CONTRA COSTA TRANSPORTATION AUTHORITY
2003 UPDATE OF THE COST ESTIMATING GUIDE

CCTA's Cost Estimating Guide was last updated in September 1998. The pricing is thus somewhat outdated and during the last five years proponent use has highlighted the need to enhance the guide in certain areas. Consequently, a general update has been prepared.

The revisions included in the 2003 Update are:

1. All prices have been updated to 2002 Dollars.
2. Selected cost items have been revised to provide for cost segregation between smaller and larger projects. Review of actual construction bids show that unit prices for smaller quantities associated with smaller projects are often significantly higher than the same item for larger projects.

3. Selected new cost items have been added to better allow estimation of the smaller, non-freeway projects.

4. Selected new cost items have been added to account for and include in the cost estimates new requirements, such as for Construction Storm Water Handling and Ramp Metering.

5. Cost allowances for the Engineering and Management items have been reviewed and adjusted.

6. *Guide* text has been revised throughout to conform to the revisions identified above.

CONTRA COSTA TRANSPORTATION AUTHORITY

Commissioners:

Julie Pierce
Chair

Amy Worth
Vice Chair

Janet Abelson

Charlie Abrams

Maria Alegria

Donald P. Freitas

John Gioia

Federal Glover

Brad Nix

Nancy Tatarka

Kris Valstad

Robert K. McCleary
Executive Director

July 2003
2003 Update of the Cost Estimating Guide
Prepared by:
CCS Planning and Engineering, Inc.

MEASURE C

COST ESTIMATING GUIDELINES

PROCEDURE

1.0 INTRODUCTION

The Cost Estimating Guide is a supporting document for the Contra Costa Transportation Authority's *Strategic Plan*. Sound financial programming requires consistent and reasonable cost estimates. The *Guide* sets out a consistent framework for estimating project costs at the conceptual level. Project proponents will be required to use this *Guide* when preparing cost estimates for submission to the Authority.

2.0 PURPOSE & GOAL

The purpose of the *Guide* is to establish consistent procedures for estimate preparation by all proponents requesting Measure C funding. The goal is to assure that project estimates are presented in a consistent and reliable fashion so the *Strategic Plan* includes a program of projects that can be delivered within available resources.

3.0 ESTIMATING METHODOLOGY

The *Cost Estimating Guide* provides a description of the procedures to be used in estimate preparation for Measure C projects. This *Guide* contains the tools, which are available to assist in preparing cost estimates. These are described in the following paragraphs.

Conceptual estimates are prepared during the early planning and project development phases when detailed information about the project is unknown. **Detailed estimates** are prepared during the design phases of project development when more detailed engineering is being performed.

Detailed instructions are provided for using spreadsheet templates when cost estimates are prepared using a computer. Spreadsheet templates, provided on the diskette along with the *Guide*, were prepared using Microsoft Excel (Version 7.0) software. Forms C-1 through C-3 are also provided on

the diskette and were created in Microsoft Word (Version 7.0). Information is provided for the Conceptual Cost Estimate described in Appendix A.

The Conceptual Estimate Database

The Conceptual Estimate Database includes definitions of cost items and the basis for the *Guide* unit prices. Unit prices are specified in several forms used in preparing estimates. Forms B-1, Conceptual Cost Estimate Summary, and B-2, Conceptual Cost Estimate, are shown in Appendix B. Unit prices also appear in the Excel templates for these same forms used in preparing the conceptual estimate.

Forms B-1 and B-2 are the output from the Excel program. The conceptual estimate database is applicable for three types of cost estimates:

1) Initial Estimate, prepared when the project is conceived;
2) Project Study Report (PSR) Estimate, prepared as part of the PSR or other scoping document; and
3) Project Report/Environmental Document (PR/ED) Estimate, prepared as part of the environmental document. These estimates are explained in greater detail in Section 5.

Unit pricing data should be carefully reviewed. The estimate pricing shown in Appendix B and used in the Excel estimating templates is to be used as a guide and should not interfere with good estimating practice. The estimator should "override" the suggested pricing when appropriate and provide an explanation for deviating from the *Guide*.

Proponents should document the scope of the project, basis for quantities, basis for pricing, assumptions, inclusions, and exclusions as accurately as possible. The cost estimate should be carefully reviewed before submittal. A completed and signed Estimate Review and Sign-Off Sheet (Form C-3) is to accompany the Conceptual Estimate. Form C-3 is provided in Appendix C.

Detailed Cost Estimate *(Please refer to CALTRANS Contract Cost Data)*

Proponents are required to use the Contract Cost Data for developing detailed cost estimates. Detailed estimates are to be developed using the format of Form B-1, from the Conceptual Cost Estimate Summary.

CALTRANS Contract Cost Data is a summary of cost by items for highway construction projects. A six-digit item code has been assigned to each standard contract item. The first two digits of the item code normally relate each corresponding contract item to its respective section of the California Department of Transportation Standard Specifications. Prices shown in this summary are the mechanically weighted average of the low bidders' prices and are affected by location (District Number), time, quantity in the job and size of the item (relative to the size of the job).

This Contract Cost Data is published annually by the Department of Transportation, Office of Office Engineer. A copy can be purchased by sending a request and remittance to

California Department of Transportation
Publication Distribution Unit
1900 Royal Oaks Drive
Sacramento, CA 95815-3800
Phone Number: (916) 445-3520.

4.0 SCOPE OF THE ESTIMATE

The project should be developed in sufficient detail to support the type of cost estimate prepared. In some cases it may be necessary to do additional work to adequately define the project scope. For example, it may be necessary to obtain a geotechnical report, information on potential for contaminated soil, or as-built drawings of existing facilities to refine cost estimates.

The Estimate Criteria (See section 10.0, Estimate Deliverables) is to include a summary narrative describing the scope of work upon which the estimate is based.

5.0 TYPES OF ESTIMATES

Seven project development milestones have been identified for which cost estimates may be prepared. The seven types of estimates corresponding to these milestones comprise of two categories: Conceptual Estimates and Detailed Estimates. These are shown in tabular form below.

Conceptual Estimates	Detailed Estimates
• Initial Estimate	• 35% Submittal Estimate
• PSR	• 65% Submittal Estimate
• PR/ED Estimate	• 100% Submittal Estimate
	• Final Engineer's Estimate

The Initial Estimate, Project Study Report (PSR), and the Project Report/Environmental Document (PR/ED) Estimate should be prepared and submitted to the Authority when funds are requested for the corresponding project development work. These estimates follow the normal chronological course of events associated with developing a capital project. As called for in Contra Costa Transportation Authority Resolution 92-02-P (Revised), cost estimates must be submitted to the

Authority along with plan submittals at the 35% and 100% design-complete phases. A submittal at the 65% design-complete phase and Final Engineers Estimate may be required as described in the following paragraphs.

Conceptual Cost Estimates

Initial Estimate

An initial estimate, based upon the project concept, is usually the first cost estimate prepared for a new project. The project may not be sufficiently defined to allow use of the *Guide*. If the *Guide* is not used, the proponent should state how the initial estimate was derived.

Project Study Report Estimate (PSR)

The Conceptual Cost Estimate should be used to prepare estimates for Project Study Report or any similar scoping document. A PSR will generally be required for all projects involving Caltrans facilities.

Note: Caltrans has a defined PSR Cost Estimate format.

Project Report/Environmental Document (PR/ED) Estimate

The PR/ED Estimate is based upon engineering studies prepared in support of the environmental document. Certain documentation should usually be available for preparation of this estimate.

Detailed Cost Estimates

35% Submittal Estimate is based upon documents prepared for the 35% design submittal. This submittal will define the major elements of the project

65% Submittal Estimate is required for projects for which sufficient detail was not provided for major work elements at the 35% Submittal Estimate or if the project scope has changed significantly.

100% Submittal Estimate is based upon documents prepared for the 100% design submittal. Costs evaluated for this submittal address the final definition of the project, completed specifications, and a detailed implementation schedule. The estimate should also consider any special terms or conditions in the contract.

Final Engineer's Estimate is based on the advertised contract bid documents and any subsequent addenda. Documents upon which this estimate is based include any review comments, which may have been incorporated into the project since preparation of the 100% estimate. The Final

Engineer's Estimate may be the same as the 100% Submittal Estimate if no changes have occurred nor addenda issued.

6.0 PROCEDURES FOR PREPARING CONCEPTUAL ESTIMATE

In order to obtain consistent cost estimates, the Authority has established a standard project work breakdown structure and has developed unit prices based on state highway projects for selected items of work. (See Appendix B)

Estimate Format

Conceptual estimates are to be developed using the format of Form B-1, the *Conceptual Cost Estimate Summary*. Form B-2 is to be used for the *Conceptual Cost Estimate (See* Appendix B). Both forms are provided as templates on the diskette.

Cost elements contained on Form B-2 should be adequate for most conceptual estimates for Measure C projects. Blank spaces are provided on the form for items of work not listed under each major category of cost.

Form B-1 is a total project cost summary containing estimates of both basic contract and other costs. When the spreadsheet software is used, costs associated with contract work from Form B-2 are automatically summarized into 6 major categories of work on Form B-1. Items not in the contract and other markups are added below the line. (See section 7.0, Below the Line Costs, for discussion of these items). The Excel spreadsheets produce forms B-1 and B-2.

Quantity Takeoff

Quantity takeoffs should be prepared using the prescribed format and should be based on available conceptual engineering. Appendix B, *Basis of Quantity and Unit Cost Measure*, describes the basis of measurement to be used. Quantity takeoff may be accomplished on the standard takeoff sheet. See Form C-1 in Appendix C.

Pricing

The conceptual cost database developed by the Authority contains *Guide* unit costs in Form B-2. These *Guide* prices are preset on the diskette provided. Appendix B contains a description of the assumptions supporting the *Guide* unit prices. These prices are intended as a guide and may be adjusted if deemed appropriate. All unit prices that deviate from the *Guide* unit prices should be highlighted by shading the proponent unit price cell. When the estimator feels it is necessary to make significant deviations from the *Guide* pricing, an explanation of deviations should be provided as part of the *Estimate Deliverable*, Section 10.0.

On occasion, it may be necessary to develop the cost of a particular line item in more detail (especially if the unit is composed of several items) or to demonstrate the derivation of a unit price should the *Guide* not be used. Form C-2, Unit Price Estimate, is provided for this purpose. The form may also be used to explain the derivation of a lump sum item.

Note: Form B-1, Conceptual Cost Estimates are provided in both English and Metric Units. A conversion factor table is also provided in Appendix D.

7.0 BELOW THE LINE COSTS

Items below the Total Contract Cost shown on the estimate summaries (Form B-1 and C-1) are termed "Below The Line Costs". These costs are defined as follows:

Work by Others

Certain items of work may be excluded from the work of the prime construction contract. For instance, relocation of a railroad track or a gas line may be accomplished by force account by the railroad or the local utility, or the owner may procure an item and provide it to the contractor for installation. Detailed information should be entered on Form B-2 or C-2, as appropriate. The total cost shown on the estimate summary will automatically adjust.

Land and Right-of-Way

Initially, right-of-way to be acquired for construction of the project should be approximated using unit prices for comparable land values. Once the proposed take is specifically defined, special expertise is required to develop the cost. The appropriate detail should be entered on Form B-2, or C-2. The form allows cost input for land, relocation costs, right-of-way engineering, land acquisition services, engineering support, hazardous material remediation, and contingencies. The total will be automatically included on the estimate summary.

Contingency

Contingency is an allowance to cover design development and imperfections in estimating methods. The Contingency Guidelines in Table 1 show the contingency as a percentage of estimated construction cost decreasing as more detailed engineering is performed. This table should be used to determine the appropriate contingency percentage, unless an itemized evaluation is prepared.

For conceptual level estimates the contingency has been set at 25%. This percentage is applied automatically on the preceding subtotal as shown on forms B-1 and C-1. The contingency section in the spreadsheet templates provided along with this *Guide* should be used during the corresponding project development phase.

Type	Estimate Description	Probable Contingency as to Percentage of Construction Cost
1	Initial or PSR	•
2	Conceptual or EIR	•
3	Preliminary	•
4	Definitive (30% - 75%)	•
5	Engineers or Detail (75% - 100%)	•
		25% 20% 15% 10% 5%

Table 1: Contingency Guidelines

Engineering and Management

Included in this category are pre-design, design engineering, construction staking, and construction management services. Pre-design services include engineering and environmental studies necessary to obtain environmental clearance.

Project Reserve

This is a reserve to cover construction and engineering change orders. The estimate summaries anticipate that 10% of project cost is a reasonable amount to allow for this item. This percentage may be overridden if it is deemed appropriate and an explanation is provided.

8.0 VALUE ENGINEERING

It is the Authority's policy that value engineering is inherent in the design process and that no separate value engineering is warranted.

However, Contra Costa Transportation Authority Resolution 92-02-P, Revised, has been prepared to provide the project proponents with a checklist of project components that would be discussed at each level of peer review. This checklist is intended as a general guideline and additional information may be required depending on the specific project.

9.0 ESTIMATE REVIEW

Review by CCTA

The Authority will review each cost estimate submitted. The review will evaluate compliance with the *Strategic Plan*, appropriateness of the defined scope, completeness of the estimate and, if appropriate, compliance with environmental or other mitigation required.

Method of Review

In general, review of cost estimates will attempt to answer a series of questions as shown below:

- **Scope:** What is included? What is excluded? Does the scope of the estimate match the scope of defining documents? Any variations must be identified and the reason for the deviation explained.

- **Quantities:** Are the quantities reasonable? Is the method clear and easy to follow? Has the math been checked? Do the totals come forward to the summaries? A good technique is to use parametric checks from other experience, i.e. 1000 pounds of reinforcing steel per cubic yard of concrete would be extraordinary.

- **Pricing:** Does the pricing follow the *Guide* pricing? If not, are the explanations reasonable? Does the pricing cover the kind and quality of materials contemplated? Are incidentals like sales tax and freight covered? Have unusual working conditions been factored into the pricing?

- **Major items:** The major items of work should be investigated with care. A faulty assumption on a major work item will have a large effect on project cost.

- **Presentation:** Is the estimate presentation clear? Is it easy to follow? Is the basis of the estimate documented in a concise fashion so that it will be readily understood by an unfamiliar party?

10.0 ESTIMATE DELIVERABLES

Each estimate submittal is to contain the following items:

Letter of Transmittal

The completed estimate should be transmitted to the Contra Costa Transportation Authority, to the attention of the appropriate project coordinator.

Estimate Review and Sign off Sheet
The *Estimate Review and Sign Off Sheet,* Form C-3, is to be used to indicate the appropriate approvals.

Estimate Criteria
The estimate should include a written scope of work, a listing of the documents (drawings, sketches, etc.) that form the basis of the estimate, explanations of any deviations from the *Guide* pricing, and discussion of assumptions made.

Estimate Summary
Form B-1

Estimate Details
Form B-2

Note: Forms C-1 and C-2 have been provided to develop cost of a particular line item in more detail or to demonstrate the derivation of a unit price should the *Guide* not be used.

11.0 CONCLUSION

The *Cost Estimating Guide* is intended to achieve consistent and reliable estimates for projects that may receive Measure C funding. Persons using the *Guide* are encouraged to suggest improvements or corrections to Contra Costa Transportation Authority at Hookston Square, 3478 Buskirk Avenue, Suite 100, Pleasant Hill, CA 94523.

MEASURE C

COMPUTER ESTIMATING

A *Guide* Conceptual Cost Estimate, provided in metric or English units, have been prepared for proponent use. The templates are on a 3.5" diskette and can be loaded with Microsoft Excel. The template for Microsoft Excel will work in Windows 95 Version 7.0 or greater. The excel template filename is designated as follows:

CONCEPTUAL COST ESTIMATE ..... **CONC-EST_English.XLS**
CONCEPTUAL COST ESTIMATE ..... **CONC-EST_Metric.XLS**

This template will assist you in preparing Estimate Details and an Estimate Summary. Instructions on opening the template in **Microsoft Excel** are explained below.

USING THE GUIDE IN MICROSOFT EXCEL

1. Open Microsoft Excel. Verify that default printer is correct. Insert the 3.5" diskette attached to the back cover of this binder. File, Open, A:\CONC-EST_English.XLS (or CONC-EST_Metric.XLS). Remove the diskette.
2. Insert a new formatted diskette in your drive. Save your estimate on this new diskette with a *different* file name.
3. The cell pointer should be at the revision number field in your new estimate. Input or revise the following items 3a. through 3j. Press enter after each field is typed. This will move your cell pointer to the next field.

a. **Revision Number:** Add new revision number, if needed.
b. **Date:** The computer will automatically set the date to today's date. If you wish to change the date (i.e. if your computer is not set to the correct date), enter the date in the following format: 'dd-mmm-yy (e.g. '19-nov-98)
c. **By:** Who prepared the Estimate.
d. **Project Name:**
e. **Type of Estimate:**
f. **Proponent:**
g. **Design Consultant:**

h. **Contract No:**

i. **Percent for Contingency:** 25% is used as a guideline. This may be modified by referring to Table 1, contingency Guideline Section 5.0, Types of Estimates.

j. **Percent for Project Reserve:** 10% is used as a guideline. This may be modified.

After you have input the appropriate information press the <CTRL> <HOME> keys, simultaneously.

4. The following steps will assist you in entering your estimate data.

   a. For each item, use the Guide Price or modify as the Proponent Price when appropriate.

   b. When the quantity for a particular item is input, the Total Cost for that Item will be calculated automatically.

   c. Items for which the "unit" is a percentage do not require an input in the quantity field. If you wish to change units from percentage to another unit of measure, create a new line item. Input the unit of measure, proponent price, and quantity. For the quantity, enter a "1" for lump sum, or the quantity for any other unit of measure.

   d. If an item needs to be added, space down to the next blank item for that particular Group Code and input the Item Code, Item Description, Unit, Proponent Price and Quantity.

   e. For line items in group code 09, Engineering and Management, space is provided to add additional categories. These are set up to be lump sum entries. Proponents may override the lump sum units with % calculations by the appropriate Excel manipulations should this change be desired. For lump sum entries place a 1 in the quantity field and a dollar amount in the proponent price column.

   f. To move from one part of the worksheet to another, use the <F5> key as follows: Enter **REV** to go to the initial data entry screen; **_1**, **_2**, etc. to go to Group Codes 01, 02, etc. and **S** to go to the summary screen.

5. Saving your work:
   Save your changes to a file name other than CONC-EST_English.XLS (CONC-EST_Metric.XLS).

6. Printing your reports:
   After completing your input, you can print your reports as follows:

REPORT	Keys To Be Pressed Simultaneously
Summary and Detailed Group Rpts	<Ctrl> <Shift> and <A>
Detailed Group Report Only	<Ctrl> <Shift> and <D>
Summary Report Only	<Ctrl> <Shift> and <S>

The reports can also be printed by selecting the appropriate report name from the bottom of the Tools pull-down menu.

Note: This is set up for HP LaserJet, but may also work with other printers. To use a different printer, select File, Print from the pull-down menu.

7. Submittal:
   Submit the diskette containing your estimate files along with the printouts to the Contra Costa Transportation Authority.

CONCEPTUAL DATABASE
MEASURE C
BASIS OF QUANTITY AND UNIT COST MEASURE

ADVANCE WORK

Temporary Work (Primarily a Maintaining Traffic item)
Temporary work, detours, etc., includes all labor materials and incidental costs for the installation and removal of all items necessary to maintain reasonable flow of traffic and safety during construction of the proposed work. The scope includes, but is not limited to, such items as temporary pavement, signs, signals, barriers, striping, traffic control, traffic management plan, etc.

Unit of Measure: Lump Sum
Guideline Unit Cost: 10% of Total Construction Bid Items

For Freeways, interchanges, or major arterial projects that will require significant detours or staging, additional costs may need to be included in the estimate.

Maintenance of Utilities
Maintenance of utilities includes all labor, materials and incidental costs for temporary relocations, supports, protection, and restoration of electrical or mechanical utilities located in the work areas as required to maintain service with minimal or no interruption. This does not include utility relocation costs, which are included in right-of-way costs.

Unit of Measure: Lump sum
Guideline Unit Cost: 3% of Total Construction Bid Items

Particular attention should be given to these items. Costs could be significantly larger than the percents shown, especially if project requires significant rehabilitation and involves traffic management, detours and construction staging.

Mobilization
Mobilization provides reimbursement of cost to the contractor prior to “move in”.

Unit of Measure Lump sum
Guideline Unit Cost 10% of Total Construction Bid Items

Clearing and Grubbing

Clearing and grubbing includes all labor, materials and incidental costs for clearing from the entire area of the construction right of way all vegetation, shrubs, trees including the removal of stumps and disposal of the cleared items.

Unit of Measure: 2.5% of Total Construction Bid Items

Demolition

Demolition includes all labor, materials and incidental costs for the removal of all items within the right of way that interfere with the construction of the proposed work. Exceptions are those items which are to remain functional during construction and which will be an integral part of the finished project. Demolition includes the cost of hauling and disposing of all demolished items. Removal and disposal of hazardous materials should be included under miscellaneous costs.

- Demolition of Typical Items (Excluding Bridges, Major Structures, & Buildings):

  Unit of Measure: Lump Sum
  Guideline Unit Cost: 2% of Total Construction Bid Items

- Demolition of Bridges, Major Structures, & Buildings:

  Removal of buildings and miscellaneous structures can involve significant costs and should be estimated separately.

  Unit of Measure: Lump Sum

EARTHWORK

General

Earthwork includes all labor, materials and incidental costs for all earthwork operations including haulage, testing and disposing excess excavation, backfill compaction, and grading. Excavation for drainage ditches will be included under "Drainage".

Earthwork (Roadway Excavation) costs can vary significantly between larger and smaller projects. Often for smaller projects, the significant portion of the roadway excavation is associated with grading for the roadway pavement section. This is more labor intensive and therefore more costly than for larger projects with a larger volume of mass earthwork. Separate unit prices will be given for Smaller and Larger Projects.

Roadway excavation

Roadway excavation includes but is not limited to, excavation, embankments using excavated materials, compaction for embankments, haulage, and disposal of over-excavation.

Unit of Measure: CY (cubic yard) of excavated material (English) or
M3 (cubic meter) of excavated material (Metric)

The guideline unit price per cubic yard (cubic meter) is based on a cut and fill operation in soft soil. No allowance for rock excavation is included.

Imported Borrow

Imported borrow includes, but is not limited to, imported material, its placement and compaction, including haulage.

Unit of Measure: CY (cubic yard) of imported borrow in place (English) or
M3 (cubic meter) of imported borrow in place (Metric)

The guideline unit price per cubic yard (cubic meter) is based on the availability of suitable borrow material within 10 miles (16 km). Similar to Roadway Excavation, unit prices for Imported Borrow can vary significantly between smaller and larger volume projects.

Erosion Control

Erosion Control includes all slope and unpaved areas not to be landscaped. It consists of, but is not limited to, placing soil retention netting, hydro-seeding and mulching or, where required. Other

methods of erosion control, such as rip-rap, concrete or asphaltic cover need to be estimated separately.

Unit of Measure: AC (acres) of applicable area (English) or
HA (hectares) of applicable area (Metric)

The guideline unit price per acre (hectare) is based on Type D erosion control of sloping areas.

DRAINAGE

General
Drainage includes all labor, material and incidental costs for providing adequate drainage of the roadway, and all connections to existing storm sewers, modifications to existing catch basins and manholes as required.

Drainage Ditches
Drainage ditches include excavation and lining, or seeding as required.

Unit of Measure: LF (linear feet) of ditch (English) or
m (meter) of ditch (Metric)

The guideline unit price per LF (meter) for a large ditch is based on a concrete lined ditch with an average cross section of 3 ft bottom width (0.9 m), 9 ft top width (2.7 m), 3 ft depth (0.9 m).

The guideline unit price per LF (meter) for a small ditch is based on a concrete lined V-ditch with a 1:1 slope and a top width of 4 LF (1.2 m).

Roadside ditches would typically only be appropriate in rural or semi-rural settings, as urban projects would normally have curb & gutter.

Reinforced Concrete Pipe (RCP)
Reinforced concrete pipe includes manufacturing, hauling, excavation, and placing the RCP, endwalls, all connections and modifications to existing storm drain systems, as required.

Unit of Measure: LF (linear feet) of RCP (English) or
m (meter) of RCP (Metric)

Drainage Structures (Manholes, Catch Basins)
Drainage Structures include excavation, furnishing and installing manholes and catch basins (inlets) with covers and grates.

Unit of measure: EA (each)

The guide unit price is based on a 48" diameter (1219 mm) manhole, 6’ deep (1829 mm), and a 4' x 4' catch basin (inlet) (1219 mm x 1219 mm).

Unit prices will be presented separately for Manholes and Catch Basins (Inlets) and for smaller and larger projects.

Box Culverts (RCB)

Box culverts include excavation, furnishing and placing the culvert, and end structures. Typically projects requiring box culverts will be conveying large amounts of water that would justify a closer look at box culvert costs.

Unit of Measure: SF (square feet) of box culvert (English) or

M2 (square meter) of box culvert (Metric)

PAVEMENT

General

Pavement includes all labor, materials and incidental costs for compaction, fine grading, and placing sub-base, base, wearing and finish course. Striping and pavement markings including all delineator buttons and reflectors, will be estimated separately.

Typically city streets and arterial projects (non-freeway/expressway) will include curb & gutters, sidewalks, and sometimes raised medians. Estimate line items are included for these items.

Roadway Pavement Sections and corresponding costs vary significantly between Freeway/Expressways and local streets and arterials. Costs also vary between smaller and larger projects. Guideline costs are presented considering these variations.

Asphalt Concrete Pavement (AC)

Asphalt Concrete pavement includes the area of main road, shoulders, and ramps based on the following road section:

Local Streets and Arterials:

Asphalt Concrete (Type A)	0.5 ft (150 mm)
Class 3 Aggregate Base	0.75 ft (225 mm)
Class 4 Aggregate Sub-base	1.0 ft (300 mm)

Freeway:

Asphalt Concrete (Type A)	0.67 ft (200 mm)
Class 3 Aggregate Base	0.83 ft (250 mm)
Class 4 Aggregate Sub-base	1.33 ft (400 mm)

Unit of Measure: SF (square foot) of asphalt concrete pavement (English) or M2 (square meter) of asphalt concrete pavement (Metric)

The Asphalt Concrete pavement includes the necessary surface coating such as prime coat and tack coat.

Portland Cement Concrete Pavement

Portland Cement Concrete pavement includes the total area of Portland Cement Concrete pavement based on the following structural section. Note that the structural section indicated is for a Long Life

(40-year Design Life) pavement, as the majority of freeways in Contra Costa County will require it. Normal (20-year Design Life) pavement will be approximately 20% less in unit cost.

Portland Cement Concrete	1.00 ft (300 mm)
Lean Concrete Base (LCB)	0.50 ft (150 mm)
Class 4 Aggregate Sub-base	0.75 ft (225 mm)

Unit of Measure: SF (square foot) of PCC pavement (English) or
M2 (square meter) of PCC pavement (Metric)

Pavement Striping & Markings

Pavement striping includes striping with reflective paint, all delineator buttons and reflectors required.

For Conceptual Striping & Marking Costs:

Unit of Measure: 2% of Total of Group Codes 02, 04, & 06

For a more detailed Striping Cost:

Unit of Measure: LF (linear foot) of Striping (English) or
m (meter) of Striping (Metric)

For a more detailed Pavement Markings Cost:

Pavement markings will include all markings such as direction arrows, lettering, etc. with reflective paint and all delineator buttons and reflectors required.

Unit of Measure: SF (square foot) of marked area (English) or
M2 (square meter) of marked area (Metric)

Sidewalk and Curb & Gutter

Sidewalk, Curb, and Curb & Gutter are assumed to be constructed of PCC.

Curb and Curb & Gutter:

Unit of Measure: LF (linear foot) of Curb or Curb & Gutter (English) or
m (meter) of Curb or Curb & Gutter (Metric)

Sidewalk:

Unit of Measure: SF (square foot) of Sidewalk (English) or
M2 (square meter) of Sidewalk (Metric)

STRUCTURES

General

Structures include all labor, materials and incidental cost for structural earthwork, foundations, and superstructures.

Bridges

Bridges include structural excavation and backfill, piles, abutments, foundations, piers, girders and beams, the bridge deck, and cast in place curbs.

Unit of Measure: SF (square foot) of Bridge Deck (English) or
M2 (square meter) of Bridge Deck (Metric)

The guideline unit prices are presented for a "relatively straight forward and uncomplicated bridge" and for a "more complex bridge". Unique or extremely complex bridges should be examined more closely and unit prices adjusted accordingly.

Retaining Walls

Retaining walls include structural earthwork, piling, footing and stem wall.

Unit of Measure: LF (linear foot) of Retaining Wall (English) or
m (meter) of Retaining Wall (Metric)

The guide presents unit prices for Retaining Walls in increments of 5 ft (1.5 m) and 10 ft (3 m) up to a wall height of 30 ft (9 m).

Sound Walls

Sound Walls include structural earthwork, piling, concrete base, and reinforced masonry wall, pre-cast or cast in place concrete wall.

Unit of Measure: LF (linear foot) of Sound Wall (English) or
m (meter) of Sound Wall (Metric)

The guideline unit price per LF (meter) for Sound Walls is based on a 16 foot high 8" (4.9 m high 203 mm) concrete masonry wall, on a 1.75 foot (533 mm) high concrete base, with 16" (406 mm) drilled piers, at 16 feet (4.9 m) center to center.

MISCELLANEOUS ITEMS

General
Miscellaneous items include all labor, materials, and incidental costs for supply and installation.

Fencing
Fencing includes all posts, rails, chain link fabric, and hardware as required.

Unit of Measure: LF (linear foot) of fence (English) or
m (meter) of fence (Metric)

The guideline unit price per LF (meter) is based on a 6 foot (1.8 m) high chain link fence. Separate unit prices are given for smaller and larger projects.

Railings and barriers
Railings and barriers include metal beam guardrails and cast in place or pre-cast concrete barriers. All posts, brackets and hardware are included.

Unit of Measure: LF (linear foot) of Railing or Barrier (English) or
m (meter) of Railing or Barrier (Metric)

The guideline unit price per LF (meter) for metal beam guardrail is based on standard metal beam guardrail with wood posts. The guideline unit price per LF (meter) for concrete barrier is based on Caltrans Type 50 Concrete Barrier.

Traffic Signals
Traffic signals include, but are not limited to, signals, supports, controllers, and power supply.

Unit of Measure: INT. (intersections)

Separate costs are given for a Partially Modified Existing System and for a New or Totally Reconstructed Traffic Signal System.

Roadway Lighting
Roadway lighting includes fixtures, posts, cabling and power supply, panels and controls

Unit of Measure: each (EA) of individual street lights/electroliers

The specific street light/electrolier spacing requirements for the individual jurisdiction that will operate the roadway should be utilized to estimate the approximate total number of lights/electroliers required.

Signing

Signing includes all directional and traffic control signs such as speed limit, do not enter, merge, yield, etc.

Unit of Measure: for off ramps: RMP (ramps)
for on ramps: RMP (ramps)
additional highway signs: mi (miles) of roadway (English) or
km (kilometer) of roadway (Metric)
for truss signs: EA (each)
for roadside signs: EA (each)

The guideline unit price per ramp for on ramps is based on 8 signs on wood posts associated with the ramps and freeway merge.

The guideline unit price per ramp for off-ramps is based on 2 truss signs, and 10 signs on wood posts associated with the ramps and located both on and off the freeway.

The guideline unit price per mile (kilometer) for additional highway signs is based on 1 additional truss sign and 10 additional signs on wood posts per 5 miles (8 km) of roadway.

The guideline unit price for truss signs is based on a 48 foot (14.6 m) cantilever sign and includes foundations and lighting.

The guideline unit price for roadside signs is based on a sign on a single wood post and on two wood posts.

Landscaping

Landscaping includes all seeding, planting of shrubs and trees, fertilizing and mulching, except for hydro-seeding as included under erosion control and irrigation. No provision is made for hardscaping in this unit price.

Unit of Measure: SF (square foot) of landscaped area (English) or
M2 (square meter) of landscaped area (Metric)

The guideline unit price per SF (m^2) for freeway / expressway locations is based on 1 shrub or tree per 100 SF (9.3 m^2), wood chip mulch over the entire area and irrigation. Maintenance period is one year.

The guideline price for city street and arterials, roadside or median locations, represents an average level of treatment that is significantly denser than typical freeway landscaping. It may also include some hardscape treatments within the total landscaped area.

Construction Storm Water BMP's

Increased legislation concerning handling construction storm water has resulted in the addition of significant construction costs to projects. The guideline costs for this storm water handling provides for the use of construction related Best Management Practices (BMP's) and development of project specific Storm Water Pollution Prevention Plans (SWPPP).

Unit of Measure:	Lump Sum
Guideline Cost:	4.5% of Total Construction Bid Items for Codes 2,3,4,5, &6

Ramp Metering System

Typically all on-ramps to freeways will require the installation of a Ramp Metering System.

Unit of Measure:	each (EA) for each lane of an on-ramp lane installation

WORK BY OTHERS

General

Work by others shall include all labor, materials and incidental items furnished by companies or agencies other than the construction contractor. Typical items included here are utility construction or relocations provided by a Utility company, force account work by a railroad company, and materials furnished by others (i.e. owner). For State Highways, Caltrans furnishes various items such as controllers, Resident Engineers Office, COZEEP, monument disks, pad locks, route shields for funding signs, and sign panels.

Units of measure shall be LS (lump sum)

ENGINEERING AND MANAGEMENT

General

The costs for engineering and management have been broken down into the following categories:

Engineering Studies

Engineering studies includes all costs associated with conceptual engineering activities. This may include alternative configuration studies, site investigations, information gathering, and other engineering studies and reports as needed, except as included with Environmental Studies.

The guideline cost is 3% of estimated Total Construction Cost.

The stated 3% general allowance should be reviewed for appropriateness for each individual project, as project complexity and size can have dramatic effect on this cost.

Environmental Studies

Environmental studies shall include all costs of studies and reports as required to obtain an environmental permit. All consulting fees, regulatory requirements and cost shall be included.

The guideline cost is 3% of estimated Total Construction Cost.

The stated 3% general allowance should be reviewed for appropriateness for each individual project, especially for smaller projects (less construction cost). Several environmental studies have realistic minimum costs, regardless of the size of the construction value, so their potential cost impact can easily be under estimated for smaller projects.

Design Engineering

Design Engineering shall include all engineering costs from preliminary engineering to final construction drawings. All consulting fees, fieldwork necessary for design, and coordination costs with regulatory agencies and authorities shall be included. The extent of the more stringent approval requirements associated with Caltrans involvement makes it appropriate to have a varying allowance rate for Design Engineering depending on the involvement.

Caltrans Involvement	Design Engineering Allowance
Category 1: Having No Direct Caltrans Involvement	10% of Total Construction Cost
Category 2: Requiring a Caltrans Encroachment Permit	12% of Total Construction Cost
Category 3: Having Direct Caltrans Involvement and Approval	14% of Total Construction Cost

The Guide is set to automatically calculate Design Engineering Costs at 12%. To use another percentage rate, enter the new rate in the Proponent Price Column.

Design Services During Construction

Construction Engineering includes all design services during construction (i.e. review of shop drawings and contractor submittals, responding to Requests for Clarifications, and the preparation of construction Record Drawings).

The guideline cost is 2% of estimated Total Construction Cost.

Construction Staking

Construction Staking includes all staking costs for the location of the proposed structure.

The guideline cost is 2.5% of estimated Total Construction Cost.

Construction Management

Construction Management includes all supervision, inspection, administrative support and testing necessary to ensure the work is being constructed to the appropriate standards.

The guideline cost is 12% of estimated Total Construction Cost.

LAND AND RIGHT-OF-WAY

General

Land and right-of-way shall include all costs associated with purchase of land, easements and right-of-ways such as purchase price, cost of relocating current businesses or residences, right-of-way engineering, and acquisition services.

Land Costs

Land costs are to include the purchase price of land, easements and right-of-way.

Unit of measure shall be LS (lump sum)

Relocation Costs

Relocation costs shall include all costs associated with the relocation of a current tenant and may include locating a suitable replacement property, interest payments during a construction of the replacement property as well as all costs associated with relocating all movable property to the replacement property.

Unit of measure shall be LS (lump sum).

Acquisition Services

Acquisition services include the costs of all services necessary to bring the purchase of land, easements and right of way to a satisfactory conclusion. This includes legal services, title searches, appraisal preparation, negotiations with current owners, financial and real estate consultants, etc.

Unit of measure shall be LS (lump sum).

Right-of-Way Engineering

Right-of-way engineering includes developing plans for land requirements, reapportionment of assessment districts, surveying, documenting the land and easement limits. For Caltrans facilities services include preparation of right of way appraisal maps and record of surveys.

Unit of measure shall be LS (lump sum).

Utility Relocation Costs

Include all utility relocation costs excluding any costs for maintenance of utilities, which are included under advance work.

Unit of Measure: LS (lump sum)

FORMS

The forms found in this appendix were created in Microsoft Word. Forms are as follows:

Quantity Sheet	Form C-1
Unit Price Estimate	Form C-2
Estimate Review and Sign-Off Sheet	Form C-3

FORM C-1
QUANTITY SHEET

JOB NO.____________	SUBJECT	REF. NO.

JOB NO.____________	SUBJECT	REF. NO.
		SHEET OF
TITLE		DATE
		BY
DRG. -R		CHECKED BY

	DESCRIPTION	NO. PCS	LENGTH	WIDTH	HEIGHT OR WEIGHT	QUANTITY			TOTAL QUANTITY		

FORM C-2
UNIT PRICE ESTIMATE

TITLE

CLIENT LOCATION

SUBJECT

JOB NO.

DATE

BY

SHEET OF

CHECKED BY

CODE	DESCRIPTION	QUANTITY	UNIT COST	AMOUNT	TOTAL

FORM C-3
MEASURE C
ESTIMATE REVIEW AND SIGN OFF SHEET

PROJECT NAME: _____
ESTIMATE: _____ DATE: _____
PROPONENT: _____ ESTIMATOR: _____
DESIGN CONSULTANT: _____

INCLUDED IN ESTIMATE

	YES	NO
CONTRACT COST		
WORK BY OTHERS		
LAND AND RIGHT OF WAY		
ENGINEERING AND MANAGEMENT		
CONTINGENCY		
PROJECT RESERVE		

ESTIMATE REVIEW

REVIEWER:	_____	_____
POSITION:	_____	_____
TELEPHONE:	_____	_____
	X	X
SCOPE PROPERLY COVERED		
QUANTITIES REASONABLE		
PRICING DEVIATIONS EXPLAINED		
INDIRECTS REASONABLE		
MAJOR ITEMS REASONABLE		