

Report on Quality Control/Quality Assurance (QC/QA) Activities for Project Cost Estimating

Introduction

In recent years the Department has been experiencing rapidly increasing project costs and bids well above the Engineer's Estimate. The resulting increase in supplemental fund requests to the CTC triggered the Department to take a closer look at its cost estimating practices.

A September 15, 2005 memorandum from Chief Engineer Rick Land (Attachment 1) required each District or Region to establish and maintain a Quality Control/Quality Assurance process to improve their project cost estimating practices. Another memorandum from the Chief Engineer dated December 14, 2005 (Attachment 2) required, for projects with an Engineer's Estimate over \$5 million, District Director certification that the contract cost estimate is complete and accurate, reflecting the true scope of the work to be performed and representative of the most current market trends. During the Fall of 2006, as a follow-up to the direction given by the Chief Engineer, the Division of Design surveyed each District/Region to see specifically what QC/QA processes had been implemented. The survey findings are summarized below:

North Region

- Developed and implemented an Estimating Certification Policy (Attachment 3). The policy set forth process, preparation guidelines and roles and responsibilities.
- Major portions of estimates are to be prepared utilizing the 'Complete Analysis Method' as set forth in PDPM.
- Hired dedicated staff to prepare estimates from a geographical perspective.
- Developed an Estimating Website to share estimating information.
- Purchased subscription to Construction Daily. Also purchased Caterpillar Performance Handbooks and R S Means Heavy Construction Cost Data manuals.
- Developed and delivered a Quantities and Estimating OJT course for design staff.
- Have conducted Contractor outreach with respect to specific projects.
- Instituted a second level review process for all estimates to be certified.

District 4

- District 4 has created a stand alone Cost Estimate Certification Form (Attachment 4) which must be processed for every project in the District. The form lists factors considered in developing an estimate including: assumptions, source of unit prices, the Risk Management plan, the Traffic Management plan and the escalation rate. The form also documents the quality control and quality assurance process and includes Value Analysis, Constructability, DES/OS, DOE, and consultant-prepared independent cost estimate reviews. The Form must be signed by the PE, Design Senior, Design Office Chief and Design Division Chief and initialed by the Deputy District Director. For projects over \$5 million, it must also be forwarded, along with the request for funds, to the District Director for approval.

- District 4 has implemented quarterly contractor outreach meetings with industry and small business representatives where projects in the next three months are discussed and handouts with pertinent project information for each region (e.g. quantities for major items of work, detailed project description, unique elements and project constraints) are made available. Projected use of rubberized asphalt concrete (RAC) over the next 12 months is also provided. The district has also held individual contractor outreach meetings for large projects (Devil Slide and various toll bridge projects).
- The district relies on a cost estimate database developed by District 8 as well as a bid summary document produced by the Program Management Division that links directly to bids and summarizes all District 4 projects, all received bids and unit cost of AC.
- District 4 uses bid stipends on large projects.
- The District has started to use consultants to develop a critical path construction schedule for major projects.
- District 4 carefully analyzes recent bids when preparing cost estimates for other projects. Additionally, bi-monthly Project Engineer meetings always includes a "lessons learned" item from construction which contributes to better quality PS&Es and project cost estimates in the future.

Central Region

- Last January the Central Region issued memo (CR-PJD-7) "QC/QA Estimate Certification Process" (Attachment 5) which outlines roles and responsibilities and procedures.
- The Central Region established an "Estimate Specialist in Central Region Office Engineer". This individual provides information on a regular basis to Design staff on current trends in the construction industry (suppliers, AGC, equipment). They also provide info from Headquarters OE on statewide trends, provide data to Design staff on the results of recent bids within the Central Region and review project estimates at critical points in the project development process.
- New CR process (CR-PJD-9) requiring Preparer's/Checkers for Quantity Calculations and Unit Costs (Attachment 6).
- New CR process (CR-PJD-10) requiring Estimate Certification Packages (Attachment 7).

District 7

- District 7 has created a Cost Estimating Unit, within their District Office Engineer office, to provide a level of quality assurance for project cost estimates developed by the design squads. The individual design squads are still responsible for providing the quality control of their estimates.
- Rather than relying on the Cost Data book, District 7 is also compiling data from the most recent bid prices for Districts 7, 8 & 12 projects and are making this data available to the engineers developing the project cost estimates.

- Additionally, District 7 is looking at the most recent local, national and international trends (e.g. costs of steel, oil, etc.) to get a better handle on where futures bid prices will be headed, similar to what DES Structures has been doing.
- With the requirement for District Director certification of engineer's estimates over \$5 million, District 7 has implemented an additional layer of QC/QA review for these estimates. Before any estimates go to the District Director, they are first reviewed and signed off by the District Office Engineer and Deputy District Director for Design.

District 8

- In February 2006, a memo (Attachment 8) was issued to staff that discussed best practices, how often and when cost estimates should be prepared, and changed the constructability review to include the review and approval of cost estimates. The memo included information on where to obtain information to prepare a cost estimate and required that the district office engineer and construction be consulted with before finalizing the estimate.
- Documentation and verification of our estimates is critical. The District has developed a new form (Attachment 9) that is now required as part of the project file. The PE is required to document when the estimate was prepared, how the cost was developed including who was contacted, what reference material was used, and what assumptions were made. This document must also include the name of the person who prepared it and who checked it.
- All projects on the delivery plan are required to have an independent check by a consultant. The consultant is asked to conduct a constructability review and prepare a cost estimate for the project. If, for example, the District ends up with three different estimates (this happened) they have a joint meeting to develop one estimate that everyone can support.

District 11

- For programming, an "11-Page Estimate" (Attachment 10) is used. This format was developed, and is regularly updated, in collaboration with the local MPO. Unique elements of the estimate include:
 - ✓ Variable escalation rates (capital and support) that are periodically adjusted, with input from our local MPO, to reflect market conditions;
 - ✓ Right of Way cost estimates that include anticipated condemnation settlements, and that are signed-off by the R/W Project Coordinator, Utility Coordinator, and Cost Estimator;
 - ✓ Structure cost estimates that are signed-off by the ESC Project Coordination Engineer;
 - ✓ support cost estimates that are signed-off by the Project Control Engineer in Program/Project Management;
 - ✓ approving signatures for the estimate, by the District Office Engineer and the Project Manager.

- Office Engineering in the District provides QA/QC of the estimates during the Planning and Design Phases. One person in the office is tasked with tracking multiple cost databases and maintaining production rate records for use in the estimates.
- Two cost estimate (studies/pilots) have been done. One sponsored by SANDAG and one by HQ Design, which quantified risk (on select items) and incorporated it into the cost. The methodology of the studies was similar, with the difference being that the SANDAG study assessed risk with team members individually, and the HQ Design study did it with team members as a group.
- District Design has received approval for a new Unit that will provide independent construction cost estimate checks that include quantifying risk, on select projects. In addition to working with the Design Manager, Functional Managers, and Office Engineer, it will work with construction contractors and consultant estimators. The Unit, which should be functional around February 2007, will have a working knowledge of the projects, as it will also direct constructability reviews for all projects in the Design Phase.

District 12

- The District 12 Project Engineer is required to research and use the Contract Cost Database for preparation of the project cost estimate. The PE then verifies the project prices using the recently received bids for similar work of similar quantity.
- The Project Engineer compares and checks “commodity” items of work and the PE and Design Senior contacts contractors regarding current pricing for “commodity” items of work.
- The Project Engineer requests Office of Structure Design to provide a Certification of the Structures Estimate for Structures Item of Work in the project.
- The Project Engineer and Design Senior provide the draft final cost estimate to Construction, Project Management and Office Engineer for review and comment prior to the finalization of the cost estimate and BEES.
- The Project Engineer, Design Senior and Design Office Chief present the final cost estimate to the Deputy District Director for Capital Outlay Program and District Director prior to signing the Certification.

Division of Engineering Services – Structures Office Engineer

The Division of Engineering Services (DES), Structure Office Engineer, Cost Estimates Branch supports the cost estimating QC/QA effort by providing the Districts with the basis of how the structure cost estimate was derived. This includes information regarding significant project variables, the source or basis for unit prices, the assumed project construction start date and the midpoint of construction date. This information is transmitted to the District under the “Estimate Certification Data” section on the “Structure Cost Estimates PS&E Transmittal Data/Estimate Certification Data” form (Attachment 11), which is available on the Caltrans Internet site at:

<http://www.dot.ca.gov/hq/esc/estimates/forms/>.

Summary/Recommendations:

- Several Districts/Regions reported establishing a dedicated person or unit to provide support concerning local trends in individual item costs. For those Districts that have not yet done so, it is recommended that they pursue establishment of such support services, in conformance with Rick Land's September 15, 2005 Memorandum.
- There were several reports of Districts/Regions implementing policies to require checking of quantity calculations and/or unit costs using either internal staff or external consultants. It is recommended that this process be implemented in all Districts statewide to reduce the risk of errors and improve cost estimate quality.
- It is further recommended that each District /Region evaluate the success of the QC/QA procedures they've implemented over the past year and look for opportunities to add to or modify those procedures as appropriate to continuously improve their project cost estimates.

List of Attachments:

Attachment 1 - Chief Engineer's September 15, 2005 memorandum - Engineer Estimates

Attachment 2 - Chief Engineer's December 14, 2005 memorandum - Certification of Project Cost Estimates

Attachment 3 - North Region Estimating Certification Policy

Attachment 4 - District 4 Cost Estimating Certification Form

Attachment 5 - Central Region "QC/QA Estimate Certification Process" memo (CR-PJD-7)

Attachment 6 - Central Region Quantity/Estimate Check memo (CR-PJD-9)

Attachment 7 - Central Region Estimate Cert Package memo (CR-PJD-10)

Attachment 8 - District 8 Cost Estimates memo

Attachment 9 - District 8 Estimate Documentation Form

Attachment 10 - District 11 11-page Estimate Form

Attachment 11 – DES's January 17, 2007 memorandum - Structures Cost Certification, and "Structures Cost Estimates PS&E Transmittal Data/Estimate Certification Data" form

Attachment 1

Chief Engineer's September 15, 2005 memorandum – Engineer Estimates

Memorandum

*Flex your power!
Be energy efficient!*

To: DISTRICT DIRECTORS

Date: September 15, 2005

From: **RICHARD D. LAND**
Chief Engineer



Subject: Engineer Estimates

The California Department of Transportation (Department) and our transportation partners are facing great challenges in delivering up to \$4.152 billion dollars worth of vital transportation projects this fiscal year. One of these challenges is providing quality projects with Engineer Estimates that reflect the true cost of construction. Currently, up to 10 percent our of projects statewide are requiring supplemental votes in order to award.

The Federal Highway Administration (FHWA) Guidelines on Preparing Engineer's Estimate, Bid Reviews and Evaluation states, "...the engineer's estimate should be within +/-10 percent of the low bid for at least 50 percent of the projects. If this degree of accuracy is not being achieved over a period of time, such as one year, confidence in the engineer's estimates may decline." For comparison to that target, attached are five-year histories showing for each district the percentage of bids within +/-10 percent of the engineer's estimate and of bids less than 110 percent of the engineer's estimate.

The Project Delivery Toolbox (http://pd.dot.ca.gov/pd_guidance.asp) and the Office Engineer RTL Guide (http://www.dot.ca.gov/hq/esc/oe/specifications/rtl_guide/) provide practices useful to achieve and maintain quality estimates. Practices include, but are not limited to, timely constructability reviews and adherence to change control policy. Following those instructions is the first step toward achieving a quality estimate. The second step is to ensure that each specific estimate is being tailored to the project specific parameters. Application of historic bid prices is not sufficient by itself to ensure quality estimates. Finally, it is necessary to apply prudent Quality Control (QC) and Quality Assurance (QA) practices. Each district or region is responsible for establishing and maintaining a QC/QA process to improve project-estimating practices.

The Division of Engineering Services is in the process of establishing and filling a specialist position to provide district support concerning overall trends in individual item costs statewide. This individual will be in place within 30 days. Regions and/or districts

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are to establish similar services within their areas so that individuals estimating projects in those regions/districts can get information on local trends.

If you have questions concerning estimating please contact John C. McMillan, Deputy Division Chief, Office Engineer, Division of Engineering Services at (916) 227-6300.

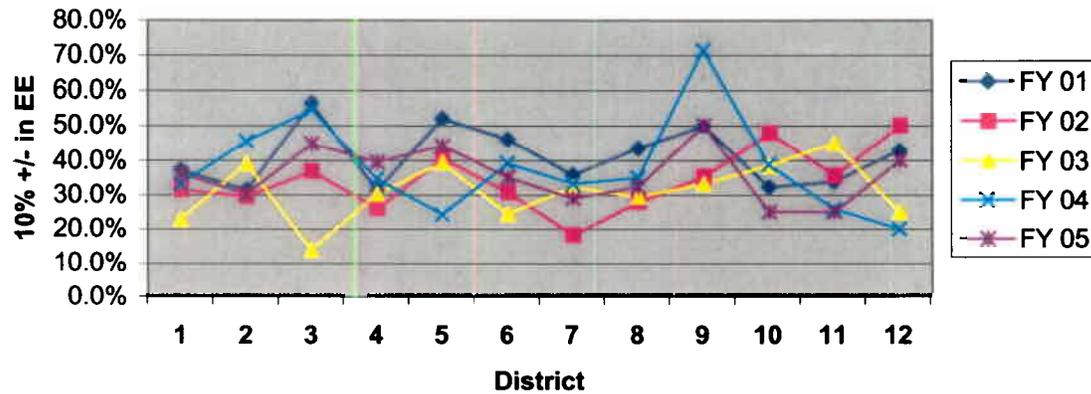
c: District Deputy Directors – Project Delivery
Division Chiefs
Deputy Directors

Attachment(s)

Lowbid in 10% +/- of Engrs Estimate By District

District	FY 01	FY 02	FY 03	FY 04	FY 05	5 year Ave
1	37.2%	31.4%	22.9%	33.3%	36.1%	32.4%
2	31.5%	29.4%	39.1%	45.5%	30.3%	35.5%
3	56.4%	36.8%	13.9%	54.5%	44.7%	41.3%
4	31.4%	26.0%	30.3%	34.7%	39.5%	31.2%
5	52.1%	40.5%	39.4%	24.2%	44.2%	41.2%
6	46.2%	30.6%	24.5%	39.1%	35.1%	35.5%
7	35.8%	18.2%	32.4%	33.3%	28.9%	30.0%
8	43.4%	27.9%	29.4%	35.0%	32.4%	34.8%
9	50.0%	35.3%	33.3%	71.4%	50.0%	45.3%
10	32.3%	47.9%	38.5%	38.9%	25.0%	37.3%
11	33.9%	35.5%	45.0%	25.9%	25.0%	33.7%
12	42.9%	50.0%	25.0%	20.0%	40.0%	37.8%

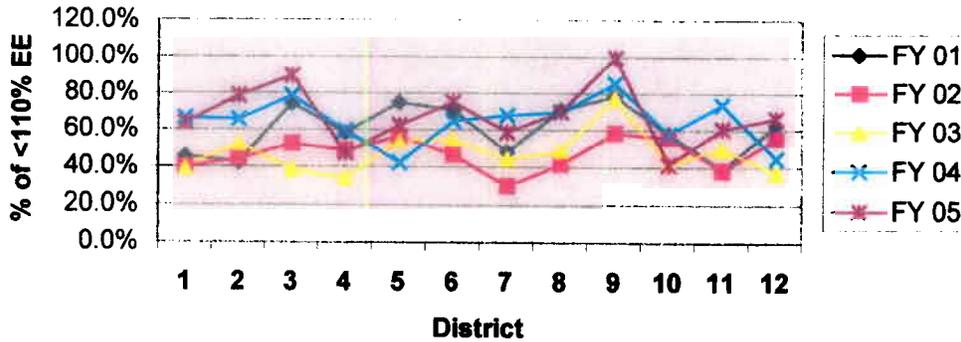
Low Bid in 10% +/- of EE By District



Low Bid Less Than 110% of the Engineer's Estimate By District

District	FY 01	FY 02	FY 03	FY 04	FY 05	5 year Ave
1	45.6%	40.0%	40.0%	66.7%	63.9%	50.6%
2	42.6%	44.1%	52.2%	65.9%	78.8%	55.5%
3	74.4%	52.6%	38.9%	78.8%	89.5%	66.8%
4	58.5%	49.0%	34.2%	59.7%	47.4%	50.7%
5	75.0%	56.8%	54.5%	42.4%	62.8%	59.8%
6	70.8%	46.8%	55.1%	65.2%	75.4%	62.7%
7	48.1%	30.3%	44.6%	68.3%	59.2%	50.0%
8	71.1%	41.9%	49.0%	70.0%	70.3%	61.1%
9	78.6%	58.8%	77.8%	85.7%	100.0%	75.5%
10	58.1%	56.3%	42.3%	58.3%	41.7%	52.0%
11	39.0%	38.7%	50.0%	74.1%	61.1%	50.3%
12	62.9%	55.9%	37.5%	45.0%	66.7%	55.2%
Average	60.4%	47.6%	48.0%	65.0%	68.1%	57.5%

Low Bid Less Than 110% of the Engineer's Estimate



Attachment 2

Chief Engineer's December 14, 2005 memorandum – Certification of Project Cost
Estimates

Memorandum

*Flex your power!
Be energy efficient!*

To: CHIEF DEPUTY DIRECTOR
DISTRICT DIRECTORS
DEPUTY DIRECTORS
DIVISION CHIEFS

Date: December 14, 2005

From: **RICHARD D. LAND**
Chief Engineer



Subject: Certification of Project Cost Estimate

Historically the Department has been very successful in forecasting project cost estimates that are within a reasonable range of the contractor's low bid. This success has allowed the Department to maximize the number of projects planned, programmed and delivered within given budget constraints. Recent market trends have seen escalating costs of key construction commodities used in transportation projects, making it difficult even at Construction Contract Ready to accurately forecast bid item costs. The California Transportation Commission (CTC) holds the Department accountable for project cost increases, whether they be at time of funds vote, award, or during construction.

It is imperative that the funds voted and allocated by the CTC are based on current and accurate project cost estimates developed using the Department's best forecasting capabilities. To drive accountability at the District level for those estimates, the District Director will be required, for all projects with an Engineer's Estimate over \$5 million, to certify that the contract cost estimate is complete and accurate, reflecting the true scope of the work to be performed and representative of the most current market trends. This District Director certification will be required to achieve Ready to List (RTL) beginning January 1, 2006. The RTL Certification form has been revised to include this signature and is available from the District Office Engineers. Also, contract estimates must be updated and re-certified by the District Director for these projects with an Engineer's Estimate more than three months old. Updating estimates due solely to item cost increases will not change the District RTL certification date if it has already been achieved.

The Division of Engineering Services-Office Engineers will monitor the success of these measures, tracking the Engineer's Estimate relative to the low bids. These measures may be relaxed, strengthened or eliminated depending on the lessons learned from this new requirement.

Your continued efforts to accurately forecast the costs of our transportation improvement projects is greatly appreciated. Please contact John McMillan, Deputy Division Chief, Office Engineer, Division of Engineering Services at 916-227-6300 if you have questions.

Attachment 3

North Region Estimating Certification Policy

CALIFORNIA DEPARTMENT OF TRANSPORTATION NORTH REGION DESIGN & ENGINEERING SERVICES		
North Region Project Development Directive	Date Issued: 3/20/06	No. D-3 Revised Page 1 of 3
Title: Project Estimates	Approved By: CHARLES C. FIELDER  BRIAN F. CRANE  JODY JONES 	
Subject Area: Procedures for developing project estimates.	Issuing Unit: North Region Design and Engineering Services	
Supersedes: Design Directive No. D-3	Distribution: All Project Delivery staff in the North Region	

Activity

Project Development staff in the North Region produce high-quality plans and specifications along with accurate project design cost estimates in accordance with the North Region Quality Management Plan.

The Region will change its project estimating practices by requiring an Estimate Certification for all projects. A focal point position (District Estimator) will be established to work in concert with the Project Engineer (PE) and Design Senior, in estimating unit prices, and prepare documentation for the Estimate Certification. The District Estimator will seek input from many sources including the Construction Industry. All project design estimates will undergo rigorous QC/QA checks to ensure construction item quantities are accurate and their estimated unit prices are reasonable.

Procedure

Project Development staff engaged in the preparation of design estimates will follow the procedures outlined in Chapter 20 and Appendix AA of the Project Development Procedures Manual (Gold Book).

All design estimates will be submitted to the District Estimator (DE) at Project Initiation, Project Report, Draft PS&E, Ready to List, Revised Ready to List and annually. The DE will work with the PE and Design Senior to determine roadway unit prices, taking into account influential factors that could impact the estimate. The District Estimator will document significant factors on the Estimate Certification (Supporting Data) form (see attached). All applicable estimates from other sources such as Structures, Electrical, Landscape, etc., will be listed and verified by their author. Also, for projects greater than \$5 million, an Estimate Certification Memo (see attached) will be prepared. The District Director will certify the estimate by signing the Estimate Certification Memo. For all projects, the Estimate Certification Supporting Data form will be signed by the Design Senior and initialed by the PE, DE, Construction Representative and Project Manager. By signing, the Design Senior verifies that Construction and Project Management were involved in the process, quality input was incorporated, and conflicts were addressed. If conflicts cannot be resolved between parties, the Region's Conflict Resolution Process will be utilized. As early as possible, all imbalances between the project estimate and the

project budget shall be reported to the Project Manager and the District SFP. If needed, the PM will lead the PDT in activities that will bring the project scope and project budget into alignment.

Methodology

Per the Gold Book (PDPM, Appendix AA), it states that the use of previous bid prices as a basis for cost estimating is probably the most frequently used method and in most cases the most practical method. It has become evident, that due to the volatility of today’s market, more aggressive analysis is needed. The Gold Book discusses an analysis method commonly used by the Construction Industry, called the “Complete Analysis Method.” This method analyzes construction operations, production rates, and material costs. Unit item costs are calculated based upon labor and equipment rental rates at the specified production rates. Overhead costs and profit are then added to obtain the final unit cost. The “Complete Analysis Method” for determining unit prices shall be utilized for major items of work, effective immediately (see PDPM, Appendix AA). The results of this analysis can be crosschecked by utilizing the “Previous Bid Prices Method” (see PDPM, Appendix AA). In light of the need for more aggressive analysis, the District Estimator will proactively pursue Construction industry knowledge and become specialized in contractor estimating methodology, recognizing common factors that affect unit prices, and timely identification of sudden changes in the market that could influence bids. The District Estimator will be a key resource for the PE and Design Senior to utilize.

Roles and Responsibilities

The process of preparing complete and accurate project estimates, which are in balance with the project scope and budget, relies upon an empowered project development team. The responsibility matrix describes the major activities of the process and displays related responsibilities.

	Project Engineer	Assistant PE	District Estimator	Construction Rep.	Design Senior	Specification Writer	Project Manager	Single Focal Point	District Director
A = Accountable I = Input S = Signature QA = Quality Assurance Check QC = Quality Control Check									
Major Activity									
Calculates Unit Quantities	A	QA			QC				
Calculates Working Days	A	QA	I	I	QC				
Determines Unit Prices	A		I/QA	I	QC	I			
Ensures estimate reflects work required by the plans and specs	A	QA	I		QC	QA			
Ensures project estimate is not inflated or constrained	A		QA		QC				
Ensures project scope and estimate is within budget	I				QC		A	QA	
Prepares Estimate Certification (Supporting Data) form	I/QA		A	I	QC				
Prepares Certification Memo for estimates > \$5 Million			A						S
Verifies all estimates	I		I	I	A/S		I		

Applicability

The procedure outlined above will apply to all projects in the North Region (including major maintenance).

References

- PDPM, Chap 20, Project Development Cost Estimates
- PDPM, Appendix AA, Cost Estimate
- Design Memorandum, Certification of Project Cost Estimate, Richard D. Land, December 14, 2005
- Design Memorandum, Independent Assurance of Project Cost Estimates, Robert L. Buckley, January 26, 2006.

Attachments

- Estimate Certification (Supporting Data) form
- Sample Estimate Certification Memo

ESTIMATE CERTIFICATION (SUPPORTING DATA)

DIST/EA: _____
 LOCATION (CO/RTE/PM): _____

DATE: _____
 PREVIOUS ESTIMATE: _____
 CURRENT ESTIMATE: _____
 % CHANGE +/-: _____
 PROGRAMMED AMOUNT: _____

DIST.DIR.CERT.REQUIRED: YES NO

Estimate Level	PID	PR	PS&E	RTL	ANNUAL	OTHER
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PROJECT PERSONNEL	CONCURRENCE INITIALS	COMMENTS
District Estimator		
Project Engineer		
Design Senior	Signature below	
Project Manager		
Construction Representative		

DISCUSSION OF FACTORS INFLUENCING ESTIMATE:

A narrative discussing influential factors has been requested by the District Directors. Replace this instruction text with the actual narrative. Refer to PDPM, Appendix AA. Consider the following factors: California Construction Cost Index, costs adjustment for future bid date, fluctuation of costs such as: wage increases and time of advertisement, construction work windows due to: environmental, traffic, and holidays, staging/restrictive work methods, quantities of work, separate operations, handwork/inefficient operations, accessibility, geographic location, construction methods, material shortages/industry issues, adequate competition, specialty work, sole source, etc....

Other areas to discuss:

- Comparison of "complete analysis method" to "previous bid price" method.
- Discussion of Contractor contacts made, # of likely bidders and who they might be, and any information the Contractor shares that will likely influence his estimate.
- Recent projects that have advertised in the geographic area, along with the type of work
- Location of material sources/disposal sites

A discussion of the realistic range of low to high unit prices for the higher priced items, and the impact this variability could have on the estimate may be useful. This could be done in table summary format as follows:

Item #	Item Description	Quantity	Engineer's Estimate	Realistic Range	Item Cost @ High End
XXXXX					
XXXXX					
Cumulative Impact:					Total \$\$ Uncertainty

OTHER ESTIMATE SOURCES:

Function	Estimate Amount	Date Last Verified	By Whom
Structures			
Electrical			
Landscape/Erosion Control			
Signing & Striping			
TMP			
Other			

Only use this table as needed. Modify to reflect those units that are actually involved with the project. You are accountable to review the estimates with these specialty units to better be able to recognize industry trends that may be affecting their estimates. This is also a good opportunity to understand their estimating practices and gain confidence in their process.

SUPPLEMENTAL FUNDS:

Discuss the percentage of supplemental funds to the overall amount of the job, if relevant. Communicate the reason for each supplemental item, the cost, and any other pertinent information (such as location: ie. additional work may be needed around the bridge abutments)

STATE FURNISHED MATERIALS:

Discuss the state furnished materials included in the estimate.

- For example, a discussion of an RE Office item may include other projects in the area, or that staff will work out of the Red Bluff office, or that Construction communicated a certain dollar value to share in the cost of the RE Office. The RE Office item should not be considered an automatic; it should reflect thoughtful consideration of need.
- Discussion of items such as revegetation or mitigation should include reference to permits that require specific needs, or other related pertinent info to the item
- Connection fees should discuss what utility is anticipating connection: sewer, water, reclaimed water, etc.

CONTINGENCIES

Only include this heading with a general discussion, when an Exception has been processed through the Construction Office Chief to allow a deviation from the standard 5%.

PROJECT ESTIMATE CERTIFICATION:

The Engineer's Estimate was developed in a collaborative team environment including, but not limited to, the PM, PE, Construction Engineer and District Estimator. Issues raised during this process have been resolved and incorporated in the Estimate and this certification.

Design Senior

Date

Memorandum

To: DES OE

Date:

File: County, Route , PM, EA, Dollar Amount

From: **Enter District Director's name**
District X (enter 1, 2, or 3) Director

Subject: Project Cost Estimate Certification

I certify that the contract cost estimate for the above mentioned project is complete and accurate reflecting the true scope of the work to be performed and representative of the most current market trends.

Attach: Estimate Certification (Supporting Data) form (District Director gets a copy of this attachment, the original goes in the Project Files. When this cert letter is sent to HQ, strikethrough the attachment info and note that the attachment is located in the Design Project Files. Do not send the attachment to HQ.)

cc: District Estimator, Spec Writer, Project Engineer, Design Engineer

Attachment 4

District 4 Cost Estimating Certification Form

COST ESTIMATE CERTIFICATION (CERT) FORM (Version 3—Sept. 15, 2006)

DIST-UNIT-CO-PM		Initial: _____ Date: _____ DDD of Design
DIST-EA		
PROJECT DESCRIPTION		
PROGRAM		
CURRENT PROGRAM COST		
NUMBER OF WORKING DAYS		
A+B Contract? (Yes or No)		

PROJECT ROLE	PRINTED NAME	SIGNATURE
Project Engineer (QC)		
Design Senior (QA)		
Design Office Chief (QA)		
Design Division Chief (QA) (South/North, East Region)		DDC to approve CERT for all regional projects in 2 days.
Project Manager		

DATE	WBS	PROJECT DELIVERABLE	COST ESTIMATE
	150	PID (Program \$)	
	180	PA&ED	
	255	PS&E	
	260	Update CTC vote	

		<i>Briefly provide details below.</i>
Quality Control	Assumptions <i>How did assumptions about location (e.g., terrain, distance to construction site, etc.), relative availability of materials, weather conditions, etc. influence the cost estimate? What other elements influenced the estimate?</i>	
	Source of Unit Prices <i>What factors were considered to determine unit prices of major items? Provide EAs of projects considered, unit prices and quantities used. Add specialty items and costs as appropriate. Provide TRO cost.</i>	
	Traffic Management Plan <i>Identify lane closure windows and assumptions about traffic control costs and elements (e.g., number of signs, public outreach component, night work, etc.).</i>	
	Risk Management Plan <i>Identify risks relating to the development and management of the construction capital cost estimate (BEES).</i>	
	Escalation Factors Used <i>Explain forecasted variables and assumptions used. Demonstrate forward estimating method.</i>	
	Contingencies <i>Is 5% contingency adequate to address each risk factor? If not, why not? How much more is needed?</i>	
	DES Structures Verification of Estimate and Quantities <i>List preparer of calculations, date calculated, name of verifier, and date verified.</i>	
Quality Assurance	Constructability Review <i>What is the assumed construction method and what risks are associated with that method? Indicate when reviews occurred and major findings.</i>	
	DOE Cost Estimate Review <i>List completion date and conclusions of the review.</i>	
	Value Analysis Performed <i>List completion date and any alternatives that impact cost.</i>	
	DES Structural Liaison Review <i>List date and conclusions of Review and name of reviewer.</i>	
	Independent Estimate Performed <i>List completion date and variance, if any, from Caltrans estimate. If variance, explain how resolved.</i>	

Status	Variance from Programmed Funds (%) <i>Compare current program cost to 255 PS&E BEES.</i>	
	Next cost estimate update <i>List projected date (three weeks before CTC vote).</i>	

Attachment 5

Central Region “QC/QA Estimate Certification Process” memo (CR-PJD-7)

Memorandum

*Flex your power!
Be energy efficient!*

To: R. GREGG ALBRIGHT
J. MIKE LEONARDO
TOM HALLENBECK
KOME AJISE

Date: January 12, 2006

File: PJD-7

From: KIM E. ANDERSON
Chief, Central Region
Project Development

***ORIGINAL SIGNED BY
RORY V. QUINCE FOR***

Subject: QC/QA Estimate Certification Process

Based on the direction given in Rick Land's memorandum, "Certification of Project Estimates", dated December 14, 2005, Central Region Project Development proposes utilization of the following quality control/quality assurance (QC/QA) process prior to submittal to the District Directors for their certification. This QC/QA verification process utilizes some procedures already in place and also adds to existing processes. This process by no means lists all QC/QA procedures used within Project Development during the life of a project. It simply summarizes the procedures proposed to insure the District Directors that appropriate QC/QA has occurred to develop the best estimate possible for Estimate Certification.

Proposal of Central Region Project Development Procedures for Estimate Certification by District Directors:

Noted below is a summary of Central Region Project Development's proposal to the District Directors. Reviews by the individuals noted below will occur for all projects over \$5 million per [Mr. Land's memorandum](#). Documentation of said reviews, via signatures, will be part of the submittal to the District Director and part of the certification to be signed by the District Director. The documentation to the District Director will include the date of the BEES and an actual copy of the BEES will be an attachment. Attached is a [sample](#) of the proposed documentation to be submitted to the District Directors:

1. Project Engineer
2. Division of Engineering Services (if applicable)
3. Design Senior
4. Estimate Specialist in Central Region Office Engineer
5. Design Office Chief

Submittal of Estimate to District Program/Project Management:

Once the above QC/QA efforts have occurred, and corresponding signatures obtained, said documentation will be forwarded to the Project Manager for their review and signature. It should be noted that this process will need to occur very quickly and Project Managers will need to be advised of potential cost changes as soon as possible. If the Project Manager, Single Focal Point or District Director need additional clarification or have questions regarding an Engineer's Estimate and potentially how it coincides with programming amounts prior to certification, they should contact the appropriate Office Chief in Project Development to resolve.

Rational for Proposal:

Project Engineer: The Project Engineer would be the Licensed P.E. who signs and seals the project title sheet. Various QC/QA procedures are undertaken by Project Development prior to the initial submittal of the PS&E to Headquarters OE. Set procedures include verification of quantities and item costs. At the time of Estimate Certification, changes in quantities are normally minimal, however with the volatility occurring in the Construction Industry, changes in unit costs are likely. The Project Engineer is the most knowledgeable individual of all aspects of the project and needs to again review the unit costs in comparison with recent bid openings and market trends throughout the state.

Division of Engineering Services: For projects including work prepared by units within the Division of Engineering Services, DES is responsible for preparing quantities and unit cost estimates. While some minimal verification can be done by Central Region Project Development in relation to DES work, it would seem appropriate that they also document that they have again verified quantities and updated unit costs per the latest available data. Documentation of this subsequent review may have to occur via fax or email due to the limitations in time for the Estimate Certification process.

Design Senior: Review by the Design Senior will largely concentrate on an overview of the estimate to cover all needs of the project. Although this will have occurred at the initial submittal of the PS&E, the Design Senior will insure that all work to be done on the project has been identified and included in the Engineer's Estimate. This would include any changes that may have occurred during the Headquarters OE process. More importantly, the Design Senior will review unit costs in light of their added experience/perspective of other projects and industry trends.

Should the Licensed P.E. for the project and the Design Senior be the same individual. Another Design Senior within Central Region Project Development will serve to perform this review and sign as per this QC/QA process.

Estimate Specialist in Central Region Office Engineer: Identification of one specific individual in Central Region Office Engineer to specialize in estimates is a new improvement to be added to our current processes. Steps have been taken to implement this immediately. This individual, in coordination with Central Region Construction, will do some of the following:

1. Provide information on a regular basis to Design staff on current trends in the construction industry (suppliers, AGC, equipment). Provide info from Headquarters OE on statewide trends.
2. Provide data to Design staff on the results of recent bids within the Central Region.
3. Review project estimates at critical points in the project development process.

Design Office Chief: Review by the Design Office Chief is similar to the review done by the Design Senior, but at a higher level. Because of the breadth of experience/perspective of the Office Chiefs, they are a final check for the estimate and their signature verifies completion of Project Development's QC/QA efforts for Estimate Certification.

Project Manager: The Project Manager is the team leader and the primary individual responsible to communicate with the project sponsor(s). The Project Manager will be responsible to address funding or programming issues that may exist due to updated project estimates.

Should you have any questions or feedback regarding the process described within, please do not hesitate to contact myself or Malcolm Dougherty.

c: Tim Gubbins
Mike Rastegar
Craig Holste
Dennis Agar
RQuince
DFapp
MSheridan
TOgle

[QC/QA Documentation for Estimate Certification](#)
[Certification of Project Cost Estimate Sample Memo](#)
[Estimate Certification Timeline Chart](#)

Memorandum

*Flex your power!
Be energy efficient!*

To: ROBERT L. BUCKLEY, Chief
Division of Engineering Services

Date:

File: - - /
06-

Attn: John McMillan

From: District Director

Subject: Certification of Project Cost Estimate

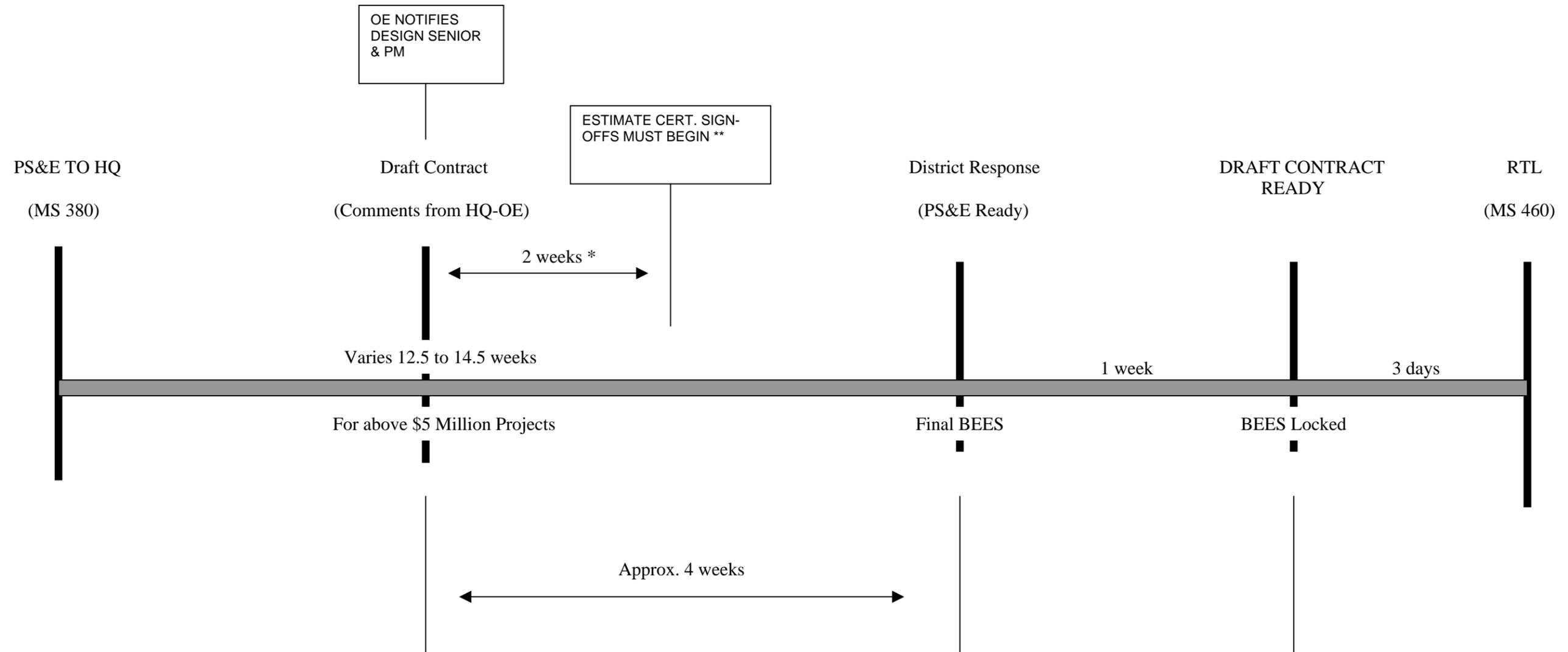
I certify that the contract cost estimate is complete and accurate, reflecting the true scope of the work to be performed and representative of the most current market trends.

In reference to the above noted project, the Engineer's Estimate (BEES) is dated: _____

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ESTIMATE CERTIFICATION TIMELINE

(PROJECTS \$5 MILLION & OVER)



* DESIGN TO RESOLVE BEES ISSUES FROM HQ-OE AND UPDATE UNIT COSTS AS NECESSARY

** SIGN-OFF BY PE & SENIOR SHOULD HAVE OCCURRED. INFORM (NOT FOR SIGNATURE) PM OF ESTIMATE – SEND TO OE ESTIMATE SPECIALIST & REST OF REVIEWERS

TARGET
COMPLETION OF
ESTIMATE
CERTIFICATION

RTL
CERTIFICATION
MUST INCLUDE
DISTRICT
DIRECTOR
EST CERT

Attachment 6

Central Region Quantity/Estimate Check memo (CR-PJD-9)

way that the Checker and others can reasonably understand the methodologies, locations, and determinations. The Preparer's work shall include the following:

1. All assumptions, clearly stated.
2. References to other sheets, sources, and files listed.
3. Quantity sheets, cross sections, sketches, layouts, tabulation of earthwork generated by Caice, Microstation, etc., attached as necessary to ensure clarity
4. Sources/rational for unit costs, clearly stated
5. Lump sum item content with unit cost calculations used to determine the lump sum cost, documented.
6. Consistent with controlling Special Provisions.
7. Errors found, crossed out, and corrected during the review process showing the initials of the Preparer and date noted next to the correction.
8. Upon completion by the Checker as outlined in this memorandum, placement of all backup documentation in the project records in a timely manner.

Checkers:

The Checker shall have an equal responsibility in achieving a sound estimate of quantities and unit costs. The Checker shall consider the following while reviewing the Preparer's work:

1. Correctness of the methodology and rational used.
2. Completeness of work (examples – all locations included in calculations, consistent with Special Provisions).
3. Mathematical accuracy of the work.
4. Correctness of outputs generated by Caice and/or Microstation including design quantities, cross sections, surfaces, areas, item counts, etc.
5. Understandability of work by others.
6. Clarification of any questions or concerns with the Preparer and/or his/her supervisor
7. Marking of any found errors, and returning sheet to Preparer for correction.
8. Rechecking any previously found errors for correctness, initialing and dating same, signing, dating, and returning completed sheet to the Preparer for inclusion in the project records.

Preparer of the BEES Document:

BEES should match the project quantities and unit costs with the project quantities sheets and calculations in the project file and the project quantities sheets. The Preparer should also produce a final BEES that conforms with the RTL Guide instructions on specialty items, rounding, etc.

Prior to submitting to Central Region Office Engineer, the Design Senior shall ensure that the BEES has been properly developed by the Preparer and verified by the Checker.

The names of the Preparer and Checker, and the date, are to be recorded on the BEES.

Estimates for Project Initiation Document (PID), Project Report (PR), and Annual Cost Estimate:

For project estimates (commonly referred to as “six page estimates”) prepared for PID’s, PR’s, and Annual Cost Estimates, the Senior Design Engineer and the licensed Project Engineer shall ensure that the estimate has been developed using a Preparer and a Checker, as outlined above.

The Preparer/Checker shall use unit costs comparable to recent market trends. Any and all backup documentation as referenced by this memorandum shall be placed in the project records in a timely manner.

The Design Senior and the licensed Project Engineer shall review the estimate for the following:

1. Completeness of all work needed for the ultimate project is identified and is accounted for.
2. Quality and clarity, so that it may be understood by others who will utilize the information.
3. Item costs reflect the estimated quantities, current trends, and project potential conditions, (ex: location, availability of materials, equipment, and labor).
4. Compliance with any applicable requirements of this memorandum whether stated here or elsewhere within same.

Preparation of Quantity Calculation Sheets and Unit Price Calculation Sheets

Quantity Calculation Sheets shall be developed on standard forms (DC-CEM-4801) showing how quantities were derived with ‘Calculated By’, ‘Checked By’, and all other heading information along with the project EA filled in. A sheet shall be submitted for each item, including ‘lump sum’ items. Examples are attached.

Unit Cost Calculation Sheets shall be utilized for each item to show how unit costs were derived with ‘Calculated By’, ‘Checked By’, and all other heading information filled in. A blank example and an executed example are attached. Also attached are several sample item analyses demonstrating how to execute a typical item unit cost analysis.

Implementation

These QC/QA procedures are to be implemented immediately on all projects.

The following attachments are included as examples only. The Engineer is responsible for final calculation methodology and documentation.

Attachments:

[Sample Quantity Sheet #1](#)

[Sample Quantity Sheet #2](#)

[Sample Quantity Sheet #3](#)

[Engineer’s Estimate – Unit Cost Calculation Sheet](#)

[Example Engineer’s Estimate – Unit Cost Calculation Sheet](#)

[Sample Unit Cost Analysis #1](#)

[Sample Unit Cost Analysis #2](#)

[Sample Unit Cost Analysis #3](#)

[List to useful web sites](#)

[Consideration Factors Affecting Unit Cost Estimates](#)

STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION

QUANTITY CALCULATIONS

SHEET 1 OF 1

ITEM CODE	ITEM	FILE NO
ITEM CODE 397001	ASPHALTIC EMULSION (PAINT BINDER)	05-0G4101
	LOCATION	SEGREGATION
	05-SCr-17 KP 15.12-15.52 (PM 9.4-9.6)	■ NO □ YES
	CALCULATION BY	DATE
	JOHN SMITH, PROJECT ENGINEER	February 25, 2005
	CHECKED BY	DATE
	BILL JONES, TET	September 2, 2005

ASPHALTIC EMULSION (A.E.) SPREAD RATE = 0.45 L/M², Sec 39-4.02

Mass = 1002 L/tonne

AREA TO BE COVERED BY EMULSION:

SOUTH BOUND, $A_{SB} = 3,980 \text{ M}^2$ ITEM # 153103
 NORTH BOUND, $A_{NB} = 5,260 \text{ M}^2$ SEE COLD PLANE AC PAVEMENT

MASS USED PER LAYER:

SOUTHBOUND
 $M_{SB} = 3,980 \text{ M}^2 (0.45 \text{ L/M}^2)(\text{Tonne}/1002 \text{ L}) = M_{SB} = 1.8 \text{ Tonnes}$ ✓

NORTHBOUND
 $M_{NB} = 5,260 \text{ M}^2 (0.45 \text{ L/M}^2)(\text{Tonne}/1002 \text{ L}) = M_{NB} = 2.42 \text{ Tonnes}$ ✓

Sum = 4.2 Tonnes ✓

-
-

SECTION 2

USE 4.2 tonnes

397001 ASPHALTIC EMULSION (PAING BINDER)

STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION
QUANTITY CALCULATIONS

SHEET 1 OF 1

ITEM CODE		ITEM	FILE NO
ITEM CODE	150662	REMOVE METAL BEAM GUARD RAILING	05-0G4101
		LOCATION 05-Scr-17 KP 15.12-15.52 (PM 9.4-9.6)	SEGREGATION <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES
		CALCULATION BY JOHN SMITH, PROJECT ENGINEER	DATE July 26, 2005
		CHECKED BY BILL JONES, TET	DATE 09/02/05

Sheet	Location	From	To	L (m)	Description
L-1	1	"A" 78+40	"A" 78+74.9	34.9	SB Turnout
L-1	2	"B" 78+70.4	"B" 78+11.4	43.0	Ret Wall Approach
L-1	3	"B" 79+49.6	"L" 79+55.5	19.5	Turn Pocket to Laurel Rd
L-1 - L-2	4	"L" 79+25.0	"B" 81+05.6	166.9	Laurel Rd and NB Shoulder
SC-5	5	"4" 78+76.6	"A" 82+27.1	350.5	SB Shoulder
				<i>total</i>	<u>614.8m</u>

-
-

SECTION

USE

620.0 M

REMOVE METAL BEAM GUARD RAILING

150662

Standard Plan

SSP

STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION
QUANTITY CALCULATIONS

SHEET 1 OF 2

ITEM CODE	ITEM	FILE NO
150662	CHANNELIZER (SURFACE MOUNTED)	06-41961
	LOCATION 06-FRE-41 KP (R49.4/51.1)	SEGREGATION <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES
	CALCULATION BY JOHN SMITH, PROJECT ENGINEER	DATE April 5, 2006
	CHECKED BY BILL JONES, TET	DATE 04/11/06

STAGE 1 PHASE 2

<u>Sheet</u>	<u>LOL</u>	<u>EA</u>	<u>Description</u>
TH-1	"A"	10 ✓ 8 ✓	Route 41 NB Shld (Alluvial Ave str. widening.)
TH- 2-3	"A"	28 ✓	Route 41 NB Shld (Friant Rd. str. widening.)
TH-6		4 ✓	closing nb on ramp and herndon ave
TH-11	"F"	17 ✓	Friant Road
TH-12	"F"	23 ✓ 22 ✓	Friant Road
TH-13	"C"	36 ✓ 35 ✓	Alluvial Ave
		TOTAL 114.0 118 EA ✓	

Revised

6/13/06 John Smith

10/17/06 Bill Jones ✓

Note: No channelizers will be used on mainline during stage 2 of construction. At this time, K-Rail will begin on the NB on ramp from WB Herndon, and ramp will be closed for the duration of construction. (see plansheets for illustration)

SECTION

USE

~~120.0~~
114.0 EA

Standard Plan

SSP

CHANNELIZER (SURFACE MOUNTED)

120165

ENGINEER'S ESTMATE – UNIT COST CALCULATION SHEET

ITEM CODE:		EA:	
DESCRIPTION:			
QUANTITY:		UNIT:	
		UNIT PRICE:	

PREPARED BY: _____ DATE: _____

Initial

CHECKED BY: _____ DATE: _____

Initial

RESEARCH/CALCULATIONS:

METHODOLOGY/ASSUMPTIONS:

REFERENCES USED:

CONTACTS/REVIEWED BY:

FILE LOCATION:

Sample Unit Cost Analysis #1

COLD PLANING EXAMPLE

09/06/06

Spoke with Bobby Mack (Penhall) on cold planing. He says the following: 4' machine - \$2700/8hrs. 6ft - \$3300, 7 ft - \$4500. Mobilization is \$250 to \$500 or more on occasion. Haul off and sweeping is in addition to the above prices. Minimum time is one day. Production is 75mm - 18'/min, 60mm - 20'/min, 30mm - 25'/min (all times the machine width to get sq ft. area/minute). Automatic controls are available but additional charge for setup depending on circumstances/situation.

Example of cold planing calculation for EA 06-342431, a new freeway construction job on SR180 east of Fresno and was calc'd on 100506:

Assumptions:

Cold plane operation is on surface streets and is done in the latter stages of the project.

Due to some small locations, cold plane operation will require 13 days and include 4 mobilizations at \$250/mobilization

Total cold plane quantity = 80,300 m²

Automatic controls on grinder not required

Grindings must be hauled off instead of placing in fill (fill completed)

Dump site for grindings is a/c recycle plant on North and Cedar, south of Fresno

Round trip haul time including fill and dump is estimated to be 1 hr.

Truck load quantity is 22.6 tonnes

Truck cost is \$90.00 / hr

Water Truck @ \$90.00 / hr will be required 25% of the shift

Street sweeper @ \$150 / hr will be required for full shift

Specific Density of grindings is 2.2

Maintenance and overhead is 10%

Contractor profit is 15%

Machine to be used is 7' wide at \$4500.00 per 8 hr shift

Machine production for 45mm grind is (metric)

$$(7')(.3048\text{m/ft})[((20\text{ft/min})(.3048\text{m/ft})+(25\text{ft/min})(.3048\text{m/ft}))/2](60\text{min/hr})(8\text{hr/shift}) = 7000\text{m}^2/\text{shift}$$

Volume of grindings generated per shift = (7000m²/shift)(.045m) = 315m³/shift

Weight of grindings = (315m³)(2.2 tonnes/m³) = 693 tonnes/shift

of truckloads per shift = 693 tonnes per shift/22.6 tonnes/truckload = 31 truck loads/shift

of trucks required per shift = (31 truckloads per shift)(1 hr haul time/truckload)/8 hr/shift) = 4

Trucks

Total cost of grinding per shift = (\$4500.00 machine cost/shift)+(\$90.00/hr)(4 trucks)(8 hr/shift) + (\$90.00/hr for water truck)(8hr/shift)(.25 shift) + (\$150.00/hr for sweeper)(8 hr/shift) = \$8,760.00 per shift

Maintenance and overhead = (10%)(8760.00) = \$876.00/shift

Contractor profit = (15%)(8760.00+\$876.00) = \$1445.00/shift

Total Cold plane operation contract cost to Caltrans = 13 days (\$8760.00 + \$876.00 + \$ 1445.00) + (4 mobilizations)(\$250.00/mobilization) = \$145,000.00

Cost per m² = \$145,000.00 / 80,300 m² = \$1.81/m² USE \$1.90

Sample Unit Cost Analysis #2

Cost of I/B EA 06-342431

Trucking at \$90.00/hr.

Material cost at \$1.90 / M3 (Source: FMFCD @ McCall and McKinley)

Pit operation

Excavator at \$109.52

Operator at 53.25

Loader at \$82.89

Dozer at \$75.53

Operator at 53.25

Water truck at 45.00

Entry/exit protection \$0.25 / M3

Finish grading \$0.10 / M3

Fill operation

Compactor at \$70.84

Operator at 53.25

Dozer (D4) at 35.00

Operator at 53.25

Blade at \$96.11

Laborer (2) at 33.75

Grade setter at 53.25

Pickup at 10.00

Water Truck at 45.00

Total hourly labor and equipment cost = \$741.00

Estimated M3 at 12 trucks per hour $12 \times 10.5 = 126$ M3

Material cost per M3 = $(\$1.90 + 0.14 \text{ (tax)}) \times 1.05 \text{ (shrinkage factor)} = \$2.15/\text{m}^3$

Freight per M3

10 miles per trip, includes 2 stop signs = 30 minutes

Cost per M3 = \$2.15 (Raw Material Cost) + \$4.28 (freight) + \$5.90 (excavation & placement)

Total cost per M3 in place to finish grade = \$12.33

Add 10% for maintenance, oversight, etc and 15% profit $\$12.33 + \$1.23 + \$2.03 = \15.60 Use \$16.00

Sample Unit Cost Analysis #3

CLASS II AGGREGATE BASE

Cost of CI II a/b EA 06-342431

Trucking at \$90.00/hr.

Truck load is 22.3 tonnes or 10.3 m3 at 2.16 density

Material cost at \$11.00/ton + tax at the plant (Convert to Tonnes)(From Vulcan on SR180)

Blade at 75.42

Operator at 53.25

Broom at \$18.31/hr.

Operator at 53.25 (use 1 hr. per shift)

Laborer (2) at 33.75

Grade setter at 53.25

Pickup at 10.00

Vibratory roller at 70.00

Operator at 53.25

Skip loader at 20.00

Operator at 53.25

Water Truck at 90.00

Total hourly cost = \$570.00

Estimated tonnes at 12 trucks per hour $12 \times 22.3 = 267$ tonnes

Convert Tonnes to M3 $267 / (2.16 \text{ tonnes per m}^3) = 124 \text{ M}^3/\text{hr.}$

Material cost per M3 $2.16 \text{ tonnes per m}^3 \times \$11.00 \text{ per ton} \times 1.12 \text{ tons per ton} \times 1.075 \text{ (sales tax)} = 28.60$

Freight per M3 $\$90 \text{ per hour} \times 0.75 \text{ hour per round trip} \times \$90 \text{ per hour} / 10.3 \text{ M}^3 \text{ per truck} = \6.50 per M^3

Cost per M3 = $\$28.60 + \$6.50 = \$34.10$

Total cost per M3 in place to finish grade = $\$34.10 + \$570 / 124 \text{ M}^3 \text{ per hour} = \38.70

Add 10% for maintenance, oversight, etc and 15% profit $\$38.70 + \$3.87 + \$6.39 = \48.96 Use \$49.00 /m3

Links to useful web sites

District 8 bid results database: <http://t8web/design/contractcost/links.htm>

Bid Summary Results: <http://www.dot.ca.gov/hq/esc/oe/awards/bidsum/>

Caltrans Construction Cost Indexes: http://www.dot.ca.gov/hq/esc/oe/contract_progress/chcci.html

Caltrans Asphalt Price Index: http://www.dot.ca.gov/hq/esc/oe/asphalt_index/astable.html

The PDPM On Cost Estimates (Chapter 20):

http://www.dot.ca.gov/hq/oppd/pdpm/chap_hm/chapt20/chapt20.htm

The Ready-To-List (RTL) Guide: http://www.dot.ca.gov/hq/esc/oe/specifications/rtl_guide/

Headquarter's Estimating Site: <http://www.dot.ca.gov/hq/oppd/costest.htm>

Item Cost Databases:

<ftp://hqoefileservr.dot.ca.gov/HQ%20OE%20FileServer/Item%20Cost%20Data%20Bases>

Item Code Descriptions:

<ftp://hqoefileservr.dot.ca.gov/HQ%20OE%20FileServer/Item%20Code%20Descriptions>

BEES User Guide: <http://oe.dot.ca.gov/BEES/BEES-2004.pdf>

CONSIDERATION FACTORS AFFECTING UNIT COST ESTIMATES

Office of Construction Estimate Review (OCER)

October 13, 2006

Unit Cost Data

- Caltrans Annual Contract Cost Books
- Caltrans Cost Database
- Awarded contracts
- Other bidders
- Force account analysis

Project Location

- Rural locations
- Mountainous Terrain
- Coastal zone or coastal bluff
- Desert
- Roadways adjacent to rivers

Item Availability

- National shortages
- Special product vendor

Unusual or Special Materials

- Lightweight fills
- Special aggregates

Unusual or Unique Construction

- Soundwall or structure decorative surfaces

Difficult Construction

- Irregular areas
- Repeated start and stop of work
- Difficult terrain
- Intersection construction
- Cross slope & profile correction

Haul Distances Within Project Limits

Plant / Material Source Distance to Project

Imbalanced Excavation/Embankment Quantity

Difficult Slope Construction

- Steep cuts or fills
- Rocky slopes
- Unstable slopes excavation
- Potential for rock blasting

Accelerated Construction

- Emergency repair work

A+B Contracts

Large Incentive or Liquidated Damages

Economic Price Trends

- Oil
- Steel

Construction Windows

- Nighttime work
- Excessive Noise from pile driving
- Lane Closures of short duration

Longitudinal Dropoffs

Special Work Forces Required

Climate Conditions

- Seasonal water flow
- Desert high heat
- Freeze or Snow conditions

Attachment 7

Central Region Estimate Cert Package memo (CR-PJD-10)

Memorandum

*Flex your power!
Be energy efficient!*

To: **RORY V. QUINCE**, Chief Office Design I
DAVID FAPP, Chief Office Design II
MICHAEL F. SHERIDAN, Chief Office Design III
TERRY OGLE, Chief Office Design IV
Central Region Design Seniors
Central Region Landscape Architects

Date: December 5, 2006

File: Project Development
Central Region
CR-PJD-10

From: **KIM E. ANDERSON**, *Original signed by Kim E Anderson*
Chief, Central Region
Project Development

Subject: Estimate Certification Package

Background

Based on the direction given in Rick Land's memorandum, "Certification of Project Estimates," dated December 14, 2005, Central Region Project Development has implemented a quality control/quality assurance (QC/QA) process prior to submittal to the District Directors for their certification per Kim Anderson's Policy Memo ([CR PJD-7](#)), QC/QA Estimate Certification Process, dated January 12, 2006. This process by no means lists all QC/QA procedures used within Project Development during the life of a project. It simply summarizes the procedures to ensure the District Directors that appropriate QC/QA processes have been instituted to develop the best estimate possible for Estimate Certification.

The purpose of this memorandum is to outline the documentation necessary for the Estimate Certification package/process.

Documentation for Estimate Certification Package/Process

The minimum documentation for verifying estimates for certification is as follows:

1. Engineer's Estimate Unit Cost Calculation Sheets (highways only) showing how item unit costs were derived per Kim Anderson's Policy Memo ([CR PJD-09](#)), Quantity Calculations and Unit Cost Estimate Calculations, dated November 1, 2006.
2. Plan set (11x17 hard copy).
3. CPM Schedule as required per Kim Anderson's Policy Memo ([PJD-3 Rev1](#)), Construction Contract Time Implementation, dated January 18, 2005, in Suretrac, Microsoft Project, or Microsoft Excel, 11x17 hard copy, (Suretrac preferred).
4. Special Provisions (electronic copy with hidden text).
5. Executed DES - VERIFICATION OF ESTIMATE (if Structures or any other DES unit is involved with producing costs that affect the estimate, is involved).

For projects including work prepared by units within the Division of Engineering Services, DES is responsible for preparing quantities and unit cost estimates. While some minimal verification

can be done by Central Region Project Development in relation to DES work, DES should document that they have again verified quantities and updated unit costs per the latest available data. Documentation of this subsequent review can occur via fax or email due to the limitations in time for the Estimate Certification process.

6. BEES for Highways, Structures (if involved) and Combined. (8 ½ x 11 hard copy)
7. QC/QA Documentation for Estimate Certification Form per Kim Anderson's Policy Memo ([CR PJD-7](#)), QC/QA Estimate Certification Process, dated January 12, 2006. (8 ½x11 hard copy)

NOTES RELATING TO ITEMS NOS. 1-8, ABOVE:

- A. All documentation submittals shall be accompanied by a memo that includes the contents and purpose of the submittal, along with the desired completion date.
- B. Item Nos. 1-4, 6 and 7 are required prior to the Draft Contract Ready date, minimum review time is two weeks, and does not commence until all documentation requirements are met.
- C. Item No. 5 is required prior to verification and re-verification.
- D. BEES should be revised at each review/submittal and the most current submitted for review/verification.
- E. Office of Construction Estimate Review (OCER) shall be notified of any delivery date changes that occur after submittal of estimate data for verification.
- F. Engineer's Estimate Unit Cost Calculation Sheets should be submitted only one time unless changes are made, in which case, changes should be re-submitted along with supporting documentation, an updated BEES, and a cover memo.
- G. The timing of the "three-month" review/verification is based on the original certification date, and is the responsibility of the Design Engineer, or his delegate, to track and notify the OCER that re-verification is required along with the due date of said review/verification.
- H. The estimate unit costs should be reviewed, and unit cost changes along with a cover memo, sent to OCER at the time of submittal for the "three-month" review/verification.
- I. Minimum "three-month" review/verification time required is one week.
- J. The BEES will be reopened only to update unit costs as necessary per re-verification.

Implementation

These Estimate Certification Package guidelines are to be implemented immediately on all projects with an engineer's estimate exceeding five million dollars.

Attachments:

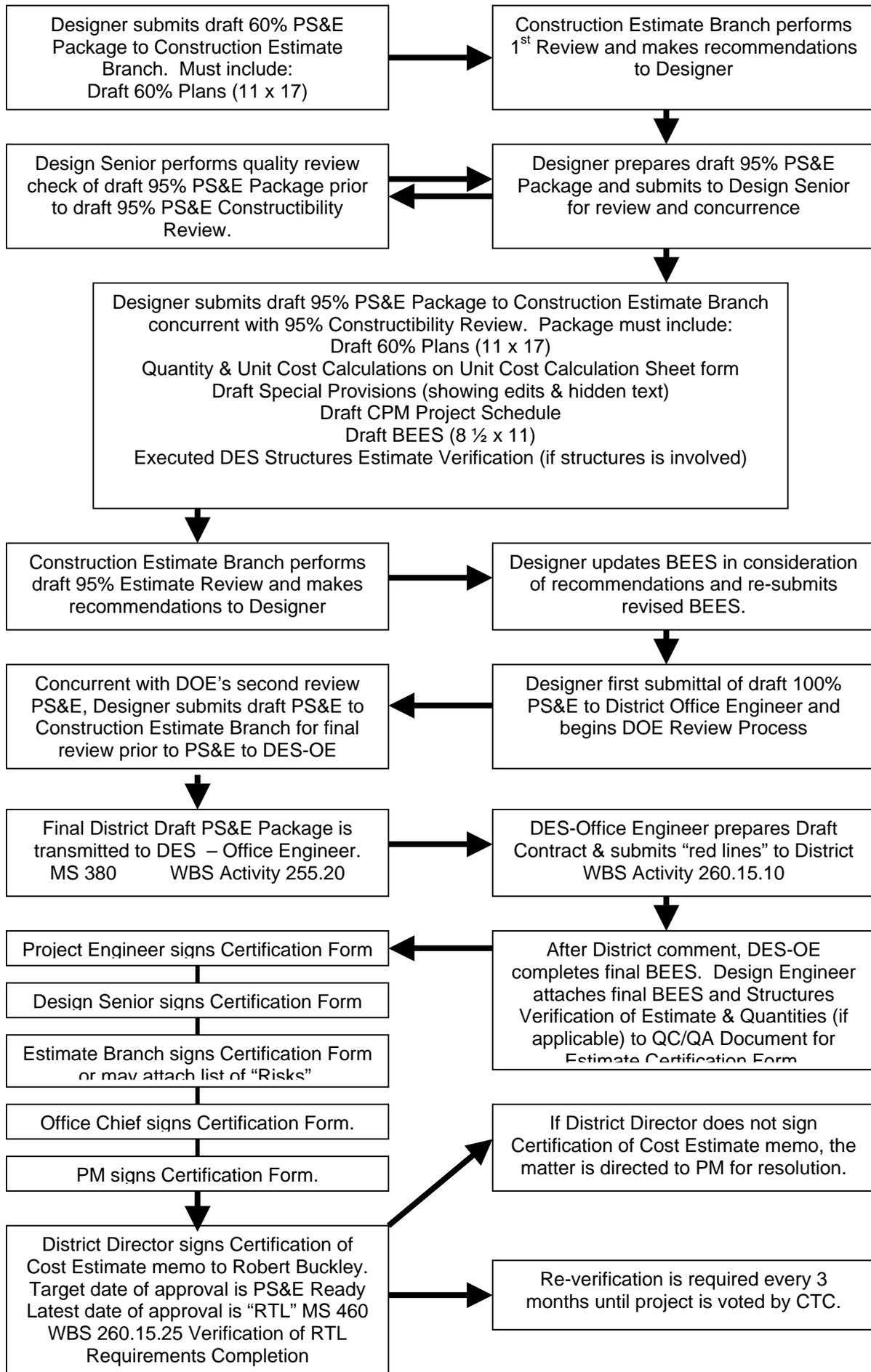
[PJD-3 Rev1, Construction Contract Time Implementation](#)

[PJD-7 QC/QA, Estimate Certification Process](#)

[CR PJD-09 Quantity Calculations and Unit Cost Estimate Calculations](#)

[FAQ Document](#)

QC/QA Document for Estimate Certification Process Flowchart



CONSIDERATION FACTORS AFFECTING UNIT COST ESTIMATES

Office of Construction Estimate Review (OCER)

October 13, 2006

Unit Cost Data

- Caltrans Annual Contract Cost Books
- Caltrans Cost Database
- Awarded contracts
- Other bidders
- Force account analysis

Project Location

- Rural locations
- Mountainous Terrain
- Coastal zone or coastal bluff
- Desert
- Roadways adjacent to rivers

Item Availability

- National shortages
- Special product vendor

Unusual or Special Materials

- Lightweight fills
- Special aggregates

Unusual or Unique Construction

- Soundwall or structure decorative surfaces

Difficult Construction

- Irregular areas
- Repeated start and stop of work
- Difficult terrain
- Intersection construction
- Cross slope & profile correction

Haul Distances Within Project Limits

Plant / Material Source Distance to Project

Imbalanced Excavation/Embankment Quantity

Difficult Slope Construction

- Steep cuts or fills
- Rocky slopes
- Unstable slopes excavation
- Potential for rock blasting

Accelerated Construction

- Emergency repair work

A+B Contracts

Large Incentive or Liquidated Damages

Economic Price Trends

- Oil
- Steel

Construction Windows

- Nighttime work
- Excessive Noise from pile driving
- Lane Closures of short duration

Longitudinal Dropoffs

Special Work Forces Required

Climate Conditions

- Seasonal water flow
- Desert high heat
- Freeze or Snow conditions

ESTIMATE CERTIFICATION FREQUENTLY ASKED QUESTIONS

Office of Construction Estimate Review (OCER)

October 13, 2006

What projects are required to be reviewed by the Office of Construction Estimates Branch?

Estimate Certification by the District Director is required for projects within the Central Region that have Engineer's Estimates that are \$5 million and over and will require funding vote by the CTC.

Where can information about Estimate Certification policies be found?

Refer to the Central Region policy PJD-7 memorandum, QC/QA Estimate Certification Process, by Kim Anderson, dated January 12, 2006 (including the Estimate Certification form) is found on the Central Region PJD web site under PJD Policies, PJD-7 (<http://sv06web/pjd/home/docs/crpjdpolicy/crpjdpolicy.htm>)

The initiating policy from headquarters Certification of Project Cost Estimate by Rick Land, Chief Engineer dated December 14, 2005 may be found on the headquarters Project Delivery Memorandums website (http://pd.dot.ca.gov/pd_memos.asp)

When is the Design Engineer required to submit estimates to the Construction Estimate Review Branch for review?

Estimate review by OCER is required at

60% Constructibility Review (if Level 1 or Level 2 project over \$5 million).

95% Constructibility Review (all projects over 5 million).

DOE 2nd Draft PS&E Review (concurrent with final draft PS&E review by Environmental, Traffic Operations & Construction units just prior to PS&E submittal to DES-Office Engineer).

How long will review by OCER Branch usually take?

The normal minimum estimate review time is two weeks and the maximum is five weeks. (If additional review time is required due to project complexity or OCER workload, the Project Engineer will be informed of the additional time required.)

What must the Design Engineer do after submitting the project estimate for review?

Following the review by the Estimates Branch, suggested changes will be submitted to the Design Engineer by OCER. The Project Engineer shall update the estimate and re-submit the estimate for verification.

What must be included in the Estimate Review Package?

The minimum required information for checking estimates is as follows:

- *Quantity Calculation Sheets on standard form DC-CEM-4801 (highways only) showing how quantities were derived with 'Calculated By', 'Checked By', and all other project heading information filled in.*
- *Unit Cost Calculation Sheets showing how unit costs were derived with 'Calculated By', 'Checked By', and all other project heading information filled in. This includes "Lump Sum" items and unit cost items from other functional units such as Electrical and Traffic.*
- *One hard copy reduced size draft set of plans.*
- *Draft CPM (if available at 60% but no later than 95%) Suretrak format preferred.*
- *Draft Special Provisions printed showing hidden text and showing all edits, number all pages, perform a spellcheck, and copy the SSPs back-to-back. Draft SSPs are not typically available until 95%. Special Provisions should also be submitted electronically.*
- *Draft BEES for Highways, Structures (if involved) and Combined. Print BEES file to fit an 8-1/2 x 11 page (do not reduce). Prior to 95% an Excel Spreadsheet estimate is acceptable.*

What if the Engineer Estimate changes after submittal to OCER?

The Designer is to submit revised estimates along with a cover memo outlining the changes.

What if the Project Engineer does not agree with changes recommended by OCER?

OCER and the Design Engineer must meet and try to reach agreement. If agreement is not reached, then the OCER will not verify the estimate but will attach a list of risks to the QC/QA Documentation for Estimate Certification document for consideration by the Director.

When does the Project Engineer begin the QC/QA Documentation for Estimate Certification and approval by District Director process?

The Project Engineer begins completion of the QC/QA Documentation for Estimate Certification process when DES-Office Engineer submits the Draft Contract to the District for "red line" review. This will occur after the PS&E to HQ Milestone 380 and prior to the Ready to List Milestone 460. The Project Engineer must obtain the final BEES Estimate from DES-Office Engineer and attach the BEES Estimate to the QC/QA Documentation for Estimate Certification form. The Project Engineer may continue to process by submitting the form for required signature approvals.

How long does it take for the District Director to approve the Certification of Project Cost Estimate memo after being submitted by the Project Manager?

The District Director determines this on a project-by-project basis. Approval by the District Director should require one week provided the QC/QA Documentation for Estimate form was “verified” and signed by the Construction Estimate Branch and there are no identified risks.

Does the estimate verification and certification need to be redone if it is less than 3 months old and a new fiscal year begins?

No. A change in fiscal year is not pertinent. Following initial certification by the District Director, the verification and certification must be re-done every three months to remain current.

After District Director initial certification approval, how long does it take to have the Estimate Certification re-verified?

The minimum re-verification time is one week.

What is the role of the Design Engineer in the re-verification process?

It is the responsibility of the Design Engineer to track the re-verification calendar, review the estimate, make any necessary unit cost changes, and re-submit the updated estimate along with supporting documentation to OCER. Quantities are not to be changed.

I thought the BEES system was locked at RTL. Does the project lose the RTL date if the BEES is changed?

DES – Office Engineer has established a procedure that will allow BEES to be reopened for adjustment of unit costs only and the project RTL date will not be changed. No changes other than unit costs may be made.

What if the project delivery schedule changes after the start of the estimate review and certification process?

The Design Engineer shall notify OCER of the schedule change and the affect on project delivery.

What happens if during the review and certification process the project is found to require more or less funding than is programmed for the project?

Project cost versus the programmed budget issues are the responsibility of the Project manager. The project cost estimate should reflect the true estimated cost as determined by the Design Engineer, and shall not be adjusted to “fit” the programmed budget. The CTC acknowledges the effects of economic changes that can cause the project cost to fluctuate significantly. The CTC wants to know as early in the process as possible of the need to adjust funding.

Attachment 8

District 8 Cost Estimates memo

Memorandum

*Flex your power!
Be energy efficient!*

To: ALL EMPLOYEES

Date: February 8, 2006

File:

From: MICHAEL A. PEROVICH 
District Director

Subject: Preparation of Cost Estimates

The purpose of this memo is to re-emphasize the importance of preparing complete and accurate estimates that reflect the true scope of work to be performed.

The December 14, 2005, memo from Chief Engineer Richard Land (attached) was issued to drive accountability at the District level and will require the District Director to certify that contract cost estimates over \$5 million are complete and accurate.

The District will meet this requirement by implementing the following procedures:

1. As of this year, projects over \$5 million will require the attached certification memo to be completed prior to the project being considered Ready to List (RTL). In addition, a copy of the signed and checked calculation package used to develop the estimate is to be submitted with the request for certification. This will prove the accuracy of the estimate.
2. Project cost estimates shall be updated throughout the project development process, specifically:
 - ✧ At the beginning of the calendar year
 - ✧ Prior to Ready to List (RTL)
 - ✧ Prior to California Transportation Commission (CTC) vote
 - ✧ As trends dictate
3. The constructability review meeting will now include the review and approval of the cost estimate.

ALL EMPLOYEES

February 8, 2006

Page 2

All estimates, regardless of the dollar amount, will require the review and approval of the deputies of the Constructability Review Senior, Project Manager and Design Senior four weeks prior to RTL (see attached memo).

The District has begun updating and improving the Contract Cost Database and will be providing training aimed at preparing estimates. There is also a project development toolbox on the web at (http://pd.dot.ca.gov/pd_guidance.asp) and the RTL guide at (http://www.dot.ca.gov/hq/esc/oe/specifications/rtl_guide) that provides practices useful in preparing estimates.

Moreover, any person or persons responsible for the preparation of estimates must consult with the district office engineer (OE) and construction staff before finalizing an estimate.

Your efforts to continue to provide accurate cost estimates have not gone unnoticed and are greatly appreciated. Implementation of the above-mentioned procedures will ensure continued accuracy of project cost estimates.

Attachments

Memorandum

*Flex your power.
Be energy efficient!*

To: CHIEF DEPUTY DIRECTOR
DISTRICT DIRECTORS
DEPUTY DIRECTORS
DIVISION CHIEFS

Date: December 14, 2005

From: RICHARD D. LAND
Chief Engineer



Subject: Certification of Project Cost Estimate

Historically the Department has been very successful in forecasting project cost estimates that are within a reasonable range of the contractor's low bid. This success has allowed the **Department** to maximize the number of projects planned, programmed and delivered within given budget constraints. Recent market trends have seen escalating costs of key **construction** commodities used in transportation projects, making it difficult even at Construction Contract Ready to accurately forecast bid item costs. The California Transportation Commission (CTC) holds the Department accountable for project cost increases, whether they be at time of funds vote, award, or during construction.

It is imperative that the funds voted and allocated by the CTC are based on current and accurate project cost estimates developed using the Department's best forecasting capabilities. To drive accountability at the District level for those estimates, the District Director will be required, for all projects with an Engineer's Estimate over \$5 million, to certify that the contract cost estimate is complete and accurate, reflecting the true scope of the work to be performed and representative of the most current market trends. This District Director certification will be required to achieve Ready to List (RTL) beginning January 1, 2006. The RTL Certification form has been revised to include this signature and is available from the District Office Engineers. Also, contract estimates must be updated and re-certified by the District Director for these projects with an Engineer's Estimate more than three months old. Updating estimates due solely to item cost increases will not change the District RTL certification date if it has already been achieved.

The **Division** of Engineering Services-Office Engineers will monitor the success of these measures, tracking the Engineer's Estimate relative to the low bids. These measures may be relaxed, strengthened or eliminated depending on the lessons learned from this new requirement.

Your continued efforts to accurately forecast the costs of our transportation improvement projects is greatly appreciated. Please contact John **McMillan**, Deputy Division Chief, Office Engineer, **Division of Engineering Services at 916-227-6300 if you have questions.**

Memorandum

*Flex your power!
Be energy efficient!*

To: MICHAEL A. PEROVICH
District Director

Date:

File:

From: PATRICIA ROMO
Deputy District Director
Design

Subject: Certification of Project Cost Estimate Over \$5 Million

The contract cost estimate is complete and accurate, reflecting the true scope of the work to be performed and is representative of the most current market trends.

Recommend Approval:

PATRICIA ROMO
Deputy District Director
Design

Date

APPROVED BY:

MICHAEL A. PEROVICH
District Director
District 8

Date

Memorandum

*Flex your power!
Be energy efficient!*

To: PATRICIA ROMO
Deputy District Director
Design

Date:

File:

From: Office Chief

Subject: Certification of Project Cost Estimate

The cost estimate for this project has been prepared under the direction of the following registered engineer:

Project Engineer	Date	Constructability Review Senior	Date
------------------	------	--------------------------------	------

The contract cost estimate is complete and accurate, reflecting the true scope of the work to be performed and is representative of the most current market trends.

Recommend Approval:

Design Senior	Date	Project Manager	Date
---------------	------	-----------------	------

APPROVED BY:

PATRICIA ROMO
Deputy District Director
Design

Date

Attachment 9

District 8 Estimate Documentation Form

ENGINEER'S ESTIMATE - UNIT PRICE CALCULATION SHEET

ITEM CODE:	120200	EA:	12345		
DESCRIPTION:	Flashing Beacon (Portable)				
QUANTITY:	10	UNIT:	EA	UNIT PRICE:	\$1500

PREPARED BY: Jane Doe Initial DATE: 2/13/06
CHECKED BY: John Doe Initial DATE: 3/2/06

RESEARCH/CALCULATIONS:

- Contract Cost Database (see attached) → weighted average \$1900 EA
 - Districts: 7, 8, 11 and 12
 - Years: 2003, 2004 and 2005
 - Minimum Quantity: 5
 - Maximum Quantity: 15
- Removed high and low bids → weighted average \$1460 EA
- Recent bid openings in D8
 - EA 08-11111, 1/26/06, 9 EA → \$4500
 - Second bidder → \$3500
 - Third Bidder → \$5500
- Recent bid opening for SANBAG
 - EA 08-22222, 2/23/06, 12 EA → \$1200
- $\$1460 + 25\% = \1825
- $(\$1825 + \$1200)/2 = \$1512$ → **SAY \$1500**

METHODOLOGY/ASSUMPTIONS:

- EA 11111 was located in rural San Bernardino County. The location and type of work was very different, therefore the prices were discarded
- Assumed 25% inflation on historic data based on increases in similar items of work
- Averaged inflated historic data price with recent SANBAG bid

REFERENCES USED:

District 08 Contract Cost Database
Caltrans Bid Summary Results
SANBAG Bid Results

CONTACTS/REVIEWED BY:

Constructability Reviewer
Construction on-call consultant

Resident Engineer
Office Engineer

FILE LOCATION:

J:\12345\DES\est\backup\120200\summary.doc
J:\12345\DES\est\backup\120200\database.pdf

J:\12345\DES\est\backup\120200\08-22222.pdf
J:\12345\DES\est\backup\120200\08-11111.pdf

Attachment 10

District 11 “11-page Estimate Form”

I. ROADWAY ITEMS

Section			Cost
1	Earthwork _____	\$	-
2	Structural Section _____	\$	-
3	Drainage _____	\$	-
4	Specialty Items _____	\$	-
5	Environmental _____	\$	-
	5A Environmental Mitigation \$ -		
	5B Landscape and Irrigation \$ -		
	5C NPDES \$ -		
6	Traffic Items _____	\$	-
	6A Electrical \$ -		
	6B Signing and Striping \$ -		
	6C Traffic Management Plan \$ -		
	6D Traffic Control \$ -		
7	Detours _____	\$	-
8	Minor Items _____	\$	-
9	Roadway Mobilization _____	\$	-
10	Supplemental Work _____	\$	-
11	State Furnished _____	\$	-
12	Contingencies _____	\$	-
13	Overhead _____		\$0
TOTAL ROADWAY ITEMS		\$	-

Estimate Prepared By : _____
Name and Title
Date
Phone

Estimate Reviewed By : _____
Name and Title
Date
Phone

By signing this estimate you are attesting that you have discussed your project with all functional units and have incorporated all their comments or have discussed with them why they will not be incorporated.

DISTRICT 11
PRELIMINARY
PROJECT COST ESTIMATE

SECTION 1 EARTHWORK

Item code	Unit	Quantity	Unit Price (\$)	
190101 Roadway Excavation	M3	x	=	Include item for "lead compliance plan" under "specialty items."
190103 Roadway Excavation (Type Y) ADL	M3	x	=	Include item for "lead compliance plan" under "specialty items."
190105 Roadway Excavation (Type Z-2) ADL	M3	x	=	Shoulder backing is a thin course of granular material that is used to protect the outside edge of pavement by providing support that prevents edge cracking and pavement edge loss. It also minimizes drop-off heights for overlays.
194001 Ditch Excavation	M3	x	=	Measured by the tonne. Minimum unit weight to
198001 Impored Borrow	M3	x	=	
198007 Imported Material (Shoulder Backing)	Tonne	x	=	See standard plan A62B/A62C for limits of
192037 Structure Excavation (Retaining Wall)	M3	x	=	payment for structure excavation
193013 Structure Backfill (Retaining Wall)	M3	x	=	See standard plan A62B/A62C for limits of
193031 Pervious Backfill Material (Retaining Wall)	M3	x	=	payment for structure backfill.
160101 Clearing & Grubbing	LS	x	=	Estimate is based on the amount of hectares that would be cleared and grubbed. Use \$7500 per Hectare as a general rule. Include the amount as a Lump Sum
170101 Develop Water Supply	LS	x	=	
TOTAL EARTHWORK SECTION ITEMS				\$ -

Section 2 STRUCTURAL SECTION

Item code	Unit	Quantity	Unit Price (\$)	
401000 Concrete Pavement	M3	x	=	If you have this item, you may also have items for "seal pavement joint" and "seal longitudinal isolation joint."
404092 Seal Pavement Joint	M	x	=	If you have this item, you may also have items for "seal existing concrete pavement joint", "grind existing concrete pavement" and "repair spalled joints (polyester grout)."
404094 Seal Longitudinal Isolation Joint	M	x	=	Use the conversion: 2.373 Tonne/m3
413115 Seal Existing Concrete Pavement Joint	M	x	=	Use the conversion: 2.373 Tonne/m3
401108 Replace Concrete Pavement (Rapid Strength Concrete)	M3	x	=	Use the conversion: 2.240 Tonne/m3
390102 Asphalt Concrete (Type A)	Tonne	x	=	Use on all new or existing AC surfaces within the project limits, excluding traveled way and detours, per D11 PDPM manual. Estimate:
390108 Asphalt Concrete Base (Type A)	Tonne	x	=	0.38 L/M2 and 1002 L/Tonne. This item is also used on seal coat
390126 Rubberized AC (Type G)	Tonne	x	=	Required for cold plane/AC projects. All vertical and horizontal cold planed surfaces are tacked with binder prior to AC placement. Estimate 0.27 L/m2 and 1002 L/Tonne
393001 Pavement Reinforcing Fabric	M2	x	=	To be used on chip seal projects. You may also have items for "asphaltic emulsion (polymer modified)", "asphaltic emulsion (fog seal coat)" and "sand cover." Include type
260201 Class 2 Aggregate Base	M3	x	=	To be used on chip seal projects. You may also have items for "sand cover", "asphaltic emulsion (fog seal coat)", and "screenings "
290201 Asphalt Treated Permeable Base	M3	x	=	To be used on chip seal projects. You may also have items for "asphaltic emulsion (polymer modified)", "asphaltic emulsion (fog seal coat)", and "screenings "
250401 Class 4 Aggregate Subbase	M3	x	=	To be used on chip seal projects. You may also have items for "asphaltic emulsion (polymer modified)", "asphaltic emulsion (fog seal coat)", and "screenings "
374002 Asphaltic Emulsion (Fog Seal Coat)	Tonne	x	=	In addition to per meter quantity, place AC dike is also paid by the tonne, and added to other work as "Asphalt Concrete (Type A)." See standard plan A87B for dike quantities.
397001 Asphaltic Emulsion (Paint Binder)	Tonne	x	=	Dike removal, when part of roadway excavation for pavement widening, is NOT a pay item. Use this item when dike is removed as part of a rehabilitation (cold planing) etc
377501 Slurry Seal	Tonne	x	=	Usually required on slab replacement projects to restore ride quality
3750XX Screenings (Type XX)	Tonne	x	=	Primarily used to remove detours. When pavement and portions of base are removed for other cases, the item should be "roadway excavation."
374492 Asphaltic Emulsion (Polymer Modified)	Tonne	x	=	In addition to m2 quantity, place AC (misc. area) is also paid by the tonne, and added to other work as "asphalt concrete (Type A)."
365001 Sand Cover	Tonne	x	=	Although plans include a breakdown of different cold plane depths, for project studies purposes, add all quantities together here. Include an item for "asphaltic emulsion (paint binder)."
731530 Minor Concrete (Textured Paving)	M2	x	=	
731502 Minor Concrete (Misc. Const)	M3	x	=	
394001 Place Asphalt Concrete Dike	M	x	=	
150771 Remove Asphalt Concrete Dike	M	x	=	
420201 Grind Existing Concrete Pavement	M2	x	=	
150860 Remove Base and Surfacing	M3	x	=	
390095 Replace Asphalt Concrete Surfacing	M3	x	=	
1532XX Remove Concrete (type)	M3	x	=	
394002 Place Asphalt Concrete (Misc. Area)	M2	x	=	
153103 Cold Plane Asphalt Concrete Pavement	M2	x	=	
394050 Rumble Strip	STA	x	=	
413112A Repair Spalled Joints (Polyester Grout)	M2	x	=	
420102 Groove Existing Concrete Pavement	M2	x	=	
TOTAL STRUCTURAL SECTION ITEMS				\$ -

DISTRICT 11
PRELIMINARY
PROJECT COST ESTIMATE

SECTION 3 DRAINAGE

Item code	Unit	Quantity	Price	Amount
150805 Remove Culvert	M	x		
150820 Modify Inlet	EA	x		
193114 Sand Backfill	M3	x		
150206 Abandon Culvert	M	x		
152430 Adjust Inlet	M	x		
155003 Cap Inlet	EA	x		
510502 Minor Concrete (Minor Structure)	M3	x		
510512 Minor Concrete (Box Culvert)	M3	x		
62XXXX XXX mm APC Pipe	M	x		
64XXXX XXX mm Plastic Pipe	M	x		
65XXXX XXX mm RCP Pipe	M	x		
66XXXX XXX mm CSP Pipe	M	x		
68XXXX Edge Drain	M	x		
69XXXX XXX mm Pipe Downdrain	M	x		
70XXXX XXX mm Pipe Inlet	M	x		
70XXXX XXX mm Pipe Riser	M	x		
70XXXX XXX mm Flared End Section	EA	x		
703233 Grated Line Drain	M	x		
72XXXX Rock Slope Protection (Type and Method)	M3	x		
729010 Rock Slope Protection Fabric	M2	x		
721420 Concrete (Ditch Lining)	M3	x		
721430 Concrete (Channel Lining)	M3	x		
750001 Miscellaneous Iron and Steel	KG	x		
XXXXXX Additional Drainage	LS	x		

Include an item for sand backfill if quantity of backfill for abandon culverts is equal to or greater than 4M3, in addition to the per meter quantity of abandon culvert.

Include an item for sand backfill if quantity of backfill for abandon culverts is equal to or greater than 4M3, in addition to the per meter quantity of abandon culvert.

TOTAL DRAINAGE ITEMS \$ -

SECTION 4 SPECIALTY ITEMS

Item code	Unit	Quantity	Unit Price (\$)	Amount
070012 Progress Schedule (Critical Path Method)	LS	x		
518002 Sound Wall (Masonry Block)	M2	x		
510524 Minor Concrete (Sound Wall)	M3	x		
153250 Remove Sound Wall	M2	x		
190110 Lead Compliance Plan	LS	x		
1532XX Remove Barrier (Insert Type)	M	x		
150662 Remove Metal Beam Guard Railing	M	x		
150668 Remove Terminal Systems	EA	x		
80XXXX Fence (Insert Type)	M	x		
80XXXX Gate (Insert Type)	EA	x		
832001 Metal Beam Guard Railing	M	x		
839301 Single Thrie Beam Barrier	M	x		
839310 Double Thrie Beam Barrier	M	x		
839521 Cable Railing	M	x		
8395XX Terminal System (Type CAT)	EA	x		
8395XX Alternative Flared Terminal System	EA	x		
8395XX Alternative In-line Terminal System	EA	x		
49XXXX CIDH Concrete Piling (Insert Diameter)	M	x		
839XXX Crash Cushion (Type X)	EA	x		
83XXXX Concrete Barrier (Type X)	M	x		
83XXXX Concrete Barrier (Type X)	M	x		
520103 Bar Reinf. Steel (Ret. Wall)	KG	x		
510408 Class 1 Concrete (Retaining Wall)	M3	x		
510133 Class 2 Concrete (Retaining Wall)	M3	x		
510060 Structural Concrete (Retaining Wall)	M3	x		
513553 Retaining Wall (Masonry Wall)	M3	x		
5110XX Architectural Treatment (Type)	M2	x		
511048 Apply Anti-Graffiti Coating	M2	x		
5136XX Reinforced Concrete Crib Wall (Type X)	M2	x		
83954X Transition Railing (Insert Type)	EA	x		
597601 Prepare and Stain Concrete	M2	x		
839561 Rail Tensioning Assembly	EA	x		
8395XX End Anchor Assembly (Insert Type X)	EA	x		

Use when project cost exceeds \$5 million dollars or more than 250 working days. Amount to enter depends on length and complexity of project.

The m2 cost includes only walls on standard spread or trench footings. Piles, pilecaps, and barriers are additional items.

Required for use on projects with aerially deposited lead soils and projects that require removal of yellow leaded striping. Estimate \$5000 for ADL or stripe; Estimate \$10,000 if both conditions exist on your project.

TOTAL SPECIALTY ITEMS \$ -

Section 5 ENVIRONMENTAL

5A - ENVIRONMENTAL MITIGATION

Item code	Unit	Quantity	Price	Amount
Biological Mitigation	LS	x	= \$	-
071325 Temporary Fence (Type ESA)	M	x	= \$	-
<u>Subtotal Environmental</u>				\$ -

5B - LANDSCAPE AND IRRIGATION

Item code	Unit	Quantity	Price	Amount
200001 Highway Planting	LS	x	=	-
208000 Irrigation System	LS	x	=	-
204099 Plant Establishment Work	LS	x	= \$	-
204101 Extend Plant Establishment (X Years)	LS	x	= \$	-
201700 Imported Topsoil	M3	x	= \$	-
20XXXX ____ mm (Insert Type) Conduit (Use for Irrigation x-overs)	M	x	= \$	-
20XXXX Extend ____ mm (Insert Type) Conduit (Use for Extension of Irrigation x-overs)	M	x	= \$	-
2030XX Erosion Control (Type __)	HA	x	= \$	-
203026 Move In/ Move Out (Erosion Control)	EA	x	= \$	-
209801 Maintenance Vehicle Pullout	EA	x	= \$	-
208304 Water Meter	EA	x	= \$	-
<u>Subtotal Landscape and Irrigation</u>				\$ -

For use on roadway projects (non-highway planting projects) with planting work.

Use only on highway planting projects. If you have MVPs on roadway projects, quantities of AC, AB, etc. need to be under "structural section."

5C - NPDES

Item code	Unit	Quantity	Price	Amount
074019 Prepare SWPPP	LS	x	= \$	-
074017 Prepare WPCP	LS	x	= \$	-
074020 Water Pollution Control	LS	x	= \$	-
074023 Temporary Erosion Control	M2	x	= \$	-
074027 Temporary Erosion Control Blanket	M2	x	= \$	-
074037 Move In/ Move Out (Temporary Erosion Control)	EA	x	= \$	-
074028 Temporary Fiber Roll	M	x	= \$	-
074042 Temporary Concrete Washout (Portable)	LS	x	= \$	-
074032 Temporary Concrete Washout Facility	EA	x	= \$	-
074033 Temporary Construction Entrance	EA	x	= \$	-
074035 Temporary Check Dam	M	x	= \$	-
074038 Temp. Drainage Inlet Protection	EA	x	= \$	-
074041 Street Sweeping	LS	x	= \$	-
<u>Subtotal NPDES (Without Supplemental Work)</u>				\$ -

Use for projects with soil disturbance equal or greater than 0.4 hectares.

Use for projects with soil disturbance less than 0.4 hectares.

Supplemental Work for NPDES

066595 Water Pollution Control Maint. Sharing*	LS	x	= \$	-
066596 Additional Water Pollution Control	LS	x	= \$	-
066597 Storm Water Sampling and Analysis*	LS	x	= \$	-

* Applies only to project with SWPPP's

TOTAL ENVIRONMENTAL \$ -

DISTRICT 11
PRELIMINARY
PROJECT COST ESTIMATE

Section 6 TRAFFIC ITEMS

6A - Traffic Electrical

Item code	Unit	Quantity	Unit Price (\$)	Cost
86055X Lighting & Sign Illumination	LS	x	= \$	-
860XXX Signals & Lighting	LS	x	= \$	-
86XXXX Fiber Optic Conduit System	LS	x	= \$	-
8611XX Ramp Metering System (Location X)	LS	x	= \$	-
8611XX Ramp Metering System (Location X)	LS	x	= \$	-
8607XX Interconnection Facilities	LS	x	= \$	-
5602XX Furnish Sign Structure	KG	x	= \$	-
5602XX Install Sign Structure	KG	x	= \$	-
56XXXX XXX mm CIDHC Pile (Sign Foundation)	M	x	= \$	-
860810 Inductive Loop Detectors	EA	x	= \$	-
8609XX Traffic Monitoring Stations	LS	x	= \$	-
150760 Remove Sign Structure	EA	x	= \$	-
151581 Reconstruct Sign Structure	EA	x	= \$	-
152641 Modify Sign Structure	EA	x	= \$	-
<u>Subtotal Traffic Electrical</u>				<u>\$ -</u>

6B - Traffic Signing and Striping

Item code	Unit	Quantity	Unit Price (\$)	Cost
566011 Roadside Sign (One Post)	EA	x	= \$	-
566012 Roadside Sign (Two Post)	EA	x	= \$	-
560XXX Furnish Sign Panels	M2	x	=	-
560XXX Install Sign Panels	M2	x	=	-
150710 Remove Traffic Stripe	M	x	=	-
150701 Remove Yellow Painted Traffic Stripe	M	x	= \$	-
150713 Remove Pavement Marking	M2	x	= \$	-
150742 Remove Roadside Sign	EA	x	= \$	-
152320 Reset Roadside Sign	EA	x	= \$	-
152390 Relocate Roadside Sign	EA	x	= \$	-
82010X Delineator (Class X)	EA	x	= \$	-
84XXXX Permanent Pavement Delineation	LS	x	= \$	-
120090 Construction Area Signs	LS	x	= \$	-
<u>Subtotal Traffic Signing and Striping</u>				<u>\$ -</u>

6C - Traffic Management Plan

Item code	Unit	Quantity	Unit Price (\$)	Cost
128650 Portable Changeable Message Signs	EA	x	= \$	-
<u>Subtotal Traffic Management Plan</u>				<u>\$ -</u>

6D - Stage Construction and Traffic Handling

Item code	Unit	Quantity	Unit Price (\$)	Cost
129099A Traffic Plastic Drum	EA	x	=	-
12016X Channelizer	EA	x	=	-
120120 Type III Barricade	EA	x	=	-
129100 Temp. Crash Cushion Module	EA	x	=	-
120100 Traffic Control System	WD	x	=	-
839603A Temporary Crash Cushion (ADIEM)	EA	x	=	-
129000 Temporary Railing (Type K)	M	x	= \$	-
120143 Temporary Pavement Delineation	M	x	= \$	-
<u>Subtotal Stage Construction and Traffic Handling</u>				<u>\$ -</u>

TOTAL TRAFFIC ITEMS \$ -

II. STRUCTURES ITEMS

	<u>Structure 1</u>	<u>Structure 2</u>	<u>Structure 3</u>
DATE OF ESTIMATE	00/00/00	00/00/00	00/00/00
Bridge Name	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX
Bridge Number	57-XXX	57-XXX	57-XXX
Structure Type	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX
Width (Meters) [out to out]	0.00 m	0.00 m	0.00 m
Total Bridge Length (Meters)	0.00 m	0.00 m	0.00 m
Total Area (Square Meters)	0.00 m ²	0.00 m ²	0.00 m ²
Structure Depth (Meters)	0.00 m	0.00 m	0.00 m
Footing Type (pile or spread)	spread	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX
Cost Per Square Meters	\$0.00	\$0.00	\$0.00

COST OF EACH STRUCTURE	\$0.00	\$0.00	\$0.00
-------------------------------	---------------	---------------	---------------

	<u>Structure 4</u>	<u>Structure 5</u>	<u>Structure 6</u>
DATE OF ESTIMATE	00/00/00	00/00/00	00/00/00
Bridge Name	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX
Bridge Number	57-XXX	57-XXX	57-XXX
Structure Type	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX
Width (Meters) [out to out]	0.00 m	0.00 m	0.00 m
Total Bridge Length (Meters)	0.00 m	0.00 m	0.00 m
Total Area (Square Meters)	0.00 m ²	0.00 m ²	0.00 m ²
Structure Depth (Meters)	0.00 m	0.00 m	0.00 m
Footing Type (pile or spread)	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX
Cost Per Square Meters	\$0.00	\$0.00	\$0.00

COST OF EACH STRUCTURE	\$0.00	\$0.00	\$0.00
-------------------------------	---------------	---------------	---------------

TOTAL COST OF STRUCTURES¹	\$0.00
---	---------------

Estimate Prepared By: _____ Date _____
XXXXXXXXXXXXXXXXXXXX ----- Division of Structures

¹Structure's Estimate includes Overhead and Mobilization.

III. RIGHT OF WAY

A)	Acquisition, including Excess Land Purchases, Damages to Remainder(s) & Goodwill Loss	\$	0
B)	Railroad	\$	0
C)	Acquisition of Offsite Mitigation	\$	0
D)	Utility Relocation (State Share) Potholing (Design Phase)	\$	0
E)	Clearance Cost	\$	0
F)	RAP and/or Last Resort Housing Costs	\$	0
G)	Title and Escrow Fees	\$	0

R/W ESTIMATE

H)	Condemnation Settlements	0%	\$ 0
I)	Design Appreciation Factor (Items H & I applied to items A + B)	0%	\$ 0

TOTAL R/W ESTIMATE Enter amount from Right of Way Data Sheet **\$0.00**

(Excluding Item #8 - Hazardous Waste)

TOTAL R/W ESTIMATE: Escalated **\$0.00**

K)	Utility Relocation (Construction Cost)	\$	0
----	--	----	---

RIGHT OF WAY SUPPORT \$ 0

Support Cost Estimate Prepared By _____ Project Coordinator¹ _____ Phone _____

Utility Estimate Prepared By _____ Utility Coordinator² _____ Phone _____

R/W Acquisition Estimate Prepared By _____ Right of Way Estimator³ _____ Phone _____

¹ When estimate has Support Costs only

² When estimate has Utility Relocation

³ When R/W Acquisition is required

IV. SUPPORT COST ESTIMATE SUMMARY

Please obtain a P3 report (CL#3) from PPM to fill in the support cost for these categories

SB-45 CATEGORY SUPPORT COST	FY 00/01	FY 01/02	FY 02/03	FY 03/04	FY 04/05	FY 05/06	FY 06/07	FY 07/08	FY 08/09	P3 Subtotal
PR/ED (PD,PE,PM)										0
PS&E (PS)										0
R/W (RW)										0
CONSTRUCTION (CM)										0
Total Support Cost:	0	0	0	0	0	0	0	0	0	0

Please obtain a P3 report (CL#3) from PPM to fill in the support cost for these categories

SB-45 CATEGORY SUPPORT COST	FY 1	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	P3 Total	Support Ratio
PR/ED (PD,PE,PM)								0	#DIV/0!
PS&E (PS)								0	#DIV/0!
R/W (RW)								0	#DIV/0!
CONSTRUCTION (CM)								0	#DIV/0!
Total Support Cost:	0	0	0	0	0	0	0	0	0

Total Capital Cost:	\$0
Overall Percent Support Cost:	#DIV/0!

Approved by: _____
Project Control Engineer

Date

Attachment 11

DES's January 17, 2007 memorandum – Structures Cost Certification, and “Structures Cost Estimates PS&E Transmittal Data/Estimate Certification Data” Form

Memorandum

*Flex your power!
Be energy efficient!*

To: CHARLIE FIELDER-1
BRIAN CRANE-2
JODY JONES-3
BIJAN SARTIPI-4
RICHARD KRUMHOLZ-5
MALCOLM DOUGHERTY-6
DOUG FAILING-7
MICHAEL PEROVICH-8
TOM HALLENBECK-9
KOME AJISE-10
PEDRO ORSO-DELGADO-11
CINDY QUON-12

Date: January 16, 2007

From: **ROBERT A. STOTT** 
Deputy Division Chief
Structure Design Services &
Earthquake Engineering
Division of Engineering Services

Subject: DES Structures Cost Estimate Certification Data

In reference to Rick Land's attached memorandum, "Certification of Project Estimates", dated December 14, 2005, the Division of Engineering Services, Structure Office Engineer, Cost Estimates Branch will support this effort by providing the District the basis of how the structure cost estimate was derived. This will include information regarding significant project variables, the source or basis for unit prices, the assumed project start of construction date, and the midpoint of construction date.

This information will be transmitted to the District under the "ESTIMATE CERTIFICATION DATA" section on the "STRUCTURE COST ESTIMATES PS&E TRANSMITTAL DATA/ESTIMATE CERTIFICATION DATA" form. A copy of this form is attached and can be found on the Caltrans Internet site at <http://www.dot.ca.gov/hq/esc/estimates/forms/>.

If you have any questions please contact me at (916) 227-8728.

Attachments

c: DES – Deputies
District Design Deputies

Memorandum

*Flex your power!
Be energy efficient!*

To: CHIEF DEPUTY DIRECTOR
DISTRICT DIRECTORS
DEPUTY DIRECTORS
DIVISION CHIEFS

Date: December 14, 2005

From: **RICHARD D. LAND**
Chief Engineer



Subject: Certification of Project Cost Estimate

Historically the Department has been very successful in forecasting project cost estimates that are within a reasonable range of the contractor's low bid. This success has allowed the Department to maximize the number of projects planned, programmed and delivered within given budget constraints. Recent market trends have seen escalating costs of key construction commodities used in transportation projects, making it difficult even at Construction Contract Ready to accurately forecast bid item costs. The California Transportation Commission (CTC) holds the Department accountable for project cost increases, whether they be at time of funds vote, award, or during construction.

It is imperative that the funds voted and allocated by the CTC are based on current and accurate project cost estimates developed using the Department's best forecasting capabilities. To drive accountability at the District level for those estimates, the District Director will be required, for all projects with an Engineer's Estimate over \$5 million, to certify that the contract cost estimate is complete and accurate, reflecting the true scope of the work to be performed and representative of the most current market trends. This District Director certification will be required to achieve Ready to List (RTL) beginning January 1, 2006. The RTL Certification form has been revised to include this signature and is available from the District Office Engineers. Also, contract estimates must be updated and re-certified by the District Director for these projects with an Engineer's Estimate more than three months old. Updating estimates due solely to item cost increases will not change the District RTL certification date if it has already been achieved.

The Division of Engineering Services-Office Engineers will monitor the success of these measures, tracking the Engineer's Estimate relative to the low bids. These measures may be relaxed, strengthened or eliminated depending on the lessons learned from this new requirement.

Your continued efforts to accurately forecast the costs of our transportation improvement projects is greatly appreciated. Please contact John McMillan, Deputy Division Chief, Office Engineer, Division of Engineering Services at 916-227-6300 if you have questions.

STRUCTURE COST ESTIMATES PS&E TRANSMITTAL DATA /ESTIMATE CERTIFICATION DATA

Revised - January 12, 2007

DATE:
DIST.-CO.-RTE:
EA:
LEAD STRUCTURE:
Estimate prepared by:
Phone Number:

PS&E TRANSMITTAL DATA:

KEYWORD: _____

The Engineer's Estimate for the structure portion of this project

is available from BEES.

has been revised as of this date and are available from BEES.

STRUCTURE ITEMS - Including Mobilization & Time Related Overhead

STRUCTURE ITEMS - Including Mobilization

STRUCTURE ITEMS - No Mobilization Item

Supplemental Work:

State furnished materials and expenses:

CONTINGENCIES APPROXIMATELY 5%

Total \$0

SUGGESTED WORK DAYS FOR STRUCTURE WORK:

SUGGESTED WORK DAYS FOR STRUCTURE WORK WITHIN

RAILROAD RIGHT-OF-WAY:

REVISIONS TO THE ESTIMATE ARE DUE TO:

ESTIMATE CERTIFICATION DATA: (To be completed at fsPS&E only)

ASSUMED BID OPEN DATE:*

ASSUMED MID POINT OF CONSTRUCTION:*

BRIDGE COST INDEX AT TIME OF THIS ESTIMATE:

SOURCE OF UNIT PRICES:

SIGNIFICANT PROJECT VARIABLES: (That were considered in preparing the estimate)

* Note: If the actual Bid Open date or Assumed Mid Point of Construction date vary significantly from the assumed dates the estimate and suggested working days should be re-evaluated.

Instructions for completing the "STRUCTURE COST ESTIMATES PS&E TRANSMITTAL DATA/ESTIMATE CERTIFICATION DATA" form.

Complete the project specific data:

Date: – The date the project estimate and working day schedule was completed.

DIST-CO-RTE: The District-County-Route of the project.

EA: The Expenditure Authorization Number

LEAD STRUCTURE: The name of lead structure.

ESTIMATE PREPARED BY: The name of the estimator who prepared the estimate.

PHONE NUMBER: The phone number of the estimator who prepared the estimate.

KEYWORD: Keyword used in the BEES file.

Check the appropriate box regarding the availability of the BEES and whether or not the BEES have been revised.

List all SUPPLEMENTAL WORK items and dollar amount for each item (add additional lines if needed)

List all STATE FURNISHED MATERIALS AND EXPENSES items and dollar amount for each item (add additional lines if needed)

CONTINGENCIES APPROXIMATELY 5% - Contingency amount (can be found in the BEES output).

SUGGESTED WORK DAYS FOR STRUCTURE WORK: The total number of structure working days. calculated using Suggested Work Schedule form or SURETRAK scheduling software..

SUGGESTED WORK DAYS FOR STRUCTURE WORK WITHIN RAILROAD RIGHT-OF-WAY: The total number of structure working days within 50 feet of railroad tracks.

REVISION TO THE ESTIMATE ARE DUE TO: State why the estimate is being revised (example, prior to RTL, greater than 1 year old, re-PS&E).

ASSUMED BID OPEN DATE: The assumed bid open date can be calculated by subtracting approximately 45 days from the START CONSTRUCTION date listed on the STRUCTURE P&Q TRANSMITTAL form.

ASSUMED MID POINT OF CONSTRUCTION: .Calculated by finding the midpoint between the CONSTRUCTION COMPLETE date and the START CONSTRUCTION date listed on the STRUCTURE P&Q TRANSMITTAL form.

BRIDGE COST INDEX AT TIME OF THIS ESTIMATE: The current bridge cost index at the time the estimate was prepared. This number can be found on the CALTRANS Estimating Branch website <http://www.dot.ca.gov/hq/esc/estimates/>

SOURCE OF UNIT PRICES: List sources used in calculating unit prices (i.e. Contract Cost Database, force account analysis, RS Means, etc.)

SIGNIFICANT PROJECT VARIABLES: List variables that were considered when estimate was prepared. As a Branch we should try to be consistent as to how we list the variables. The following is a list of possible variables.

- Stage construction
- Work windows
- Environmental restrictions
- Site access
- Material availability
- Accelerated construction schedule