Departments throughout the project, as right of way determinations, right of way surveys for delineation and monumentation, acquisitions and relinquishments, and deed and map preparation play a part through and after Construction.

As with any general guidelines, which must apply to a wide range of activities, NROS-RWE staff members are expected to use professional judgment in their application.

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<sup>1</sup> The **RIGHT OF WAY MANUAL** can be found at:  
<http://www.dot.ca.gov/hq/row/rowman/manual>. Chapter 6 is dedicated to Right of Way Engineering. Its index is appended to this document. It is continually updated as processes and technology change.

In its conception, **QC/QA** is not intended to be an additional layer of effort required to deliver a successful project. It is, simply or not, intended to be the norm that governs all activities, projects, and processes within **NROS**.

The more specific steps towards Quality Assurance, through Quality Control, are described, listed and appended below.

## **IMPLEMENTING QUALITY ASSURANCE**

The policies and processes of **NROS-Right of Way Engineering** are developed and continually refined to ensure high quality in its project deliverables through a series of **Quality Control** measures. These policies and processes are applied throughout the product delivery process from project initiation to post-construction. These measures include, but are not limited to, the following:

- A well trained and experienced work force, which is dedicated to producing a high quality product;
- The RIGHT OF WAY MANUAL, Chapter 6, which specifies the procedures, documents, and attendant items for defining, locating, and mapping property, acquisitions and relinquishments, the SURVEYS MANUAL, which defines the technical aspects of surveying for land-net and right of way, and the aforementioned legal principles that govern surveys and mapping (also noted in Chapter 6).
- The RWE "Quality Assurance Check List" with its well defined quality control checkpoints<sup>2</sup>;
- Feedback from the customers, including the other CALTRANS divisions and the public;
- The daily interaction of the staff, to inform, critique and improve current practices.

The more specific steps to Quality Assurance through Quality Control are contained in NROS-RWE and Departmental checklists and flowcharts, of which the pertinent ones are described and appended below.

## **APPENDED CHECKLISTS AND ASSOCIATED DOCUMENTS**

The following documents are appended:

1. "QC/QA DESIGN BASED FLOWCHART FOR RIGHT OF WAY ENGINEERING", which is the base flowchart document for the QMP
2. "QC-QA FLOWCHART OUTLINE", which is an outline of the materials within the QC/QA Flowchart ("1" above).

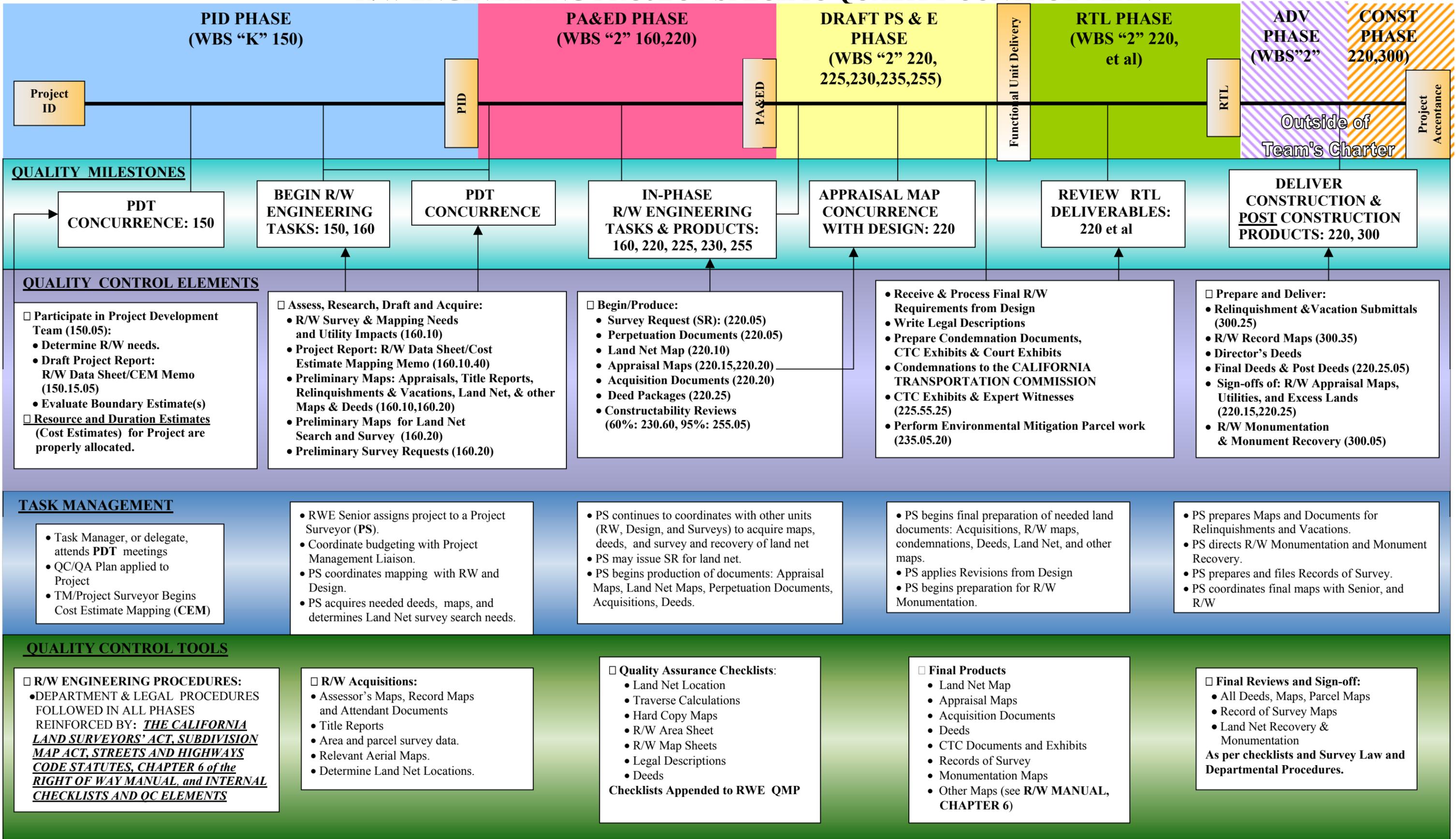
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<sup>2</sup> The checkpoints are defined by the checklists and job flow charts appended to this document.

3. "The Right of Way Engineering Quality Assurance Check List", which is a thorough, item by item, check and review list for all RWE products (maps, deeds, easements, et al);
4. "Approval Sheet(s)", which are signing off documents (i.e. review and approval of documents) for R/W Appraisal Maps to be approved by: Project Development, R/W Utilities, and R/W Excess Lands;
5. "Processes and Related Right of Way Engineering Products", which is an ordered list of Process/Products/Notes (WBS codes) that are the products of RWE;
6. "Right of Way Engineering Table of Contents" from Chapter 6, RIGHT OF WAY MANUAL (<http://www.dot.ca.gov/hq/row/rowman/manual>), which lists and defines the products and steps that lead to the final products of RWE;
7. "Right of Way Engineering Project Related Activities", which is an alternative flowchart from RWE.
8. "Combined RWE & Surveys Project Work Flow Diagram", which is a complex flow chart diagramming the interactions of Surveys and R/W Engineering from project inception to completion (post construction and monument and control maintenance activities).

# NORTH REGION QUALITY MANAGEMENT PLAN

## R/W ENGINEERING PROJECT SPECIFIC QUALITY CONTROL PLAN



# **RIGHT OF WAY ENGINEERING PROJECT FLOW CHART OUTLINE<sup>1</sup>**

1. Project Initiation:
  - A. Obtain information from the status book, design, maintenance, or construction. Review any project reports.
  - B. Create Hardship and Protection Parcel Maps as/if required.
  - C. Create Estimate Maps as/if required.
2. Create a Project File and Locate, Add, and File the following:
  - A. Obtain Assessor's Maps, and Record Maps (Record of Surveys, Parcel Maps, Tract Maps, etc.).
  - B. List the Assessor's Parcel Numbers that are affected.
  - C. Obtain copies of property ownership lists from the Assessor's Files.
  - D. Check the map files for any previous jobs in the Project Area that may apply to or impact the current Project.
3. Maps:
  - A. Obtain aerial photos and topographic maps.
  - B. Create an Assessor's composite map.
  - C. Visit the Project Site to compare maps to reality.
4. Issue a Survey Request (SR):
  - A. Prepare the maps necessary for the surveyor's use.
  - B. Prepare/calculate search coordinates for property and R/W corners.
  - C. Denote/list the property corners that need to be searched for and tied.
  - D. Visit Project Site to recover needed corners.
  - E. Meet with the surveyors to discuss the survey with regard to monumentation maps, recovered/recovery of points, and survey methodology.
5. Process returned Survey Data:
  - A. Using the data, delineate the property, and compute areas affected.
6. Prepare the Base Maps:
  - A. Assign parcel numbers and order the needed Title Reports.
  - B. Create parcel inventory sheets (IRWS).
7. Obtain/receive Right of Way requirements from Design:
  - A. Review Design right of way requirements for completeness.
  - B. Meet with designers to resolve any conflicts.
  - C. Overlay the R/W requirements on the Base Maps and compute the areas needed (for takings, et al).

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<sup>1</sup> Adapted from a District 02 document.

8. Appraisal Maps:
  - A. Prepare and send out Appraisal Maps.
  - B. Prepare/fill out Certificates of Sufficiency for Hazard Materials.
  - C. Send copies of the Appraisal Maps to Design for their review and approval.
  - D. Revise Appraisal Maps, if needed.
9. Final Deeds:
  - A. Write and Post Final Deeds with revisions if necessary.
10. Perform Condemnation Procedures.
11. Post Record Maps and associated documents for Public Display.

## Processes and Related Right of Way Engineering Products

Process	Products	Notes
Project Initiation Document (R/W Data Sheet)	Cost Estimate Mapping	WBS 150.15.05, CEM Memo
Draft Project Report (R/W Data Sheet)	Cost Estimate Mapping	WBS 160.10.40, CEM Memo <i>Above should both be tied in with resource and scheduling (duration) estimates for RWE</i>
Draft Project Report	Preliminary Land Net Map (Includes research, survey request, field work, and boundary determination)	WBS 160.20.25, 160.20.30, 160.20.35
Perform Right of Way Engineering	Survey Request (Includes research, corner records*, etc.)	WBS 220.05.05, 220.05.10
Perform Right of Way Engineering	Perpetuation Documents* (Includes field work and mapping)	WBS 220.05.10, 220.05.20, 220.05.25 <i>* May be done by others</i>
Perform Right of Way Engineering	Land Net Map	WBS 220.10
Perform Right of Way Engineering	Appraisal Maps, etc.	WBS 220.20.05, 220.20.15, 220.15.30, 220.15.35, 220.15.95 <i>Recognized need to work closely with Mapping Standards Team</i>
Perform Right of Way Engineering	Acquisition Documents	WBS 220.20.05, 220.20.15
Perform Right of Way Engineering	Deed packages for Contract Obligations	WBS 220.25.05, 220.25.15, 220.25.95
Perform Right of Way Engineering	Revisions	WBS 220.30.05, 220.30.10

## Processes and Related Right of Way Engineering Products

Process	Products	Notes
Project R/W Certification	CTC Exhibits, Expert Witness	WBS 225.55.25, 245.55.25 (closeout cond.)
Tort Litigation	Expert Witness, Court Exhibits	Owner/Operator EA (researching)
PS&E Review	Review/Comment, Constructability Reviews	WBS 230.60 (60%), 255.05 (review/95%)
Perform Environmental Mitigation R/W Work	Appraisal Maps & Deeds for Mitigation Parcel(s) not covered under WBS 220/225	WBS 235.05.20 (QC/QA – same as 220)
Prepare Staking Notes	R/W Data (summaries, etc.) for inclusion in Survey File	WBS 255.35
		<i>Need to develop QC checklist in conjunction w/ Construction Surveys Group</i>

## QUALITY ASSURANCE REVIEW

---

PROJECT: \_\_\_\_\_

CONTRACT NO: \_\_\_\_\_

TASK: \_\_\_\_\_

SEGMENT: \_\_\_\_\_

JOB NO: \_\_\_\_\_

DATE: \_\_\_\_\_

---

ENTERED AND COMPUTED BY: \_\_\_\_\_

COMPILED BY: \_\_\_\_\_

CHECKED BY: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_

## QUALITY ASSURANCE CHECK LIST

### LAND NET LOCATION Project – Caltrans Right-of-Way Engineering

<u>ITEM</u>	<u>CALC'D</u>	<u>CHK'D</u>	<u>REVIEWED</u>
Survey Plan	_____	_____	_____
Record Maps	_____	_____	_____
Existing Control	_____	_____	_____
 <u>Field Notes</u>			
Cover Sheet	_____	_____	_____
Title	_____	_____	_____
Job No.	_____	_____	_____
Equipment	_____	_____	_____
Crew	_____	_____	_____
 <u>Computation Sheets</u>			
Horizontal Datum	_____	_____	_____
Controls Points Used	_____	_____	_____
Software			
Program _____	_____	_____	_____
Program _____	_____	_____	_____
Program _____	_____	_____	_____
Data File _____	_____	_____	_____
Results File _____	_____	_____	_____
Path _____	_____	_____	_____
Disc/Tape Format _____	_____	_____	_____
Compare Closures with Allowable _____	_____	_____	_____
 <u>Survey Report</u>			
Survey Purpose	_____	_____	_____
Datum	_____	_____	_____
Methods	_____	_____	_____
Results	_____	_____	_____
 <u>Contract Deliverables</u>			
Survey Report	_____	_____	_____
Calcs	_____	_____	_____
Field Notes	_____	_____	_____
Basis of Survey	_____	_____	_____
Presentation of Materials	_____	_____	_____

**QUALITY ASSURANCE CHECK LIST**  
**TRAVERSE CALCULATIONS**  
**Project - Caltrans Right-of-Way Engineering**

<u>ITEM</u>	<u>CALC'D</u>	<u>CHK'D</u>	<u>REVIEWED</u>
<u>Control and Right-of-Way</u>			
Enter Control Data	_____	_____	_____
Enter New R/W Data	_____	_____	_____
Enter Old R/W Data	_____	_____	_____
<u>Field Survey</u>			
Enter Field Data	_____	_____	_____
Reduce to Grid	_____	_____	_____
Compare with Field Data and Adjust, if necessary	_____	_____	_____
<u>Record Data Taraverse</u>			
Enter Record Data	_____	_____	_____
Reduce to Grid	_____	_____	_____
Compare with Field Data and Adjust, if necessary	_____	_____	_____
<u>Parcel Break-Out Traverses</u>			
Block/Deed Cahin Adjustment and Proportion	_____	_____	_____
Ownership Break-Out	_____	_____	_____
Parcel Take Area	_____	_____	_____
Remainder Area	_____	_____	_____
Easement Take Area, if necessary	_____	_____	_____
<u>Contract Deliverables</u>			
Computer Printout Reflecting, Parcel Number, Point Numbers, Bearings, Distances Curve Data, Coordinates, Closure and Areas	_____	_____	_____
Disc of Same, if necessary			

\* Note: Normally traverse calculations will accompany the various maps, sketches and legal descriptions for parcels and will apper on an intergraph disc for that map, sketch or legal description.

**QUALITY ASSURANCE CHECK LIST**  
**HARD COPY MAPS**  
**Project - Caltrans Right-of-Way Engineering**

<b><u>ITEM</u></b>	<b><u>DRAWN</u></b>	<b><u>CHK'D</u></b>	<b><u>REVIEWED</u></b>
<b><u>Map Requirements</u></b>			
Sheet Size (Varies)	_____	_____	_____
Title Block	_____	_____	_____
Point Listing	_____	_____	_____
<b><u>Location Data</u></b>			
Rancho, Meridian, Township Range, Section, subdivision, forest boundaries, property lines, and Base and Meridian if applicable.	_____	_____	_____
Section lines, corners, labeled.	_____	_____	_____
Subdivision with recordations data, lot, block, parcel.	_____	_____	_____
Street names, survey line, and widths (if uniform).	_____	_____	_____
Railroad names, rights-of-eay, withs and recordation data.	_____	_____	_____
Waterways names, rivers, creeks, washes, lakes etc. widths and reference data.	_____	_____	_____
<b>Centerline Data</b>			
Stationing, point numbers, curve data, bearings and distances.	_____	_____	_____
<b><u>Land Net and Parcel Data</u></b>			
Transfer traverse calculations data file, from each finished parcel.	_____	_____	_____
Easements to be acquired: numbered, dimensioned and labeled as to purpose.	_____	_____	_____
Existing easements involved in the project are to be shown and labeled.	_____	_____	_____
Parcels, numbers and ownership names.	_____	_____	_____
Areas: total holding, R/W requirements, remainder and excess.	_____	_____	_____
Analysis	_____	_____	_____
Decision	_____	_____	_____

HARD COPY MAPS (Continued)

ITEM

Hard Copy Number	_____	_____	_____
NAD__ __ Coordinates	_____	_____	_____
Zone 5	_____	_____	_____
Grid Factor	_____	_____	_____
0: " ' at Pt.	_____	_____	_____
No. Near	_____	_____	_____
&	_____	_____	_____
● = Found Point	_____	_____	_____
○ = Calc Point	_____	_____	_____
— = Calc line	_____	_____	_____
— = Grapic line	_____	_____	_____
Tract Boundary	_____	_____	_____
North Arrow	_____	_____	_____

Point Listing Area

Point Number	_____	_____	_____
Northing Easting	_____	_____	_____
Description	_____	_____	_____
Level	_____	_____	_____

Point Listing Improvements

Closure	_____	_____	_____
Point Number	_____	_____	_____
Curve Data, Bearing	_____	_____	_____
Distance	_____	_____	_____
Norhting, Easting	_____	_____	_____
Description	_____	_____	_____

\* A total take completely within the R/W may be described by its record demensions and the area corrcted if necessary by further calculation.

QUALITY ASSURANCE CHECK LIST  
R/W AREA SHEET  
Project - Caltrans Right-of-Way Engineering

ITEM	<u>DRAWN</u>	<u>CHK'D</u>	<u>REVIEWED</u>
<b><u>Map Requirements</u></b>			
Sheet Size (22' x 36")	_____	_____	_____
Margins (RWM50 Format)	_____	_____	_____
Title Block	_____	_____	_____
Signatory Block	_____	_____	_____
Revision Block	_____	_____	_____
Quality Check Block	_____	_____	_____
Norht Arrow	_____	_____	_____
<b><u>Location Data</u></b>			
Streets, Name R/W	_____	_____	_____
Railroads, Name, Run	_____	_____	_____
Freeway, Name/No., R/W	_____	_____	_____
Parcels	_____	_____	_____
R/W Map Sheet Layout (dashed), and No.'s	_____	_____	_____
<b><u>Parcel Identification</u></b>			
Parcel No. and Owner Per Sheet	_____	_____	_____
<b><u>Title Block</u></b>			
Title: Area Map	_____	_____	_____
Bar Scale	_____	_____	_____
Map File Number	_____	_____	_____
Source, Charge, E.A.	_____	_____	_____
<b><u>Revision Blocks</u></b>			
Date, revision and descrition of change	_____	_____	_____
Revision by, checked by, date.	_____	_____	_____
<b><u>References</u></b>			
To other highway routes and map numbers of intersecting projects.	_____	_____	_____

R/W AREA SHEET (Continued)

ITEM

Signatory Blocks

Dist, County, route, post mile,  
sheet no., total sheets.

Signature

Date

Seal

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Quality Control Block

Detailed

Checked

Traced

Checked

Hard Copy No.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

QUALITY ASSURANCE CHECK LIST  
R/W MAP SHEETS  
Project - Caltrans Right-of-Way Engineering

**ITEM**

DRAWN

CHK'D

REVIEWED

**Map Requirements**

Sheet Size (22'x36")

Margins (RWM50 Format)

Title Block

Signatory Block

Revision Block

Quality Control Block

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**Location Data**

Rancho, Meridian, Township Range, Section  
Subdivision, forest, boundaries, property  
lines, and Base and Meridian if applicable.  
Section lines, corners, labeled.

Name of city, town: subdivision with recordation  
data, lot, block: city limit lines.

Street names, centerlines, R/W lines and widths  
(if uniform)

Waterways: rivers, creeks lakes, etc.

Railroad, name, rights-of-way and widths.

Existing landmarks (by name), parks,  
schools, airports

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**Centerline Data**

Stationing, curve data, bearings and  
distances, Post mile on centerline.

_____	_____	_____
-------	-------	-------

**Land Net and Parcel Data**

Transfer traverse calculations data  
file, from each finished parcel.

Easements to be acquired: numbered,  
dimensioned and labeled as to purpose

Existing easements involved in the project  
are to be shown and labeled.

_____	_____	_____
_____	_____	_____
_____	_____	_____

**Access Information**

Current requirements, identified by access  
denial ticks.

Acces rights previously acquired - labeled.

Frontage roads.

Grade seperation labeled.

Acces openings: symbol, size ties to centerline.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

MAP SHEETS (Continued)

ITEM

DRAWN

CHK'D

REVIEWED

Use of Details

Use when needed to clarify demensioning  
 Place close to parcel, or add note "See  
 Detail 'A' ", etc.  
 If not drawn to scale must be so labeled  
 Repeat at least one parcel number and one  
 dimension for reference.  
 If necessary to rotate detai, use additional  
 norht arrow.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Ownership Record

Prcel Numbers  
 Grantors name tabulated in block.  
 Areas Required: Remainder, total and excess.  
 Recordation: Instr, date, O.R.  
 Remarks: Easements to be acquired, area  
 and purpose.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Map Background

Grid ticks on field of drawing.  
 Topography.  
 Contours if needed.  
 Basis of Bearing (when CCS used, included  
 grid factors and zone)  
 Norht arrow

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Title Block

Title: R/W Map  
 Coordiante basis and combination factor.  
 Bar scale.  
 Map fiel number.  
 Source, charge, E.A.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Revision Block

Date, revision and description of changes.  
 Revision by, checked by, date.

_____	_____	_____
_____	_____	_____

References

To adjoining right-of-way maps if needed  
 for clarity.  
 To other highway routes and map numbers  
 of intersecting projects.

_____	_____	_____
_____	_____	_____

R/W MAP SHEET (Continued)

ITEM

DRAWN

CHK'D

REVIEWED

Signatory Block

Dist., county, route, post mile,  
sheet no., total sheets.

Signature

Date Seal

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

Quality Control Block

Detailed

Checked

Traced

Checked

Hard Copy No.

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QUALITY ASSURANCE CHECK LIST  
LEGAL DESCRIPTIONS

Project – Caltrans Right-of -Way Engineering

<u>ITEM</u>	<u>PRP'D</u>	<u>CHK'D</u>	<u>REVIEWED</u>
<u>Title</u>			
Type or Name of Legal	_____	_____	_____
Parcel Number	_____	_____	_____
<u>Preamble</u>			
State	_____	_____	_____
City, County of Unincorporated Territory	_____	_____	_____
Of County	_____	_____	_____
Portion, all or of	_____	_____	_____
Subdivision, Plat, Document, Township	_____	_____	_____
Plat, Land Grant or Survey	_____	_____	_____
Name or Number	_____	_____	_____
Recording Date and Data	_____	_____	_____
<u>Body</u>			
Point of Commencement			
Where Located			
Reference, Date, and Recording Data	_____	_____	_____
True Point of Beginning			
Correct Direction and Distances from			
Point of Commencement			
To/Along, Reference, Date, and	_____	_____	_____
Record Data to T.P.O.B.	_____	_____	_____
Call for Monuments			
Found or Set			
Natural	_____	_____	_____
Reference, Date and Recording Data	_____	_____	_____
Not Called for	_____	_____	_____
Tangent Direction			
To/Along Reference, Date and Recording Data	_____	_____	_____
Bearings (Direction, Degrees, Minutes			
and Seconds)	_____	_____	_____
Distances (Feet and Decimals) and "Feet"	_____	_____	_____
Offset To/Parallel To	_____	_____	_____
Curve Direction			
Tangent/Non – Tangent	_____	_____	_____
Direction or Concavity	_____	_____	_____
Radius (Feet and Decimals) and "Feet"	_____	_____	_____
Direction Along Curve	_____	_____	_____

LEGAL DESCRIPTIONS (Continued)

<u>ITEM</u>	<u>PRP'D</u>	<u>CHK'D</u>	<u>REVIEWED</u>
<u>Clauses</u>			
The sidelines of the here in above Describe strip of land shall be prolonged, Shortened and intersect, where necessary, to Create a continuous boundary and to terminate at a _____ line.	_____	_____	_____
All as more particularly shown on Exhibit " _____ ", attached hereto and by this reference made a part hereof.	_____	_____	_____
This legal was prepared by me, or under my Direction, in conformance with the Professional Land Surveyors Act.			
All bearings and distances shown hereon are based on the State of California, Zone 5, State Plane Coordinate System NAD83, Caltrans Adjustment. A combination factor of _____ Was used to convert All ground distances directly to grid, as Shown hereon.	_____	_____	_____
<u>Intent</u>			
Meet Owner Criteria	_____	_____	_____
Meet Agency Standards	_____	_____	_____
<u>Final</u>			
Signatory	_____	_____	_____
Date	_____	_____	_____
Expiration Date	_____	_____	_____
Seal	_____	_____	_____
Signature	_____	_____	_____
<u>Contract Deliverables</u>			
Legal Description	_____	_____	_____
Sketch	_____	_____	_____
Disc	_____	_____	_____

LEGAL DESCRIPTIONS (Continued)

<u>ITEM</u>	<u>CALC'D</u>	<u>CHK'D</u>	<u>REVIEWED</u>
Delta (Degree, Minutes, Seconds)	_____	_____	_____
Length (Feet and Decimals) and "Feet"	_____	_____	_____
Radial Bearing if Non-Tangent (Direction, Degrees, Minutes and Seconds)	_____	_____	_____
To/Along Reference, Date and Recording Data	_____	_____	_____
<u>Ending</u>			
Back to True Point of Beginning	_____	_____	_____
To a Point on a Line Reference, Date and Recording Data	_____	_____	_____
"Of" Descriptions			
Define Direction	_____	_____	_____
Offset Amount	_____	_____	_____
Portion Of Reference, Date and Recording	_____	_____	_____
"Strip" Descriptions			
Offset, Each Side of the Following Described Centerline	_____	_____	_____
Define True Point of Beginning And Terminus Reference, Date and Recording Data	_____	_____	_____
Cross Reference and Check			
Check Legal Against Record Maps and Documents	_____	_____	_____
Check Legal Against Traverse Closures and Sketch	_____	_____	_____
Punctuation			
All Capital Letters	_____	_____	_____
Check for Periods, Commas, Colons Semi-Colons and Dashes	_____	_____	_____
<u>Area (If Required)</u>			
Acres	_____	_____	_____
Squares Feet	_____	_____	_____
<u>Exceptions</u>			
Reference Name, Date and Recording Data	_____	_____	_____
Buildings that Presently Exist	_____	_____	_____

QUALITY ASSURANCE CHECK LIST  
DEEDS  
Project - Caltrans Right-of-Way Engineering

ITEM

Deed Forms (Use Correct Form)

Form No.

RW 02-01	Grant Deed - Individual	_____	_____	_____
RW 02-02	Grant Deed - Individual - With Waiver	_____	_____	_____
RW 02-03	Grant Deed - Corporation - With Waiver	_____	_____	_____
RW 02-04	Grand Deed - Corporation	_____	_____	_____
RW 02-05	Highway Easement Deed - Individual	_____	_____	_____
RW 02-06	Highway Easement Deed - Corporation	_____	_____	_____
RW 02-07	Quitclaim Deed - Individual - With Waiver	_____	_____	_____
RW 02-08	Quitclaim Deed - Corporation - With Waiver	_____	_____	_____
RW 02-09	Quitclaim Deed - Corporation	_____	_____	_____
RW 02-10	Partial Release of Mortgage (Fee)	_____	_____	_____
RW 02-11	Partial Release of Mortgage (Easement)	_____	_____	_____
RW 02-12	Request for Partial Reconveyance	_____	_____	_____
RW 02-13	Waiver	_____	_____	_____
RW 02-14	Quitclaim Deed - Individual	_____	_____	_____
RW 02-15	Easement Deed - Individual	_____	_____	_____
RW 02-16	Easement Deed - Corporation	_____	_____	_____
RW 02-17	Partial Reconveyance Under Trust Deed	_____	_____	_____
RW 02-18	Partial Release of Mortgage (Corporation)	_____	_____	_____
RW 02-19	Director's Deed	_____	_____	_____
RW 02-20	Director's Deed (Quitclaim)	_____	_____	_____
RW 02-21	Director's Deed - Land Acquisition Through Inadvertence or Mistake in Description in Deed	_____	_____	_____
RW 02-22	Director's Deed - Access Rights Opening	_____	_____	_____
RW 02-23	Director's Deed - Access Rights Acquired by Inadvertence or Mistake	_____	_____	_____

DEEDS (Continued)

ITEM

	<u>DRAWN</u>	<u>CHK'D</u>	<u>REVIEWED</u>
<u>Recording Requested By</u> Name	_____	_____	_____
<u>Mail To</u> Name	_____	_____	_____
Address	_____	_____	_____
<u>Dist. CO. RTE</u> District	_____	_____	_____
County	_____	_____	_____
Route	_____	_____	_____
Post Mile	_____	_____	_____
Parcel Number	_____	_____	_____
<u>Names</u> Grantor	_____	_____	_____
Grantee	_____	_____	_____
Purpose (Easements)	_____	_____	_____
City	_____	_____	_____
County	_____	_____	_____
<u>Legal Description</u> Preamble	_____	_____	_____
Body (Cross Check With Approved Parcel Legal)	_____	_____	_____
Suveyor's Clauses (If Necessary)	_____	_____	_____
<u>Clausee</u> DF, DFA, DFO (Acquire Abutter's Access Rights)	_____	_____	_____
DM Series (General Waiver Clauses)	_____	_____	_____
CF, CFO, CFNC (Extinguish Abutter's Access Rights by Condemnation)	_____	_____	_____
<u>Rough Draft (Checks)</u> E.A NO. _____	_____	_____	_____
Interstate, Yes _____ No _____	_____	_____	_____
Map No. _____	_____	_____	_____
R.W. P.E. _____	_____	_____	_____
Written by _____	_____	_____	_____
Checked by _____	_____	_____	_____

To: North Region, Office of Surveyors – Marysville  
Right of Way Engineering Branch  
ATTN: [Robert Plumb](#)

# APPROVAL SHEET

03-~~XXX-###~~ KP ~~##.#-##.#~~  
03-310-#####

DRAWING Nos. R-#####R## THROUGH R-#####R## (## SHEETS)  
Dated [00/00/00](#)

1. *Signatures below certify Project Development has reviewed R/W Appraisal Map work prints. Appropriate action indicated by check mark.*

## PROJECT ENGINEER'S APPROVAL

- Approved** - Proceed to Final R/W Appraisal Map stage.
- Not Approved** - State reasons in next section
- Revise as indicated** - Attach one set of R/W Appraisal prints showing revisions (Additional comments may be included in next section)

\_\_\_\_\_  
Project Engineer's Signature

\_\_\_\_\_  
Project Engineer's Name (Please Print)

## BRANCH CHIEF'S APPROVAL

\_\_\_\_\_  
Senior Transportation Engineer's Signature

\_\_\_\_\_  
Senior Transportation Engineer's Name (Please Print)

2. *Describe below any corrections or changes required, or reason(s) for non-approval.*

cc: Project Manager: [Dewey Cheetem](#)  
R/W Team Leader: [Anne Howe](#)

To: North Region, Office of Surveyors – Marysville  
Right of Way Engineering Branch  
ATTN: [K. C. Cogoman](#)

# APPROVAL SHEET

**03-XXX-## KP ##.#-##.#**  
**03-310-#####**

DRAWING Nos. R-#####R## THROUGH R-#####R## (## SHEETS)  
Dated [00/00/00](#)

- 1. Sign below and check appropriate line to indicate Right of Way Utilities approval of R/W Appraisal Map work prints.**

## R/W UTILITY COORDINATOR'S APPROVAL

- Approved** - Proceed to Final R/W Appraisal Map stage.  
 **See Comments** (insert comments in next section)

\_\_\_\_\_  
Utility Coordinator's Signature

\_\_\_\_\_  
Utility Coordinator's Name (Please Print)

## R/W TEAM LEADER'S APPROVAL

\_\_\_\_\_  
Senior R/W Agent's Signature

\_\_\_\_\_  
Senior R/W Agent's Name (Please Print)

- 2. Indicate below any corrections or changes required – attach appropriate sheets as necessary.**

cc: Project Manager: [Dewey Cheetem](#)  
Project Engineer: [I. Dunno](#)

To: North Region, Office of Surveyors – Marysville  
Right of Way Engineering Branch  
ATTN: [Corin R. Searcher](#)

# APPROVAL SHEET

03-XXX-## KP ##.#-##.#  
03-310-#####

DRAWING Nos. R-#####R## THROUGH R-#####R## (## SHEETS)  
Dated [00/00/00](#)

***Sign below and check appropriate line to indicate Right of Way Excess Lands approval of R/W Appraisal Map work prints.***

## R/W EXCESS LANDS COORDINATOR'S APPROVAL

- Approved** - Proceed to Final R/W Appraisal Map stage.  
 **See Comments** (insert comments in next section)

\_\_\_\_\_  
Excess Lands Coordinator's Signature

\_\_\_\_\_  
Excess Lands Coordinator's Name (Please Print)

## R/W TEAM LEADER'S APPROVAL

\_\_\_\_\_  
Senior R/W Agent's Signature

\_\_\_\_\_  
Senior R/W Agent's Name (Please Print)

***Indicate below any corrections or changes required – attach appropriate sheets as necessary.***

cc: Project Manager: [Kanway Bildit](#)  
Project Engineer: [Nidsum Halp](#)

## CHAPTER 6

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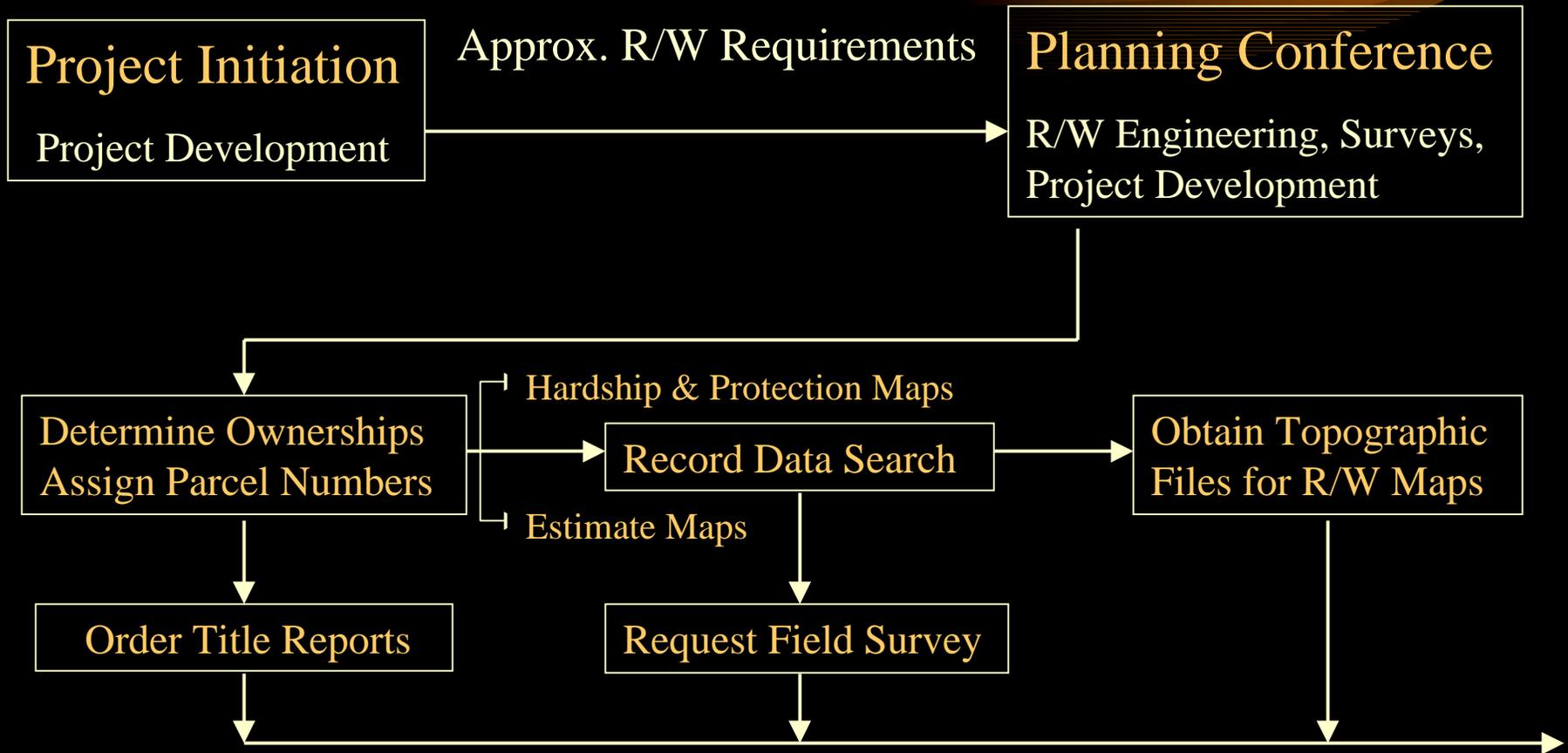
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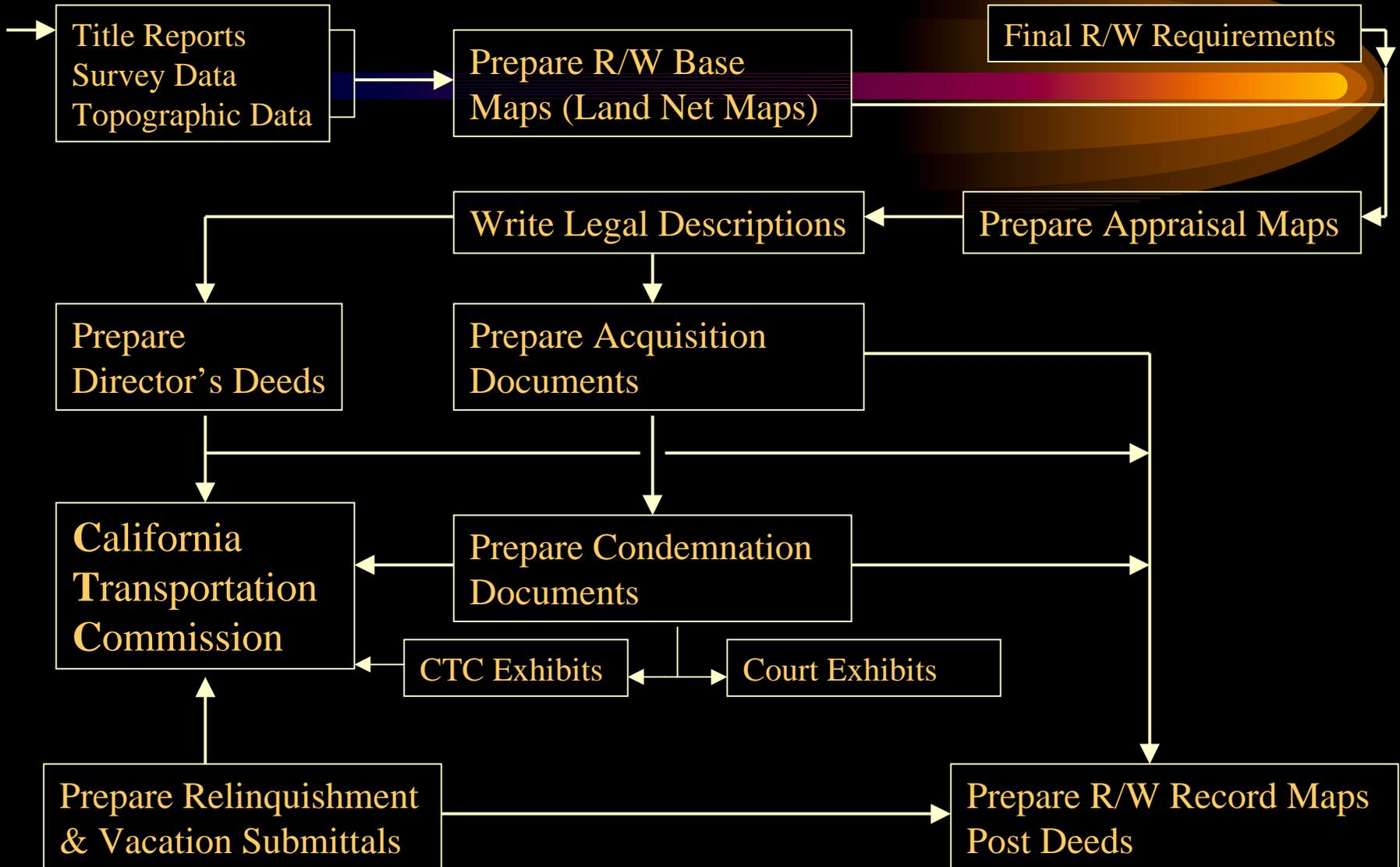
# *Right of Way Engineering*

## *Project Related Activities*



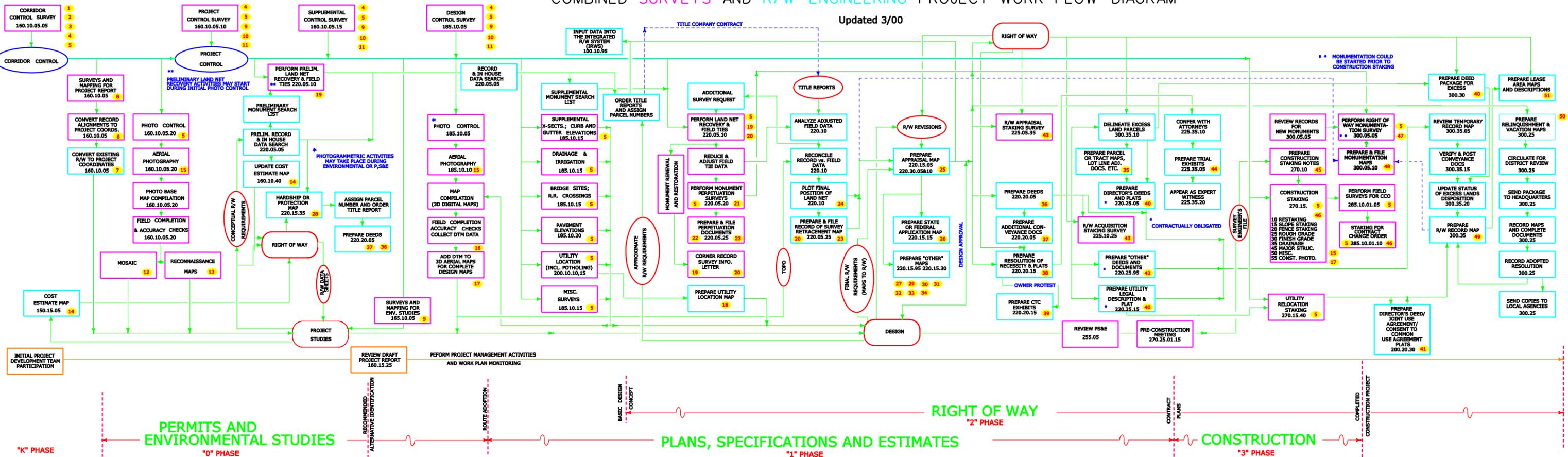
# Right of Way Engineering

## Project Related Activities (cont.)



# COMBINED SURVEYS AND R/W ENGINEERING PROJECT WORK FLOW DIAGRAM

Updated 3/00



**PRODUCTS**

1	Corridor Control Diagram
2	Coordinate List (Published with NGS)
3	Corridor Control Report
4	Control Monuments
5	Field Notes
6	Converted and Adjusted Record Alignments
7	Converted Existing R/W Boundary Traverses
8	Surveyed Alignments of Existing Facilities
9	Project Control Diagram
10	Coordinate and Bench Mark List

11	Project Control Report
12	Photo Mosaic
13	Reconnaissance Maps
14	Cost Estimate Map
15	Aerial Photos
16	Design Maps
17	Digital Terrain Model
18	Utility Location Map
19	Corner Records
20	Survey Information Letter

21	Monuments
22	Monument Perpetuation Map (Record of Survey)
23	Retracement Map (Record of Survey)
24	Land Net Maps (Base Maps)
25	Right of Way Appraisal Maps
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27	Comparable Sales Maps
28	Right of Way Hardship and Protection Maps
29	Appraisal Report Plats
30	PUC Application Maps

31	Transfer of Control and Possession Maps
32	Railroad Right of Way Agreement Exhibits
33	Federal Participation Area Maps
34	Material Site Maps
35	Parcel Maps, Tract Maps, Lot Line Adj. Plats
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**KEY**

- ACTIVITIES TRADITIONALLY DONE BY SURVEYS
- ACTIVITIES TRADITIONALLY DONE BY RIGHT OF WAY ENGINEERING
- PRODUCTS GENERATED BY SURVEYS/RWE
- PRODUCTS GENERATED BY OTHERS
- FUNCTIONAL GROUPS
- WORK FLOW
- INFORMATION FLOW

# **NORTH REGION OFFICE OF SURVEYS**

## **QUALITY MANAGEMENT PLAN**

### **FOR SURVEYS**

#### **INDEX:**

- 1. MISSION STATEMENT FOR NROS-SURVEYS, QMP.**
- 2. QC/QA DESIGN BASED FLOWCHART FOR SURVEYS**
- 3. QC-QA FLOWCHART OUTLINE**
- 4. "COMBINED SURVEYS AND R/W ENGINEERING PROJECT  
WORK FLOW DIAGRAM", (THIS IS A DETAILED FLOW CHART OF  
THE INTERACTION OF SURVEYS AND R/W ENGINEERING WITH  
THE PROJECT).**
- 5. GENERAL GUIDELINES FOR DESIGN FIELD SURVEYS**
- 6. FIELD BOOK PREPARATION**
- 7. REPORT OF FIELD SURVEY**
- 8. PROCESSING THE SURVEY REQUEST**
- 9. SURVEY FILE CHECKLIST**
- 9A. CONSTRUCTION/SURVEYS EXPECTATIONS**

## NORTH REGION OFFICE OF SURVEYS: QUALITY MANAGEMENT PLAN

The **NORTH REGION OFFICE OF SURVEYS (NROS)** is a product and customer satisfaction driven division. In its efforts to attain a high level of quality assurance it finds its quality control elements bound to the integrity of its employees, who initiate and maintain the quality of the product, the **SURVEYS MANUAL<sup>1</sup>**, the laws embodied in the **CALIFORNIA LAND SURVEYORS ACT** and **SUBDIVISION MAP ACT**, and its internal processes built with redundancies and checklists from field surveys through office processing.

### **GENERAL GUIDELINES FOR QUALITY CONTROL AND QUALITY ASSURANCE (QC/QA)**

In broad scope, the NROS QC/QA program aims to ensure the following:

- That each task complies with the laws and regulations that govern the use of Federal, State, and local transportation funds;
- That each product meets the customer's needs and purposes, as defined in the **Task Order** and **Cost Estimate**;
- That a process for constructive feedback is implemented and contributes to satisfactory product delivery;
- And, that immunities established by law to protect the Department and its employees from liability are preserved.

These guidelines apply to all **Survey Tasks** including participation in the preparation of the Project Initiation Document (PID); engineering and environmental studies; plans, specifications and estimates; right of way, and construction to project closeout.

As with any general guidelines, which must apply to a wide range of activities, NROS staff members are expected to use professional judgment in their application.

In its conception, **QC/QA** is not intended to be an additional layer of effort required to deliver a successful project. It is, simply or not, intended to be the norm that governs all activities, projects, and processes within **NROS**.

The more specific steps towards Quality Assurance, through Quality Control, are described, listed and appended below.

---

<sup>1</sup> The **SURVEYS MANUAL** can be found at: <http://www.dot.ca.gov/hq/esc/geometronics/SurveysManual>. It is continually updated as processes and technology change.

## **IMPLEMENTING QUALITY ASSURANCE**

The policies and processes of **NROS** are developed and continually refined to ensure high quality in its project deliverables through a series of **Quality Control** measures. These policies and processes are applied throughout the product delivery process from project initiation to post-construction. These measures include, but are not limited to, the following:

- A well trained and experienced work force, which is dedicated to producing a high quality product;
- The SURVEYS MANUAL, which specifies the precision, quality, and accuracy of the survey and its attendant documents throughout the range of NROS' many tasks;
- The office preparation, field surveys, and office processing practices with their many quality control checkpoints<sup>2</sup>;
- Feedback from the customers, including the other CALTRANS divisions and the public;
- Monthly field and office personnel meetings with Senior level participation to critique and improve current practices.

The more specific steps to Quality Assurance through Quality Control are contained in NROS and Departmental checklists and flowcharts, of which the pertinent ones are described and appended below.

## **APPENDED CHECKLISTS AND ASSOCIATED DOCUMENTS**

The following documents are appended:

1. "QC/QA DESIGN BASED FLOWCHART FOR SURVEYS", which is the base flowchart document for the QMP
2. "QC-QA FLOWCHART OUTLINE", which is an outline of the materials within the QC/QA Flowchart ("1" above).
3. "COMBINED SURVEYS AND R/W ENGINEERING PROJECT WORK FLOW DIAGRAM", which is a complex flow chart diagramming the interactions of Surveys and R/W Engineering from project inception to completion (post construction and monument and control maintenance activities).
4. "GENERAL GUIDELINES FOR DESIGN FIELD SURVEYS", which is a descriptive document of field survey procedures.
5. "FIELD BOOK PREPARATION", which is a checklist of procedures for preparing the SR for the Survey Field Crew.
6. "OFFICE TO FIELD: REPORT OF FIELD SURVEY", which is a checklist for topographic surveys, or TLI, for field crews.

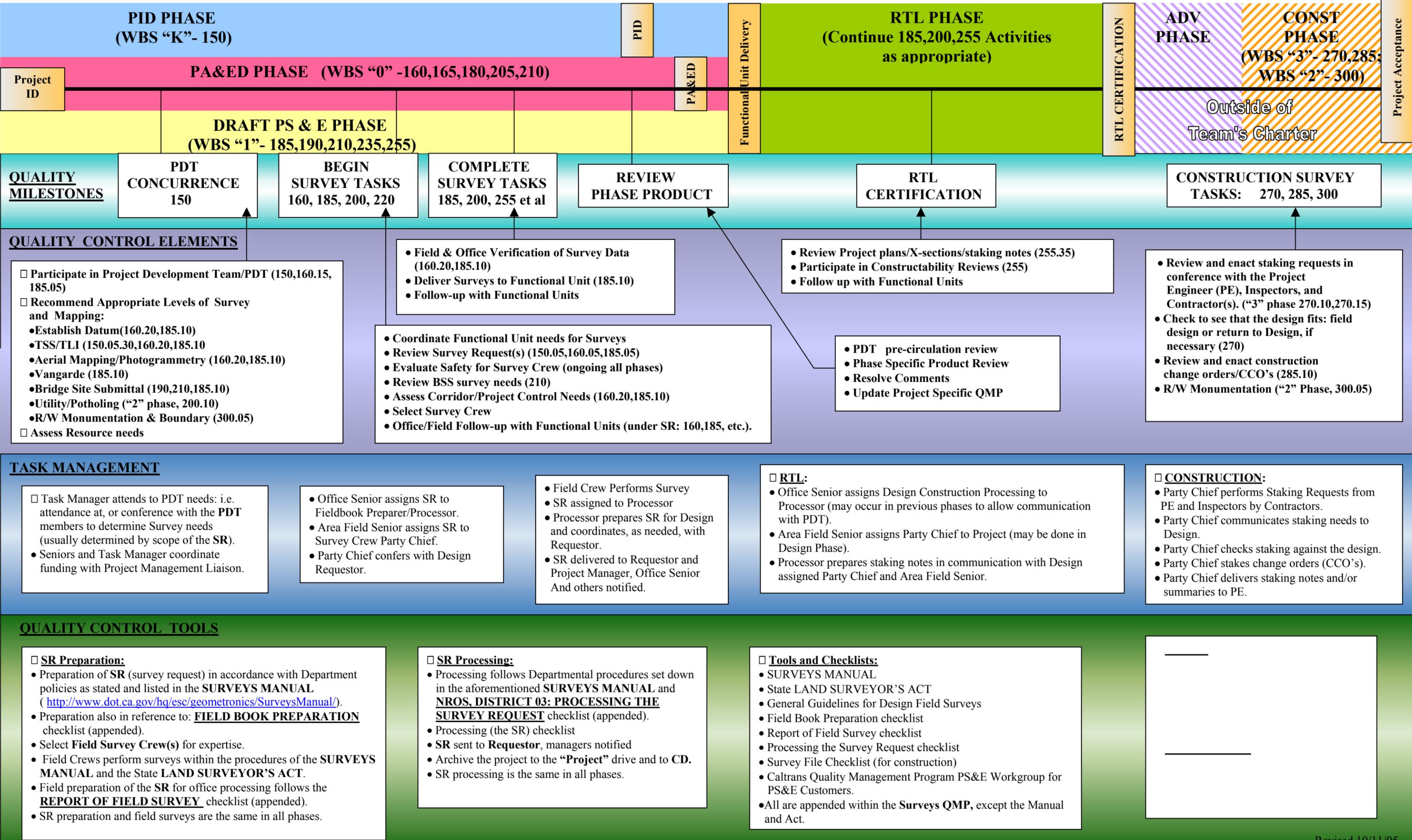
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<sup>2</sup> The checkpoints are defined by the checklists and job flow charts appended to this document.

7. "PROCESSLING THE SURVEY REQUEST", which is a checklist for preparing the field survey for the Requestor.
8. "SURVEY FILE CHECKLIST", which is a checklist and guideline of needed elements of the "Survey File" from field to design to construction.
9. "CONSTRUCTION/SURVEYS EXPECTATIONS", which is a listing of the "Expectations and Performance Measures of PS&E Customers" and serves as a general guideline for construction project procedures and consultant project procedures.

# NORTH REGION QUALITY MANAGEMENT PLAN

## -SURVEYS PROJECT SPECIFIC QUALITY CONTROL PLAN-



**NORTH REGION OFFICE OF SURVEYS**  
**QUALITY MANAGEMENT PLAN (QMP)**  
**RE: DESIGN QC/QA PLAN-SURVEYS-FLOWCHART**  
**(An outline/elaboration of the flowchart)**

**Of note:** The flowchart is designed to meet Design's needs, as the Project directing body. Surveys has found some plasticity in the row definitions or headings as they apply to the services we provide. Sometimes a "Quality Control Element" and a "Quality Control Tool" are interchangeable. In the process of surveying, as in the other divisions, there are constant checks built into the procedures employed by the surveyors, and they, the surveyors, are the most important "Quality Control Element", and their "tools" are the knowledge and understanding of the processes needed for good design. Too, our processes tend to be responses of a service division to a Survey Request and are much the same throughout the Project flow.

**PROJECT INITIATION DOCUMENT (PID), PROJECT APPROVAL AND ENVIRONMENTAL DOCUMENTS (PA&ED), AND DESIGN PHASES:**

1. Surveys involvement with a Design Project begins with the PDT meetings leading up to PDT Concurrence.
2. Seniors and Project Management Liaison review budgeting needs for Project.
3. Project specific work begins with the Survey Request, or **SR**, being received from another functional unit, usually Design.
4. The preparation of the SR for field survey is the same in all phases and occurs in "K" phase through construction, and, on occasion, post-construction with a monumentation request from Right of Way Engineering.
5. The project or SR is assessed on arrival for specific survey needs which can include: area control needs (the vertical and horizontal datum and monumentation), the type of survey that best fits the request (TSS/TLI, Photogrammetry, Vangarde), whether it is a Bridge Site Submittal (**BSS**), what utility location may be needed (potholing), and whether any R/W location and monumentation is needed
6. Processing the field survey for the Requestor is also the same in all phases. It begins with the return of the survey from the field. It is processed or edited on the current department software, and the product is delivered to the Requestor with any needed explanations and/or accompanying data. The current deliverables are the processed/edited

- survey file (Caice.zip, currently), a Microstation.dgn file, a Microsoft Access.kcm file (optional), and a description of the processing (zones and levels where various information is stored).
7. The survey project is then archived on CD and on the District Project drive. All the field notes are also scanned and archived.
  8. All the Surveying processes are governed by the Caltrans **SURVEYS MANUAL** (<http://www.dot.ca.gov/hq/esc/geometronics/SurveysManual/>), the California Land Surveyor's Act, and various district and departmental policies that are present in district checklists, and other descriptive documents (appended to the QMP).

### **READY TO LIST (RTL) PHASE:**

1. The Ready to List, or **RTL PHASE**, sees surveys reviewing design plans received from Design, and preparing the needed notes to enable the Project to be surveyed for construction.
2. The products prepared for Construction include: cross section and staking notes, and the electronic files needed to survey, or stake, the Design on the ground.
3. In this phase, constructability reviews are completed with meetings with other functional units.
4. Storm water and drainage data reports are also assessed.
5. Safety Reviews are performed and project specific safety concerns addressed, to allow the survey work to proceed safely within the areas called for by interaction with the Project Engineer (PE) and contractor.
6. Construction staking concerns are addressed by:
  - A. Communication with the Project Engineer (PE), on project/survey related concerns.
  - B. Communication with the Inspectors who carry out the directions of the PE and needs of the Contractor on a day-to-day basis.
  - C. Checking the suitability of the slope stake notes for the field.
  - D. Checking the completeness of the plans for staking.
  - E. Communications between the survey office construction processors and Design, reviewing any concerns with the "final plans".
7. Construction processors, too, work closely with the field crews as the project moves into the Construction Phase.

## **CONSTRUCTION PHASE:**

The Construction Phase consists of the following processes and practices:

1. Meetings with PE, Inspectors and contractors addressing the project staking needs, and the scheduling of staking requests (request flow: Contractor to PE/Inspector to Field Crew Party Chief).
2. Construction staking is performed within the standards defined in the SURVEYS MANUAL, and within agreements with the Project Engineer(s), Inspector(s), and contractors.
3. Field crew and office construction processors communicate and interact with the "final" design plans, design engineers, PE & Inspectors, and Contractor to fulfill staking requests.
4. In the process of staking, the Project Surveyor checks to see that the field staking fits the design requirements and fit with the existing ground and structures (a continuing process throughout staking), and noting if area re-designs are needed.
5. The field crew finalizes the staking, finishing staking requests, and any construction change orders (CCO's) approved by the PE/Inspector/Contractor interaction.

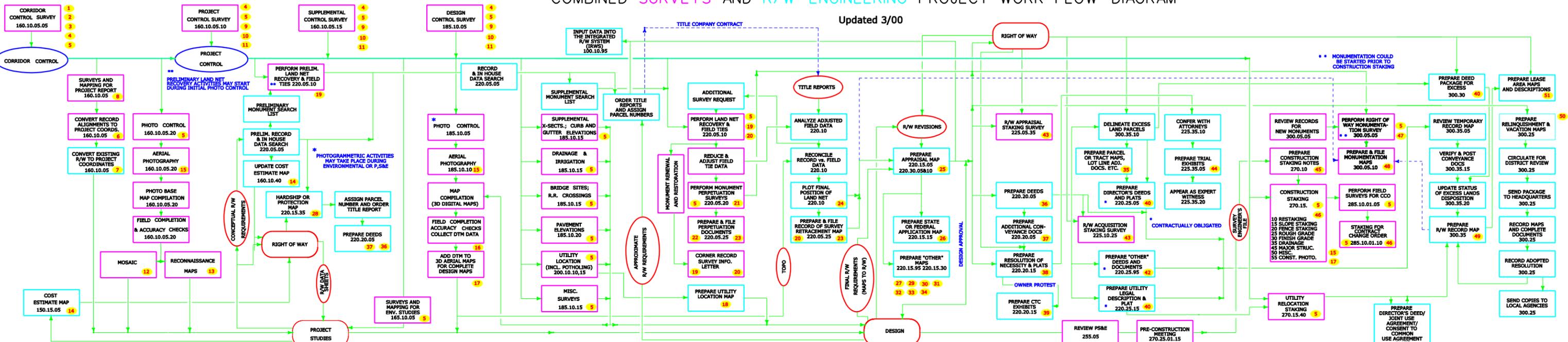
## **POST-CONSTRUCTION PHASE:**

The Post-Construction Phase essentially involves Surveys in monumenting the "new" right of way and establishing any needed land net monuments required by the scope of the project. Such requests usually come from Right of Way Engineering, or Right of Way, and in some cases can be a decade or two from the end of construction or the abandonment of a project. Such work usually consists of:

1. Right of Way Engineering requests monumentation of the Right of Way (R/W).
2. Project Control is refurbished and construction losses are replaced in contemplation of future road maintenance and construction concerns.

# COMBINED SURVEYS AND R/W ENGINEERING PROJECT WORK FLOW DIAGRAM

Updated 3/00



## PRODUCTS

1	Corridor Control Diagram
2	Coordinate List (Published with NGS)
3	Corridor Control Report
4	Control Monuments
5	Field Notes
6	Converted and Adjusted Record Alignments
7	Converted Existing R/W Boundary Traverses
8	Surveyed Alignments of Existing Facilities
9	Project Control Diagram
10	Coordinate and Bench Mark List

11	Project Control Report
12	Photo Mosaic
13	Reconnaissance Maps
14	Cost Estimate Map
15	Aerial Photos
16	Design Maps
17	Digital Terrain Model
18	Utility Location Map
19	Corner Records
20	Survey Information Letter

21	Monuments
22	Monument Perpetuation Map (Record of Survey)
23	Retracement Map (Record of Survey)
24	Land Net Maps (Base Maps)
25	Right of Way Appraisal Maps
26	Government Application Maps
27	Comparable Sales Maps
28	Right of Way Hardship and Protection Maps
29	Appraisal Report Plats
30	PUC Application Maps

31	Transfer of Control and Possession Maps
32	Railroad Right of Way Agreement Exhibits
33	Federal Participation Area Maps
34	Material Site Maps
35	Parcel Maps, Tract Maps, Lot Line Adj. Plats
36	Deeds
37	Other Acquisition Documents
38	Resolution of Necessity and Plats
39	CTC Exhibits
40	Director's Deeds and Plats

41	Common/ Joint Use Agreement Exhibits
42	"Other" Documents
43	R/W Stakes (Flagging)
44	Court Exhibits
45	Construction Staking Notes
46	Construction Stakes
47	R/W Monuments
48	Monumentation Maps (Record of Survey and In-lieu)
49	Right of Way Record Map
50	Relinquishment and Vacation Maps and Requests
51	Lease Area Maps

## KEY

- ACTIVITIES TRADITIONALLY DONE BY SURVEYS
- ACTIVITIES TRADITIONALLY DONE BY RIGHT OF WAY ENGINEERING
- PRODUCTS GENERATED BY SURVEYS/RWE
- PRODUCTS GENERATED BY OTHERS
- FUNCTIONAL GROUPS
- WORK FLOW
- - - INFORMATION FLOW

## **General Guidelines for Design Field Surveys**

The purpose of this document is to standardize the way in which NROS field surveys for design are accomplished, and to provide for better coordination between the various elements of those surveys. In addition to the work accomplished by the field crews, design surveys may include support from vanguard, photogrammetry, and GPS. The manner in which each function is accomplished directly effects the various other functions and ultimately the project deliverables.

These guidelines are not cast in stone, but should be adhered to unless circumstances dictate otherwise. Any deviance from the suggested procedures must be coordinated in advance with the Field Chief so that he can insure that all parties are aware of the change.

### **Project Overview**

#### **Site Evaluation**

The first function to arrive onsite will be the field crew. Initially, their job will be to uncover the existing control net and to determine the limits of the project. Additionally, they will need to search for and recover a number of right - of - way monuments sufficient to generally locate the bounds of the project area for design purposes. This doesn't mean that every monument needs to be located. Generally, if monuments can be uncovered at the ends of the project, with a few thrown in somewhere in the middle, a rough boundary analysis can be accomplished.

Once the existing control and right - of - way has been recovered, the party chief analyzes the site to determine if supplemental control is required. In cases where '83 control is not available, GPS static control will need to be brought in to control the site. (Note that for the purposes of this document, static and fast static GPS will be lumped together as "static.") It is also a good idea to tie any existing '27 control into the '83 net so as-built drawings and monument maps can be used in conjunction with the new design data. Party chiefs must beware of using any found GPS control until they have verified that it was brought in by static means. RTK is not suitable for precise control and will result in significant error propagation if improperly utilized.

When considering the project's control needs, the party chief should also look to future needs, remembering that some or all of his control may be useful during construction. He is also charged with densifying Caltran's existing primary control net. Ideally, primary control (brass disks in concrete, GPS statically controlled) should be spaced at about one mile intervals throughout the project. If practical, primary control should also be elevated to at least second order, class II specifications, by three - wire or digital leveling. The GPS Coordinator should be consulted with prior to the placement of any control requiring static GPS.

## **Photogrammetry**

If the project is to be flown, premarks need to be laid out on the main line(s) at 450-foot intervals for high flight, or 250-foot intervals for PTL. These targets are in addition to the HV and V points shown on the photogrammetry control plan. Mainline HV and V points should be tied into a comprehensive control net, not just "hung" on some nearby GPS control or bench. Unless this procedure is followed, the next party onsite will have to run control before they can finish their job. Remember, the purpose of static GPS is to provide conventional control traverse endpoints.

Premark marks must be set out as soon as practical so that the project can be flown at the earliest possible date. Photogrammetry is the longest process in the design deliverables package so we need to expedite our portion of it. Once the project has been flown it is ready to be controlled.

Conventional supplemental control needs to be run from one end of the project to the other, in such a manner as to support TLI collection and if possible, future construction needs. All of the HV, V, and intermediate premarks (450's) on the mainline need to be elevated, preferably by differential levels, to second order, class II standards. Second order, class II specifications can be met with trig leveling procedures (see attachment). For projects utilizing PTL, all HV, V, and mainline intermediate premarks (250's) must be elevated by digital level to apparent first order, second class specifications. High flight wing points can be trig leveled, but should be double tied to prevent blunders.

On projects where RTK is utilized to locate premarks, it should only be used on the wing points for elevation. The mainline must be elevated conventionally to minimize error in the pavement planes. RTK can also be used to tie found right - of - way monuments. All RTK

coordinates sheets must be clearly marked to indicate RTK positioning was used in order to prevent confusing future surveyors regarding the precision of the data.

## **Vangarde**

In cases where vangarde is not following photogrammetry on the project, they will need to have horizontal and vertical project control spaced at no less than 1000-foot intervals. In cases where vangarde follows photogrammetry, the existing control scheme will be sufficient for their needs.

Vangarde will be responsible for the collection of pavement planes and any topographic information lying in harm's way. Additionally, they may be called upon to collect drainage structures, etc. on smaller projects or projects where the scope of work doesn't warrant conventional TLI methods.

## **TLI**

In addition to controlling the project and providing support for photogrammetry and vangarde, field crews will be responsible for all TLI collection not accomplished by other means. All topographic features not clearly discernible from aerial photos (power poles, pull boxes, etc.) and all drainage (submersed flowlines, inverts, etc.) are the responsibility of the field crews. In areas where safety is not a problem, field crews may also be responsible for topographic and DTM features normally captured by vangarde or PTL.

<input type="checkbox"/> <b>NROS: <u>FIELD BOOK PREPARATION</u></b>
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**Notes on preparing a Survey Request for the Field Surveyor.**

- I. The Survey Request.
  - Receive a Survey Request (SR) and label a "field notebook" for this request.
  - Sign and date the SR as the Preparer.
  - Read the SR to assess its scope and needs.
  - Communicate with the Requestor for needed clarifications.
  - Assess the Field Crew's needs.
  
- II. Inclusions for the Survey Request (as applicable):
  - Control for the survey area (research and acquisition).
  - Evaluate the found control for accuracy (is it up to date, is there superceding control).
  - Note Datum of the Horizontal Control:
    - NAD 83: \_\_ Metric, \_\_ Feet
    - Epoch of the Control (1991.35 or other)\_\_\_\_\_.
    - NAD 27: \_\_ Feet, \_\_ Metric
    - Assumed: \_\_ Feet, \_\_ Metric
  - Vertical Control:
    - NGVD29: \_\_ Feet, \_\_ Metric
    - NAVD88: \_\_ Feet, \_\_ Metric
    - NGS control as available, and if needed.
    - GPS Control
    - GPS Control Particulars (HPGN et al): \_\_\_\_\_
  - "To Reaches" for the control.
  - Corridor Maps of the Control relative to the Project.
  - Previous Work in the Area
  - .DGN maps provided by Requestor (required with the SR).
  - Any DHIPPS (photos) of the area needed for explanation, if available.
  - Topo Maps of Previous Work (if it applies).
  - Needed Elements for the Request (e.g. Land Net to be tied, scope of the survey, H/V control ties to adjacent control, etc.).

III. Electronic Files to be supplied (on floppy and/or **CD**):

- Control Files:
- .CTP
- CGF (combined grid factor), if needed (needed with HP200), available through Corpscon.
- .CTL
- .DC
- .ALN or .ALI if alignments are needed or helpful.
- Caice.zip (if needed or explanatory, usually optional as these large files are unwieldy on laptops).
- .DGN maps if useful or provided by Requestor (usually provided as hard copies).

IV. Assemble the Fieldbook:

- SR
- Maps
- Control
- "To reaches for control"
- Control files on disk or CD
- Notes and communications
- "Sign" and date the SR as the Preparer.

V. Deliver the Field Book:

- Deliver to Office Senior
- Office Senior routes to Field Senior
- Field Senior routes to appropriate Field Crew Party Chief.

VI. Archive/store the Data you send to the field:

- "Project" drive under SR, within "Final Content", or as appropriate.
- Optional: On CD under the SR/Project.

Report of Field Survey  
Checklist

NAME:

TITLE:

Report

- Cover Sheet / Statement of Responsible Charge
- Scope of Work(SR, EA, COUNTY, ROUTE, PM)
- Survey Party Members
- Date(s) of Survey
- Equipment Used
- Work Summary - Control
  - Control Datum / Pedigree / Problems Encountered w/ Historical Positions
  - Problem Solving – Assumptions & Methodology
  - Floated Historical Positions – Reasons / Justification for Floating Points
  - Suspected Problems / Unresolved Issues
- Work Summary – TLI
  - Logical “Zones” or “Locations” Subdividing Project for Collection
  - Unusual Situations Encountered / Solutions
  - 900 Codes Utilized
  - Statement of Resolution of Crossing Breaklines (CAiCE), with any unusual solutions or resolutions noted, if they were needed.
- Work Summary – Boundary / ROW
  - Problems / Solutions / Unresolved Issues
  - Disturbed / Suspect Monuments
  - Evidence of Encumbered Title (encroachments / occupations, etc.)

Supporting Documents

- TRIMBLE/TGO/TDS Files, or, CTDC / CTDAP Files
  - .DC FILES, Raw .dmp files (electronic copies)
  - Electronic copies of data collector associated files, primarily .tss and .dc files, or CTDC/CTDAP equivalents (.apr, .sdb, .sts, .fob, .tss, .ucr and .obs).
  - Edited TGO files, or .dmp files, if needed (electronic copies w/ cross references on field notes).
- STARNET Files
  - Files produced from STARNET adjustment of control/traverse points.
  - .lst (electronic copy and printout)
- DIGILEV / STARLEV Files
  - Files produced from level adjustments (re: .raw, .dat, and .lev, et al)
  - .dat, .err, .lst, and .prj (electronic copies), if applicable.
  - .pts (electronic copy and printout)
- CAiCE Files
  - .zip (electronic copy)
  - Printout of .txt file tracking all edits (optional). An unedited file (.dmp or TGO version) would suffice.
- Field Notes (as applicable)
  - Traverse, TLI and Trig level note sheets (original copies)
  - Control Schematic (if not included on traverse notes)
  - ROW / Property Point Schematic (tied points)
  - ROW / Property Point Search Schematic (points not found / obliterated)
  - Corner Records (filed IAW PLS Act)
  - To Reach Notes (set points and recovered points)
  - Peg Book Notes (copies of original notes)
  - Monument Rubbings / Photos
- Job Book Remnants
- Report of Field Survey Checklist

## **NROS: PROCESSING THE SURVEY REQUEST (SR) FROM THE FIELD SURVEY FOR THE REQUESTOR**

- I. Receive the Field Survey
  - Field Survey routed from Field Senior to Office Senior.
  - Field Survey routed from Office Senior to Processor.
  - If the field survey is routed directly to the Processor, communicate this to the Office Senior and Field Senior.
  
- II. Check the Field Survey for the appropriate files:
  - .TSS file
  - Caice.zip file
  - New control "to reaches".
  - .DC file in lieu of .TSS or Caice.zip.
  - .TSS or Caice segment files, if segmented.
  
- III. Process the Field Survey
  - Create a Project file under the "SR" number in your "jobs" or "projects" file (usually on the **project server** or local drive).
  - Open the job in Caice (note: Caice naming conventions must be attended to, and the file(s) may need to be renamed).
  - Zone the files by segment (A=1) or by a personal process and keep notes on the zoning and segmentation. It is often useful to put the control and DTM boundary in 99 or 100 (Caice has 10,000 zones.).
  - If this project is attached to a previous file import the "new" field project into the "old" or master project.
  - Attach or detach the Caltrans Feature Table (Caltrans.ftb).
  - Attach or detach the appropriate cell file (mtcellib.ccl for caice).
  - Edit crossing lines and attend to other edits: large projects edit more easily with the feature and cell files detached (i.e. attach the Null files).
  - Create the DTM, after editing lines et al.
  - Edit the DTM triangles to the survey area (i.e. obscure triangles outside of the survey), and create a DTM boundary (zone boundary and associated points in a separate zone from the project: e.g. Zone 99,100,..., but not with control).
  - View (drive through) the DTM for anomalies such as holes and spikes that indicate HI/elevation or editing problems.

#### IV. Prepare the deliverables for the Requestor

- Create the following electronic files:
- .kcm file, optional (Microsoft Access file). This file is sometimes created earlier as it makes edits and importation into Caice easier in some cases.
- .dgn file (Microstation file). First remove the DTM from the screen. The .dgn exporter exports what is on the screen.
- For the .dgn, usually attach a Zone 2 metric seed file (or the appropriate seed file), and attach the mtcclib.cel cell file (note the difference from the Caice cell: mtcclib.ccl).
- Prepare a statement for the Requestor explaining your editing and zoning of these files, and any project concerns.

#### V. Deliver the Project to the Requestor

- E-mail the requestor and cc the appropriate parties, including the Office and Field Seniors, telling him/her where to find the project, and other particulars.
- Store the project on a drive or server where it can be accessed by the Requestor.
- <http://10.24.22.201> with delivery/Marysville, a delivery site
- <ftp://sv03surveys02/archives/d1/delivery/Marysville>, the same site by another address.
- Or an associated Project drive/server (the Gateway project drive is sv03s03).
- Give the requestor the name of the project and where it is stored (a double check bullet).
- Include the following files/documents:
- Caice.zip, project file
- .dgn
- .kcm (optional, and may be more useful to the processor).
- A Read-Me file with project particulars
- Processor's office phone number.

## VI. Archive the Project.

- Archive the project on the project drive (e.g.: on the project server: sv03/s01://suv1/03/EAfile#/SR# for District 3. As filing conventions vary slightly within the district and among the districts, the address is slightly variable (the EA may be "older" and have an "s" before the EA number).
- Archive the various files within the appropriate folder.
- Book: store a .pdf file of the appropriate field survey notes.
- Caice: store the processed Caice.zip file (usually SR.zip as 04108.zip).
- Control: control file for a .ctp, .ctl, or .dc file.
- MS: store the .dgn or microstation file here.
- .kcm: store the .kcm with the Caice file.
- Photo: store any photogrammetry files here (usually not the purview of the processor, but a good place to possibly find a photogrammetry file related to the project).
- Optional: Archive on a CD with all the above burned on it.
- Notify the Office Senior, or appropriate responsible party, that you have archived the project.

Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002

**Expectations and Performance Measures of PS&E Customers**  
(Draft Updated 15 –16 Oct)

Construction / Surveys Expectations

Biddable and Buildable

**Accuracy and consistency between plans, specifications and estimates**

Complete and accurate plans (including existing field verified conditions and as-builts information)

Clear set of plans

Accurate quantities (with checked back up; drainage, electrical etc.)

Enough construction detail (especially if non – standard)

Accurate estimate (enough money to build job)

Project draws accurate bids that are near the engineer's estimate and at completion of construction, has only nominal contract change orders or claims, and has been built as designed

All items have a measurement and payment clause

No significant change in quantities due to design error or omissions

Appropriate number of working days

Construction work plans (CPM) clearly identifies permit windows including construction windows (environmental, weather, utility, traffic handling, etc.) and sufficient work days

Storm water Pollution Prevention Plan (SWPPP) provided

Survey information is correct and complete

Survey engineer's file agree with plan sheets

Staging plans and lane closure charts do not conflict

**Contract documents clearly identify constraints (construction windows, environmental, cooperative agreements, permits, materials, utilities, right of way, etc.)**

Permits, pre-construction permits obtained, construction phase permits identified and related information identified (especially environmental)

All right of way elements have been identified

Right type

Complete and final right of way certification

Enough room to do project

**Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002**

**Expectations and Performance Measures of PS&E Customers  
(Draft Updated 15 –16 Oct)**

Utilities relocated prior to construction and identified clearly  
Property owners have access during construction  
Special features (driveways, fences, etc)

Safety

Safe work environment

Construction staging is realistic, minimizes delays and enhances workers safety  
Compatible with adjacent projects and/or existing conditions\*

Communication

Continuous communication through PS&E \* (include a field review with construction) (Measures TBD)

Design support through completion of construction  
All products delivered to RE at or before pre-construction meeting  
Timely Construction support from all areas  
Standardized meeting schedule and point of contact for design team during construction  
Commitments are accurately and fully communicated in a timely fashion  
RE file, permits, agreements, and mitigation list points of contact (from all functions)  
RE file is complete  
RE gets timely (24 hours) and valuable support during construction from design team

Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002

**Expectations and Performance Measures of PS&E Customers**  
(Draft Updated 15 –16 Oct)

Policy and Procedures

All design exceptions have been approved before construction

Need and Purpose

Minimize change in scope (**Measures TBD**)

Construction / Surveys Performance Measures

- Number of CCO's due to design errors or omissions
- Number of CCOs for unidentified contract items
- Number of CCOs caused by missing or conflicting measurement and pay clauses
- Number of RFI's due to design errors or omissions
- Number of bidder inquiries
- Number of contract addendum due to design error or omissions
- Contractors bid within \_\_% of engineers estimate
- Number of potential claims
- Collision rates (type of incidents) during construction
- Number of design exceptions during construction
- Number of Cost Reduction Incentive Proposal
- Number of survey RFI's

Operations Expectations

Need and Purpose

**Improve traffic operations\*\* Scope issue**

**Improve level of service\*\* Scope issue**

Safety

**Meet drivers expectations for traffic delays and safety during construction and provide appropriate detours to minimize travel time**

- Staging to minimize disruption and delays to drivers
- Staging to minimize safety issues
- Adequate access controls to minimize risk of collisions and traffic delays

Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002

**Expectations and Performance Measures of PS&E Customers**  
(Draft Updated 15 –16 Oct)

Incident response is rapid, interval time to clean up is minimized  
As appropriate maximize use of K Rail during construction  
Minimize construction duration  
Traffic management plan (maintain access) is fully implemented  
COZEEP is fully implemented and in accordance with guidelines

Standards and Manuals

**Design documents in accordance with Caltrans standards, policies and procedures**

Traffic features installed according to specification and inspected for compliance  
Implement contract streamlining measures with objective standards to reduce construction duration  
Adequate signage and striping to meet drivers expectations and in accordance with standards  
Meet operations standards

Efficient

**Project features compatible with total system operations (ramp metering enforcement, signal phasing, etc)**

Compatible with adjacent facilities

Operations Performance Measures

Measured traffic delays during construction do not exceed specifications  
Number of public complaints due to unclear design features during construction  
Number of public complaints due to unclear design features after construction  
Traffic operations and level of service have been improved after construction  
Traffic operations and level of service have not been exceeded prior to design life  
Collision rates (type of incidents) reduced after completion of construction

Maintenance Expectations

Safety

**Safe to operate and maintain**

Safe to operate  
Safe to maintain (enough work space, group roadside fixtures away from traffic or in shielded locations, minimize handwork)

**Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002**

**Expectations and Performance Measures of PS&E Customers  
(Draft Updated 15 –16 Oct)**

Designed to allow easy and safe access for routine maintenance considering equipment constraints.

Easy and safe access for routine maintenance

Design for constraints of maintenance equipment to be used on the facility

Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002

**Expectations and Performance Measures of PS&E Customers**  
(Draft Updated 15 –16 Oct)

Communication

**Continuous communication through PS&E:**

**Field review with maintenance**

**Maintenance needs incorporated into PS&E**

**Long term commitments communicated to maintenance**

Maintainable

**Designed to provide long life features that are easy and inexpensive to maintain.**

**Designed to use readily available stock and minimize specialty items.**

Post PS&E

**Timely delivery of as – builds**

**Electronic version of physical inventory of maintainable items delivered at project completion**

Maintenance Performance Measures

Safety

Minimize the number of maintainable items

Routine maintenance items are safely accessible

Communication

Commitments are accurately and fully communicated in a timely fashion

Routine maintenance has been incorporated into construction reducing the need for immediate maintenance in the construction zone

Maintainable

**Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002**

**Expectations and Performance Measures of PS&E Customers  
(Draft Updated 15 –16 Oct)**

Minimize Life cycle cost & Maximize Life of facility as compared with similar facilities.  
No net increase in maintenance inventory or operations  
New design features do not require maintenance for 5 years (slopes, culverts, vegetation etc.)

Pre-PS&E

Flexibility in Funding

Post-PS&E

Maintainability review checklist is complete

Environmental Expectations

Low Impact

Project impacts are minimized and limited to the foot print for which environmental compliance has been effected.

Mitigation measures incorporated in PS&E

Avoid/minimize construction impacts

Construction impacts are limited to the foot print for which environmental compliance has been effected

Safe for the environment

Complete & Accurate

Mitigation measures and ESA are documented and incorporated into the PS&E.

Mitigation measures incorporated in PS&E

Show ESA's on plan

Biddable & Buildable

Environmental permits obtained or identified, and related information incorporated into the PS&E

Statutory requirements incorporated into the PS&E

Mitigation measures incorporated in PS&E

Work plan incorporates mitigation procedures (construction schedule window)

Meets statutory requirements

Complete permit request package

Permits obtained as appropriate in a timely manner

Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002

**Expectations and Performance Measures of PS&E Customers**  
(Draft Updated 15 –16 Oct)

Has permits, environmental permits obtained, environmental phase permits identified and related information identified  
No enforcement action

Communication

Environmental staff included in PS&E development.

Communication during process\*

Invitation to pre-construction meeting

Global

Adequate time and resources to do environmental assessment

Post-PS&E

Include environmental on change order construction

Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002

**Expectations and Performance Measures of PS&E Customers**  
(Draft Updated 15 –16 Oct)

Environmental Performance Measures

Low Impact

Mitigation measures incorporated in PS&E  
Community consensus is maintained through construction

Biddable & Buildable

No increase in construction days or cost (CCOs and claims) due to environmental errors or omissions

No redesign (CCO) due to unidentified permits or impacts beyond previously defined footprint

No re-evaluation of environmental document or additional permits required to build the project as planned

No Enforcement Actions

All Requirements and commitments to regulatory agencies, permit requirements and mitigation measures incorporated in PS&E

Number of (preferably none) unanticipated permits required during construction

Number of (preferably none) environmental reevaluation based on change of footprint during construction or design

Number of (preferably none) increase in construction days and cost (CCOs and claims) due to environmental errors or omissions

No enforcement actions

Safety Expectations

Policies and Procedures

Meets design standards, GAD, and design exception fact sheets as appropriate **(TBD)**

Recoverable slopes (1:4 or flatter)

A forgiving roadside - fixed objects in the clear zone removed, relocated, made breakaway, or shielded

Design elements shall meet or exceed standards wherever practicable

All drainage take into account all reasonably predictable weather condition

Traffic management plan or traffic handling plans for all construction projects and account for disabled / emergency vehicles during construction

**Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002**

**Expectations and Performance Measures of PS&E Customers  
(Draft Updated 15 –16 Oct)**

Safety

Safe for: construction, maintenance, traveling public, emergency vehicles, environment, pedestrians, and bicyclists

Safety that balances maintenance with traveling public

Meets drivers expectations during and after construction

Provide for disabled vehicles

Coordination with local law enforcement agencies

Safety Measures

Collision rate related to construction activities

Number of public complaints due to unclear design features during construction

Number of public complaints due to unclear design features after construction

Collision rates (type of incidents) reduced after completion of construction

Need for a safety project five years after completion of construction

Number of changes during construction (eliminate)

Design Expectations

Standards & Manuals

Appropriate design speed and standards for driver expectations and adjacent roadway sections

Meets Caltran's design standards

Appropriate design speed for driver expectation and adjacent roadway sections

Efficient

Balance customer expectations with cost effective design to achieve the best possible result

Makes users benefits available as early as possible

Cost effective design

Balance customer expectations as best possible

Makes users benefits available as early as possible

Low Impact

Balance socio-economic and environmental with project needs.

Consider economic, social, and environmental balance

**Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002**

**Expectations and Performance Measures of PS&E Customers  
(Draft Updated 15 –16 Oct)**

Communication

Coordinate timely input between technical functions  
Communicate and secure management concurrence on critical decisions and risk management  
    Timely and appropriate technical input from other functions  
    Management concurrence on risk design

Global

Technical functions provide deliverables on the agreed upon schedule that fits into the overall design for PS&E submittal  
Each design shall be independently checked by a qualified engineer  
Each plan sheet shall be signed by a professional engineer who is in responsible charge of the work.  
    Meets reasonable schedule  
    Separate or independent check of PS&E done

Pre- PS&E

    Fixed scope/scheduled and cost early in the project

Design Performance Measures

Standards & Manuals

Balance the need for the project with design standards using engineering judgement  
Engineering Decisions Documented (Permanent History File)

- **Risk Design**
- **Independent Checks (Backup)**
- **Environmental Commitments**
- **Technical reports completed**

    In accordance with all Caltrans standards and policies  
    Independent design check has been completed and documented  
    Engineering Decisions Documented

Global

Maintenance, traffic and hydraulics are satisfied with the project  
    Quantities calculations and backups are included in a complete RE file

**Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002**

**Expectations and Performance Measures of PS&E Customers  
(Draft Updated 15 –16 Oct)**

Efficient

Design effort is proportionate to product completeness

Construction costs is balanced with project need

Minimal redesign effort

    Earned value

    Value analysis has been performed

    Minimal redesign effort

Communication

No unresolved conflicts between functional components of overall design

Overall design meets management expectations

Pre-PS&E

    Project Change Request (scope, cost, schedule) is not needed

Right of Way Expectations

Biddable and Buildable

Right of way requirements include all state facilities and cover all constructed work

    All easements are identified

    Right of way obligations shown on plans and specifications

Policies and Procedures

Railroad agreements are complete and comprehensive (Measures 1,2,3)

State's liability on utilities is minimized

    Utility agreements are complete and comprehensive

    All utilities relocation are complete prior to construction as applicable

    All utilities are in conformance with state policies and procedures

Caltrans Quality Management Program  
PS&E Workgroup  
15 – 16 October, 2002

**Expectations and Performance Measures of PS&E Customers**  
(Draft Updated 15 –16 Oct)

Timely and complete right of way transmittals

Right of Way Performance Measures

Right of way delay cost

Right of way certification delays

Number of revisions by design after certificate of sufficiency

Number of revisions by design after right of way certification

No unidentified utilities encountered on project

\*Global Expectations

Need and purpose should be stated in clear, measurable, and should relate to better service, greater safety, or preserving the structural integrity of a facility

Meets standards and manuals

Communication plans with appropriate functions

Safety

Consistent with regional plans, customer expectations and other projects in area

Periodic PDT meetings take place throughout PS&E and include all stakeholders

Global Performance Measures

Keep orderly and complete project files

Check design against need and purpose at appropriate milestones

Accurate meeting minutes and decisions documented

## SURVEY FILE CHECKLIST

Co. Rte. KP (PM): \_\_\_\_\_ EA: \_\_\_\_\_  
Project Limits: \_\_\_\_\_  
Project Manager: \_\_\_\_\_ Phone: \_\_\_\_\_  
Design Senior: \_\_\_\_\_ Phone: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_ Phone: \_\_\_\_\_  
Design Team Contacts: \_\_\_\_\_ Phone: \_\_\_\_\_  
\_\_\_\_\_ Phone: \_\_\_\_\_  
\_\_\_\_\_ Phone: \_\_\_\_\_

### 1) **Horizontal Datum and Existing Alignment History**

- Metric coordinates, bearings and grid distances are based on:** (see options below)

**California Coordinate System - Zone (1 – 6):** \_\_\_\_\_

- CCS83 (1991.35)  
 CCS83 (pre-HPGN)  
 CCS27 (USC&GS 1965)  
 Other: \_\_\_\_\_

- Method alignments were generated:**

- Existing CCS83 alignments from as-builts  
 "Best-fit" to CCS83 photogrammetric topographic data  
 "Best-fit" to CCS83 survey topographic data  
 Generated by Surveys Office  
 Other: \_\_\_\_\_

**If metric stationing is based on English as-builts identify a major tie point:**

**Metric station** \_\_\_\_\_ **is equivalent to English station** \_\_\_\_\_.

- Identify or deliver all as-built documentation referenced for existing alignment.

### 2) **Vertical Datum**

- Elevations are based on** (see options below)

- NGVD29  
 NAVD88  
 Other: \_\_\_\_\_

### 3) **Design Documentation and Electronic Format Design Files**

The electronic formatted deliverables requested in the following table are recommended files known to be compatible with Caltrans current Design software, Microstation and CAICE.

Discuss alternate electronic formats with the District Surveys Office during the Constructability Review Process.

## SURVEY FILE CHECKLIST

Required Deliverables – Hardcopy (Electronic Files as noted)	Date Required	Date Provided	Remarks
1. Preliminary Plans (See Section 5 1a & 2a)	Prior to PS&E		
2. Final Contract Plans (See Section 5 2b) (Do we want/need electronic?) <input type="checkbox"/> Reduced (11" x 17") <input type="checkbox"/> Full size (on request)	RTL		
3. Base Map – Electronic Format Only (See Section 5 2a) <input type="checkbox"/> Roadway, structural, and drainage layouts, and contours	RTL		
4. Roadway Alignments (See Section 5 1a or 1b) <input type="checkbox"/> Main lines, Ramps, & Branch Connections <input type="checkbox"/> Frontage Roads <input type="checkbox"/> Detours <input type="checkbox"/> Other _____	Preliminary 30%  Updates 60% & 95%  Final PS&E		
5. Structural Layout Lines (See Section 5 1a or 1b) <input type="checkbox"/> Retaining and sound wall LOL's <input type="checkbox"/> Bridge abutment and wing wall LOL's <input type="checkbox"/> Curb returns and pullouts not parallel with roadway alignments <input type="checkbox"/> Pipes and culverts over 60 m long or those containing curves and angle points	Preliminary 30%  Updates 60% & 95%  Final PS&E		
6. Profiles for items requiring vertical control for construction (See Section 5 1a or 1b) <input type="checkbox"/> Roadways <input type="checkbox"/> Median Barriers <input type="checkbox"/> Retaining Walls <input type="checkbox"/> Curb Return gutters <input type="checkbox"/> Ditch <input type="checkbox"/> Other _____	Preliminary 30%  Updates 60% & 95%  Final PS&E		
7. Rights of Way (See Section 5 1a or 1b) Final traverse and R/W Maps approved by R/W Engineering.	PS&E		

## SURVEY FILE CHECKLIST

Required Deliverables – Hardcopy (Electronic Files as noted)	Date Required	Date Provided	Remarks
<p>8. Roadway Cross-Sections <b>(See Section 5 1a &amp; 1c)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hardcopy on request</li> <li><input type="checkbox"/> Minimum of 20 m station intervals</li> <li><input type="checkbox"/> Minimum of 10 m station intervals                             <ul style="list-style-type: none"> <li>▪ On curves with a radius equal to or less than 300 m</li> <li>▪ When the profile grade is less than 0.3%, the minimum profile grade allowed without an exception</li> </ul> </li> <li><input type="checkbox"/> Include a cross-section for all begin/end of curves, roadway tapers, roadway pullouts, angle point locations, begin/end high side super, etc.</li> <li><input type="checkbox"/> Include all planes necessary for staking finish roadbeds, including slopes, benches, and ditches</li> <li><input type="checkbox"/> Slope rounding when applicable</li> <li><input type="checkbox"/> Include all cross slopes, including areas of “Pavement Plane Projection” or “Match Existing Cross Slope”</li> <li><input type="checkbox"/> Include offsets to R/W if the slope catch point is within 3 m of the R/W</li> <li><input type="checkbox"/> Tapered sections at on/off ramp connections shall be included in the main line listings up to and including the nose (or end) of the gore paving area. The remaining portion of each ramp is to be listed separately.</li> <li><input type="checkbox"/> When two alignments are converging or diverging, provide a match line between both slope stake listing segments until the alignments become completely separated.</li> </ul>	<p>Preliminary 60%</p> <p>Updates 95%</p> <p>Final PS&amp;E</p>		
<p>9. Roadway Slope Stake Listings (<i>1 or 2 per page</i>) <b>(See Section 5 1d)</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Millimeter accuracy for both horizontal and vertical labels</li> <li><input type="checkbox"/> Finish Grade only</li> <li><input type="checkbox"/> Minimum of 20 m station intervals</li> <li><input type="checkbox"/> Minimum of 10 m station intervals                             <ul style="list-style-type: none"> <li>▪ On curves with a radius equal to or less than 300 m</li> </ul> </li> </ul>	<p>Preliminary 60%</p> <p>Updates 95%</p> <p>Final PS&amp;E</p>		

**SURVEY FILE CHECKLIST**

Required Deliverables – Hardcopy (Electronic Files as noted)	Date Required	Date Provided	Remarks
<ul style="list-style-type: none"> <li>▪ When the profile grade is less than 0.3%, the minimum profile grade allowed without an exception</li> <li><input type="checkbox"/> Include a station listing for all begin/end of curves, roadway tapers, roadway pullouts, angle point locations, begin/end high side super, etc.</li> <li><input type="checkbox"/> Include all planes necessary for staking finish roadbeds, including slopes, benches, and ditches</li> <li><input type="checkbox"/> Slope rounding when applicable</li> <li><input type="checkbox"/> Include all cross slopes, including areas of “Pavement Plane Projection” or “Match Existing Cross Slope”</li> <li><input type="checkbox"/> Include offsets to R/W if the slope catch point is within 3 m of the R/W</li> <li><input type="checkbox"/> Tapered sections at on/off ramp connections shall be included in the main line listings up to and including the nose (or end) of the gore paving area. The remaining portion of each ramp is to be listed separately.</li> <li><input type="checkbox"/> When two alignments are converging or diverging, provide a match line between both slope stake listing segments until the alignments become completely separated.</li> </ul>			
<p>10. Documentation identifying the horizontal alignments, profiles, and cross section files delivered in electronic format. <i>(See Section 7 - Electronic File Reference Listing)</i></p>	<b>PS&amp;E</b>		

**4) Required Items on Contract Plans**

**THESE ITEMS MAY BE MOVED TO THE PS&E CHECKLIST SINCE THEY ARE REQUIRED WELL BEFORE PS&E**

The following items are important in the construction phase of a project and should be shown on the Contract Plans.

<b>CONTRACT PLAN REQUIREMENTS</b>
<p>1. Roadway alignment data for all stationed lines (main lines, ramps, frontage roads, detours, branch connections, etc.) to include:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Stationing at all angle points and at the beginning and endings of curves</li> <li><input type="checkbox"/> Station Equations</li> </ul>

**SURVEY FILE CHECKLIST**

<b>CONTRACT PLAN REQUIREMENTS</b>
<input type="checkbox"/> Line & Curve data
<p>2. Drainage Facilities – including Ditches &amp; Channels</p> <p>a. Alignment References            (Station/offset for horizontal and vertical angle points, end points, and curve data of the drainage facility.)</p> <input type="checkbox"/> Cross-sections <input type="checkbox"/> Structure Locations (Provide station/offset to the centerline point at the flow line of all structures.) <input type="checkbox"/> Skews (if not 90°) <input type="checkbox"/> Crosscheck Drainage Plan, Profile, Details, and Quantity Sheets for consistency.
<p>3. Bridge Structures</p> <input type="checkbox"/> Abutment and wing wall lay-out lines and references to footings <input type="checkbox"/> Abutment fills <b>Needs more explanation</b> <input type="checkbox"/> Pier/Bent alignments
<p>4. Structural Lay-out Lines            (Provide station/offsets for angle points, begin/end curves, and end points, curve data, bearings, and distances)</p> <input type="checkbox"/> Retaining Walls and Noise Barriers (Berms) <input type="checkbox"/> Benches <input type="checkbox"/> Curb Returns <input type="checkbox"/> Other
<p>5. Minor Structures Locations</p> <input type="checkbox"/> Signs <input type="checkbox"/> Signals <input type="checkbox"/> Lighting Foundations <input type="checkbox"/> Other _____
<p>6. Utilities</p> <input type="checkbox"/> <b>Any specifics?</b>
<p>7. Taper, Transition Curves, and Flare Locations            (Sufficient data to precisely define and differentiate tapers and flares: begin &amp; end roadway tapers and super transitions, radius point, offset, and parabolic curve base line distances, offsets, and direction.)</p> <input type="checkbox"/> Guard Rails <input type="checkbox"/> Pavement Edges <input type="checkbox"/> Pull outs <input type="checkbox"/> Other _____
<p>8. Profiles</p> <input type="checkbox"/> Roadways <input type="checkbox"/> Curb & Gutter <input type="checkbox"/> Median barriers <input type="checkbox"/> Ditches or Channels <input type="checkbox"/> Other _____

# SURVEY FILE CHECKLIST

CONTRACT PLAN REQUIREMENTS
9. Super Elevations (Sufficient data to precisely define begin & end of transitions and grade.)
10. Construction Details - Staking Plans shown in detail when slope stake listings do not adequately depict the area to be constructed.

## 5) Recommended Digital File Formats

### 1: Recommended CAiCE files:

All of the Geometry Chains, Profiles, and Cross-sections that are required in the construction of the project should be delivered to the District Surveys Office with a completed Electronic File Reference Listing, found in Section 7 below.

a. CAiCE Project Archive (\*.ARC or \*.ZIP)

A CAiCE Project Archive should include the Existing Survey data and **only** those objects required in the construction of the project. Extraneous data should be removed from the project before archiving.

Included objects:

- Geometry Chains and associated Points and Curves
- Profiles
- Cross-sections
- Design Digital Terrain Models.

Please specify if WinZip is used to package the project files instead of the CAiCE Archive Utility.

b. CAiCE Database Explorer File (\*.KCM)

A CAiCE Database Explorer File should include only those objects required in the construction of the project. Extraneous data should not be included in the delivered KCM file.

Included objects:

- Geometry Chains and associated Points and Curves
- Profiles

c. CAiCE End Area File (\*.EAR)

Only the final Cross-section files required in the construction of the project should be delivered.

d. Microsoft Word document (\*.DOC) and/or Slope Stake Note Generator 3.1 Report File (\*.SSR)

Slope Stake Listings must be generated from the final Cross-section files required in the construction of the project.

### 2: Recommended Microstation Design files (\*.DGN):

a. Basemap and associated design files with the coordinate design plane still intact, prior to submittal for PS&E. At a minimum the file(s) should contain roadway, structural and drainage layouts, and any contours created for the construction of the project.

b. Contract Plans as submitted to PS&E (*Coordinates may or may not contain the values based on the California Coordinate System*). **Do we really need this????????????????????**

## 6) Typical Grade Break Headers

**We still need to work with CADD about standardizing these**

## SURVEY FILE CHECKLIST

**BSW** - Back of Sidewalk  
**CONT** or **CON** - Contour-grading point  
**CP** - Catch Point (Cut or Fill)  
**DIKT** – Top of Dike  
**EB** – Edge of Barrier  
**EOD** – Edge of Deck  
**DEP** - Designed Edge of Pavement  
**DES** - Designed Edge of Shoulder  
**DETW** – Designed Edge of Travel Way  
**DFL** - may designate any Designed flow line of a ditch, curb, or dike  
**DTOP** – Designed Top of Ditch  
**GTR** - Gutter  
**HP** or **HNG** - Hinge Point  
**LIP** - Lip of curb & gutter  
**LOL** - Layout Line for walls  
(Use Mainline, Gore area or Ramp alignment name for layout line)  
**PG** - Profile Grade  
**R/W** – Right of Way  
**S/C**– Sawcut  
**TC** - Top of Curb  
**TOE** - Toe of Sound Berm/Ditch  
**TOP** - Top of Sound Berm/Ditch

(If there is more than one plane of the same callout then number the planes if possible. For example, DETW1, DETW2, or HP1, HP2 etc.)

## SURVEY FILE CHECKLIST

### 7) *Electronic File Reference Listing*

Co. Rte. KP (PM): \_\_\_\_\_ EA: \_\_\_\_\_

Full un-restricted path to the electronic format project data files:

Alignment/Layout Line		Profile		CAiCE Deliverable	Cross Section & Slope Stake Notes	
Alignment Name	CAiCE Name	Profile Name	CAiCE Name	KCM file name	EAR file name	DOC &/or SSR file name
Additional Comments: _____						
Additional Comments: _____						
Additional Comments: _____						
Additional Comments: _____						
Additional Comments: _____						

# NORTH REGION QUALITY MANAGEMENT PLAN

## Travel Forecasting and Modeling Project Specific Quality Control Plan

