

## Chapter 17

### Engineering Design Estimate Process

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## Chapter 17

### Engineering Design Estimate Process

#### 17.1 General

The construction cost estimate (Authorization Estimate) is one of the last activities performed on roadway and structures design projects. To do a quality cost estimate, the engineer must have available the following:

1. The complete contract plans set, including all component sets such as structures, architectural, etc.;
2. The complete specifications, including the supplemental specifications and technical special provisions;
3. The **Design Standards** booklet referenced on the key sheet of the contract plans;
4. The completed computation book or lump sum project quantity computation document(s) for the roadway and structures plans; and
5. The current **Basis of Estimates Manual**.

## 17.2 Basis of Estimates

The Specifications establish the method of measurement, basis of payment, and pay items for work specified for road and bridge construction. The ***Basis of Estimates Manual*** contains design aids, notes, the pay item structure, a list of currently open pay items, and computation information to aid the engineer in preparing the cost estimate. The ***Basis of Estimates Manual*** is available on the Specifications and Estimates Office web pages at: [www.dot.state.fl.us/specificationsoffice/](http://www.dot.state.fl.us/specificationsoffice/) .

Pay items for the various categories of construction work should be identified as those components are completed. For example, pay items for base and pavement work may be identified as the pavement design is completed; signal pay items may be identified as the signal design is completed. The engineer doing the design and specifications should be knowledgeable about what work is to be done and which pay items are needed. The quantity take-off is generally performed at a later date when the plans are final and the tabulations and calculations are completed. The persons doing the quantity take-off should also ensure that all pay items have been identified.

The ***Basis of Estimates Manual*** shall be utilized to identify pay items on all types of projects, including resurfacing, widening, safety, bridge, etc. If any work on a project is not covered by existing specifications, then a technical special provision and possibly a new pay item description, unit of measure, and basis of payment may be required. If a desired pay item is not available, contact your Project Manager and /or District Estimates Office for assistance. Additional details for requesting pay items are available in ***Chapter 6*** of the ***Basis of Estimates Manual***.

## **17.3 Designer Interface for Trns•port**

The Designer Interface, available through the Specifications and Estimates Office Webgate, is used to build categories and to add pay items and quantities to categories. Contact your District Estimates Office for more information.

## 17.4 Estimated Quantities

### 17.4.1 Computation Book and Summary of Quantities

Quantities for pay items are tabulated and computed by two methods; they are tabulated and totaled on Summary of Quantity sheets in the plans, or they are tabulated and calculated on standard computation forms. Do not record quantities in both locations. The computation book contains calculations and summary of quantities organized in pay item sequence for the project. Detailed information on the documentation required with the computation book can be found in the ***Computation Methods for Design, Construction and Final Estimates Handbook***. Summary of Quantity sheets in the plans should be completed in accordance with ***PPM Volume 2, Chapter 7***.

The computation book, including the structures computation book, shall be transmitted with the PS&E submittal. For lump sum projects, the quantity computation document(s) shall be included with the PS&E submittal if a computation book is not available.

#### 17.4.1.1 Plan Quantity

The Department's current practice is to provide for final payment under the plan quantity concept for a large number of commonly used items. Refer to the ***FDOT Specifications*** to determine if an item is paid by plan quantity. This concept requires that the estimated quantities be calculated and documented as accurately as possible. Plan quantity pay items shall not include contingencies in the quantity calculation. The designer is responsible for the final pay quantity for all plan quantity items.

#### 17.4.1.2 Final Measurement Concept

The designer is responsible to estimate a quantity for all final measure items. Because there are many variables associated with these items, the final pay quantity will be determined by measurements performed in the field when the item is being used or constructed.

## 17.4.2 Breakdown of Quantities

Pay item quantities are loaded into the Trnsport system by category (design group), to reflect the work shown in each of the component plans. When a contract contains more than one Financial Project ID, pay item quantities for each project are loaded separately; the computation book for each project should clearly distinguish the location for each item of work. Similarly, the Summary of Quantities (plan tabulation sheets) must show separate quantities for each project. Only the Summary of Pay Items (Trns- port report) will show the project totals, as well as the combined proposal/contract total. Additional information is available in **Chapter 9** of the ***Basis of Estimates Manual***.

## 17.4.3 Participating and Non-participating Pay Items

When multiple funding sources are available for a single project (federal, state, and/or local funds), an additional breakdown of pay item quantities may be necessary to identify those pay items or quantities that will “participate” in the available funding. For projects with federal funds, most of the pay items are eligible to “participate” for federal funds. Federal funds are not eligible for use on routine maintenance activities (mowing, litter removal, etc.), but may be used for preventative maintenance (extending the useful life of a highway.) Refer to **Chapter 9** of the ***Basis of Estimates Manual*** for more information on loading pay items with multiple funding sources. Note that with multiple funding sources, the method of presenting this information in the plans must be of sufficient detail for project personnel to readily distinguish between participating and nonparticipating work, including its physical location on the project. Project personnel must be able to properly account for the necessary separation of quantities.

For Lump Sum and/or projects without federal funds, most items will “participate” in the available funding source(s). Unless otherwise directed by the Federal Aid or Work Program Office, all items of work (not including the initial contingency item) will default to participate in the available funding source.

## 17.4.4 Utility Work by Highway Contractor Agreement Plans

When separate plans for utility construction are to be included in the contract, special attention should be given to establishment of pay items and loading the projects into Trns•port. Refer to the [Work Program Instructions \(Section 42\)](#) for guidance on the Financial Project ID phase number identification.

For contracts with more than one project, the pay items for Mobilization and Maintenance of Traffic will be shown on each project's Summary of Pay Items. An exception to this is when the contract contains a Utility Work by Highway Contractor (UWHC) Agreement. The pay items for Mobilization and Maintenance of Traffic will not be shown on the Summary of Pay Items for the UWHC Agreement. The cost of these items will be included in the lead project.

## 17.4.5 Pay Item Notes

Pay item notes are intended to be used to clarify basis of quantity, work included or method for payment. In general, pay item notes should be kept to a minimum. Only those notes that are job specific should be used. Notes that restate the standard **FDOT Specifications** or **Design Standards** shall not be used. This will help to place proper emphasis on those notes that are job specific and avoid discrepancy of documents. Refer to **PPM Volume 2, Chapter 7** for details on the usage of pay item notes in the plans.



## **17.5 Contract Time**

Contract duration is the time required for the complete construction of the contract. Pay items measured per day need an accurate estimate of construction duration. Before completion of the design project, the plans package is submitted to the District Construction Office scheduling engineer for establishing the contract duration. Large complex projects should have the desired contract duration established earlier in the design process.

## **17.6 Alternative Contracting Practices**

The Construction Office web page defines various contracting techniques used by the Department (<http://www.dot.state.fl.us/construction/AltContract/AltContract.shtml>). When alternative contracting is called for by the Department, coordinate the PS&E preparation with the FDOT Project Manager.

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