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## CHAPTER 11 – COST ENGINEERING

### 11.1 OVERVIEW

#### 11.1.1 Purpose

The purpose of this chapter is to provide specific guidance for the preparation of cost estimates for military construction projects. Estimates are prepared for programming, controlling costs during design, evaluating bids, assisting in negotiations, and to serve as a guide in establishing a schedule of payments. Often these estimates are also used to evaluate the reasonableness of the Contractor's proposal for negotiated procurement contracts. As such, estimates must be current, complete, and accurate.

The primary intent of this design guide is not to establish basic core estimating methods. It is written with the assumption that the reader has a working knowledge of general construction cost estimating. It provides specific guidance to facilitate cost engineering services and promote estimate uniformity using adopted tools and requirements specific to USACE.

#### 11.1.2 LRL ED-M-C Function, Mission & POC

The Cost Engineering Section is responsible for cost estimates for all military, civil works and environmental restoration projects assigned to the Louisville District. This Section reviews all prepared cost estimates submitted by A-E firms, contractors, installation support groups, and others. The Cost Engineering section provides a wide variety of support as cost consultants to the District and HQ for contractor proposal analyses, VE workshops, cost software analysis, etc.

#### 11.1.3 Current Software Packages *(subject to change, verify prior to start)*

PACES Version 1.6

Cost Book: 2023 DoD Cost Book

(MII) MCACES 2nd Generation Version 4.4.4

Cost Book: 2024

Equipment: 2024

WBS: Approved TRACES MII Template

On Screen Take-off (OST) or Bluebeam Revu

(CAD/BIM) AutoDesk Revit 2021 7.2.7391.0

#### 11.1.4 Obtaining Software

A-E firms or others under contract or providing services to LRL may request software installation packages from ED-M-C Section Chief. Primary estimating software is generally distributed to A-E's free of charge, however accompanying database licenses must be purchased and licensed as appropriate by the user. Other software may be purchased from the vendor.

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### 11.1.4.1 *PACES Purchase and Training*

The current version of PACES can be obtained directly from the software vendor AECOM via the following:

Sales/Support Phone: 1-800-499-2919

Sales/Support Email: [paces@aecom.com](mailto:paces@aecom.com)

The requestor will receive a current License pricing list, order form and contractor verification form. The contractor verification form shall be filled and signed by the USACE design manager associated with the project that requires the use of PACES. The contractor verification form allows the A-E firm to purchase software at a discounted price when purchased for the purpose of providing support to USACE.

Software training may also be purchased directly from the software vendor and if conjunction with a software purchase, may be offered at a discounted rate. A-E firms can contact the software vendor for details.

Once purchase arrangements are completed, the A-E may receive disk media or download the software for installation from the vendor. After installation, the software must be registered with the software vendor in order to receive a license key to decrypt the cost book purchased.

### 11.1.4.2 *MCACES (MII) Purchase and Training*

The current version of MII (MCACES Second Generation) can be obtained via request through LRL ED-M-C. The installation and setup software are distributed directly to the requestor. Prior to being approved for the software, the requestor must complete MII training. The MII training is to be completed within 3 months of request and is required for each MII user.

After installing MII, the user must register the software following the prompt at program startup. During this process, record the email address and password provided. In order to activate the Cost Book Library, the user must login at: <http://www.miisoftware.com/Login.aspx> using the registration email and password. Once login is successful, the user can purchase the appropriate cost book by clicking “Products” choosing the appropriate option(s), providing billing information, and completing the ordering process. Once payment has processed the required activation key will be emailed to the user. The user can then enter the activation key as prompted to use the library.

Support and training for software usage can be purchased after login at:

<http://www.miisoftware.com/Default.aspx>

This site contains FAQ’s and other resources for the MII user.

Required training for MII software can be found through **PROSPECT** at the USACE Learning Center:

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<https://ulc.usace.army.mil/default.aspx>

PROSPECT Course Title is “Micro-Computer Aided Cost Estimating System II BASIC.”

Training for MII software may also be obtained by **JMF Training & Support Specialists, LLC** (Sam.gov under Cage 86UB2 DUNS 051283053 Unique Identity number 116624803) or other private MII Basic Training provider vendor not listed.

### 11.1.4.3 On Screen Take-Off (OST) or Bluebeam

### 11.1.5 Terms and Definitions

**Programmed Amount (PA):** The Programmed Amount represents the total funds, excluding design, which are available for the project. The PA is for cost of construction in place, cost of supervision and administration during construction, contingencies, cost of communications over and above the basic contract, cost of as-built drawings, cost of energy monitoring and control system connections and other costs required to complete the construction scope of work. The PA is set by law for most projects and cannot be changed except by Congress (except for O&M). However, the Office of Chief of Engineers and the Secretary of the Army, Air Force, or DLA have limited authority to fund projects in excess of the PA provided funds are available in their departments.

**Current Working Estimate (CWE):** In accordance with ER 1110-3-1300, the CWE is the latest construction cost estimate, which includes the estimated contract cost (i.e. **NOT ECC** as defined below), construction contingency, and S&A costs. The CWE should not exceed the PA, however if the CWE does exceed the PA, then discussions with the PM & PDT should immediately be made to remediate the budget issues.

**Construction Cost Limit (CCL):** The maximum cost of construction allowable within appropriated fund amounts for a complete and usable project.

**Estimated Construction Cost (ECC):** The ECC is defined as the expected cost to construct a project inclusive of all construction labor, materials, and equipment, site development, utility fees, permits, design fees, design or estimating contingency, escalation, contractor markups and other costs directly associated with the construction of the project that a reasonable and prudent contractor would incur during construction. The ECC does not include real estate, other appropriations, S&A (or SIOH) or construction contingency and thus is directly comparable to contractor’s proposal or bid. The ECC shall not exceed the CCL.

**Independent Government Estimate (IGE):** The construction cost estimate prepared by the government for cost control and bid evaluation. The IGE is comprised of two parts: 1) The government estimate (Title and signature pages and bid schedule) routed through multiple levels of approval and signature and 2) detailed estimate reports that comprise

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its basis. An estimate does not comprise the IGE without both components of the document. The term "fair and reasonable cost estimate" is used when referring to the IGE. Access to the IGE shall be limited to government personnel who require knowledge of the subject, and the IGE preparer shall mark the IGE "Controlled Unclassified Information (CUI)."

**Construction Contingency:** An estimated amount or cost to account for unforeseen problems beyond interpretation at the time of or after contract award. This is typically added as a markup along with S&A (or SIOH) to a project estimate to form the project cost. For MILCON projects, new construction contingency is typically 5% and for renovation is 10%, however the appropriate contingency is determined by the project manager.

**Design Contingency:** An amount or cost added to a project estimate that covers costs that will likely be incurred but are not precisely known or designed at the time of estimation. Typically, this is applied during the early stages of project and is reduced or eliminated as the project develops. This amount is determined by the estimator based on their prior experience and judgment.

### 11.1.6 *References and Guidance*

The following publications provide guidance and/or policy for military construction cost estimating. The following list is provided for reference; however, the most current edition of each publication should be obtained from the USACE repository as identified in section 11.1.7.

- a. UFC 3-701-01 DoD Facilities Pricing Guide
- b. UFC 3-710-01A Code 3 Design with Parametric Estimating
- c. UFC 3-730-01 Programming Cost Estimates for Military Construction
- d. UFC 3-740-05 Handbook: Construction Cost Estimating
- e. UFC 3-700-02A Construction Cost Estimates
- f. ER 1110-2-1302 Civil Works Cost Engineering

### 11.1.7 *Recommended Web Resources*

#### 11.1.7.1 *Guidance and Policy*

USACE publications such as ER, EC, EM and other official public documents from HQ USACE can be found at:

<http://www.publications.usace.army.mil/>

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UFC's can be found at the Whole Building Design Guide site at:

[http://www.wbdg.org/ccb/browse\\_cat.php?o=29&c=4](http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4)

### **11.1.7.2 Programming Information**

PAX Newsletter: Army Facilities Pricing Guide and DoD area Cost Factors

<http://www.usace.army.mil/CostEngineering/ProgrammingAdministrationandExecutionSystemNe.aspx>

### **11.1.7.3 Wage Rates**

Davis-Bacon Wage Rates (Dept of Labor)

<https://sam.gov/content/wage-determinations>

Field Personnel and other exempt professionals:

<http://www.salary.com/>

### **11.1.7.4 Travel Expense Cost Source**

GSA Per Diem Rates:

<http://www.gsa.gov/portal/content/104877>

### **11.1.7.5 Online Pricing Sources**

GSA Advantage:

[https://www.gsadvantage.gov/advantage/main/start\\_page.do](https://www.gsadvantage.gov/advantage/main/start_page.do)

Google Shopping:

<https://www.google.com/shopping?hl=en>

MRO Sites:

<https://www.grainger.com/>

<https://www.mcmaster.com/>

<https://www.zoro.com/>

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<https://www.mscdirect.com/>

Construction Materials and Products:

<https://www.build.com/>

<http://www.homedepot.com/>

<https://www.lowes.com/>

<https://www.menards.com/main/home.html>

### 11.1.8 Cost Sources and Pricing Data

All cost sources and pricing information used by the estimator must be documented, traceable, and reproducible by the government estimator. The estimator will employ a wide range of cost and pricing data to produce an accurate estimate. This data may be obtained from vendor quotations, historical bid results, or widely recognized cost databases. Regardless of source, the data must be fully documented or annotated such that the source can be identified, traced, and/or reproduced if necessary.

Vendor quotations provide the most accurate pricing available but must be documented. Annotation for vendor quotes should include company name or website, POC, phone number or email address, identifying information such as quote number, and the date the quotation was obtained such that a third-party estimator can verify the quote or receive updates in the event of delayed project development.

Where vendor quotations are not available, the use of widely recognized construction cost databases, such as RS Means and others, is highly encouraged. While it is recognized that database costs are occasionally subject to error or inaccuracy, the estimator can correct (and note) as necessary. ***Database cost information shall be the default cost source in the absence of more accurate information such as a vendor quote.*** Additionally, cost database items shall be unaltered by default, unless the estimator has sufficient basis for modification and annotates accordingly.

An example is as follows: (Project Location = Grissom AFB, IN)

Item: Rigid Foam Insulation

Vendor: Home Depot (Logansport, IN)

Web: <https://www.homedepot.com/p/R-Tech-2-in-x-4-ft-x-8-ft-R-7-7-Rigid-Foam-Insulation-310891/202532856>

Phone: 574-739-1337

Item: 2" 4'x8' R7.7 Rigid Foam Insulation

Cost: \$30/Foam Board (or \$0.94/SF)

Date: 12/8/22



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Historical cost information may also be used but the supporting data used must accompany the estimate submittal. Historical costs must be supported with documentation that denotes general scope, location, date, etc. such that the applicability of such information can be accurately assessed by a third-party estimator. Historical cost must also be escalated and adjusted per location accordingly with documented information.

In the unlikely event no cost information is available for a construction task, the estimator's judgment should be employed. However, all judgmental costs should be noted and supported by a sound logical basis, such as comparison to a similar task or product, simple reasoning, proportional relations, weight basis, etc. such that the costs are fully explained for a third-party reviewer.

### **11.1.9 *Estimator's Role***

The project estimate and the estimator play an integral role to project development. The importance of an accurate and well-developed estimate cannot be understated. The project estimate provides valuable feedback to the PDT as design choices are encountered and changes are made in response to funding and other project constraints.

In comparison to the typical disciplines such as structural, electrical, and mechanical, the successful cost engineer or estimator often applies a much wider degree of judgment and professional opinion in the generation of an estimate, especially early in the project design. While design disciplines have defined criteria that defines correct and incorrect design inclusions and calculations, there are no such equivalent for the construction cost estimate. All estimates comprise an opinion of probable project cost and take into account many variables such as bidding climate, strategy, history, local market factors, construction techniques and prime-sub contractor structures to name only a few.

With the multitude of variables that affect project cost in mind, estimates must be prepared in a detailed manner, commensurate with the detail available for the project. Tasks and quantities shall be based on project drawings where available and based on the estimator's judgment and prior experience otherwise. All estimates should be self-evident and formed upon a solid basis in the form of detailed quantity takeoff, construction tasking, and standard estimating procedures.

### **11.1.10 *Estimator's Background and Qualifications***

Estimates must be prepared and reviewed by personnel competent in construction cost estimating. The cost estimator must possess a working knowledge of construction, ability to make professional determinations based on experience, and capability of applying sound judgment on construction methodology. An A-E firm may hire cost consultants for this role if not adequately staffed to prepare the required cost estimate.

### **11.1.11 *Estimate Accuracy and Cost Control***

The estimator is responsible for providing timely and accurate estimates and estimating products during design development in order to provide a successful and executable project within

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funding limits. Military construction projects may utilize a variety of appropriated funding streams for certain features of work, and it is imperative that the estimate structure reflects these funding constraints. The estimator shall provide feedback to the designer if and when funding limits are approached for the related features of work. ***Pursuant to FAR 52.236-22, the A-E firm is responsible for project design within funding limits regardless if estimating services are self-performed or hired.***

### 11.1.12 *Estimating Tools*

Unless otherwise negotiated and approved by LRL ED-M-C, estimates shall be prepared utilizing standard estimating practices within the appropriate software packages listed in 11.1.3. Complete estimates shall be formed in the appropriate software package. Estimate components and other estimating products may be calculated in other software packages, such as Excel, and imported into the approved software program, however, imported or manually entered estimate components must be accompanied by the file(s) or documents that comprise their elemental basis. Under no circumstances should proprietary software or algorithms be used in formulation of the estimate in part or whole. The prepared estimate must be fully usable by government estimators in formulation of the IGE. As such, the estimate file(s) must be compatible with approved software packages and allow full manipulation and reproduction by the government.

### 11.1.13 *Excel and Other Tools*

In general, Excel may not be used for estimate generation except for partial or basic estimating products or portions in which the native functions of the approved software packages are not sufficient or in the best interest of the government. Usage of Excel or other software tools, in full or part, for estimating a project shall be pre-approved by LRL ED-M-C. All estimates and estimate portions prepared via other software means shall mirror the elemental construction and mathematics of the approved software packages. Each estimated task shall be composed of labor, labor output, material, and equipment cost basis along with a complete description of the task item. Additionally, the source of such cost basis shall be identified for each task, i.e. “RSM 260533135000,” “Judgmental,” “Quote #21315 dated...” such that the cost basis is traceable and fully reproducible.

## 11.2 ESTIMATE GENERATION & BEST PRACTICES

### 11.2.1 *Basis of Estimate (BOE)*

With each project estimate, documentation of the Basis of Estimate shall be provided with each submittal. If using MII, this documentation may be embedded in the Notes tab of the project properties for simple or small scope projects. This practice is highly encouraged but depends on length of the narrative. If the BOE is a lengthy document or formatting is unmanageable within the author notes section of MII, the BOE shall be compiled externally. If the BOE is a separate document it shall accompany the estimate submittal at all stages and an author note in the MII native file shall identify the title, date, and other necessary identifying information such that the reviewer is alerted to its existence and can locate this document.

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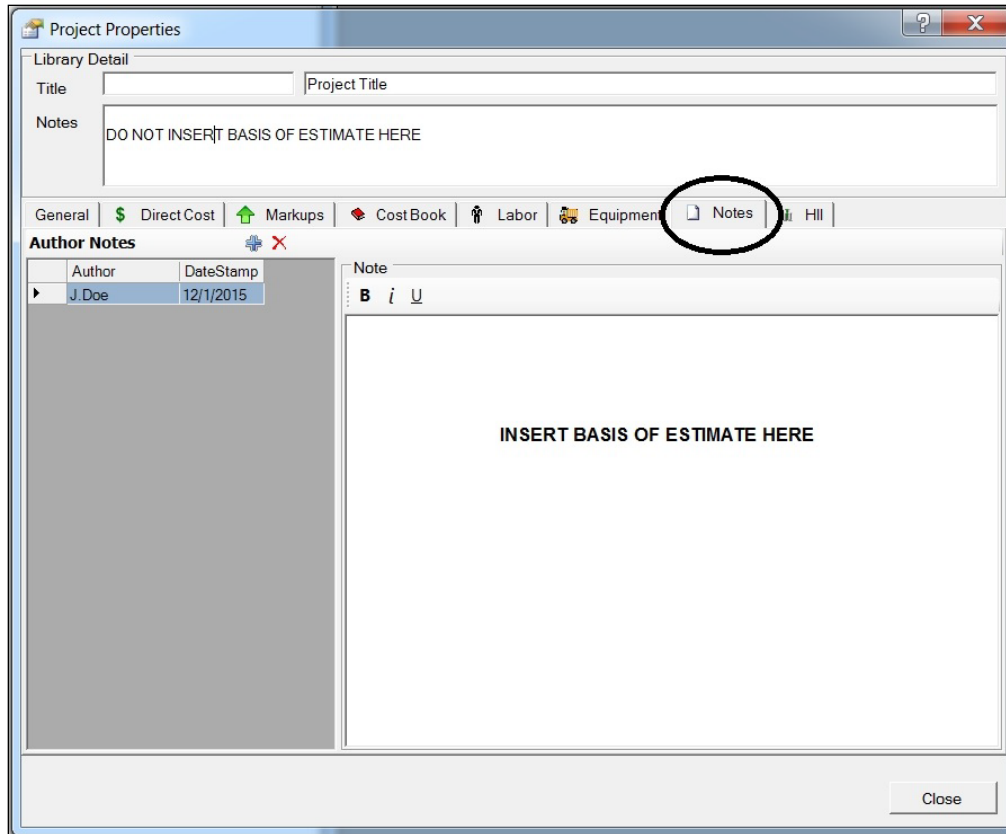
### 11.2.1.1 *General BOE Information*

The basis of the estimate should include the following:

- a. Project title
- b. Location or Installation
- c. P2#
- d. Delivery method: Design-Bid-Build (DBB) or Design-Build (DB)
- e. Fiscal Year
- f. Solicitation # (if known)
- g. Program amount (PA) (required)
- h. Construction Cost Limit (CCL) (required)
- i. Description of project scope and assignment of base bid and option items
- j. Significant assumptions
- k. Direct Cost Markups (as applicable)
  - a. Productivity
  - b. Overtime
  - c. Sales tax (required)
  - d. Adjustments
- l. General range of each sub-contractor markup
- m. Prime Contractor Markups (as applicable)
  - a. Profit (required)
  - b. JOOH (required)
  - c. HOOH (required)
  - d. Bond (required)
  - e. Design fees
  - f. Design Contingency
  - g. Other
- n. Project Markups (as applicable)
  - a. Escalation (required)
  - b. Construction Contingency (required)
  - c. S&A or SIOH (required)
  - d. Other
- o. Other pertinent information

Basis of Estimate information above should be inserted in the large notes window of the Notes tab in project properties as shown below.

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The author notes should be used as a log of information updates after initial information is inserted as the first entry. At subsequent submittals updated information can be added as a new note such that the history of estimate evolution is captured and integral to the estimate file.

### 11.2.1.2 Critical BOE Information

**Item g.** Program Amount or PA above, shall be assessed and listed in the BOE. The term PA is as applicable for military projects, but this line is intended to cover the total amount congress has appropriated for the project, on non-military projects and may be identified by other acronyms. The requirement is that the total funding allocated for the project is identified for direct comparison to project total cost, IAW with definition in section 11.1.5, regardless of title.

**Item h.** Similar to the PA, CCL or Construction Cost Limit shall be assessed and listed in the BOE. The CCL for each funding type shall be listed. This represents the upper limit for construction within each fund type that must not be exceeded as set forth by project management. For typical MILCON projects, this amount is defined in paragraph 9 or 10 of Appendix A of the design AE scope of work. The CCL is a limit for the estimator to be aware of, not a goal to reach. The estimator shall not increase cost or “back-in” to a CCL. The estimate shall represent the tasks required to build the scope as intended by the designer, regardless of CCL. It is absolutely critical that the estimator is aware of these limits for each funding type and assesses, considers, and communicates to the PDT when a limit is approached, and especially when it’s exceeded.

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CCL shall be clearly identified for all applicable cost accounts, such as K&L funds, on projects with overlapping renovation and new work. Estimate inclusions for each funding account should be closely coordinated with the appropriate end customer personnel and the Design Manager.

### 11.2.2 MCACES 2<sup>nd</sup> Generation (MII)

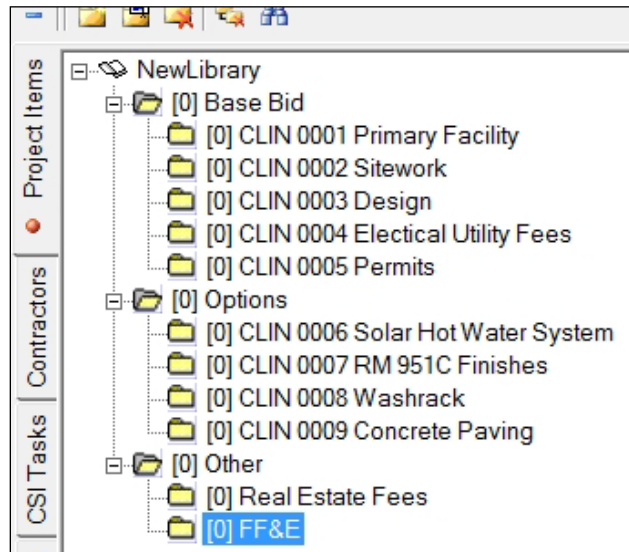
#### 11.2.2.1 Organization

##### 11.2.2.1.1 Estimate Structure

The estimate structure shall match the bid schedule and shall require no manipulation of totals to populate the bid schedule fields (other than the addition of escalation if applied as an owner markup). There shall be at least one highest level folder representing the base bid, or two if options are identified. One highest level folder should contain all base bid CLIN items and a second highest level folder for all option CLINs. Each bid schedule CLIN should correspond to a single sub-folder containing all tasks and costs associated with that CLIN.

If the estimate contains cost items for project tracking purposes but are unrelated to the construction contract, such as FF&E or real estate, they shall be located in highest level folders (equal to base bid and option folders) such that the estimator can un-assign contractors or omit the folder entirely for completion of the bid schedule. If the estimate contains these items, the estimator shall ensure the extra items are not assigned to the same prime contract as the work items of the construction contract. Doing so will distribute JOOH over this other “tracked” work and falsely decrease costs on the primary contract work accordingly.

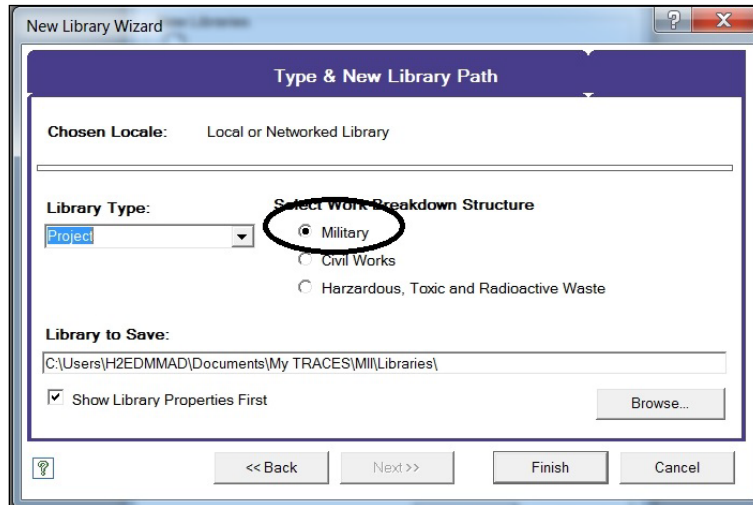
The following represents the typical folder structure for military construction projects:



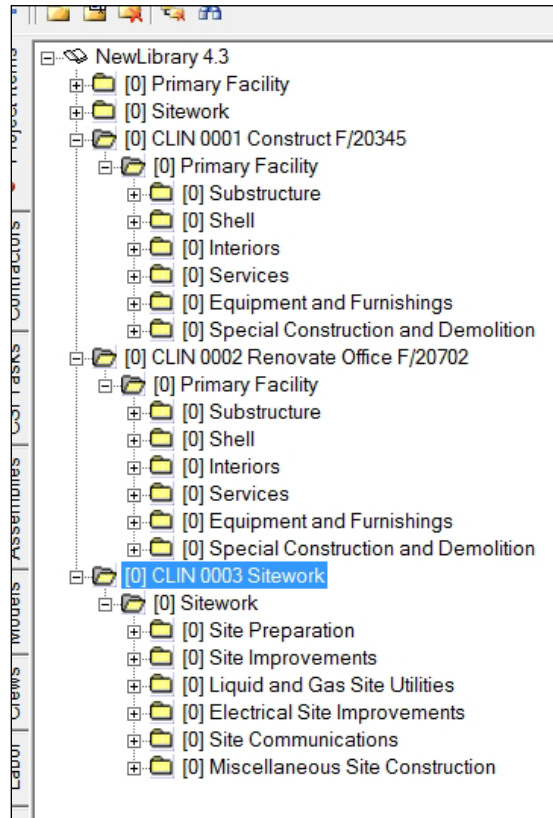
##### 11.2.2.1.2 Work Breakdown Structure

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All military construction estimates shall use the approved TRACES work breakdown structure template. This WBS templates are included in MII and are selected by the estimator upon initial setup of the estimate as shown below.



For projects where CLINS involve work across several divisions for multiple CLINS, the estimator shall copy and paste the necessary template folders from the basic template into the folder corresponding to each CLIN as shown below such that each CLIN has a complete WBS.



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It is important that the WBS is completed BEFORE estimating the project. It provides an organized road map of the project and allows portions to be neatly severed in the event a project is estimated by a team. Upon substantial completion of the estimate, the estimator shall remove unused folders. It is also good practice to use the repair and compact tool after unused folders have been pruned.

### **11.2.2.1.3 Contractor Structure**

#### **11.2.2.1.3.1 Contractor Hierarchy**

The contractor tab shall be structured according to anticipated contractor structure. While this is not precisely known prior to award, the estimator shall apply prior experience to order contractors and subs according to general practice. Contractor structure may have more than two levels of subcontractors and this structure is important to capture all appropriate markups. Examples of this include 3<sup>rd</sup> tier sub-contractors for mechanical and electrical subs. Mechanical subs may have insulators, T&B, and controls subs as 3<sup>rd</sup> tier subcontractors while performing sheet metal and equipment installation work. Similarly, the main electrical sub-contractor may have 3<sup>rd</sup> tier low voltage systems subs for communications, fire alarm, mass notification, surveillance, security and others while performing power distribution and lighting.

#### **11.2.2.1.3.2 Option Contractor Hierarchy**

It is common to include options for the project. It is recommended practice to arrange a second contractor structure from the Prime down for application to option items. This allows assignment of options to option subs to appropriately capture secondary markups, while maintaining proper distribution of JOOH items to the base bid project items. Bidders often do not distribute Prime JOOH costs to option work.

#### **11.2.2.1.3.3 Option Credits**

Options for betterments or system substitution shall include credits for base bid work as negative quantities along with the positive quantities for additional work. A very common application of this is for paving options. As an example, paving options should include credits for base and topping removed from the base bid as negative quantities and the replaced work, such as thicker base and concrete topping as positive quantities, such that the option represents the NET value of the work substitution. Where option items are additive only in nature, credits may not be required.

### **11.2.2.2 Labor**

#### **11.2.2.2.1 Craft Labor**

Federal projects are subject to prevailing wage rates in the locality of construction as a minimum, however appropriate wage rates may be higher in certain locales. The corresponding minimum

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wage rate can be found at the Dept. of Labor website noted in 11.1.7.3. The general decision number should be entered in the description field on the left with the decision date in the field to the right. The wage rate utilized in the estimate should be noted as follows:

The screenshot shows the 'Project Properties' dialog box with the 'Labor' tab selected. The 'Library Detail' section at the top has a 'Title' field with 'Project Title' and a 'Notes' field. Below this is a tabbed interface with 'General', 'Direct Cost', 'Markups', 'Cost Books', 'Labor', 'Equipment', 'Notes', and 'Hill'. The 'Labor' tab is active, showing a 'General Info' section with a 'Description' field containing 'KY168' and 'KY150168 09/25/2015', and a 'Note' field with a URL and text about Davis Bacon & Service Labor Rates. Below the 'General Info' is a 'Labor Rates' section with a list of 'LaborCost1' through 'LaborCost4'. A footer note states: 'Labor Rate Descriptions over 10 characters will be truncated, in some cases, to fit limited spaces'. A 'Close' button is at the bottom right.

If an estimate or portion of estimate is performed outside of the approved estimating platforms (i.e. Excel), it is essential that each task have fundamental labor and output basis and attached craft labor rate to allow for wage rate changes. It is extremely common for wage rates to change after the project has advertised (and thus A-E or estimator involvement has materially concluded) but before award. Often the government estimator will make these modifications rather than re-engaging the A-E chain, however estimates must be structured to facilitate such a change.

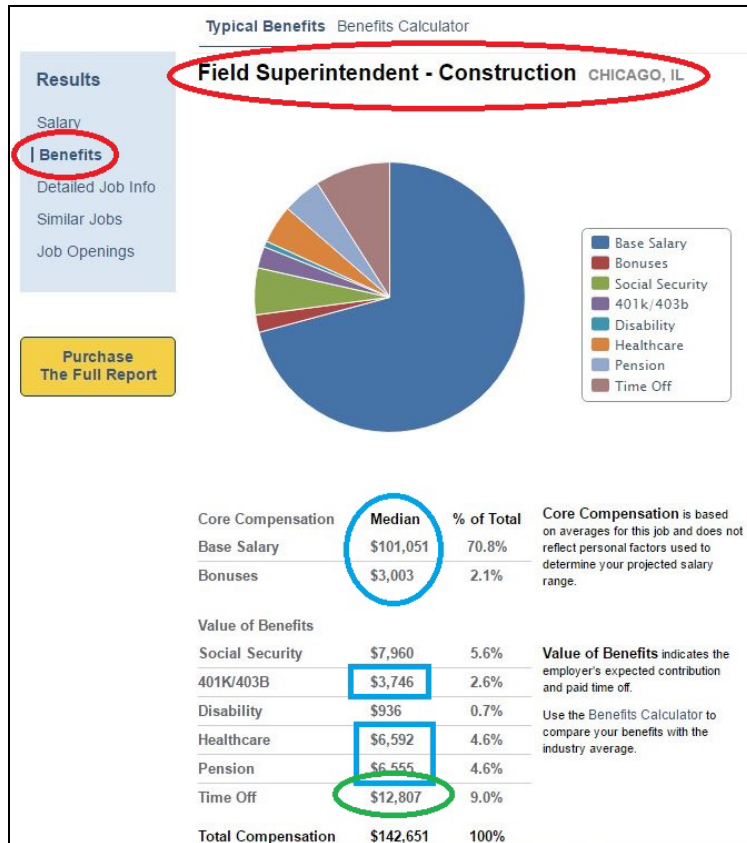
Hourly craft rates consist of a wage and fringe component. The fringe component may be further divided in taxable and non-taxable wages. Tax status of a fringe benefit is dependent on several factors such as fringe type, local practice, etc. It is a commonly accepted practice to consider a small amount of the fringe rate as taxable and the remainder as non-taxable. This small amount of taxable fringe covers the typical vacation pay a worker receives and for base rates in \$30-35/hr range the taxable fringe is approximately \$1.25/hr. For base rates in the vicinity of \$50/hr, the taxable fringe should be \$2/hr. The estimator may consider all fringe wages as taxable as well, the latter having a more conservative effect and increasing overall cost. If the estimate is highly dependent on one or few craft labor rates or is of high value (>\$40M) the estimator shall determine tax status of fringes more accurately, however for most military construction projects of typical size and employing a wide range of craft labor rates, this is unnecessary.

### 11.2.2.2.2 Field Personnel and Salaried Professional Wages



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In absence of current contract information such as prior proposals or certified payroll, the preferred method for establishing a salaried professional's wage rate is to base them on information available at [www.salary.com](http://www.salary.com). To determine the base wage rate search for the position or title desired, such as a field superintendent, and select amongst qualifications most closely mirrored by contract specifications outlining personnel requirements, i.e. experience. Searching the site for the typical occupations of field superintendent, project manager, project engineer, QC manager or SSHO or related titles can be done for the project location or nearest metro area. A snapshot is shown below after one clicks “benefits” to the left to show total compensation for the selected title and locality.



### 11.2.2.2.1 Base Wage Rate Determination for exempt personnel

The general methodology for determining the base wage rate is to total all direct, cash or liquid payments to the employee, i.e. salary + bonus, as shown in the blue oval above, and divide by 2080hrs. The hourly base wage rate can be calculated by summing the salary and bonus amounts (if any) and dividing by 2080hrs. Other similar sites may be used for this data, but [www.salary.com](http://www.salary.com) seems to have the most comprehensive data available. The estimator shall copy the URL into the labor item notes tab to denote the source of this information.

### 11.2.2.2.2 Fringe Wage Rate Determination for exempt personnel

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The TOTAL FRINGE rate can be summing the figures shown in blue rectangle and green oval in the preceding figure and dividing by 2080hrs. The figures for social security and disability correspond to pay roll taxes assessed within in MII in contractor tab, according to state and contractor classification fields and also contractor assignment for the associated CSI task. Thus, the program accounts for those and their inclusion in the calculation would be double-dipping. For simple or small projects, it is not necessary to split the taxable and non-taxable fringe pay and the estimator may enter all of the fringe pay as taxable, while noting this induces a small of amount of error and increases project cost. However, if the project is very large or highly dependent on the wage rate for the personnel under consideration, the fringe pay shall be split as follows.

TAXABLE FRINGE pay is determined by dividing the “time off” figure by 2080hrs as this is regular pay to the employee and is thus taxable.

NON-TAXABLE FRINGE is calculated by summing figures in the blue squares in the preceding figure and dividing by 2080hrs. These types of compensation are often deducted on pre-tax basis and thus non-taxable.

These three portions of the pay rate can be entered as wages for a constructed laborer for task makeup or inclusion in project tab directly after the labor item is created.

*Please note: Many UPB site supervision and project field personnel items contain labor as a sub bid entry and do not have complete and proper makeup. This results in many field personnel items not appropriately adding on labor markups such as payroll tax and WCI.*

### **11.2.2.3 Materials**

The estimator may use a wide variety of sources or vendor quotes for material costs associated with construction task. The web sites listed in 11.1.8 and many others may be used as cost information. The estimator shall cut and paste the website for all web pricing into the project item or CSI task notes field, wherever is more appropriate based on how frequently the item is used throughout the estimate. For “spot” updates, notation should be included in the project item notes. For new CSI task generation or items that are used in multiple places, the notes or citation should be placed in the CSI task notes field.

Additionally, the estimator shall describe allowances made in excess of the cited cost. As an example, if a home improvement site is cited for drywall, the estimators may include an allowance over the displayed cost for waste, mud, tape, shipping or delivery, etc. The explanation should make calculations or alterations to the displayed cost apparent such that the reviewer can arrive at the same total material unit cost.

***In the absence of specific pricing information or vendor quote, the unaltered UPB material cost shall be used.***

### **11.2.2.3 Markups**

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### 11.2.2.3.1 *Direct Cost Markups*

#### 11.2.2.3.1.1 *Productivity*

The estimator may choose to alter the default productivity of 100% for projects that include adverse conditions that hinder task performance. A common application of this factor occurs on military construction contracts in high security areas to account for site badging and close supervision or for common overtime productivity losses. For regular losses of productive time, the native factor provided is the preferred method for adjustment, rather than additional estimator created markups. If a productivity is chosen, the reason for such shall be documented by the estimator, preferably via notation in the project properties or BOE.

The productivity factor is DEFINED in the project properties Markups tab; however, the estimator must APPLY the markup in the Project Items view either broadly through folder assignment on individual tasks as needed.

#### 11.2.2.3.1.2 *Overtime*

Military construction projects may incur varying work schedules including weekend or after-hours work. The native method for calculating overtime shall be used wherever possible and blanket percentage markups elsewhere are not recommended unless the schedule for the project cannot be represented accurately via the native method.

Note: The estimator should be aware that using the built-in OT calculation only accounts the cost aspect of abnormal working hours. From a scheduling perspective, the total man hours are not adjusted to account for recognized productivity losses due to working longer hours for lengthy periods of time.

The estimator shall also account for standard productivity losses associated with overtime. If using multiple productivity factors, i.e., one for security and one for OT, they shall be aptly named and denoted in the project properties or BOE. See the table below.

**Suggested Efficiency Rates from Studies**

<b>Days / Wk</b>	<b>Hrs / Day</b>	<b>Efficiency Factor</b>
5	8	100.0%
5	9	95.0%
5	10	92.0%
5	11	88.0%
5	12	86.0%
6	8	96.0%
6	9	87.5%
6	10	82.5%
6	11	78.0%
6	12	75.0%
7	8	92.0%

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7	9	83.0%
7	10	78.0%
7	11	75.0%
7	12	72.0%

### 11.2.2.3.1.3 *Sales Tax*

The estimator shall determine the applicability of sales tax in each locality. Sales tax exemptions exist for federal projects in many locations, however implementation of the exemption by the bidder is subject to estimator's interpretation. In many states, exemptions exist only for direct purchases by the government, which is not applicable for military construction projects. In some areas a simple, easily obtained exemption certificate may be issued to the contractor by the State DOR and may be transferrable to sub-contractors as well. On military installations, the sales tax exemption means, and methods may be well known and commonly implemented. However, in other areas forms and documentation must be filed with each purchase or may not be transferrable to subcontractors making material purchases. Additionally, not all materials will be purchased within the state boundary of the project location, especially near borders. Therefore, sales tax application must be assessed by the estimator for each project with final determination and application noted in the project properties notes or BOE. The appropriate state Dept. of Revenue may be contacted for tax rates and other information.

The sales tax rate is DEFINED in the project properties Markups tab; however, the estimator must APPLY the markup in the Project Items view either broadly through folder assignment or on individual tasks as needed.

### 11.2.2.3.2 *User Markups*

The estimator may create any markups needed for direct cost adjustments but is reminded to categorize and choose calculation method accordingly. Documentation or explanation for created markups is required.

### 11.2.2.3.3 *Contractor Markups*

#### 11.2.2.3.3.1 *General*

The estimator shall order all default or created markups in the fashion they are typically calculated as follows:

1. JOOH (Job Office or Field Overhead)
2. HOOH (Home Office Overhead)
3. Profit
4. Bond
5. Design and others

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In the case of created markups for subs or other contractors, the relative order shall follow that above and the markup may appear before or after the corresponding Prime markup. *Failure to follow this markup order can cause inaccurate calculation of the estimate total.*

All default and created markups shall have an appropriate category assigned, i.e. HOOH = HOOH, Profit = profit, etc. created markups may be categorized as “Allowance” or “Misc” if appropriate. *Although mis-categorization does not affect estimate total calculation, column addition in reports may be affected.*

### **11.2.2.3.3.2 JOOH (Job Office Overhead) or Field Overhead**

By default, prime contractor field overhead (JOOH) should be calculated and itemized per contract and project requirements, rather than applied as general percentage. JOOH typically includes, but is not limited to, job supervision personnel, temporary project office, temporary storage, temporary utilities, quality control, schedules, etc. Military construction projects’ JOOH range in cost from a few hundred thousand to many millions of dollars. For small projects, such as MATOC procurements, required field personnel can comprise a large cost component of the estimate and as a percentage may be 40-50% or even higher. For larger projects, the fraction of field overhead is smaller, typically less than 10%. The highly preferred method is to itemize JOOH requirements per contract and project requirements.

For sub-contractor JOOH markups, a percentage may be used instead of calculated.

The default method of calculation is “running” and is encouraged. The estimator is free to deviate from this, if necessary, but shall provide basis explaining the need for modification.

By default, each prime contractor shall have only one JOOH folder. The use of multiple sub folders shall be avoided wherever possible. Sub folders with a single CST task are not permitted, this disables list view and makes review difficult. If linking is used, personnel shall be grouped in to one sub folder and other tasks such as field trailers, port-a-johns, storage boxes, etc. shall be grouped in another. However, the use of sub folders in the JOOH folders is not recommended.

#### **11.2.2.3.3.2.1 JOOH Personnel**

Generally, the dominant cost for JOOH or field overhead, personnel wage rates shall be made up properly and completely. See section 11.2.2.2.2 for details. UPB items for field personnel may be used if makeup is complete, but best available salary information and proper labor makeup shall be used in the event that JOOH personnel constitute a large portion of project cost.

#### **11.2.2.3.3.2.2 Mobilization and De-Mobilization**

Lump sums for mob or de-mob shall be avoided. Wherever possible, mob/de-mob shall be itemized per the equipment required to construct the project. For example, if roof top HVAC equipment is involved, a crane item complete with crew and labor makeup is more appropriate than a single lump sum cost. Mob/de-mob itemization shall include the estimator’s best

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judgment on what equipment will need to be mobilized to complete the project based on estimate details.

### **11.2.2.3.3.3 *HOOH or Home Office Overhead***

This markup may or may not be used for military construction cost estimates. Typically for construction firms, this markup accounts for corporate office overhead, executive salaries, etc. If this markup is not used, the estimator should consider increasing JOOH to account for these incurred costs. For smaller MILCON project the estimator may choose to omit this markup. If implemented, the default method of calculation is “running” and is encouraged. The estimator is free to deviate from this, if necessary, but shall provide basis explaining the need for modification.

### **11.2.2.3.3.4 *Profit***

The estimator is required to use the *Profit Weighted Guideline Method* (UFC 3-740-05) of prime profit calculation for negotiated MILCON projects and highly encouraged for all other projects. This is a widely accepted, methodical approach for determining fair and reasonable profit amounts. Details of the method can be found in reference F and G of section 11.1.6. The PWG wizard in MII calculates factors based on the guidance criteria and may be used in lieu of manual calculation.

It is the locally accepted practice to assign the government assistance factor to 0.12 (below average) by default since it is highly unlikely the government will assist the contractor with construction. All other factors shall be assigned using data given in reference F of section 11.1.6 and the estimator’s judgment.

This method may also be employed for sub-contractor profit calculation; however, a basic percentage may be applied. Calculation method should be “Running” by default but may be altered if appropriate notation of basis is given.

### **11.2.2.3.3.5 *Bond***

Use of the bond tables for the prime contractor is encouraged, but a general percentage may also be applied. Generally, the prime contractor’s bond covers that of subcontracted work, thus bond markups for subs are unnecessary. Sub-contractors rarely include itemization of bond in their proposals to prime contractors or as provided to the government.

### **11.2.2.3.3.6 *User markups***

An accurate estimate may employ a variety of user created markups, such as design or contractor premiums. The estimator may create markups as needed but is reminded to categorize them appropriately so as not to affect reports and to document why the markup was applied.

### **11.2.2.3.4 *Owner Markups***

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### 11.2.2.3.4.1 *Escalation*

Escalation is an owner cost and shall be included in estimates as appropriate, especially for large projects with a long construction period. Escalation is incurred as general cost increases occur affecting all three of the fundamental bases: labor, material, and equipment. Escalation shall be computed from the current estimate date through the mid-point of construction. One possible such source for escalation rates is the PAX Newsletter cited in section 11.1.7.2. For MILCON projects the MCP Index is required for escalation via UFC 3-740-05.

Other sources for escalation rates may be utilized, but underlying data and/or basis must be provided such that applicability can be determined.

### 11.2.2.3.4.2 *Post-Award Contingency*

This owner markup represents the construction contingency cited in cost engineering guidance. It is an allowance for unexpected conditions or circumstances encountered post award of the project during construction. For military construction projects the appropriate contingency amount is determined by the project manager, however 5% and 10% are default values for new construction and renovation work, respectively.

For large or specially designated projects, the post award contingency may be based on a Cost and Schedule Risk Analysis (CSRA). If CSRA is the method used to establish post award contingency, the result from the exercise shall be included in the estimate. Additionally, the BOE shall denote the filename and date or revision level of the CSRA such that the external analysis file can be located or retrieved for updates, changes and further revision as the project progresses.

### 11.2.2.3.4.3 *S&A or SIOH*

This markup is the allowance for construction administration of USACE projects. It represents a sum to allow for quality assurance activities of USACE construction personnel such as field inspection, submittal review, etc. Applicable rates are set annually by HQ USACE in the internal Consolidated Command Guidance. The current applicable rates may be obtained through A-E Manager of the project.

As of FY24 applicable CONUS rates are as follows:

MILCON = 6.5%

O&M = 6.6%

### 11.2.2.3.5 *User Defined Markups*

#### 11.2.2.3.5.1 *Material Inflation*

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The estimator shall employ a material cost adjustment to account for material inflation occurring between the publish date of the cost database and the time of estimate generation or local material market effects. Such a markup should be created as a direct cost markup applicable to material costs only and categorized other than “Productivity” or “Overtime.”

It is a locally accepted practice to adjust database material costs utilizing the Engineering News Record Material Price Index for the period between database publication (typically January) and the current month. Other indexes may be used if there is documentation within the estimate as to what index was used for the material inflation.

The estimator is reminded that once the markup is defined, it must be applied in the project items view broadly via folder assignment or by individual tasks to become effective. The estimator shall consider the effect of such markups in estimates with significant numbers of task level material overrides or other user created costs.

### ***11.2.2.3.5.2 Labor Inflation***

In general, labor inflation markups shall be avoided as appropriate labor costs should be computed via accurate wage rates. However, in certain circumstances, such as localities hosting large municipal projects, labor shortages or other local labor market effects, a labor premium may be appropriate. If needed, labor inflation shall be defined as a direct cost markup applicable to labor costs and applied to necessary task items. The source used for the labor inflation must be documented within the estimate.

### ***11.2.2.3.5.3 Equipment Inflation***

In general equipment inflation markups should also be avoided as equipment rates should be appropriately calculated using the correct equipment library. For military construction projects, equipment typically comprises a small portion of project cost, however local market effects may be captured via this method. This markup should also be defined as a direct cost markup applicable to equipment cost only.

### ***11.2.2.3.5.4 Other User Defined Markups***

The estimator may define other markups to adjust task items or overall cost as necessary to account for various market conditions. These may be employed as direct cost or contractor markups as appropriate, however, all user defined markups require explanation of basis in the way of project notes such that applicability can be determined and verified.

## ***11.2.2.4 User Manipulations***

### ***11.2.2.4.1 Overrides***

In general, manual overrides of output, labor, material, or equipment should be avoided, unless more accurate and substantial information is known, in which case override is expected. All



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overrides must be accompanied by an explanation of basis and specific supporting information. If an override's basis is historical information, that information or data must be included with the estimate such that it is verifiable, and its applicability can be assessed.

Manual overrides should only be made for spot or minor adjustments. Where a task is of high value due to attached L, M or E costs or through its applied quantity, more robust changes of the underlying CSI task or crew makeup should be made. If significant modifications are needed, the estimator should consider creating a unique USR cost with the appropriate labor, crew and material component makeups.

General, non-specific override notation of “based on prior bids” or “estimator’s experience” are not acceptable. Additionally, estimates comprised of significant manual overrides without adequate explanation or substantiation are not acceptable. Significant manual overrides make estimates cumbersome or impossible to update, verify or corroborate. Un-explained overrides do not provide the self-evident basis required in cases of dispute, modification, or negotiation.

The estimator should choose the method and location (project task level or CSI task level) wisely considering the effect of the override given the task item makeup hierarchy. If the override is to be made on a single or few tasks, project level override may be most appropriate and is generally preferred because the accompanying notation is immediately apparent to the reviewer. However, if the same task is used in multiple places throughout the estimate, changes at the underlying CSI task level with accompanying notation there may be more appropriate.

Project task level overrides of output, labor, material, equipment, or sub bids should be accompanied by explanation in the notes field directly below the task description as follows:

The screenshot displays a software interface for 'Project Item Detail'. The 'Description' field contains 'Structural concrete, in place, slab on grade (3500 psi), 6" thick, includes forms(4 uses), reinforcing steel, concrete and'. The 'Note' field below it contains 'Material cost updated per local concrete plant operator Mike Humboldt @ 1-800-672-8527', which is circled in red. To the right, 'Item Values' shows 'UOM CY (Cubic Yard)', 'Quantity 3', 'Labor Rate Labor', and 'Assigned Contractor Concrete'. Below this is a table with tabs for 'Values', 'Members', and 'Markups'. The 'Values' tab is active, showing a cost breakdown:

	Bare	Unit Costs	Markups	Direct	Extended Costs
Crew Output	11.5000				
Labor Cost	47.42	+	0.00	= 0.00	0.00
Equip Cost	0.32	+	0.00	= 0.00	0.00
Material	107.50	+	0.00	= 0.00	0.00
Sub Bid					

### 11.2.2.4.2 Output Overrides

If labor costs must be adjusted on individual or low value tasks, the preferred method is via adjusting task output. This provides capability to update wage rates appropriately. If the task is of high value due to labor component or quantity, more proper adjustments of the crew and labor makeup should be made.

### 11.2.2.4.3 Labor Overrides

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Labor cost adjustments may be made through manual overrides, however the estimator is cautioned that the labor cost will not reflect subsequent wage rate changes.

### 11.2.2.4.4 *Material overrides*

Material overrides are frequently needed to address material price fluctuations. However as with other overrides, explanation (cost source, date, POC, etc.) is needed.

### 11.2.2.4.5 *Equipment and Sub-bid Overrides*

Overrides of these parameters have the same requirement for explanation as Labor, Material, and Output equivalents.

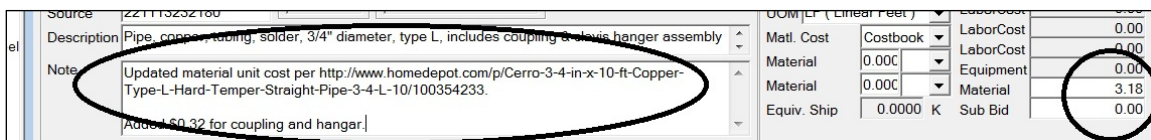
### 11.2.2.5 *User Adjustments*

#### 11.2.2.5.1 *CSI Task Level Adjustments*

The estimator shall alter the source tag of all modified CSI tasks. This is typically done via appending to the source tag with the estimators initials, “.01,” “.A,” etc. The alteration shall be unique such that the item can be readily identified via sorting and differentiated from similar tasks. Source tags representing more than one task are not permitted.

#### 11.2.2.5.2 *Material and Sub Bid Adjustments*

The estimator may choose to modify the default attached material or sub-bid cost at the CSI task level. This method is more appropriate and expedient if the CSI task is used in many places throughout the estimate and allows the modification to be made in one place instead of many. As always, notation explaining the nature of the change is required. An example is shown below:



Source	221113232100	UOM	LF (Linear Feet)	Labor Cost	0.00
Description	Pipe, copper, tubing, solder, 3/4" diameter, type L, includes coupling & hanger assembly	Matl. Cost	Costbook	Labor Cost	0.00
Note	Updated material unit cost per <a href="http://www.homedepot.com/p/Cerro-3-4-in-x-10-ft-Copper-Type-L-Hard-Temper-Straight-Pipe-3-4-L-10/100354233">http://www.homedepot.com/p/Cerro-3-4-in-x-10-ft-Copper-Type-L-Hard-Temper-Straight-Pipe-3-4-L-10/100354233</a> .	Material	0.00C	Equipment	0.00
	[Added \$0.32 for coupling and hanger.]	Material	0.00C	Material	3.18
		Equiv. Ship	0.0000 K	Sub Bid	0.00

#### 11.2.2.5.3 *Output Adjustment*

*Under no circumstances shall output be modified at the CSI task level.* For spot adjustments and minor corrections, this change shall be made at the project level. However, if the value of the task or frequency of use requires modification of the CSI task, the estimator shall make a copy of the CSI task, modify the output as required and provide notes detailing the change as required.

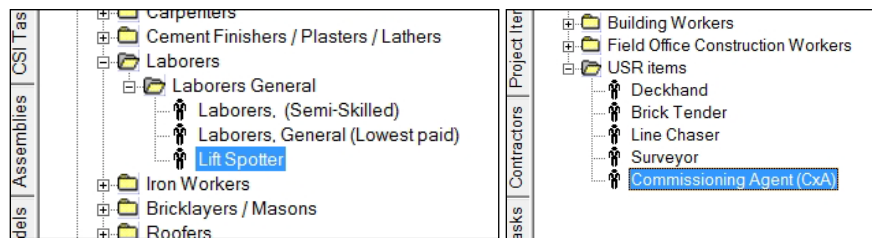
### 11.2.2.6 *User Creations*

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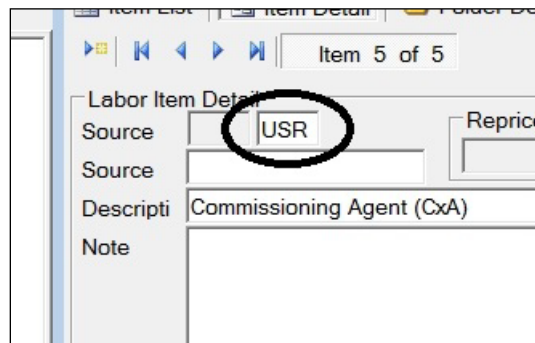
The estimator is often tasked with generating cost data for unique or summarized construction tasks. User created tasks shall be created from elemental basis in a similar fashion to standard task items. Task items begin by defining required labor and equipment and associating them via crew makeup. The created crew is attached to a CSI task where appropriate materials cost and output rate are assigned before use as a project task.

### 11.2.2.6.1 Labor Items

Labor items may be created as needed. Sufficient notation and description of the labor item shall be included. If only a few labor items are created, they can be arranged in the appropriate folder of similar labor crafts as shown on the left below. If many labor crafts are created, they should be grouped into a user created folder to facilitate review as shown on the right below.



Generally, it is preferred that items are created rather than copied and edited. If a labor item is copied and then edited, the estimator shall ensure the source code is edited to USR as shown.



The estimator shall provide explanation of the attached wage rate and fringe if they do not follow the appropriate wage decision noted in the estimate, see 11.2.4.6.

### 11.2.2.6.2 Equipment

Creation of equipment items shall follow the general tenets of equivalent labor, crew, and CSI task items. Makeup shall be self-evident, complete, and noted as necessary. USR created equipment items shall be similarly located in a USR folder in order to facilitate review.

### 11.2.2.6.3 Crew Makeup

Crews may be copied and edited or created by the estimator. The estimator shall take care in assigning crew labor, labor type, and equipment assignment. Similar to assemblies, crew

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makeup errors can result in significant estimating error. All user created or edited crews shall be located in a USR folder as shown in section 11.2.4.16.1.1, regardless of the number of created or copied crews.

### 11.2.2.6.4 CSI Tasks

CSI tasks may be created or copied and edited as needed, similar to crews. The estimator should take care in assigning material, sub bid, and crew output fields. If the CSI task is user created, it shall include a complete description with explanatory notes in the notes field as necessary. If a CSI task is copied and subsequently edited, the estimator shall provide notation explaining edits and must change the description of the item to suit. This is necessary to easily distinguish the edited CSI task from the original and understand intent.

### 11.2.2.6.5 Assemblies

Assemblies can expedite estimate development by arranging common or frequently used tasks in a summarized manner. User created assemblies must be noted sufficiently to explain their basis and makeup such that a third-party reviewer can understand and verify the assembly's contents and content relations. For assemblies comprised of five items or less, a titular description will usually suffice. Where the assembly contents are more complex or not obvious, the estimator shall provide a more complete description in the notes sections as shown. The best description of an assembly is achieved via reference to a contract document or drawing, such as "IAW Detail 5 Sheet S501."

The screenshot shows a software window titled "Assemblies Item Detail". It contains several input fields and a text area. The "Source" field is set to "USR". The "Copy Version" field shows a timestamp "12/14/2015 2:40:42 PM". The "Shipping" field contains the value "0.2087". The "Description" field contains the text "2-4\" PVC Communications Ductbank". The "Note" field contains a detailed description: "Communications ductbank includes excavation, bedding, concrete, backfill, compaction, 2-4\" PVC conduits, pull rope in each, 50 pair copper cable, 12 strand fiber. Assumes 2'x4' deep trench." On the right side of the window, there is a vertical label "U C D M E C". At the bottom, there is a navigation bar with buttons: "Tasks & Modifiers", "Other Members", "Usage", and "Link Help".

The estimator shall take extreme care in creating assembly and defining quantity relationships. Simple math or typographical errors can be heavily multiplied and result in significant estimate error.

It is preferred local practice to leave common factors and math operations visible in quantity definitions, rather than summarize the math string as an irrational number. This facilitates the reviewer in assessing applicability of the assembly and provides further explanation of makeup. In the example shown below, the factors correspond with details of the description, showing the reviewer that intended excavation dimensions are assembly length by 2' wide by 4' deep and is then converted to native unit of LCY. This allows the program to perform calculations, facilitates review, and avoids potential transcription error from the calculator.

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Q*2*4/27	312323145...	Backfill, structural, 6" lifts, backfill around foundation, with hydraulic excavator	0.2963	LCY
----------	--------------	--	--------	-----

Units shall be assigned to the assembly that logically represent the make-up of the assembly, not based on the native units of the major components. Assigned units shall represent the most descriptive character of the assembly. All mathematical relations shall be formulated in support of the chosen UoM. Examples are as follows:

- A. F6 Spread Footing should be EACH UoM, not CY, even though it is a concrete item. This is because the assembly represents a complete footing and is not best described by its volume (CY).
- B. 24"x24" grade beam should be LF UoM, not CY. The length of the grade beam best describes the tasks involved as the cross section is constant.
- C. SOG should be SF, not CY as the area the SOG covers is the most direct measure of the assembly. Reinforcement and other accessories such as formwork, should be related to the SF measure as indicated in drawings or reinforcement tables, or related via perimeter and thickness in the case of forms.
- D. HVAC unit controls should be EACH, rather than points (PT) if the assembly represents the typical accompaniment of controls items for each HVAC unit.
- E. 25' 100A Motor connection shall be EACH, rather than LF if the assembly represents a whip of the description given for each motor it's attached to.
- F. 2-4" ductbank should be LF, rather than CY or CLF (wire unit). Description shall be given for volume-based items such as excavation or concrete with expanded math relation to give further description of assembly.

These examples show how logical assembly unit assignment can expedite review by making QTO simple and apparent. If structural plans show six F6 footings, quantity can be checked in a matter of seconds and math relations can be checked but once. If the footing assembly was CY, the volume of each footing would have to be calculated and summed and relations for reinforcement and forms be re-performed.

### 11.2.3 PACES (*Parametric Cost Engineering System*)

#### 11.2.3.1 *Background*

PACES (Parametric Cost Engineering System) is a parametric estimating program developed by AECOM for the creation of parametric cost estimates for Department of Defense construction projects. PACES may be used for concept estimates or Design-Build estimates only. PACES is not intended for unit take off estimates. However, the developed PACES estimate can be imported into MCACES to be used as a start for a complete unit take off estimate.

#### 11.2.3.2 *Estimate Setup*

The parametric estimate is started under the Program section with the program sponsor for the project. The program sponsor is typically the Army, Air Force, Army Reserve, etc. It is

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recommended to begin each separate project under this area so that it is easier to export projects. Therefore, you would indicate the program sponsor followed by the name of your project for a title in this area. Any overall project information can be placed within the comments tab.

Once the project is started under the Program section, the setup continues under the Project section. Under this section, you will add your project name. At the Project Details tab, you will complete all project information accordingly. It is important that the Construction Start date and the Construction Duration is inputted correctly so PACES calculates the project escalation correctly. PACES escalation is calculated using the NAVFAC Building Cost Index. If another source is desired to calculate the project escalation, that source must be submitted and approved by LRL. Note, that the Area Cost factors and the Location Modifiers shall be left at default values unless approved data sources are provided to LRL to indicate alternate values. All comments related to this tab shall be placed in the Comments tab. If the project is a 1391 development, the comments shall be placed under the DD1391 Comments tab.

Project

Details Comments

Project Name	TEST Project	Units Option	English
Project Number	86234	Prepared by	H2EDDANB
State / Country	Kentucky	Date Created	10/20/2022
City / Location	Fort Campbell	Construction Start	10/20/2024
Client / Agency	Amy	Construction Duration	24 Months
		Project Midpoint	10/2025 MM/YYYY
		Escalation	24.64 % Default

Area Cost Factors

Material	0.573
Labor	0.318
Equipment	0.018
Total ACF	0.91

Defaults

Location Modifiers

Seismic Zone	Moderate Damage
Summer Dry Bulb	92 F
Winter Dry Bulb	10 F
Frost Line Depth	5 IN

Defaults

DD1391 Comments

OK Cancel

### 11.2.3.3 Primary Facilities

Prior to choosing your PACES parametric model to use within the estimate, any available information about the facility or facilities should be gathered including, but not limited to, the total square foot of the facility, the number of stories, the functional space areas (FSA), exterior makeup, etc. The more information that is inputted into PACES, the more accurate the estimate will be. Choose the PACES model(s) that most represents the project's facility or facilities. Multiple facilities can be entered at this location. When the facility model is running, enter the collected information in relation to the facility. If any costs are manipulated within the Assemblies tab, the cost source information must be entered into the Comments tab.



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The screenshot shows a software window titled "Army Reserve Center" with a tabbed interface. The "Facility Definition" tab is active. The "Facility" section contains a text box for "Army Reserve Center" and a "Description" field with the text "61,113 SF, Two story, brick veneer facility with a standing seam roof." The "Area" section has a text box with "61,113 SF" and two checked checkboxes: "Default FSAs" and "Shell Assemblies". The "Stories" section has "Above Ground" set to 2 and "Below Ground" set to 0. The "Category Code" section features a table with the following data:

Category	Description
17834	40mm GR MG QUAL
21881	ABN EQ/PARA REP
14920	AC Arrest SYS
21120	AC COMP MAINT

Below the table is a "Search" text box. At the bottom of the window are "Help", "OK", and "Cancel" buttons.

### 11.2.3.4 Supporting Facilities

Supporting facility parametric models may be chosen similar to primary facilities in which their determined use is based on the project scope of work. A Comparative Supporting Facilities Add On may be used if there is not enough information about the project site to develop an estimate. If a supporting facility model is used, any manipulations of the Assembly tab's cost must be documented within the Comments tab of the model.

### 11.2.3.5 Project Markups

The markups applied to PACES developed projects shall be in accordance with current USACE cost estimating guidelines within UFC 3-740-05. Under PACES Project Markup toolbox, it is recommended to typically assume the work distribution to be 80% subcontractor work and 20% Prime contractor work. Prime Work markups are applied per guidance and sales tax shall be adjusted accordingly per location and as needed. Sub Work markups shall also be applied per guidance. Note, the Sub Work profit can be applied as a percentage verse under the Prime Markups, the Prime profit shall be adjusted to the Weighted Guidelines per UFC instructions. Under Other Project Cost markups, PACES default value for the Design Build Fee is 4%. Depending on whether or not the project is Design Build, this fee shall be adjusted accordingly or deleted.

### 11.2.3.6 Project Reporting

Reports shall be printed accordingly per project phase. For MILCON projects, it is recommended

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to print the 1391 Summary report, the Assembly Detail, each building parameter report, and a Level 2 Cost report. These reports shall be exported in PDF format and provided for review to LRL.

### **11.2.3.7 Project Submitting**

In addition to submitting the project Reports to LRL for review at each submittal phase, the native PACES file (\*.PACES) shall be submitted as well for review to LRL.

### **11.2.4 On Screen Take-off (OST) or Bluebeam Revu**

#### **11.2.4.1 Image Page Naming**

When importing sheets into OST or Bluebeam Revu, page names shall correspond to the sheet names as shown in the drawing title block. For large drawing sets, this can be a time-consuming process, but the larger the drawing set, the more necessary the requirement.

#### **11.2.4.2 Units of Measure and Naming**

The unit of measure shall match the corresponding expected line item in the estimate wherever possible. For items that require external calculation and manipulations, such as HVAC ductwork, the unit may be LF and shown as a line in the take-off image. However, the external Excel sheet for computing SF, weight, and surface area must be submitted with the estimate, just as the native take-off file. Similar requirements exist for other externally calculated or manipulated items such as excavations or other work. Naming of fields in calculation sheets or other manipulations shall be obvious and represent a clear line of traceability from the point of origin (OST image, Bluebeam, form, or excel sheet) to the qty field in MII.

Quantity take-offs shall be named as identified in the sheet image showing it most clearly, particularly for any scheduled item such as HVAC equipment, light fixtures, etc. All take-offs representing scheduled items such as HVAC equipment, plumbing fixtures, lighting fixtures, footings, slabs, roofing systems, wall types, etc. that are identified with a tag in drawings or project documents shall be use the tag for its name. If no tag is given, a commonsense name shall be made that eases traceability from the sheet in which the quantity is recorded to the corresponding line item in the estimate. For example, a steel member should be named “W8x21” such that it corresponds to a line item with similar description in the estimate. If a condition will be represented by an assembly (or linked folder) in the estimate, they shall be named the same. With exception of takeoff sub-totaling (for piping of same size on different floors, for example) or scrap, waste, and overage amounts, the qty for a specific condition in the takeoff tab should have complete calculation traceability and reproducibility through the submitted documents to the estimate file.

Take-off grouping and structure shall follow that of the estimate WBS wherever possible.



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### **11.2.5 BIM Quantity Takeoff (QTO)**

BIM models are encouraged for use as basis of QTO. However, the quality and resolution of the BIM model must be considered. Many components of the estimate may not be modeled, such as small piping or other details. The estimator must be cognizant of the level of detail the BIM model represents and shall not blindly rely on BIM qty's as a complete representation of item takeoff for the estimate. Where BIM models are used, the estimator shall include descriptions of items or systems that are completely modeled and reliable for use, as well as items that are not modeled. A general narrative of what portions of QTO are reliant on BIM and what is not shall be included in the Basis of Estimate.

### **11.2.6 Cost and Schedule Risk Analysis (CSRA)**

#### **11.2.6.1 CSRA Background**

Cost and Schedule Risk Analysis (CSRA) is an exercise required by HQUSACE for both Civil Works projects and MILCON projects. The CSRA is a tool used to identify, mitigate, and account for project risks that could potentially cause a variance from the estimated project cost and schedule. The CSRA is also used to determine contingency amounts for decision documents or in support of desired funding from the funding authority.

For LRL led CSRAs, the A/Es PDT will be asked to participate in the CSRA brainstorming session which requires the full PDT participation. The CSRA brainstorming session is a meeting that typically lasts one to two days where the PDT helps develop potential risks associated with the project.

#### **11.2.6.2 CSRA Military Construction (MILCON)**

The Under Secretary of Defense posted a memorandum (Lord Memo) on March 17, 2020, that dictates CSRA requirements for MILCON projects. Per the Memo, for MILCON projects authorized in FY24 and beyond, if the PA is greater than \$20 million, a CSRA shall be completed.

Although a CSRA can be developed at any time during a project, it is preferred to do so at the beginning of a project. For Army MILCON projects, the currently preferred project milestone is at the 35% design phase. For FY28 Army MILCON projects and beyond with a PA greater than \$20 million, the required minimum project milestone will be at the 35% project design stage per US Army official guidance. The purpose of a CSRA is to determine any risks and to mitigate them when possible. The earlier risks are identified, the more time the PDT has to mitigate these risks.

#### **11.2.6.2.1 A/E Developed Cost & Schedule Risk Analysis (CSRA)**

##### ***Cost & Schedule Risk Analysis (CSRA) Requirements***

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All Cost and Schedule Risk Analyses (CSRA) conducted on behalf of the Louisville District shall adhere to UFC 3-740-05 (Chapter 14) and the *USACE Recommended Best Practices for CSRA (2024)*, as outlined in the full document provided as Appendix C. The purpose of CSRA is to systematically identify, assess, and quantify project risks to establish defensible cost and schedule contingencies. The process ensures that risk-based contingencies are incorporated into total project cost estimates, reducing the likelihood of cost overruns and schedule delays for MILCON projects.

The CSRA process will require active participation from the full Project Delivery Team (PDT), including cost engineers, schedulers, project managers, and subject matter experts, customers, end users, and other relevant persons with knowledge about the project or specific program being assessed.

Architect/Engineering (A/E) firms performing CSRAs must facilitate a risk identification workshop (brainstorming session), develop a comprehensive risk register, conduct market research to quantify risk impacts, and use Monte Carlo-based statistical modeling (via Oracle Crystal Ball) to determine cost and schedule contingencies.

Key tasks in the CSRA process include:

1. **Risk Identification & Register Development** – Facilitating PDT discussions to document and categorize project risks.
2. **Market Research & Risk Quantification** – Establishing reasonable probability distributions for cost and schedule variations based on historical data and industry trends.
3. **Risk Modeling & Sensitivity Analysis** – Running Monte Carlo simulations to determine contingency values and identify key cost and schedule drivers.
4. **Integration into Project Planning** – Producing a CSRA report that informs decision-making, funding requests, and risk management strategies.
5. **Ongoing Review & Updates** – Ensuring that risk assessments are updated as project scope, costs, and schedules evolve.

Architect/Engineering (A/E) firms shall document their methodology and assumptions transparently, ensuring that CSRA results are traceable and reproducible. **The Louisville District, Cost Engineering Section retains final authority to review, validate, and request modifications** to CSRA results as necessary to align with USACE policy and best practices. The contractor's CSRA report must include a summary of risk drivers, probability-based contingency recommendations, and an assessment of risk mitigation strategies. Templates for these reports (and other relevant templates/checklist/examples) pertaining to Cost & Schedule Risk Analysis are available upon request or from the Cost MCX website at (<https://www.nwww.usace.army.mil/Missions/Cost-Engineering/>), as well as (<https://www.wbdg.org/dod/ufc/ufc-3-740-05>).

### 11.2.6.2.2 A/E Developed Cost & Schedule Risk Analysis (CSRA) Quality Control (QC)

Architect/Engineering (A/E) firms shall conduct a quality review (QC) on their provided CSRA report prior to submission to LRL. Another qualified estimator shall review the CSRA report. Evidence of this QC shall be presented to LRL in the form of a provided CSRA QC checklist that includes the name of the qualified estimator reviewing the CSRA.

After the A/E provides the CSRA report to LRL, the Lead Cost Engineer at LRL will conduct a Quality Assurance (QA) review using a LRL CSRA QC Checklist. The A/E shall provide corrections or

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comments as required to the satisfaction of the Lead LRL Cost Engineer. The LRL review is estimated to be two weeks but could vary pending workload. The A/E shall work closely with the PEA and LRL Cost Engineer.

### **11.2.6.3 Designated Construction Agent (DCA) Assessment**

DCA Assessments or the completion of ENG Form 6196 will be completed by USACE (ED-M-C) staff only. DCA Assessments are required for all MILCON projects authorized in FY24 and beyond.

## **11.3 SUBMITTAL PROCESSES AND REQUIREMENTS**

### **11.3.1 *General***

Project specific submittal requirements of the estimate shall be in accordance with the A-E contract scope. The Design Manager can provide specific addresses, number of copies, formats, and distribution lists as needed.

The following sections define general expectations of LRL ED-M-C for submittal contents. Which submittals are required or appropriate is as defined by contract documents or directed by the Design Manager.

### **11.3.2 *Quantity Takeoff***

All estimates shall be based on a detailed quantity takeoff of construction tasks unless the project is a Design-Build procurement or for programming purposes. If quantity takeoff is documented outside the estimating software package, files shall be maintained in an organized and retrievable manner such that examination or recalculation can be performed if necessary. The final quantity shall be recorded in the quantity field of the appropriate software package. In the event the QTO for an item is materially different from that shown in the project documents, such as adding a 10% waste factor, the difference of recorded and apparent quantity shall be noted appropriately within the estimate file.

QTO forms and sheets are required for submittal with the estimate if in electronic form, which is preferred. Manual forms, sheets, and notes in hard copy need not be submitted with the estimate submittal. However, they shall be retained, organized and retrievable by the estimator in the event a change needs implemented, or review inquiry is made.

External QTO software such as On-screen Takeoff or BIM models may be used for generating or recording QTO's. It provides easy and convenient method for displaying scope of takeoffs and calculating totals. Although use of these methods is not currently required, it is recommended.

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When external QTO software or electronic means are used, the associated QTO files become a required part of the estimate submittal.

### 11.3.3 *Estimate Distribution*

In general, the estimate report(s) shall be distributed in PDF format for project personnel in roles other than estimating in accordance with submittal requirements defined in the A-E contract. Record copies of the estimate shall be in accordance with contract documents.

The native estimate file(s) shall be distributed to only the Design Manager for forwarding to government estimators.

### 11.3.4 *Filename Convention*

The estimate files shall be named as appropriate using identifying characteristics of the project. All estimate files shall include the P2#, project title, submittal description (35%, interim, final, RTA, etc.), and date in that order. An example filename is as follows:

457861 Bldg F20607 HVAC Repair FINAL 1-25-16.mlp

### 11.3.5 *File Structure*

For most submittals, the contents will consist of the native estimate file, reports (native and pdf), and evidence of QC (i.e., quality checklist), thus little structure, if any, is needed. However, for projects complex enough to require multiple estimate files, the following file structure shall be used to organize the components of the submittal. The estimator is free to expand the file structure further down as needed. However, the example below should cover most cases. If a wholly different structure is needed to organize submittal files, present the matter to LRL ED-MC, **PRIOR** to submittal. For very large or complex projects, the file organization shall be agreed upon prior to generation of any files.

#### **Cost Engineering Submittal**

1. **Basis of Estimate**
  - A. **BOE File**
  - B. **Market Survey**
  - C. **Backup**
2. **Native Files**
  - A. **General**
  - B. **Summaries**
  - C. **Estimates**
  - D. **Estimate Supporting Files**
3. **Reports (PDF)**
  - A. **Native**
  - B. **PDF**
4. **QC Evidence**
  - A. **QCP**
  - B. **Review checklists**

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- C. ITR evidence
- D. ITR Signoff

Contents descriptions:

- 1.A – Only the BOE file in PDF or Word format. See 11.2.1 for content requirements.
- 1.B – Market survey as required by contract documents.
- 1.C – All backup to the BOE such as quotes, phone quote forms, cut sheets denoting costs, catalogue sheets. All such constituent files should be compiled into a single PDF file, enabling searching. Scanned files shall have OCR conversion performed before compiling. If the file is small (~20 pages or less) it may be appended to the back of the BOE. If the file is large, it shall be separate. It is not necessary to PDF print webpages in this file. The URL link can be referenced in the project or CSI task item in MII.
- 2.A – Shall include estimate templates and native MII report templates. May contain other native files as appropriate.
- 2.B – Shall include excel summary sheets and bid schedule. The excel summary sheet may collect estimate file bottom lines and calculate prime contractor markups in the event a project spans multiple estimate files.
- 2.C – Native estimate software files only.
- 2.D – Labor library and any supporting documentation exclusive of quotes and cutsheets as appropriate for folder 1.B. This may include excavation calculation sheets, ductwork calcs, electrical takeoff, etc. All files related to QTO and manipulations of QTO belong in this folder. This folder to include OST files. If there are many files, they shall be organized into subfolders via primary estimate divisions (building), or via subsystem such as structural, architectural, mechanical, electrical, etc.
- 3.A - Native Report files, one for each native estimate file.
- 3.B – PDF format copies of 3.A.
- 4.A – QCP for estimating process.
- 4.B – MILCON Review QC Checklists, one for each native MII file and collector/summary sheet.
- 4.C – All evidence of ITR process prior to submittal. This should include internal comments and their resolution prior to submittal.
- 4.D – ITR signature sheet only (standard file E), affirming ITR has been carried out and identifying all estimating team members and reviewers.

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### 11.3.6 *Pre-Submittal Process*

The following process shall be performed for all MII files just prior to submittal or resubmittal.

- a. Affirm QC review has been performed and that ITR sign off sheet is located in the proper folder for submittal.
- b. Affirm evidence of QC process (including MILCON checklists) is located in proper folder for submittal.
- c. Apply zero QTY filter. Populate QTY field or remove items as appropriate.
- d. Click item list in project tab, click show all items under filters. Click the contract cost header to sort by cost. Ensure there are no zero cost items.
- e. Apply no contractor assigned filter. Correct as necessary.
- f. Apply unused member cleanup tool.
- g. Affirm the latest cost book is used. Reprice as necessary.
- h. Ensure current labor library is located in proper folder with file submittal.
- i. Update wage rates using established labor library for the project.
- j. Update Equipment book as necessary. Update fuel cost.
- k. Verify sales tax rate and application at highest folder level.
- l. Verify correct information and duration in project properties tab.
- m. Save the file and close it, but not MII program.
- n. Within MII, click tools, then “Repair Library”. Choose path to the file for submission. Click OK when complete. Repeat for all \*.mlp files.
- o. Generate all reports and update summary sheets and BOE as necessary.

### 11.3.7 *File Transmittal*

File transmittal, regardless of method, shall preserve submittal file structure commensurate with complexity in accordance with section 11.3.5. This may entail several transmittals, one major folder at a time or otherwise. Note, that project PEA must be carbon copied on all transmittals.

#### 11.3.7.1 *Email*

Distribution of estimates via email should be done with caution due to attachment limitations and document control issues. However, files distributed via email can be accepted if they are compressed or file extensions are altered. Estimate files may be compressed (ZIP) to reduce file size. The attachment file size limit is approximately 10Mb. If the file is small enough, it may be sent uncompressed, but the file extension (native files only) must be changed to “.txt” to circumvent email filters for database files. When sending a native file, the email must include information regarding the original native file extension type (.mlp, .mla, .mrp, .mdb, etc.) so it can be reverted correctly when received.

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### **11.3.7.2 *FTP***

FTP utilizing DoD SAFE is the preferred method of file transfer. A user guide for accessing and using SAFE may be obtained from the Design Manager or LRL ED-MC.

Alternate FTP methods including A-E firm sites, can be used for transmittal of Controlled Unclassified Information (CUI) or formally known as For Official Use Only (FOUO) files, however FTP sites must be project specific, password protected, and require specific login. Peripheral communication (email, phone call, etc.) between the transmitter and receiver should be made to ensure complete transmittal and receipt of files, particularly if compressed into a single file.

### **11.3.7.3 *Sensitive or Secure UNCLASSIFIED Projects***

File transmittal for sensitive or secure projects shall be in strict accordance with contract requirements and applicable security procedures. Consult with the Design Manager for proper file transmission procedures.

### **11.3.8 *General Submittal Expectations***

#### **11.3.8.1 *Pre-concept and Other Estimate Derivatives***

There are generally no requirements for estimates prior to concept definition, however basic estimate products such as SF comparisons, charts, etc. may be needed. If the estimate product will be reviewed by the government or must be manipulated in anyway, the native file used to create such is required.

#### **11.3.8.2 *Concept Submittal***

At the concept submittal either software package may be used. If the project is a standard facility, PACES is probably more expedient, however MII may be used as well. Concept level estimates in MII must have summarized costs noted and explained. Assemblies, SF costs, and general allowances must be explained and noted in detail sufficient to verify applicability. The estimator may employ the use of design contingencies at this submittal commensurate with project detail.

For design-build (DB) projects PACES is likely the preferred package as it may be used throughout project development.

No bid schedule is required at the concept submittal.

#### **11.3.8.3 *Interim Submittal***

For design-bid-build (DBB) projects, MII is the preferred software package for this submittal. At this stage sufficient detail should be available to create a detailed, task-oriented estimate utilizing fewer summarized costs than at the concept submittal. The MII estimate may be an

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import from PACES or original creation. At this stage, the estimator should be migrating from primarily aggregate, summarized costs to detailed task analysis with more significant quantity takeoff. Additionally, design contingencies should be of diminished value from the concept submittal.

For DB projects, PACES is likely the preferred software package, however, MII may also be used. PACES projects should be edited and revised commensurate with project development. MII estimates may incorporate aggregated or summarized cost elements as necessary to reflect project costs.

Inclusion of editable draft bid schedule is encouraged with this submittal, although not required. The estimate structure shall reflect that of the bid schedule.

### **11.3.8.4 *Final Submittal***

For final DBB project submittals, all estimates should be complete using MII and based on detailed quantity takeoff and task analysis. At this stage, remnants of PACES import, or summarized costs should be eliminated, as well as the use of design contingencies.

For DB projects, either software may be used, although MII is preferred via importing the PACES file into the software. If PACES was used from project beginning, it is expected that basic model assumptions have been verified and edited as necessary to reflect project development. If utilizing MII, some aggregate or summarized costs may be appropriate, but should not comprise the primary basis of the estimate.

An editable and completed bid schedule is required for this submittal. The estimate structure shall reflect that of the bid schedule.

The estimates shall incorporate comments and changes from the interim review.

### **11.3.8.5 *Subsequent Submittals***

For post-final submittals, such as corrected, certified, RTA, etc., the submittal expectations are the same as for final.

The bid schedule shall be finalized, filled, and editable. The estimate structure shall match the bid schedule such that the estimator has pulled bid schedule values from the corresponding estimate report with no manipulation other than the addition of escalation if applied.

The estimate should require no manipulation by the government other than wage rate updates during the advertisement period and incorporate all comments and changes made to date.

In accordance with the A-E contract documents, the estimator shall provide estimating services for cost impacting amendments. All cost estimating principles stated within this document shall apply to the development of the cost estimate changes due to amendment.



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### **11.3.9 1354 Submittals**

The DD Form 1354 is the official DoD form documenting real property. LRL ED-M-C is sometimes tasked with developing the Draft version of this form. ED-M-C is not required to complete any version of this form beyond a Draft version. After the Draft version is developed, USACE Construction Division will develop the Interim and Final versions. All items within the DD 1354 shall be provided by the PM or the Real Property Manager for the project.

#### **11.3.9.1 1354 *DRAFT* Development**

The Draft DD Form 1354 will be completed as shown in the below example. Box 1 will be completed with the address of the District office for LRL. Box 2 will be completed with the date the form was prepared. Box 5 will be completed with the customer's real property office address. This shall be provided by the PM. Box 8c shall be checked as DRAFT. Box 9 shall be numbered according per item listed. Box 11 shall be completed with the correct CAT code for the item listed. Box 12 shall be completed with the correct CAT code description of the item. Box 13 shall be listed as "P". Box 15 will be completed with correct area unit of measure and Box 16 shall list the actual units of area if the item is an Area item. All other units of measure and quantities for any other item that is not an area item shall be completed in box 17 and 18 accordingly. Box 20, 21, & 22 shall be listed as "01" unless instructed otherwise.

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TRANSFER AND ACCEPTANCE OF DoD REAL PROPERTY														Form Approved OMB No. 0704-0188	
														PAGE 1 OF 3 PAGES	
<small>The public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Washington Headquarters Services, Executive Services Directorate, Information Management Division, 4800 Mark Center Drive, Alexandria, VA 22304-3100 (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</small>															
PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE ABOVE ORGANIZATION.															
1. FROM (Organization Name) US Army Corps of Eng. Louisville Dist. 600 Martin Luther King Jr. Blvd Louisville, KY 40201				2. DATE PREPARED (YYYYMMDD) 20210915		3. PROJECT/JOB NUMBER 88554		4. SERIAL NUMBER		8. TRANSACTION DETAILS					
5. TO (Organization - Installation Code and Name) HQ Fort McCoy ATTN: IMWE-MCY-PW Fort McCoy, WI 54656				6. RPSUID/SITENAME/INSTCODE/INSTNAME		7. CONTRACT NUMBER(S)		7a. PLACED-IN-SERVICE DATE (YYYYMMDD)		a. METHOD (X all that apply) <input type="checkbox"/> ACQUISITION BY CONSTRUCTION <input type="checkbox"/> TRANSFER BETWEEN SERVICES <input type="checkbox"/> CAPITAL IMPROVEMENT <input type="checkbox"/> INVENTORY ADJUSTMENT				b. WHEN/EVENT (X one) <input type="checkbox"/> TOTAL ASSET PLACED-IN-SERVICE <input type="checkbox"/> PARTIAL ASSET PLACED-IN-SERVICE	
										c. TYPE (X one) <input checked="" type="checkbox"/> DRAFT <input type="checkbox"/> FINAL <input type="checkbox"/> INTERIM					
9. ITEM NO.	10a. FACILITY NO.	10b. RPUID	11. CATEGORY CODE	12. CATCODE DESCRIPTION	13. TYPE CODE	14. SUBST. CODE	AREA		OTHER		19. COST	20. FUND SOURCE	21. FUND ORG	22. INTER-EST CODE	23. ITEM REMARKS
15. PRIMARY UM	16. PRIMARY UM QUANTITY	17. SECONDARY UM	18. SECONDARY UM QUANTITY												
1			14187	Brigade HQ Bldg	P		SF	22,353				01	01	01	
2			13510	Communication Lines	P				LF	800		01	01	01	
3			84210	Water Distribution	P				LF	4600		01	01	01	
4			84210	Fire Water Distribution	P				LF	65		01	01	01	
5			82410	Natural Gas	P				LF	250		01	01	01	
6			87110	Storm Sewer	P				LF	283		01	01	01	
7			85220	Sidewalks	P		SY	232				01	01	01	
8			81242	Primary Electrical	P				LF	150		01	01	01	
9			83210	Sanitary Sewer	P				LF	350		01	01	01	
10			85210	Concrete Pavement	P		SY	284				01	01	01	
24. STATEMENT OF COMPLETION. The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.										25a. ACCEPTED BY (Typed Name and Signature)			b. DATE SIGNED (YYYYMMDD)		
a. TRANSFERRED BY (Typed Name and Signature)						b. DATE SIGNED (YYYYMMDD)				c. TITLE (DPW/RPAO)			26. PROPERTY VOUCHER NUMBER		
c. TITLE (Area Engr./Base Engr./DPW/Construction Agent)															

DD FORM 1354, AUG 2013

PREVIOUS EDITION MAY BE USED.

Adobe Designer 9.0

### 11.4 QUALITY CONTROL

The lead estimator and team are responsible for adhering to quality control processes denoted in the applicable QCP. For estimates spanning multiple files the appended ITR sign-off sheet shall identify estimators and discipline, as well as their respective reviewers, and the lead estimator ultimately responsible for estimate quality. All estimates must be peer reviewed prior to submittal, and the reviewer shall possess applicable estimating experience and familiarity with the software package used. As part of that peer review, a MILCON review checklist shall be used and submitted with the estimate. The review checklist can be placed in the Basis of the Estimate or in an appendix to the estimate. Under no circumstances will the un-reviewed product of a single estimator be accepted by LRL ED-M-C.

All documentation of quality control processes and procedures including the pre-submittal process (See section 11.3.6) are a required part of each submittal and shall be located accordingly in the file structure listed in section 11.3.5.

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### **11.4.1 General**

All estimates received by LRL ED-M-C will be reviewed for quality assurance in accordance with standard estimating process and procedures outlined in this document. The reviewer will provide written comments usually in the designated review in ProjNet but may be in the form of a word document or email sent to the estimator or A-E firm representative.

The estimator is strongly encouraged to begin dialogue with the reviewer to address and alleviate concerns. As mentioned throughout this document the reviewer will seek to fully understand the estimator's intent and application of items in the estimate. The overwhelming majority of review concerns or comments are typically related to lack of understanding of the estimator's method or basis information by the reviewer.

### **11.4.2 Review Process**

#### **11.4.2.1 Step One**

The government estimator will confirm the inclusion of QC evidence in the estimate submittal prior to further review of the estimate. The reviewer will confirm peer review was performed and comments or other evidence of comment resolution was included in the submitted estimate.

MILCON projects estimates will be reviewed according to estimator's judgment as necessary but will basically follow the general direction of the LRL MILCON Checklist. A version (current as of FY23) of this checklist is included as Appendix A for reference. This is a living document subject to change and the most current edition can be obtained via request to the LRL ED-M-C POC. Estimators are encouraged to develop estimates with this checklist in mind for all MILCON projects, however for Reserve projects, its use by the government reviewer is mandatory.

In addition to the items and limits set forth in the checklist, the reviewer may use additional means or methods of review as applicable. Some of these general methods are described below.

#### **11.4.2.2 80/20 Rule**

Estimates may be reviewed in accordance with the general 80/20 rule observation that 80% of project costs are associated with 20% of tasks. Tasks comprising a high dollar value due to unit costs or large quantity will be scrutinized for accuracy. The complete task list in the estimate may be exported to excel for calculation and analysis of general rules of thumb.

Single line items comprising more than 0.5% of contract cost, will be reviewed and or verified.

#### **11.4.2.2 Contractor Markups**

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Contractor markups will be assessed for structure and reasonableness base on prior experience and project particulars. Profit will be assessed in accordance with methods suggested in this document and the reviewer's judgment as necessary. Field office overhead will be reviewed considering project requirements and methods previously suggested.

### **11.4.2.3 *Quantity Takeoff***

Quantity takeoff for high value components will be thoroughly reviewed as reflected in project documents and drawings. Depending on complexity of the estimate, varying degrees of spot checking may be employed by the reviewer.

### **11.4.2.4 *USR Items and Overrides***

All significant USR items and overrides will be reviewed thoroughly. The estimator shall thoroughly explain basis of creation or edit of user created items and overrides for the reviewer. User created assemblies, crews, and CSI tasks will be reviewed for proper makeup and math relations. Application of the procedures recommended in this document will facilitate review.

### **11.4.2.5 *Wage Rates***

Wage rates will be compared with the most current Davis-Bacon wage decision or other criteria if applicable.

### **11.4.2.6 *General Proportional Analysis***

Labor, material, and equipment proportions will be examined by comparison to prior experience for similar projects. Additionally, systems proportions may be examined for typical military construction project estimates.

### **11.4.2.7 *Army Reserve Projects***

Army Reserve projects comprise a portion of LRL's overall mission and usually consist of a standard group of facilities. These Reserve projects are often located in areas other than established military installations. It is imperative that the estimator fully understand, consider, and apply local market conditions specific to each project to produce accurate estimates.

In order to accurately capture local market conditions, Cost Analysis section R of the checklist will be applied. While this is perfectly applicable to other MILCON project estimates, it was created specifically for use on Army Reserve projects.

### **11.4.2.8 *Specially Designated Projects***

In addition to the aforementioned review processes, large or complex projects designated as "Super", "Mega", or "Giga" based on cost will incur additional review process including Agency Technical Review, Cost certification, etc. While these processes will generally be enabled for

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projects over \$40M, they may be utilized for any project based on complexity, political sensitivity, or other factors. Projects with expected cost of >\$40M will generally follow the processes required as shown in Appendix B – DVA Cost Product Review Matrix.

### **11.4.3 Estimate Submittal Rejection**

Submittals will be wholly rejected by LRL ED-M-C for the following reasons:

1. Broad in adherence to this guide & wide scale use of unexplained USR costs, adjustments, and overrides.
2. Omission of QC evidence in submittal
3. Prior submittal comments
  - a. Un-responded comments
  - b. Numerous non-specific comment responses
  - c. Unincorporated prior responses
4. Estimate and design level mismatch
5. Omission of pre-submittal process
6. Estimate not provided in approved software.

***Rejections for the aforementioned reasons will be reflected in CPARS evaluations.***

### **11.4.4 Comment Response and Resolution**

Comments from prior submittals may not have closure in ProjNet, but dialogue and discussion between the estimator and reviewer must establish some forward path to resolution prior to the current submittal. For example, if a comment is regarding a quote and the estimator is awaiting response from a vendor for comment closure, this is acceptable as the path toward closure is known and has been established.

It is preferred practice to have the estimator enabling changes to respond to comments with specific details on how the comment will be resolved, and only after that resolution has actually taken place (but not submitted). An example below:

Comment: Please review PWG factors IAW with UFC 3-740-05 Chap 11 section 2-2.

Acceptable response (from estimator):

1. Size factor changed from 0.07 to 0.04, Assistance changed from 0.07 to 0.12. (BEST)
2. These changes have been incorporated and will be evident in next submittal<sup>†</sup>.

<sup>†</sup> Some comments are complex and require complex or multiple solutions. In this case, the response is not specific, but may be the most expedient and appropriate response. However, if

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non-specific responses such as this indicating the correction is “in the next submittal” are widely used and the next submittal does not contain the corrections in multiple cases, the submittal will be rejected.

Unpreferred responses:

1. Will review.
2. Adjusted markups.
3. Will address at next submission. (from Design Manager)

It is understood that design managers or design AE PM’s must have purview of all comments generated and may need to respond to some, however, if responses are handled by anyone not directly involved with estimate manipulation, it is preferred that the response be crafted by the responsible estimator and relayed by the responder.

### **11.5 END CUSTOMER SPECIFIC REQUIREMENTS**

#### ***11.5.1 Army Reserve Projects***

Army Reserve projects currently require no special provisions.

#### ***11.5.2 Air Force Reserve Projects***

Air Reserve projects currently require no special provisions.

#### ***11.5.3 DODEA Projects***

DODEA projects require use of File D – DODEA report with estimate markup creation IAW with Appendix C DODEA Work Instruction.

#### ***11.5.4 Department of Veterans Affairs (DVA) Projects***

DVA projects may require special consideration or estimate structure to accommodate various funding streams IAW

#### ***11.5.5 Department of Energy (DOE) Projects – (In Development)***

Currently, there are no special considerations.

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### **11.6 SPECIAL PROJECT CONSIDERATIONS – *RESERVED***

### **11.7 FEEDBACK**

#### **11.7.1 *Bid Abstracts***

Feedback in the way of bid abstracts cannot be provided due to Procurement Integrity concerns. However, if award information is desired, USACE Contracting must be notified via Freedom of Information Act (FOIA) procedures.

#### **11.7.2 *CPARS Evaluation***

Government cost reviewers will provide input to the AE Manager COR with respect to cost estimate products for overall cost control and quality for CPARS evaluation at the conclusion of AE contracts or annually as needed. Submittal rejections are of particular note for the evaluation process.

#### **11.7.3 Revisions**

Revisions to this document can be requested or suggested in writing via email through the LRL ED-M-C POC. This document serves as a collection of best practices, SOP's, and lessons learned in order to continually improve the estimating process to better serve LRL's customers directly and ultimately the US taxpayer, by providing accurate, timely, and current cost information to design and project management teams.

### **11.8 APPENDICES**

**A – Equipment Region Map (from EP 1110-1-8)**

**B – MILCON Sample Checklist**

**C – CSRA Sample Checklist**

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### APPENDIX A

#### Equipment Region Map (from EP 1110-1-8)

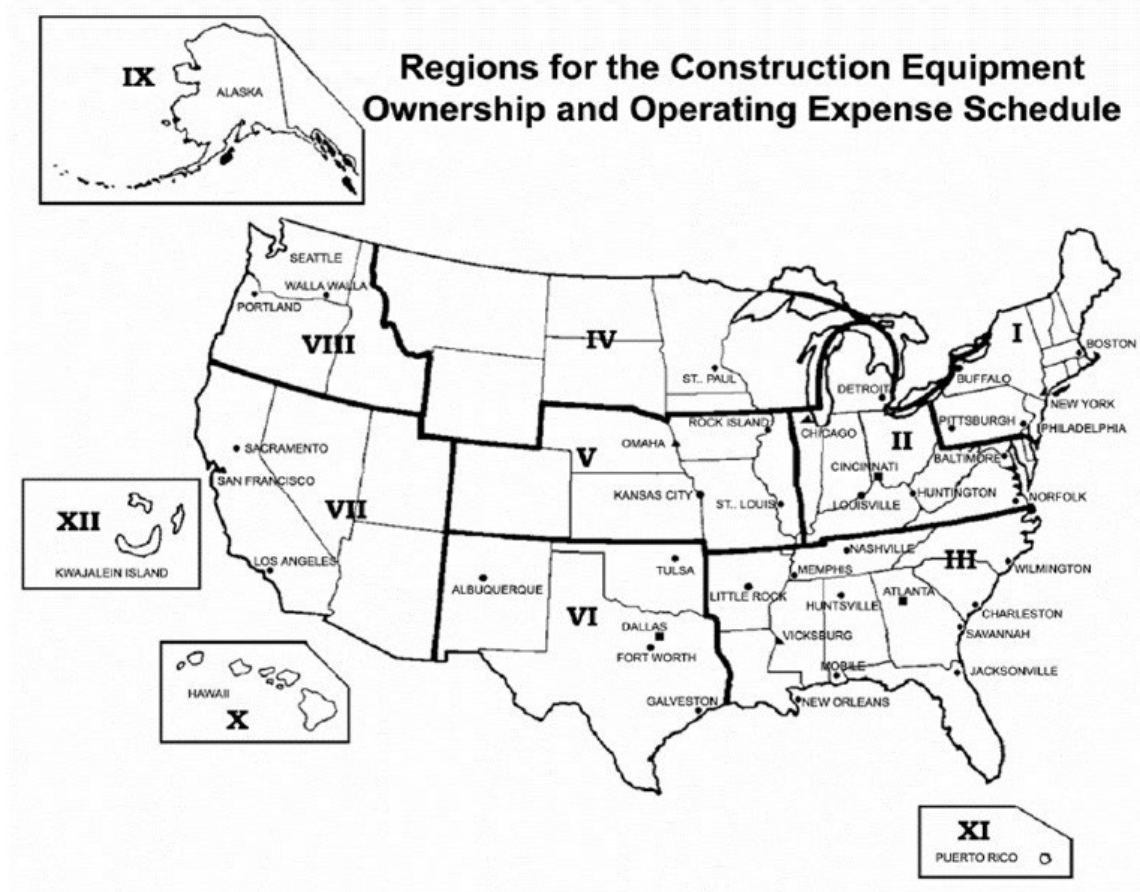


Figure 1.1. Regions for the Construction Equipment Ownership and Operating Expense Schedule



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### **APPENDIX B**

#### **SAMPLE MILCON CHECKLIST** *(For Reference Only)*

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### **APPENDIX C**

#### **SAMPLE CSRA CHECKLIST** *(For Reference Only)*