

**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 (this is already in here)
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 (this is already in here)
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 OR 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 <u>OSH</u> .	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 <u>OGS</u> .	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 <u>OGEE</u> .	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	
	<u>Draft General Plan</u>	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. <u>Confirm the scope of the project is still within the project limitations (both fiscally and technically).</u>	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>	Use Manuals and Standards. Use Standard Special Provisions and Bridge Reference Specifications	Geotechnical Services, PE	MTD 1-13, PS&E Guide
		Resolve differences between designer and checker.			
Structures Estimate	Structures Estimate	PE Review <a href="#">Sharon, this was in reference to LOTBs</a>	Use Manuals and Standards	Estimator	BDA Chapter 11
		Calculate Structure Quantities. Independent Check of Structure Quantities. Resolve final quantities within preset tolerances			
Working Days	Working Days	Use Manuals and Standards	Review for completeness.	PE, Specifications BC, Estimating BC	MTD 1-13, PS&E Guide
		Use Manuals and Standards			
Foundation Review	Foundation Review	Use Manuals and Standards	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.
		Use Manuals and Standards			
Draft Structures Information Handout Table of Contents	Draft Structures Information Handout Table of Contents	Internally generated and continuously updated standard documents. Reviewed by DES OE Standards Unit.	Internally generated and continuously updated standard specification for new or unusual work.	SOE Development Engineers	
		Internally generated and continuously updated standard specification for new or unusual work.			
Transmittal Letter	PS&E submittal form	Internally generated and continuously updated standard specification for new or unusual work.	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.
		Internally generated and continuously updated standard specification for new or unusual work.			
Reference Set of Plans ("rack set")	Reference Set of Plans ("rack set")	Independent review of Special Provisions	Independent review of Special Provisions	Independent Specification Engineer	
		Independent review of Special Provisions			
RE Pending File	RE Pending File	Review pay clauses and special requirements for inclusion in Estimate	Review pay clauses and special requirements for inclusion in Estimate	Estimator	
		Review pay clauses and special requirements for inclusion in Estimate			
Foundation Review	Foundation Review	Review pay clauses and special requirements for inclusion in Estimate	Foundation Review meeting to check consistency of plans, specs, and estimate with Foundation Recommendations.	GS, PE, Designer, Specification Engineer	
		Review pay clauses and special requirements for inclusion in Estimate			
Reference Set of Plans ("rack set")	Reference Set of Plans ("rack set")	Foundation Review meeting to check consistency of plans, specs, and estimate with Foundation Recommendations.	Review content for application to Special Provisions	PE, Specification Engineer	
		Foundation Review meeting to check consistency of plans, specs, and estimate with Foundation Recommendations.			
RE Pending File	RE Pending File	Review content for application to Special Provisions	Verification that all components of PS&E package are final	Project Management, Specification Engineer	
		Review content for application to Special Provisions			
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.	Designer/ PE	
		Verification that all components of PS&E package are final			
RE Pending File	RE Pending File	Compilation of comments to Draft PS&E on one single set of plans accessible for review.	Compilation of comments to Draft PS&E on one single set of plans accessible for review.	Designer/ PE	
		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

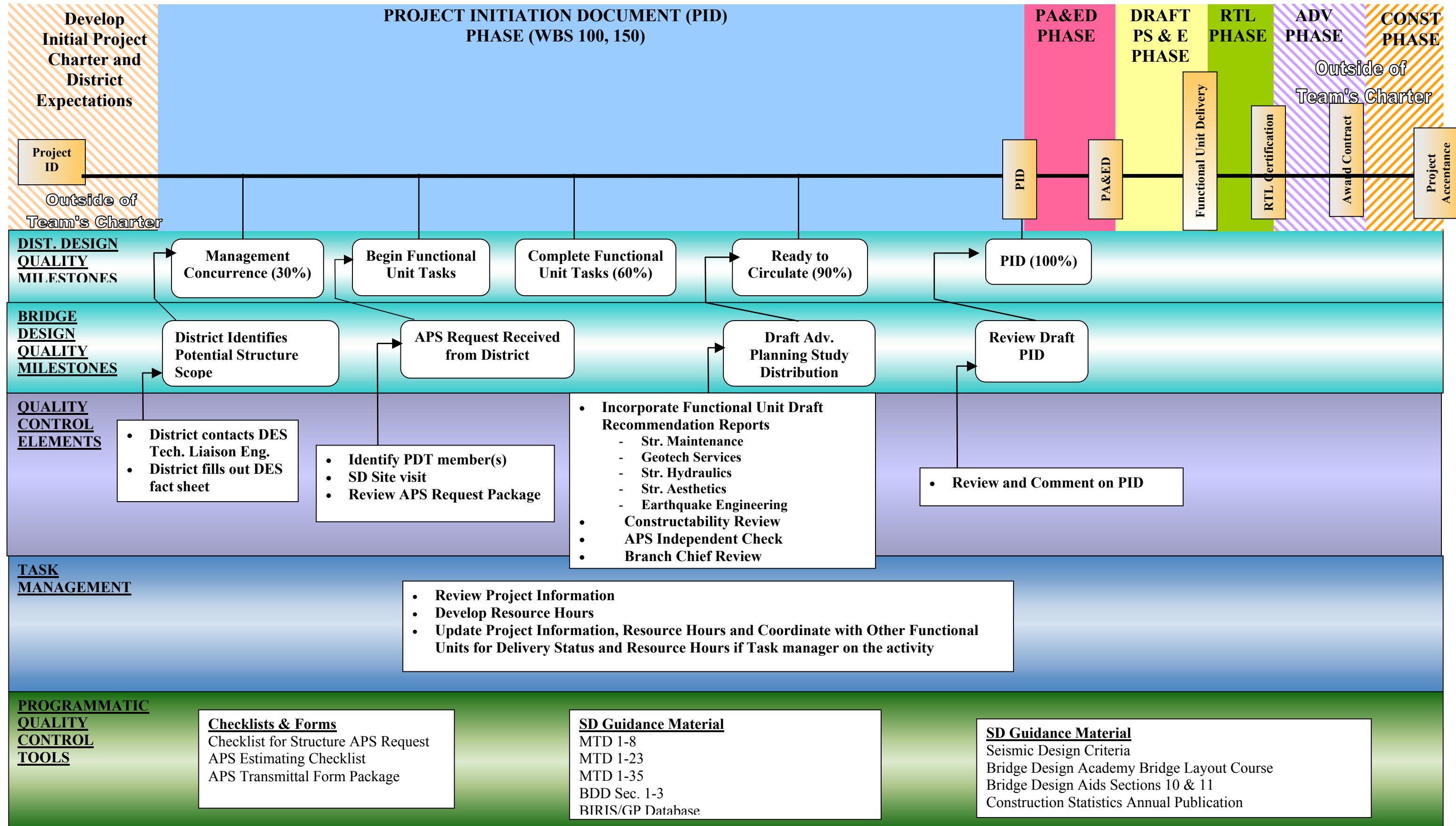
**Ready to List, Advertise and Award (WBS 265)**

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		See " <a href="#">Draft Structures PS&amp;E</a> " for process	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					

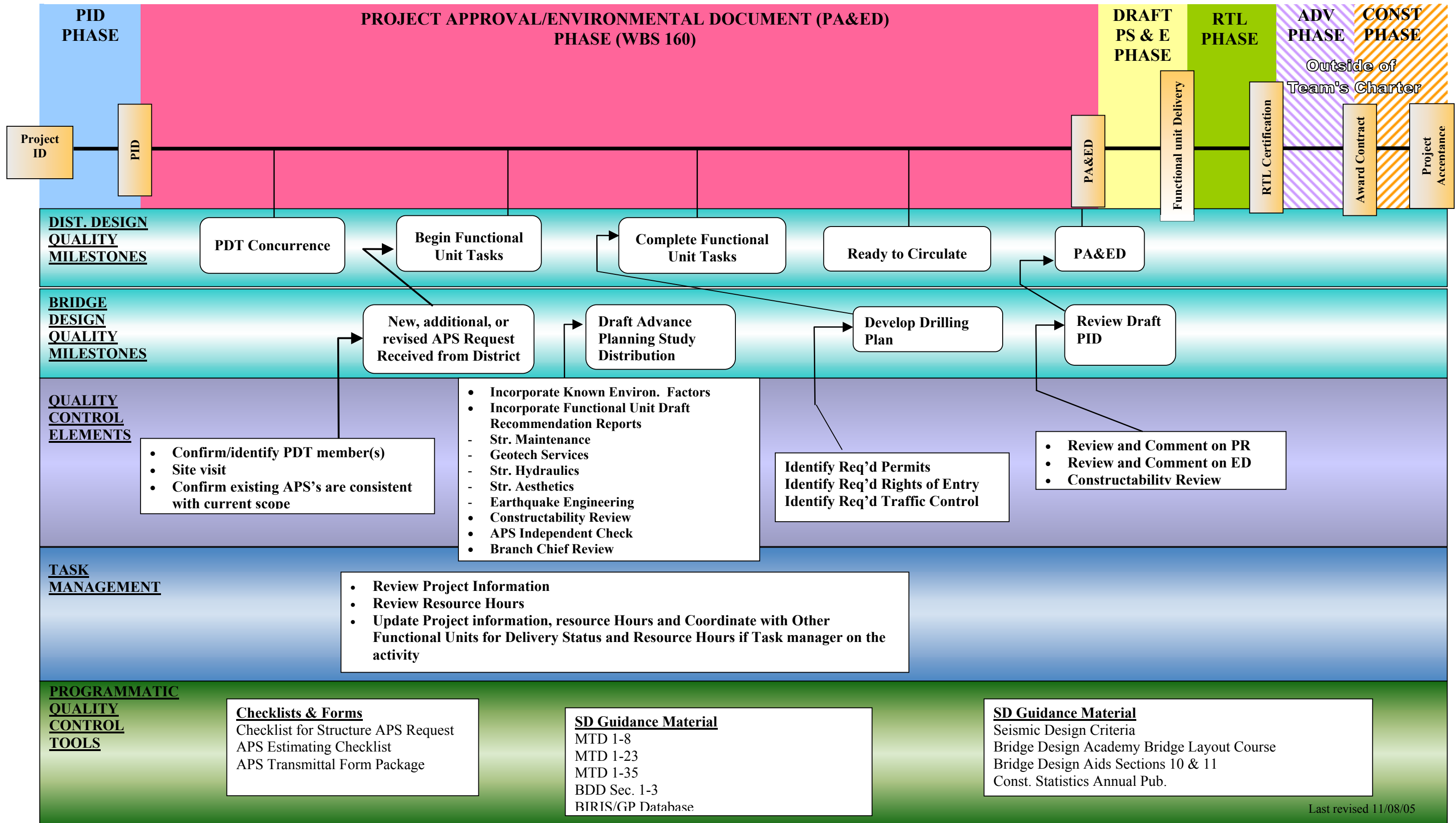
# NORTH REGION QUALITY MANAGEMENT PLAN

## 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-

