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6 June 2011

UNIFIED FACILITIES CRITERIA (UFC)

PROGRAMMING COST ESTIMATES FOR MILITARY CONSTRUCTION

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U.S. ARMY CORPS OF ENGINEERS (Preparing Activity), USACE

NAVAL FACILITIES ENGINEERING COMMAND, NAVFAC

AIR FORCE CIVIL ENGINEER SUPPORT AGENCY, AFCESA

Record of Changes (changes are indicated by \1\ ... /1/)

Change No.	Date	Location

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This UFC supersedes UFC 3-700-01A, dated 01 March 2005. This UFC was also previously numbered UFC 3-700-01.

FOREWORD

The Unified Facilities Criteria (UFC) system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with USD(AT&L) Memorandum dated 29 May 2002. UFC will be used for all DoD projects and work for other customers where appropriate. All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (HNFA), and in some instances, Bilateral Infrastructure Agreements (BIA.) Therefore, the acquisition team must ensure compliance with the more stringent of the UFC, the SOFA, the HNFA, and the BIA, as applicable.

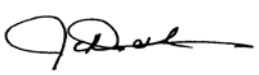
UFC are living documents and will be periodically reviewed, updated, and made available to users as part of the Services' responsibility for providing technical criteria for military construction. Headquarters, U.S. Army Corps of Engineers (HQUSACE), Naval Facilities Engineering Command (NAVFAC), and Air Force Civil Engineer Support Agency (AFCESA) are responsible for administration of the UFC system. Defense agencies should contact the preparing service for document interpretation and improvements. Technical content of UFC is the responsibility of the cognizant DoD working group. Recommended changes with supporting rationale should be sent to the respective service proponent office by the following electronic form: Criteria Change Request (CCR). The form is also accessible from the Internet sites listed below.

UFC are effective upon issuance and are distributed only in electronic media from the following sources:

- Whole Building Design Guide web site http://dod.wbdg.org/.

Hard copies of UFC printed from electronic media should be checked against the current electronic version prior to use to ensure that they are current.

AUTHORIZED BY:



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UNIFIED FACILITIES CRITERIA (UFC)
REVISION SUMMARY SHEET

Document: UFC 3-730-01
Superseding: UFC 3-700-01A, dated 1 Mar 05

Description of Changes:

This document is a complete update to UFC 3-700-01A, establishing criteria and standards for development and preparation of programming cost estimates for constructing military facilities using published guidance unit costs.

Reasons for Changes:

This UFC will provide guidance on the correct way for DOD personnel to prepare programming cost estimates.

Impact:

There are negligible cost impacts.

Non-Unification Issues: Due to differences in Services management structure and operational processes, not all criteria within this UFC are unified.

Format, Presentation of Government Estimate, and Productivity Adjustment Factors - The preliminary and intermediate steps in the preparation of the programming construction estimates vary among the Services, however, the final estimate product is essentially the same.

1) The design execution processes by which the Services produce cost estimates are also different. The Army manages this process by means of using design codes, which are issued by HQDA (DAIM-FD). There are twelve distinct design codes. The USACE in turn issues these codes to their divisions and districts through the directive network (DIRNET) system within the Programming Administration and Execution System (PAX) processor (AR-420-1). The Navy manages this process by means of the MILCON Team Planning Programming Process. There are no design code directives as with the Army. The Navy process is an ongoing reiterative process from the initial planning by Installation/PWD to the Program Final DD Form 1391 to NAVFACHQ.
2) The Military Services utilizes the DoD Facilities Pricing Guide (UFC 3-701-01, for preparation of the DD Form 1391 MILCON project estimates. However, the Army also produces a supplemental document (PAX Newsletter 3.2.2, Unit

Costs for The Army Facilities – Military Construction Program) to provide additional unit cost guidance for non-standard facilities, which are not covered by UFC 3-701-01. The Navy does not produce a supplemental unit cost guidance document for non-standard facilities, but can refer to the latest version of the Army PAX Newsletter 3.2.2.

Other Project Costs such as Supervision, Inspection, and Overhead (SIOH) - The Services set different SIOH percentage rates. SIOH is a cost allotment for the agencies field construction management of the construction projects.

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PROGRAMMING COST ESTIMATES FOR MILITARY CONSTRUCTION

1 INTRODUCTION

1-1 Purpose

This UFC establishes criteria and standards for development and preparation of programming cost estimates for constructing military facilities using published guidance unit costs or using a parametric estimating program. Published guidance unit costs that may be used are the latest versions of UFC 3-701-01 DoD Facilities Pricing Guide or the U.S. Army Corps of Engineers PAX Newsletter 3.2.2. The Tri-Services approved PACES parametric estimating program may also be used for development and preparation of programming cost estimates for constructing military facilities.

1-2 Scope

This UFC addresses programming cost estimates for new construction and alteration projects, includes cost data (based on historic data and experience) and factors for adjusting facility costs to reflect project conditions.

2 REFERENCE

The following document forms a part of this UFC to the extent referenced:

UFC 3-701-01 DoD Facilities Pricing Guide, updated and issued annually.

AR 420-1 ARMY FACILITIES MANAGEMENT (*RAR 001, 03/28/2009) 12 February 2008

3 OVERVIEW

Programming cost estimates must be prepared as accurately as possible to reflect the budgetary cost of providing facilities. In order to do this, basic data must be accurate and it must be consistently applied. A basic cost model that reflects all applicable factors derived from accurate data forms the basis for determining the facility budgetary cost at a specific location and under specific conditions.

4 ESTIMATING NEW FACILITIES (LESS FAMILY HOUSING)

4-1 Estimates Using Published Guidance Unit Costs

4-1.1 Facility Unit Costs

Estimates may use facility unit costs published in either UFC 3-701-01 or the Army PAX newsletter. These publications contain a listing of expected facility unit costs, updated annually, for locations having a geographical location adjustment factor of 1.00. Unit prices for the Army PAX newsletter reflect costs forecast on the basis of an assumed midpoint of construction date. Unit prices for UFC 3-701-01 reflect historical costs only, normalized to the “as of” reference date in the table. The prices for buildings in both documents are based on criteria existing at the time of preparation, and include the cost

of installed building equipment, heating, air conditioning, fire protection systems, and the minimum antiterrorism design features (reference UFC 4-010-01) meeting Table B-1 standoff minimum distance requirements, etc. as authorized by existing regulations. The unit costs for buildings exclude all supporting facilities outside the 5-foot line such as water, gas, electrical, and telephone service; sanitary and storm sewers; special foundations (piles, piers, rock excavation); fencing; site improvements (clearing, grading, seeding, and planting of trees and shrubs); and demolition.

4-1.2 Basic Adjustments to Facility Unit Costs

Except for facilities subject to congressional statutory limitation, programming for repetitive type facilities will be adjusted by all applicable factors. Programming estimates will make proper allowances for all factors that may be reasonably expected to influence project cost through the expected construction period. However, deviations, which are significantly above or below the factored unit cost, must be explained in detail. Appropriate cost factors will be used for facilities subject to statutory limitations (i.e. family housing). If the adjusted estimated construction cost is over the statutory limit, a waiver including complete substantiating data must be requested in accordance with cognizant agency policy.

4-1.2.1 Size Adjustment

Project Size Adjustment Factors provides adjustment factors to be used when the reference standard gross square footage differs from a similar type building's reference size shown in UFC 3-701-01, Table 2, Facility Unit Costs for Military Construction. Table 1 SIZE ADJUSTMENT FACTORS in this document provides adjustment factors to be used when the reference standard gross square footage differs from that listed in UFC 3-701-01, Table 2, Facility Unit Costs for Military Construction.

Table 1 SIZE ADJUSTMENT FACTORS

SIZE RATIO	ADJUST FACTOR	SIZE RATIO	ADJUST FACTOR	SIZE RATIO	ADJUST FACTOR	SIZE RATIO	ADJUST FACTOR
0.0000	0.0000	0.4000	1.1140	0.8000	1.0250	1.2000	0.9820
0.0500	1.2750	0.4500	1.0980	0.8500	1.0180	1.2500	0.9780
0.1000	1.2690	0.5000	1.0840	0.9000	1.0110	1.3000	0.9740
0.1500	1.2320	0.5500	1.0720	0.9500	1.0050	1.3500	0.9710
0.2000	1.2020	0.6000	1.0600	1.0000	1.0000	1.4000	0.9680
0.2500	1.1750	0.6500	1.0500	1.0500	0.9550	1.4500	0.9650
0.3000	1.1520	0.7000	1.0410	1.1000	0.9900	1.5000	0.9620
0.3500	1.1320	0.7500	1.0330	1.1500	0.9860	1.5500	0.9600

SIZE RATIO	ADJUST FACTOR
1.6000	0.9570
1.6500	0.9550
1.7000	0.9530
1.7500	0.9510
1.8000	0.9490
1.8500	0.9470
1.9000	0.9450
1.9500	0.9430

SIZE RATIO	ADJUST FACTOR
2.0000	0.9420
2.0500	0.9400
2.1000	0.9390
2.1500	0.9370
2.2000	0.9360
2.2500	0.9350
2.3000	0.9330
2.3500	0.9320

SIZE RATIO	ADJUST FACTOR
2.4000	0.9310
2.4500	0.9300
2.5000	0.9290
2.5500	0.9280
2.6000	0.9270
2.6500	0.9260
2.7000	0.9250
2.7500	0.9240

SIZE RATIO	ADJUST FACTOR
2.8000	0.9240
2.8500	0.9230
2.9000	0.9220
2.9500	0.9210
3.0000	0.9210
3.0500	0.9200
>3.05	0.9200

Table 2 BARRACKS/DORMITORIES PROJECT SIZE ADJUSTMENT FACTORS

Numbers of Soldiers in the Project	Project Size Factor
1-99	1.07
100-149	1.03
150-199	1.00
200-299	0.97
300+	0.95

Table 3 MILITARY FAMILY HOUSING PROJECT SIZE ADJUSTMENT FACTORS

Number of Units in the Project	Project Size Factor
1-9	1.25
10-19	1.15
20-49	1.10
50-99	1.04
100-199	1.00
200-299	0.93
300+	0.90

4-1.2.2 Location Adjustment

UFC 3-701-01, Table 4-1: Area Cost Factors is a listing of factors for use in adjusting estimated costs to specific geographical areas. The Area Cost Factors (ACF), updated annually, reflect the average statistical differences in normal labor, material, and equipment costs for similar facilities built in different geographical locations. The ACF includes allowances for weather, seismic, climatic, normal labor availability, labor productivity, life support/mobilization, and contractor's overhead and profit conditions. The factors do not reflect abnormal differences due to unique site consideration, such as historical preservation.

4-1.2.3 Cost Escalation Adjustment.

UFC 3-701-01, Table 4-1: Escalation Rates: Escalation Rates, updated annually, provides data to be used to project cost escalation due to inflationary factors that apply to construction costs. The unit prices shown in UFC 3-701-01: Table 2, Facility Unit Costs for Military Construction, reflect historical costs only, normalized to the “as of” reference date in the table. These costs should be escalated to the expected midpoint of construction using the appropriate escalation factor. The midpoint of construction for each facility should be determined based on a realistic judgment of the construction time schedule. Locate the applicable midpoint of construction date for the escalation rate from UFC 3-701-01 Table 4-1. It may be necessary to interpolate between the escalation rates for the months between the stated years. When using the Army PAX newsletter for projects scheduled differently than the assumed midpoint of construction, follow the guidance in the newsletter.

4-1.2.4 Technological Updating Adjustment

Technological advances in equipment and operational techniques used in some specialized facilities are being developed rapidly; this often causes obsolescence to occur before design and construction are completed. Also, revisions in criteria to provide life cycle cost benefits may increase initial funding requirements before feedback data can reflect the added cost. An additional allowance for technological updating may be appropriate for these conditions. Usage of these factors shall be fully documented and explained in the estimate notes. Technological updating factors by DoD Basic Category group codes of facilities are listed in Table 4.

Table 4 TECHNOLOGICAL UPDATE ADJUSTMENT FACTORS

DoD Basic Category	Category Series Description	Adj Factor
300	Research, Development, Test, & Eval Facilities	1.10
500	Hospital and Medical Facilities	1.05
810	Electric Power	1.01
820	Heat and Refrigeration	1.02
830	Sewage and Waste	1.05

880	Fire and Other Alarm Systems	1.05
890	Misc Central Plant (Heat, Refrigeration, & Elec)	1.03

4-1.3 Design Contingency Adjustment.

The facility cost estimate may include a design contingency allowance based on design data reliability. The design contingency (DC) allowance is to cover component items that cannot be analyzed or evaluated at the time the facility cost estimate is prepared; however, such items are susceptible to cost evaluation as engineering and design progresses. The DC depends on the reliability and refinement of the data on which the estimate is based; it therefore diminishes as design progresses from the pre-design stage through the design completion stage. Although it lessens at each successive design stage, the initial magnitude of the DC at the pre-design stage depends on the technical complexity of the project for which the facility cost estimate is being prepared. The level of technical complexity must first be established as a prerequisite for determining the magnitude of the DC. Technical complexity levels and design contingency factors are listed in Table 5.

Table 5 TECHNICAL COMPLEXITY LEVELS AND DESIGN CONTINGENCY FACTORS

Technical Complexity Level	Description	Design Contingency Factor	
		Pre-Concept	Concept
LOW	Site adapted, repetitive standard design project involving routine technology	1.050	1.025
MEDIUM	Unique design involving complex technology	1.100	1.050
HIGH	Unique design involving highly complex technology	1.150	1.100
ULTRAHIGH	Unique design involving extremely complex or innovative technology	1.250	1.150

4-2 Estimates Using Parametric Models

4-2.1 Parametric Estimating

Parametric estimating consists of a computer-based methodology that uses factors based on engineering parameters developed from historical cost databases, construction practices, and engineering and construction technology. These factors include physical properties that describe project definition characteristics, such as size, building type, foundation type, exterior materials, roof type and materials, number of floors, functional space requirements, and utility requirements, etc. The major advantage of parametric

estimating is that it can provide detailed construction cost relatively quickly with only limited analysis of the facility. Parametric estimating is only as good as the effort expended in identifying the key project inputs. It must be based upon an accurately developed project definition and scope. All parametric assumptions and key project inputs must be documented to provide rationale for the development of the estimate. The only Tri-Services approved computer-based parametric estimating program at this time is PACES and training is required prior to usage.

4-2.2 Parametric Estimate Charette Process

Parametric estimating charette process for Military Construction (MILCON) is an excellent project execution tool for DD Form 1391 project scope and cost development. The charette process is an intense design effort to gather all project data within a relatively short period of time to finalize the project definition, scope, and the parametric cost estimate. This charette process fosters quality through customer involvement in the development of project definition, scope and budgetary cost estimates. It is imperative that all major entities involved with the project be energized and actively participates in the project scope validation, such as Installation personnel, Project Manager, and the Design Product Delivery Team(s). The charette process conducted by the Design Product Delivery Team(s) is the method by which the DD Form 1391 project scope and cost development is accomplished.

4-3 Determining and Using Other Cost Adjustment Factors

In some cases other adjustment factors may apply. These are in addition to those set up in the Guidance Unit Cost conditions. The special adjustment factors apply only in special individual cases. They are not to be confused with the Guidance Unit Cost adjustment factor for size, location, and cost growth. These special adjustment factors will not be used unless they are in compliance with cognizant design agency guidance and are justified on the basis that they reflect significant cost that would not be included in the adjustment factors used to establish basic Guidance Unit Cost conditions. The usage of these special adjustment factors shall also be fully documented in the project estimate notes.

4-3.1 Historical Requirements Adjustment

An allowance for unique architectural features to comply with historical requirements is permitted for facilities to be built at locations listed in the national register of historical landmarks. The factor for historical adjustment is typically 1.05. Deviation above the allowed factor must be explained in detail.

4-3.2 Site Sensitivity Adjustment

A site sensitivity adjustment may be necessary for those special cases where the unique nature of both the site and the project, in relation to one another will cause a significant impact on the cost. An analysis for site sensitivity adjustment should consider only those unique site conditions, which will influence cost by virtue of the uniqueness of the conditions involved. The factor used in adjusting the total construction cost for such a set of unique conditions is referred to as the “Site Sensitivity Adjustment Factor.” The method outlined below may be used to determine the cost impact caused by the

influence of a project upon itself, resulting from an extremely large concentration of construction effort, or from extreme site limitations, or from both. Appendix B is a listing of example sensitivity considerations and computations with a range of values, where applicable, from above normal to substantially below normal. This sample listing of site sensitivity considerations is meant to indicate examples only and is not a complete and comprehensive list.

4-3.3 Technical Specialty Competition Adjustment

A technical specialty competition adjustment may be necessary in those special cases where competition for services of certain specialty craftsmen is created due to the increase in the type of work requiring their services; or because of the decrease in the number of craftsmen available in the workforce. An analysis for technical specialty adjustment should consider the total marketing area that may have an effect on competition for the services of the specialty craft under consideration. The factor used in adjusting the total construction cost for such a competitive market is referred to as the "Technical Specialty Competition Adjustment" factor. A method that may be used to determine the additional project costs caused by the competition for the services of specialty craftsmen is displayed for the labor availability item of Appendix B. Factors considered for the labor portion of a "Site Sensitivity" analysis would be very similar to those considered for "Technical Specialty Competition." Therefore, this same methodology can be used. By determining the degree of labor availability (i.e., slightly below normal, substantially below normal, and extremely below normal) and making assumptions as to required inducements, the cost of such inducements in terms of a Technical Specialty Competition Adjustment factor can be computed.

4-4 Other Allowable Costs for Primary Facilities

There may be situations where other Primary Facility cost components will be required for the project, which are not part of the facility guidance unit cost or parametric model, and may be itemized separately. Examples of these items may be enhanced anti-terrorism/force protection standards when more stringent that minimum are required or when minimum UFC 4-01-01 Table B-1 standoff distances are not achieved, building information system, system commissioning, special foundations, hazardous & toxic material removal/abatement, electronic security equipment (rough-in), hardstands/aprons, etc.

Sustainable design, SDD and EPAct05 costs shall be calculated as 2% to 3% percent of the total building facility cost (per each building facility if there are multiple building facilities). Costs exceeding 3% may be used, but these costs shall be fully documented and explained in the project estimate notes.

Also, some states do not have sales tax, but do impose either gross receipt taxes (often called by different names by different states) or gross excise taxes. (Arizona, Mississippi, Washington, and New Mexico have varying amounts of gross receipt taxes in lieu of a sales tax. Hawaii has a general excise tax.)

Usage of these itemized costs shall also be in accordance with cognizant design agency guidance, and shall be fully documented and explained in the project estimate notes. Examples of DD Form 1391 are shown in Appendix D.

4-5 Supporting Facilities Costs

Supporting facilities unit costs are to be in accordance with cognizant agency policy. Supporting facilities are described as items of construction directly related to the primary facility such as utilities, roads and parking, and site improvements.

4-6 Project Costs

Project cost is defined as the sum total of construction costs including primary facility costs, supporting facilities costs, any other allowable costs, cost allowances for contingencies, other allowances for supervision and administration, and design-build design cost.

4-6.1 Construction Contingencies

Each project cost estimate should include a separate item as a reserve for construction contingencies to cover construction requirements, which cannot be foreseen before the contract is awarded. The contingency reserve is for some adverse or unexpected condition not susceptible to predetermination from the data at hand during engineering and design; it must be included in the project cost estimate. This reserve is usually for latent difficulties, such as unforeseeable relocations; unforeseeable foundation conditions; encountering utility lines in unforeseeable locations; or other unforeseen problems beyond interpretation at the time of contract award. The contingency reserve is not an allowance for omissions of work items which are known to be required, but for which quality or quantity has not yet been determined by specific design. Reasonable allowances for all foreseeable requirements should be made in the estimate or shown as an allowance for cost adjustment. Application for construction contingency reserves will be in accordance cognizant design agency guidance. The construction contingency reserve for military construction programs and family housing new or replacement construction will normally be 5 percent of the total estimated contract cost.

4-6.2 Supervision and Administration

Each project estimate should include a separate item for supervision and administration (S&A). Application of S&A rate will be in accordance with cognizant design agency guidance.

4-6.3 Design-Build Design Cost

Projects which are designated to be Design-Build may include a design-build design cost. The percentage to be used will be accordance with cognizant design agency guidance.

4-7 Cost Estimate Preparation

Estimates may be prepared using the latest approved software for each cognizant design agency that uses this UFC and other authorized cost and pricing sources.

Basic Guidance Unit Cost Adjustment

A unit cost for a facility, which should reflect the cost under the adjusted guidance unit cost conditions for the facility, can be obtained by using the following equation:

$$\$A = \$GUC \times S \times ACF \times CE \times TU \times DC$$

Where:

$A is basic adjusted guidance unit cost

$GUC is guidance unit cost

S is size adjustment factor

ACF is area cost factor

CE is cost escalation adjustment due to inflation factors

TU is technological updating adjustment factor

DC is design contingency adjustment factor

A step-by-step example of procedures for developing the basic adjusted unit cost is provided in the following section.

Example Calculations for Basic Guidance Unit Cost Adjustments

The example calculations below show how to determine the facility cost estimate for an 48,750 sf administration building general purpose, Army category code 61050, to be built at Fort Bragg, North Carolina in the FY 12 program. A construction start date of Oct 2012 and a construction completion date of Oct 2014 are assumed. The equation for the basic adjusted unit cost determination is:

$A = $GUC x S x ACF x CE x TU x DC

Step 1 - Unadjusted Cost. In UFC 3-701-01 dated June 2010, Table 2-1: Facility Unit Costs for Military Construction, find the unit cost for the applicable building type closest to the building type being programmed. The Administrative Facilities: Multi-Purpose Admin facility is the comparable facility with a unit cost of $212/sf and a Reference Size of 65,000 square feet.

Step 2 - Size Adjustment. Calculate a size relationship factor by dividing the programmed building size by the closest comparable building size obtained from Table 1 SIZE ADJUSTMENT FACTORS, this document. The 48,750 square foot programmed building size divided by the 65,000 square foot comparable building size gives a size ratio factor of 0.75. Using the Size Adjustment Table, find the size ratio factor of 0.75 and obtain an adjustment factor of 1.033.

Step 3 - Area Cost Factor. Determine the location adjustment factor from UFC 3-701-01, Table 4-1: Area Cost Factors. For Fort Bragg, North Carolina, the factor of 0.92 applies.

Step 4 - Cost Escalation Adjustment. Make allowance for cost growth due to economic factors expected to occur between the dates on which the cost and pricing data in UFC 3-701-01 Table 2-1 are based and the expected midpoint of construction date for the project being programmed. For this FY 2012 example project, construction start is Oct 2013 and construction completion is Oct 2014. The midpoint of construction will therefore be six months after the start date. Using UFC 3-701-01 dated June 2010, which reflects historical cost and pricing data normalized to Oct 2009 for the preparation of the DoD budget for FY2012, the projected escalation factors from UFC 3-701-01

Table 4-2 Military Construction Escalation Rates are 1.0000 for October 2009, 1.0625 for October 2013 and 1.0806 for October 2014. The escalation factor to October 2013 would be 1.0625/1.000 or 1.0625. Interpolating for six additional months of projected escalation factor and adding this to the 1.0625 projected escalation factor will provide the total projected escalation factor to be used.

(1.0806-1.0625) / 12 = .0015

6 months x .0015 = .009

1.0625 + .009 = 1.0716

Step 5 - Technological Updating Adjustment. Make allowance for cost adjustment due to technological updating by using the technological updating factor from Table 2 Technological Update Adjustment Factor, this document. This factor is found to be 1.00 for administrative facilities.

Step 6 - Design Contingency Adjustment. Determine the design contingency (DC) factor in accordance with paragraph 5-6, Design Contingency and Table 3, Technical Complexity Levels and Design Contingency Factors. For the purpose of this example, assume the DC factor will not be used, therefore the factor is 1.00.

Step 7 - Adjusted Cost. Calculate adjusted cost using the equation for the basic adjusted unit cost conditions. Results are as follows:

$A = $GUC x S x ACF x CE x TU x DC

$A = $212/sf x 1.033 x 0.92 x 1.0716 x 1.00 x 1.00

$A = $215.90/sf

Step 8 - Facility Cost Estimate. Determine the estimated facility cost by multiplying the size of the facility being programmed by the adjusted unit cost ($A) derived in step 7 and then round off the product to the nearest thousand dollars. The size of 48,750 square feet multiplied by $215.90/sf gives a facility cost estimate of $10,525,125 which when rounded off to the nearest thousand dollars is $10,525,000.

Step 9 - Project Cost Estimate. Determine the project estimate cost by adding contingency and supervision and administration factors to facility cost and supporting facilities cost. (Assume supporting facilities cost of $500,000.) Since this project is new construction and location is CONUS, a contingency factor of 1.05 and supervision and administration factor of 1.057 should be applied as follows:

Project Cost Estimate = ($10,525,000 + $500,000) x 1.05 x 1.057

= $12,236,096

In accordance with Appendix A, Congressional Rounding Rule, the project cost is $12,200,000.

Example Calculations for Other Guidance Unit Cost Adjustments

The following are step-by-step example calculations showing how to apply the SA factor to the same 48,750 sf administration building general purpose (continuation of example

from above) to be built at Fort Bragg, North Carolina, in the FY12 program based on a midpoint of construction date of January 2013.

Step 10. Determine the need for special adjustment factors for further cost adjustment based on site and project conditions as described above. Assume that for the basis of this example, the following two special adjustment factors were justified per cognizant agency guidance.

Historical Adjustment	0.05
Site Sensitivity Adjustment	0.089

The special adjustment factors for each cost consideration are added together giving a total site sensitivity adjustment factor of 1.139.

Step 11. Using the special adjustment factors, the cost is calculated as follows:

$AA = $212/sf x 1.033 x 0.92 x 1.0716 x 1.00 x 1.00 x 1.139

= $245.91/sf

Step 12. Determine the estimated facility cost by multiplying the size of the facility being programmed by the adjusted unit cost and round off to the nearest thousand dollars (the unit cost of $245.91 obtained in step 11 is multiplied by 48,750 square feet giving a total cost of $11,988,113).

Step 13. Determine project cost estimate by adding in the supporting facilities cost of $500,000 and then applying the contingency and supervision & administration factors.

Project Cost Estimate = ($11,988,113 + $500,000) x 1.05 x 1.057

= $13,859,932

In accordance with the rounding rule, Appendix A, the project cost is $13,800,000.

5 ESTIMATING ALTERATION PROJECTS

Alteration is defined as a change to interior or exterior facility arrangements to improve or change its current purpose. This includes installed equipment made a part of the existing facility, but does not include additions, expansions, and extensions. The procedures described in this paragraph provide a step-by-step method for preparing programming or budgetary estimates for building alteration when current design data is not available. The procedures use a building systems work breakdown structure (WBS) and relate the alteration work to new facility requirements as a percentage of new work.

Figure 1 is an example of a completed DA Form 7307-R. Appendix C tabulates the ratio of WBS cost to facility cost from the USACE and DOD military construction historical cost data. Table 6 shows the percentage of installation cost required for removal and the percentage cost required for installation. Other sources for this data are available from private industries.

Table 6 COST OF REMOVAL VERSUS COST OF INSTALLATION

WBS#	DESCRIPTION	% OF INSTALLATION COST REQUIRED FOR REMOVAL	% OF COST REQUIRED FOR INSTALLATION
01	Substructure	50	35
02	Superstructure	50	35
03	Roofing	50	35
04	Exterior Closure	50	35
05	Interior Construction	50	35
06	Interior Finishes	50	35
07	Specialties	50	35
08	Plumbing	50	35
09	HVAC	50	35
10	Special Mechanical	50	35
11	Electrical	80	35
12	Special Electrical	80	35
13	Equipment	50	35
14	Conveying Systems	50	35

5-1 Example

Consider a FY12 alteration project for an existing 40,000 sf barracks, category code 72111, at Fort Riley, Kansas, with midpoint of construction of Oct 2013. Step-by-step procedures using DA Form 7307-R are as follows:

Step 1. Identify the percentage of the building systems to be removed and enter in blocks 16a and 21a. The data for this block should be based on the scope of work (in many cases based on best judgment). A walk-through of the facility to be altered is the best way to obtain accurate data. Assume for this example that the substructure, superstructure, exterior closure are not affected; that 80% of the interior is to be replaced; and that 75% of the electrical, mechanical, and plumbing are to be replaced.

Step 2. Using data obtained from Table 6 enter in block 16b the percentage of installation cost required for removal and in block 16c the percentage of cost required for installation.

Step 3. Obtain the ratio of WBS systems cost to facility cost for barracks from Appendix C and enter in blocks 16d and 21b.

Step 4. Block 16e is calculated by multiplying entries in blocks 16a, 16b, 16c, and 16d. Block 17, removal/demolition factor (RDF), is calculated by adding all entries in block 16e, which is 10.2 percent of the cost to build the building new. To calculate the total removal/demolition cost (RDC) for the project use the following:

RDC = $GUC x S x ACF x CE x TU x DC x RDF

Where:

$GUC = Guidance Unit Cost

S = Size adjustment factor

ACF = Location adjustment factor

CE = Cost escalation adjustment factor

TU = Technological updating adjustment factor

DC = Design contingency adjustment factor

RDF = Removal/Demolition factor

RDC = $211 x 1.114 x 0.99 x 1.0625 x 1.00 x 1.00 x 0.102 = $25.22

Step 5. Determine replacement/new portion factor. The same method is used in the removal portion except the cost includes 100% labor material and equipment. Block 21c is calculated by multiplying entries in blocks 21a and 21b. Block 22, replacement new factor (RNF) is calculated by adding all entries in block 21c. Total RNF is 54.3% (block 22) of the cost to build the facility new. The total new work cost (NWC) is calculated as follows:

NWC = $GUC x S x ACF x CE x TU x DC x RNF

NCW = $211 x 1.114 x 0.99 x 1.0625 x 1.00 x 1.00 x 0.543 = $134.26

Step 6. Special adjustment factor (SAF) due to construction limitations must be considered and added. Demolition/removal and replacement construction limitations allowed are as follows:

Dust protection for adjacent work areas 2-7%

Limited use of equipment (noise/power) limitations 1-6%

Limited storage of construction materials 1-6%

Protection of completed work 2-6%

Shift work 2-10%

Any other adjustment factors must be defined and justified. Special adjustment factor (SAF) due to construction limitations can either be applied to the total unit cost or to the total cost of the project. Using the special adjustment factor from (block 25 of the completed DA Form 7307-R) the demolition and replacement costs are then adjusted as follows:

Adjusted Removal/Demolition Cost (RDC)

= RDC x (1+SAF%)

= 25.22 x 1.15 = $29.00/sf

Adjusted New Work Cost (NWC)

= NWC x (1+SAF%)

= $134.26 x 1.15 = $154.40/sf

Total Alteration Cost

= Adjusted Removal/Demolition Cost

+ Adjusted New Work Cost

= $29.00/sf + $154.40/sf

= $183.40/sf

Step 7. Determine the facility estimated alteration cost by multiplying the area of the facility being programmed for alteration by the total alteration cost as follows:

= $183.40/sf x 40,000/sf

= $7,336,000

Step 8. Determine the project cost estimate costs in accordance with step 9 of paragraph 4-7 Cost Estimate Preparation.

COST ESTIMATING WORKSHEET - FACILITY ALTERATION

1. PROJECT NUMBER	2. PROJECT TITLE			3. FY
4. BUILDING NUMBER	5. LOCATION			6. HISTORICAL ☐ YES ☐ NO
7. FACILITY TYPE	8. CATEGORY CODE	9. FACILITY SIZE *(SF)*	10. AREA TO BE ALTERED *(SF)*	11. FUND TYPE *(MCA/OMA/AFH)*
12. ESTIMATOR/OFFICE/DATE	13. BASIS OF ESTIMATE		14. MONTHS	15. CONST START

16. REMOVAL/DEMOLITION PORTION OF PRIMARY FACILITY

BUILDING SYSTEM WORK BREAKDOWN	PERCENT OF SYSTEM ALTERED *a*	PERCENT OF LABOR TO REMOVE *b*	LABOR PERCENT TO INSTALL *c*	SYSTEM PERCENT OF TOTAL *d*	TOTAL PERCENT REMOVAL *e*
01 - SUBSTRUCTURE					0.0
02 - SUPERSTRUCTURE					0.0
03 - ROOFING					0.0
04 - EXTERIOR CLOSURE					0.0
05 - INTERIOR CONSTRUCTION					0.0
06 - INTERIOR FINISHES					0.0
07 - SPECIALTIES					0.0
08 - PLUMBING					0.0
09 - H.V.A.C.					0.0
10 - SPECIAL MECHANICAL					0.0
11 - ELECTRICAL					0.0
12 - SPECIAL ELECTRICAL					0.0
13 - EQUIPMENT					0.0
14 - CONVEYING SYSTEMS					0.0
				17. RDF	0.0

18. FACILITY TYPE	19. CATEGORY CODE	10. AREA TO BE ALTERED *(SF)*

21. REPLACEMENT/NEW PORTION OF PRIMARY FACILITY

BUILDING SYSTEM WORK BREAKDOWN	PERCENT OF SYSTEM REPLACED *a*	SYSTEM PERCENT OF TOTAL *b*	TOTAL PERCENT REPLACED *c*
01 - SUBSTRUCTURE			0.0
02 - SUPERSTRUCTURE			0.0
03 - ROOFING			0.0
04 - EXTERIOR CLOSURE			0.0
05 - INTERIOR CONSTRUCTION			0.0
06 - INTERIOR FINISHES			0.0
07 - SPECIALTIES			0.0
08 - PLUMBING			0.0
09 - H.V.A.C.			0.0
10 - SPECIAL MECHANICAL			0.0
11 - ELECTRICAL			0.0
12 - SPECIAL ELECTRICAL			0.0
13 - EQUIPMENT			0.0
14 - CONVEYING SYSTEMS			0.0
		22. RNF	0.0

23. CONSTRUCTION LIMITATION ADJUSTMENTS		24. PERCENT TO ADD
a.	DUST PROTECTION FOR ADJACENT WORK AREAS	
b.	LIMITED USE OF EQUIPMENT *(NOISE/POWER LIMITATIONS)*	
c.	LIMITED STORAGE OF CONSTRUCTION MATERIALS	
d.	PROTECTION OF COMPLETED WORK	
e.	SHIFT WORK	
		25. SAF

DA FORM 7307-R, APR 1994

Print Form

Figure 1 DA Form 7307-R, Cost Estimating Worksheet - Facility Alteration

COST ESTIMATING WORKSHEET - FACILITY ALTERATION

1. PROJECT NUMBER	2. PROJECT TITLE			3. FY
12345	Renovate Barraks			12
4. BUILDING NUMBER	5. LOCATION			6. HISTORICAL
401	Fort Riley, Kansas			☐ YES ☒ NO
7. FACILITY TYPE	8. CATEGORY CODE	9. FACILITY SIZE *(SF)*	10. AREA TO BE ALTERED *(SF)*	11. FUND TYPE *(MCA/OMA/AFH)*
Barracks	72111	40,000	40,000	MCA
12. ESTIMATOR/OFFICE/DATE	13. BASIS OF ESTIMATE		14. MONTHS	15. CONST START
J. Smith/AFEN-RMP/Jan 12	Walk-Through		12	10/13

16. REMOVAL/DEMOLITION PORTION OF PRIMARY FACILITY

BUILDING SYSTEM WORK BREAKDOWN	PERCENT OF SYSTEM ALTERED *a*	PERCENT OF LABOR TO REMOVE *b*	LABOR PERCENT TO INSTALL *c*	SYSTEM PERCENT OF TOTAL *d*	TOTAL PERCENT REMOVAL *e*
01 - SUBSTRUCTURE	0	50	35	4.5	0.0
02 - SUPERSTRUCTURE	0	50	35	12.7	0.0
03 - ROOFING	0	50	35	2.3	0.0
04 - EXTERIOR CLOSURE	0	50	35	10.7	0.0
05 - INTERIOR CONSTRUCTION	80	50	35	18.1	2.5
06 - INTERIOR FINISHES	80	50	35	18.6	2.6
07 - SPECIALTIES	80	50	35	0.0	0.0
08 - PLUMBING	75	50	35	17.3	2.3
09 - H.V.A.C.	75	50	35	5.2	0.7
10 - SPECIAL MECHANICAL	75	50	35	2.1	0.3
11 - ELECTRICAL	75	80	35	8.0	1.7
12 - SPECIAL ELECTRICAL	75	80	35	0.5	0.1
13 - EQUIPMENT	0	50	35	0.0	0.0
14 - CONVEYING SYSTEMS	0	50	35	0.0	0.0
				17. RDF	10.2

18. FACILITY TYPE	19. CATEGORY CODE	10. AREA TO BE ALTERED *(SF)*
Barracks	72111	40,000

21. REPLACEMENT/NEW PORTION OF PRIMARY FACILITY

BUILDING SYSTEM WORK BREAKDOWN	PERCENT OF SYSTEM REPLACED *a*	SYSTEM PERCENT OF TOTAL *b*	TOTAL PERCENT REPLACED *c*
01 - SUBSTRUCTURE	0	4.5	0.0
02 - SUPERSTRUCTURE	0	12.7	0.0
03 - ROOFING	0	2.3	0.0
04 - EXTERIOR CLOSURE	0	10.7	0.0
05 - INTERIOR CONSTRUCTION	80	18.1	14.5
06 - INTERIOR FINISHES	80	18.6	14.9
07 - SPECIALTIES	80	0.0	0.0
08 - PLUMBING	75	17.3	13.0
09 - H.V.A.C.	75	5.2	3.9
10 - SPECIAL MECHANICAL	75	2.1	1.6
11 - ELECTRICAL	75	8.0	6.0
12 - SPECIAL ELECTRICAL	75	0.5	0.4
13 - EQUIPMENT	0	0.0	0.0
14 - CONVEYING SYSTEMS	0	0.0	0.0
		22. RNF	54.3

23. CONSTRUCTION LIMITATION ADJUSTMENTS	24. PERCENT TO ADD
a. DUST PROTECTION FOR ADJACENT WORK AREAS	5.0
b. LIMITED USE OF EQUIPMENT *(NOISE/POWER LIMITATIONS)*	5.0
c. LIMITED STORAGE OF CONSTRUCTION MATERIALS	5.0
d. PROTECTION OF COMPLETED WORK	0.0
e. SHIFT WORK	0.0
	25. SAF 15.0

DA FORM 7307-R, APR 1994

Print Form

Figure 2 Example of DA Form 7307-R, Cost Estimating Worksheet - Facility Alteration

6 ESTIMATING FAMILY HOUSING

To calculate cost estimates for the construction of new and replacement family housing, this Family Housing Cost Model methodology may be used. Specific instructions to complete the cost model are as follows:

1. FY - The fiscal year in which the project is proposed.

2. Location - The installation and state in which the proposed construction will take place.

3. # Units - The number of family housing dwelling units which will be constructed in this project. Note that for replacement projects, the number of units may be equal to or less than the number of units to be demolished.

4. ANSF - The average net square feet of the units proposed for construction. Note that family housing is based on net square footage (NSF), not gross square footage (GSF). Size of dwelling units will be based on the statutory size limit authorized in Section 2826, Title 10, USC for category of military personnel and size of family.

5. $/NSF - The cost to construct family housing per net square foot. The cost will correspond to the fiscal year of the project. Cost includes only the primary facility with sprinklers or fire rated construction, including carport (open sides) and bulk storage, not the supporting infrastructure, demolition, supporting amenities or special construction requirements.

6. 5' Line Cost - The 5 foot line cost is the cost just for the dwelling unit and is equal to the number of units times the average net square feet times the cost per net square foot.

7. ACF - The area cost factor adjusts the prescribed costs to the location of the proposed project. These factors are listed in UFC 3-701-01 Table 4-1: Area Cost Factors and are updated annually based on a construction market survey.

8. Project Size - The project size factor allows for economies of scale which is dependent upon the project size. The prescribed unit cost ($NSF) is based on an average project size. Projects which propose constructing a large number of units will realize economies of scale resulting in a smaller project size factor. The project size factor table is listed in Table 1of this document.

9. Project Factor - The project factor equals the area cost factor times the project size factor. One project factor applies to all units being constructed in a given project. Do not calculate a separate factor for each type of unit, i.e., two, three and four bedroom junior noncommissioned officers.

10. Housing Unit Cost - The housing unit cost equals the 5 foot line cost times the project factor.

11. Solar Cost and Information System Cost - These are additional costs and were not captured in the 5 foot building line cost. If project is to include solar energy features, multiply the estimated solar cost times the area cost factor times the number of dwelling units to arrive at the total project solar cost. Note that such features must be justified based on a life cycle

cost analysis. The information system cost must be added to every Family Housing construction project. This cost represents telephone and cable television connections and wiring inside the buildings *5* foot line. Include cost per dwelling unit for communication and cable television. To arrive at the information system cost, multiply the cost per dwelling unit for communication and cable television times the area cost factor times the number of dwelling units.

12. Other - In some instances, site conditions may require additional costs for the primary facility (inside the 5 foot building line). Examples include rock excavation, special foundation requirements, soil stabilization, basements, or special architectural features.

13. Average Unit Cost - The average unit cost is derived by adding the housing unit cost, the solar cost, (if any), the information system cost and any "other" cost, and dividing by the number of units.

14. Supporting Cost - This considers all work outside the 5 foot building line, and includes site preparation, roads, utilities, recreation, landscaping, demolition, etc. Where support cost estimates can be documented, show the unit cost and how derived. Often, support costs for AFH are difficult to identity for various reasons. The proposed units may be sited on the same site as some existing units which are planned for demolition or an undeveloped site. When difficult to document the support cost, a percentage of the housing unit cost can be used until detailed analysis is completed. Demolition of existing units should be a separate cost breakout. The environmental conditions and individual State regulations must be considered when determining the demolition cost. When using a "generic" for support cost and demolition, the area cost factor must be considered to arrive at the total support cost.

15. Subtotal - The summary subtotal consists of the -housing unit cost, solar cost, if any, information system cost, other cost, if any, and the support cost.

Project Total - The project total equals the summary subtotal times the contingency times the supervision & administration (S&A). Application of S&A rate will be in accordance with cognizant design agency guidance.

16. Rounded Project Cost - The rounded project cost is the project total rounded in accordance with the Congressional rounding rule (see Appendix A).

Project Cost/SF - The project cost per square foot equals the project rounded cost divided by the product of the number of units times the average net square footage times the cost factor.

Appendix A - Congressional Rounding Rule

Amount	Nearest
Less Than or Equal to 1,000,000	10,000
1,000,001 to 5,000,000	50,000
5,000,001 to 10,000,000	100,000
10,000,001 to 15,000,000	200,000
15,000,001 to 20,000,000	500,000
20,000,001 or Greater	1,000,000

Appendix B - Sample Site Sensitivity Cost Considerations

Notes:

1. The method outlined in this Appendix may be used to determine the cost impact resulting from extremely large concentration of construction effort, or from extensive site limitations, or from both.
2. Site sensitivity adjustment should be determined based on an analysis of site conditions which will influence cost.

1. IMPACT IDENTIFIER: LABOR AVAILABILITY		
Condition	Adjustment Factor	Narrative Description of Condition with Resulting Assumptions and Computations
Above Normal	-0.014	Abundance of labor available in local area creating competition and high productivity resulting in negative cost impact. Assumptions: Assume 4% more productivity. Computations: Productivity Variation x Labor Cost as a % of Total / Project Cost as 100%/35% = Productivity Adjustment Factor 0.04 x 35%/100%=-0.014
Normal	0	Normal labor market and normal productivity. Assumptions: No cost variation impact.
Slightly Below	+0.041	Inadequate local labor force, however, labor is available within daily commuting distance. Assumptions: Assume that a travel allowance for supervisory personnel and limited overtime pay as travel inducement for journeymen will be required to recruit labor. Computations: For supervisory personnel assume a travel allowance of $150/month. Travel Allowance Per Month/Avg Per Month x Field Supv as a % of Total/Project Cost as 100% = Total Allowance Factor ($150/$1,850) x (3%/100%) = 0.002 For craft journeymen, assume 1 hr overtime per day as travel inducement. Travel Inducement Allow Per Week/Hrs Work Per Week x Labor Cost as a % of Total/Project Costs as 100% = Total Inducement Factor (5 hrs/45 hrs) x (35%/100%) = 0.039 Total Allowance Factor + Travel Inducement Factor = Total Travel Adjustment 0.002 + 0.039 = 0.041

1. IMPACT IDENTIFIER: LABOR AVAILABILITY		
Condition	Adjustment Factor	Narrative Description of Condition with Resulting Assumptions and Computations
Substantially Below Normal	+0.060	Inadequate local labor within daily commuting distance. Recruitment from regional area required. Assumptions: Housing and or subsistence allowance will be required for supervisory personnel. Assume limited overtime pay as travel inducement for journeymen will be required to recruit labor. Computations: For supervisory personnel assume subsistence allowance of $300/month. Subsistence Allowance Per Month/Average Salary Per Month x Field Supv as a % of Total/Project Cost as 100% = Subsistence Allowance Factor ($300/1,850) x (3%/100%) = 0.005 For craft journeymen assume: 1-1/2 hr overtime pay per day for travel inducement. Travel Inducement Allowance Per Week/Hrs of Work Per Week x Labor Cost as a % of Total/Project Costs as 100% = Total Inducement Factor (7.5 hrs/47.5 hrs) x (35%/100%) = 0.055 Subsistence Allowance Factor + Travel Inducement Factor = Total Travel and Subsistence Factor 0.005 + 0.055 = 0.060
Extremely Below Normal	+0.076	Inadequate labor force available in local area or regional area. Recruitment from outside the regional area required. Assumptions: Housing and/or subsistence allowance will be required for supervisory personnel and overtime pay as travel inducement for journeymen will be required to recruit labor. Computations: For supervisory personnel assume subsistence allowance for $375/month. Subsistence Allowance Per Month/Average Salary Per Month x Field Supv as a % of Total/Project Cost as 100% = Subsistence Allowance Factor ($375/1,850) x (3%/100%) = 0.006 For craft journeymen assume: 2 hrs overtime pay per day for travel inducement. Travel Inducement Allowance Per Week/Hrs of Work Per Week x Labor Cost as a % of Total/Project Costs as 100% = Travel Inducement Factor (10 hrs/50 hrs) x (35%/100%) = 0.07 Subsistence Allowance Factor + Travel Inducement Factor = Total Subsistence and Travel Factor 0.006 + 0.07 = 0.076

2. IMPACT IDENTIFIER: HOUSING AVAILABILITY		
Condition	Adjustment Factor	Narrative Description of Condition with Resulting Assumptions and Computations
Normal	0	Adequate housing available in local area, no cost impact.
Slightly Below	+0.022	Adequate housing not available in local area; however, housing is available within commuting distance. Assumptions: Provide travel allowance to location of adequate housing for key personnel and critical crafts. Computations: Assume a travel allowance of $100/month. Travel Allow Per Month/Avg Monthly Wages x Key Personnel & Critical Crafts Labor Costs as % of Total/Project Costs as 100% = Adjustment Factor ($100/1,600) x (35%/100%) = 0.022
Substantially Below Normal	+0.04	Inadequate housing in local area. Housing is not available within commuting distance. Assumptions: Provide trailer housing for majority of contractor personnel and skilled crafts. Computations: Assume rental of trailers and sale of used trailers will not offset all original cost. Land lease and site development cost to be included in project cost. Loss on Trailers Lease and Development Cost/Total Project Cost = Adjustment Factor $4,000,000/$100,000,000 = 0.04

3. IMPACT IDENTIFIER: MATERIAL AVAILABILITY		
Condition	Adjustment Factor	Narrative Description of Condition with Resulting Assumptions and Computations
Normal	0	Project requirements do not exceed the capabilities of the local area. Site is within the normal delivery distance. No cost impact.
Slightly Below	+0.01	Project requirements do not exceed the capabilities of the local area, but site is outside normal delivery range. Assumptions: Additional hauling allowance required. Computations: Add'l Cost for Hauling Beyond Normal Delivery Zone/Total Normal Mat'l Cost x Mat'l Cost as % of Total/Project Cost as 100% = Adjustment Factor $1,000,000/$50,000,000 x 50% = 0.01
Subtantially Below Normal	+0.02	Project requirements exceed the capabilities of the area. Assumptions: Assume additional hauling allowance and onsite facilities. Computations: Add'l Cost for Hauling & Storage Allowance/Total Normal Mat'l Cost x Mat'l Cost as a % of Total/Project Cost as 100% = Adjustment Factor $2,000,000/$50,000,000 x 50% = 0.02

4. IMPACT IDENTIFIER: LOCAL SITE PECULIARITIES		
Individual cost model analysis as required to justify each cost consideration.		
Congested Work Area	+0.028	Loss productivity caused by congested work area. Assumptions: 3 hrs of non-productivity per week. Computations: Unproductive Hrs Per Week/Productive 100% x Labor Cost as a % of Total/Project Cost = Adjustment Factor (3/37) x (35%/100%) = 0.028
Inadequate	+0.022	Inadequate onsite parking for labor force. Assumptions: $100 per month parking allowance will be required. Computations: Parking Allowance Per Month/Avg Wage Per Month x Labor Cost as a % of Total/Project Cost as 100% = Adjustment Factor ($100/1,600) x (35%/100%) = 0.022

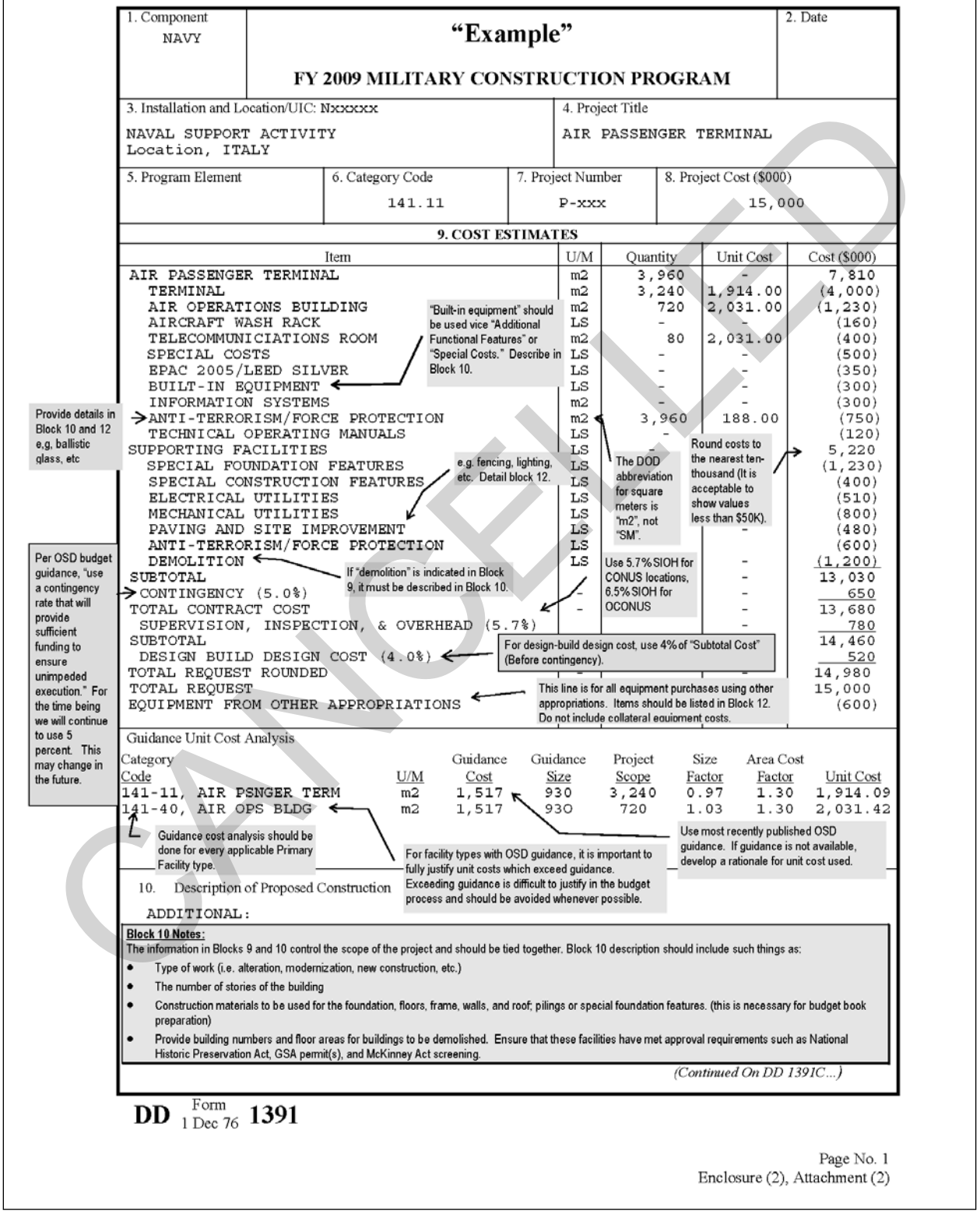
SAMPLE SITE SENSITIVITY ADJUSTMENT FACTOR SUMMARY			
Impact Identifier	Condition	Adjustment Factor	Narrative Description of Condition with Resulting Assumptions and Computations
Labor Availability	Slightly Below Normal	0.041	Inadequate local labor force travel allowance and overtime pay as travel inducement is required.
Housing Availability	Normal	0	Adequate housing available in the local area.
Material Availability	Normal	0	Local area can meet all project requirements.
Local Site Peculiarities	Individual Analysis to Justify Each Consideration	0.028	Small Congested work site.
		0.022	No parking onsite. No free parking near site.
Site Sensitivity Adjustment Factor = 0.041 + 0 + 0 + 0.028 + 0.022 = 0.091 = 1.091			

Appendix C – Ratio Of WBS Systems Cost To Facility Cost By Facility Type

	Substructure	Superstructure	Roofing	Exterior Closure	Interior Construction	Interior Finishes	Specialties	Plumbing	HVAC	Special Mechanical	Electrical	Special Electrical	Equipment	Conveying System
General Admin Facility	11.00	17.94	4.06	11.78	13.10	9.73	0.89	3.10	13.86	0.00	9.46	3.48	1.60	0.00
ADP	6.63	5.99	4.99	10.36	12.28	12.41	1.47	3.27	17.01	2.87	17.72	5.00	0.00	0.00
Applied Instruction Bldg	6.73	12.10	5.23	13.30	11.18	10.73	0.38	3.30	8.28	1.50	23.98	3.29	0.00	0.00
Avionics Facility	10.02	7.30	4.82	15.08	9.60	8.15	0.56	4.95	17.99	2.75	17.70	1.08	0.00	0.00
Enlisted Barracks	4.50	12.70	2.30	10.70	18.10	18.60	0.00	17.30	5.20	2.10	8.00	0.50	0.00	0.00
Brigade HQ	7.13	14.37	3.20	19.26	7.36	10.83	1.03	5.41	17.71	0.00	6.73	6.97	0.00	0.00
Battalion HQ	6.69	10.70	2.83	22.20	17.35	5.87	2.39	3.31	17.62	1.85	8.46	0.67	0.00	0.00
Chapel	5.97	11.62	7.49	23.33	9.02	9.09	2.45	6.29	12.15	0.00	9.08	2.03	1.48	0.00
Child Care Center	5.46	13.90	1.86	11.73	9.38	9.48	5.60	11.39	16.55	0.35	11.93	2.37	0.00	0.00
CIDC	7.73	13.25	7.13	9.82	12.51	9.96	1.29	3.98	20.38	0.00	11.10	2.85	0.00	0.00
General Instruct Bldg	7.89	12.91	5.56	15.55	12.94	8.98	4.06	3.43	15.45	1.57	9.73	1.93	0.00	0.00
Company Admin & Supply	6.47	5.03	5.14	21.79	21.63	7.50	2.45	4.79	18.10	0.00	5.97	1.13	0.00	0.00
Cold Storage Warehouse	15.16	4.23	6.84	14.58	12.68	11.31	1.97	4.19	13.66	4.90	8.46	2.02	0.00	0.00
Conforming Storage	15.16	7.63	7.04	0.00	13.86	20.95	2.61	1.60	0.92	8.24	4.23	16.00	1.76	0.00
Facility Engr Admin	8.60	11.37	5.30	29.10	3.36	1.38	4.73	17.17	3.18	0.00	14.35	1.46	0.00	0.00
Facility Engr Maint Shop	6.93	7.86	3.66	39.65	12.76	2.02	2.30	3.08	10.40	0.66	9.38	1.30	0.00	0.00
Facility Engr Storage	24.49	10.97	3.34	23.95	9.65	1.18	0.00	5.25	0.00	7.96	3.21	0.00	0.00	0.00
Fire Station	6.75	5.22	3.17	24.61	10.32	5.10	4.97	6.43	11.39	1.60	13.20	5.20	0.00	0.00

	Substructure	Superstructure	Roofing	Exterior Closure	Interior Construction	Interior Finishes	Specialties	Plumbing	HVAC	Special Mechanical	Electrical	Special Electrical	Equipment	Conveying System
Flight Simulator Bldg	6.88	19.79	13.84	13.41	7.80	6.60	1.68	6.42	11.60	0.97	9.66	9.66	0.00	0.00
Genl Purpose Warehouse	9.50	19.22	12.10	16.46	6.05	1.82	1.81	1.52	16.00	2.33	12.08	1.11	0.000	0.00
Gymnasium	5.22	13.36	5.49	21.20	2.28	12.90	3.90	3.57	11.42	0.00	9.84	0.93	9.89	0.00
Aircraft Maint Hangar	7.20	16.16	13.88	15.84	12.06	7.86	1.44	3.64	6.59	2.50	8.76	2.32	1.75	0.00
Kitchen/Dining Facility	11.06	3.34	3.63	5.59	2.29	12.84	0.61	22.15	21.12	0.00	16.38	0.99	0.00	0.00
Med Clinic	4.59	3.17	2.28	4.96	3.61	3.57	1.13	5.59	4.70	0.00	62.30	2.40	1.70	0.00
Security Police Center	8.16	7.10	4.63	14.59	14.50	7.96	0.56	4.19	20.18	0.30	11.17	6.66	0.00	0.00
Recreation Center	13.59	19.72	6.04	18.38	4.25	3.88	1.24	4.54	13.02	0.00	12.64	2.70	0.00	0.00
Reserve Center	10.39	9.85	10.19	13.90	19.02	11.32	1.14	10.98	1.76	0.00	10.14	1.31	0.00	0.00
SATCOM	15.31	2.73	2.25	10.14	3,68	17.05	0.08	1.40	13.30	3.16	22.25	5.21	3.44	0.00
Veh Maint Shop, GS	13.46	28.74	5.75	14.39	5.60	2.13	3.31	3.22	7.89	2.12	9.25	1.02	3.12	0.00
Veh Maint Shop, DS	8.65	24.18	5.06	20.02	6.21	3.47	5.57	3.45	8.48	1.29	11.89	1.93	0.00	0.00
Youth Center	5.70	13.07	6.34	17.84	7.49	10.79	2.65	5.20	10.44	3.30	9.84	3.27	4.07	0.00

Appendix D - Examples of DD Form 1391



1. Component: NAVY

"Example"

FY 2009 MILITARY CONSTRUCTION PROGRAM

2. Date

3. Installation and Location/UIC: Nxxxxx
NAVAL SUPPORT ACTIVITY
Location, ITALY

4. Project Title
AIR PASSENGER TERMINAL

5. Program Element	6. Category Code	7. Project Number	8. Project Cost ($000)
	141.11	P-xxx	15,000

9. COST ESTIMATES

Item	U/M	Quantity	Unit Cost	Cost ($000)
AIR PASSENGER TERMINAL	m2	3,960	-	7,810
TERMINAL	m2	3,240	1,914.00	(4,000)
AIR OPERATIONS BUILDING	m2	720	2,031.00	(1,230)
AIRCRAFT WASH RACK	LS	-	-	(160)
TELECOMMUNICIATIONS ROOM	m2	80	2,031.00	(400)
SPECIAL COSTS	LS	-	-	(500)
EPAC 2005/LEED SILVER	LS	-	-	(350)
BUILT-IN EQUIPMENT	LS	-	-	(300)
INFORMATION SYSTEMS	m2	-	-	(300)
ANTI-TERRORISM/FORCE PROTECTION	m2	3,960	188.00	(750)
TECHNICAL OPERATING MANUALS	LS	-		(120)
SUPPORTING FACILITIES	LS	-		5,220
SPECIAL FOUNDATION FEATURES	LS			(1,230)
SPECIAL CONSTRUCTION FEATURES	LS			(400)
ELECTRICAL UTILITIES	LS			(510)
MECHANICAL UTILITIES	LS			(800)
PAVING AND SITE IMPROVEMENT	LS		-	(480)
ANTI-TERRORISM/FORCE PROTECTION	LS			(600)
DEMOLITION	LS		-	(1,200)
SUBTOTAL			-	13,030
CONTINGENCY (5.0%)	-		-	650
TOTAL CONTRACT COST	-		-	13,680
SUPERVISION, INSPECTION, & OVERHEAD (5.7%)			-	780
SUBTOTAL				14,460
DESIGN BUILD DESIGN COST (4.0%)				520
TOTAL REQUEST ROUNDED			-	14,980
TOTAL REQUEST				15,000
EQUIPMENT FROM OTHER APPROPRIATIONS				(600)

"Built-in equipment" should be used vice "Additional Functional Features" or "Special Costs." Describe in Block 10.

Provide details in Block 10 and 12 e,g, ballistic glass, etc

e.g. fencing, lighting, etc. Detail block 12.

The DOD abbreviation for square meters is "m2", not "SM".

Round costs to the nearest ten-thousand (It is acceptable to show values less than $50K).

Per OSD budget guidance, "use a contingency rate that will provide sufficient funding to ensure unimpeded execution." For the time being we will continue to use 5 percent. This may change in the future.

If "demolition" is indicated in Block 9, it must be described in Block 10.

Use 5.7% SIOH for CONUS locations, 6.5% SIOH for OCONUS

For design-build design cost, use 4% of "Subtotal Cost" (Before contingency).

This line is for all equipment purchases using other appropriations. Items should be listed in Block 12. Do not include collateral equipment costs.

Guidance Unit Cost Analysis

Category Code	U/M	Guidance Cost	Guidance Size	Project Scope	Size Factor	Area Cost Factor	Unit Cost
141-11, AIR PSNGER TERM	m2	1,517	930	3,240	0.97	1.30	1,914.09
141-40, AIR OPS BLDG	m2	1,517	930	720	1.03	1.30	2,031.42

Guidance cost analysis should be done for every applicable Primary Facility type.

For facility types with OSD guidance, it is important to fully justify unit costs which exceed guidance. Exceeding guidance is difficult to justify in the budget process and should be avoided whenever possible.

Use most recently published OSD guidance. If guidance is not available, develop a rationale for unit cost used.

10. Description of Proposed Construction

ADDITIONAL:

Block 10 Notes:
The information in Blocks 9 and 10 control the scope of the project and should be tied together. Block 10 description should include such things as:

- Type of work (i.e. alteration, modernization, new construction, etc.)
- The number of stories of the building
- Construction materials to be used for the foundation, floors, frame, walls, and roof; pilings or special foundation features. (this is necessary for budget book preparation)
- Provide building numbers and floor areas for buildings to be demolished. Ensure that these facilities have met approval requirements such as National Historic Preservation Act, GSA permit(s), and McKinney Act screening.

(Continued On DD 1391C...)

DD Form 1 Dec 76 **1391**

Page No. 1
Enclosure (2), Attachment (2)

1. Component	FY 2009 MILITARY CONSTRUCTION PROGRAM	2. Date
NAVY		

3. Installation and Location/UIC: N62588
NAVAL SUPPORT ACTIVITY NAPLES, ITALY

4. Project Title	7. Project Number
AIR PASSENGER TERMINAL	P-196

(...continued)

Budget Estimate Summary Sheet:

Built-in Equipment:

Item	UM	Quantity	Unit Cost	Total
Elevator	LS	1	150,000	150,000
Baggage Equip.	LS	1	150,000	150,000

Built-In equipment
Include only high-cost built-in equipment items, such as elevators, communications systems, vibration-isolated flooring, clean rooms, High-altitude Electromagnetic Pulse (HEMP) shielding, TEMPEST shielding, computer flooring, uninterrupted power supply (UPS), controlled humidity, or controlled environment, and sound attenuation (only if significant in cost, otherwise mention in block 10 only)

Special Foundation Features:

Item	UM	Quantity	Unit Cost	Total
Shoring	m2	574	314	105,000
Over Excavate	m3	25000	45	1,125,000

Special Foundation Features
Consider adequacy of soils, foundation & seismic zone, also basement excavation and shoring.

Special Construction Features:

Item	UM	Quantity	Unit Cost	Total
Ramp	LS	1	50,000	150,000
Structural Floor	m2	1485	67	100,000
Foundation mat	m2	1485	101	150,000

Special Construction Features
Consider adequacy of soils, foundation & seismic zone, also basement excavation and shoring.

DD Form 1 Dec 76 **1391C**

Page No. 2
Enclosure (2), Attachment (2)

1. Component	FY 2009 MILITARY CONSTRUCTION PROGRAM	2. Date
NAVY		

3. Installation and Location/UIC: N62588
NAVAL SUPPORT ACTIVITY NAPLES, ITALY

4. Project Title	7. Project Number
AIR PASSENGER TERMINAL	P-196

(...continued)

Utilities and Site Improvements:

Item	UM	Quantity	Unit Cost	Total
Electrical				
Area Lighting	EA	75	8,000	450,000
Substation/ transformer	KV	300	200	60,000
Mechanical				
Water Distribution	m	850	120	102,000
Fire Protection	m	1000	392	392,000
Fuel Storage	L	3000	50	150,000
Sanitary Sewer	m	1200	130	156,000
Pavement & Site Improvements				
Flexible Parking	m2	1000	40	40,000
Flexible Roads	m2	1600	59	70,800
Concrete Parking	m2	350	60	21,000
Concrete Aprons	m2	600	73	44,000
Concrete Walkways	m2	100	98	9,800
Storm Drainage	m	316	174	55,000
Earthwork	m3	1000	66	66,000
Topsoil/Seed/Sod	m2	2500	6	15,000
Landscaping	m2	3960	40	158,400
Demolition				
Remove Buildings #425 & #487	m2	20,000	60	1,200,000

Utilities and Site Improvements:
For DD-1391 + provide the items and the best information available. Consider user hours of operation when designing systems (will systems be in use constantly or is there down-time?

Electrical
- Consider adequacy of utility and infrastructure support necessary such as primary electrical distribution, transformers or substations, area lighting and communications.
- Consider system redundancy (UPS, etc.).
- Lightning protection.

Mechanical
- Consider adequacy of mechanical infrastructure necessary such as chilled water, steam, gas, and water distribution, fire protection water, sanitary sewer, and fuel storage.

Pavement
- Consider adequacy of asphalt or concrete roads, parking, walkways or aprons.

Site Improvements
- Consider site-work required such as earthwork, topsoil, seed, landscaping, irrigation, storm drainage and water ponds.

Demolition
- Provide BUILDING #'s of buildings / structures to be demolished.
- Indicate the AREA (m2) to be demolished.

DD Form 1 Dec 76 **1391C**

Page No. 3
Enclosure (2), Attachment (2)

1. Component	FY 2009 MILITARY CONSTRUCTION PROGRAM	2. Date
NAVY		

3. Installation and Location/UIC: N62588
NAVAL SUPPORT ACTIVITY NAPLES, ITALY

4. Project Title	7. Project Number
AIR PASSENGER TERMINAL	P-196

(...continued)

Equipment associated with this project which will be provided from other appropriations:

Equipment from other appropriations:

- Projects that support equipment being procured with other funding are cross referenced with the equipment funding budget and procurement schedule/delivery/installations milestones to assure a timely coordination.
- Include in table below major equipment items with a cost of $500K and above . Lump all low cost equipment into one line item as necessary.
- **Examples Include:** Computer systems, collateral equipment, flight trainers, automated storage equipment, material handling equipment, fire fighting trainers, R&D support equipment.

Major Equipment	Funding Source	Funding Year	Installation Start-End Mo/Yr	Shakedown Start-End Mo/Yr	IOC date Mo/Yr	Cost (000)
Computer equipment (various)	OPN	2003	Mar 04/Apr 04	Mar 04/Apr 04	Apr04	600
Collateral Equipment (various)	O&M	2003	Apr04/Apr04	N/A	N/A	500

Collateral Equipment totals should not be displayed as part of the "Equipment from Other Appropriations" on Block 9 of the 1391.

Facility Sustainable Development (E.O. 13123 refers):
"Design of Sustainable Facilities and Infrastructure", team focus has been applied with improvements proposed beyond guidance cost. Justification required for each item checked. **Final design authorization will confirm acceptance of features discussed.** We are accepting the Green Building Councils **LEED** tm rating system, on a self-certification basis, along with cost impact analysis as justification:

Yes	No	
(x)	( )	Increased energy conservation of integrated building systems beyond DoD standards where preliminary calculation demonstrates Life Cycle Cost (LCC) benefit.
( )	( )	Use of renewable energy resources where LCC demonstrates feasibility.
( )	( )	Monitoring and/or reduction or elimination of toxic and harmful substances in building environment.
( )	( )	Life cycle cost analysis which includes value of increased or enhanced personnel productivity.
( )	( )	Efficiency in water resource conservation from recycled use, ground recharge, etc. supported on a cost or locale requirement basis.
( )	( )	Increased use of materials and products with recycled and/or recyclable content. Generally expected to be competitive in the market and within guidance cost.
( )	( )	Recycling of construction waste and building materials after demolition.
( )	( )	Reduction in waste products as a consequence of construction.
( )	( )	Building systems commissioning to assure full interoperability.

Activity POC: Phone No:

DD Form 1 Dec 76 **1391C**

Note: This DD1391 is not an actual project. This is only an example of what may constitute possible entries of items and format for a DD1391.

"EXAMPLE"

2010 98989CF P REVISION DATE: 25 OCT 2007
ARMY MCA (AS OF 10/25/2007 AT 17:05:39) 25 MAR 2007
LAF = 1.29 UM=E

Fort Irwin
California — General Instruction Building

171 20 — 98989 — 30,171

PRIMARY FACILITY				30,171
General Instruction Building	SF	100,000	260.93	(26,093)
Conc Retaining Walls, Spec Fdn	LS	--	--	(375)
Bldg Pad Engr'd Fill, Spec Fdn	LS	--	--	(450)
EMCS Connections	LS	--	--	(80)
IDS Connections	LS	--	--	(100)
SDD and EPAct05	LS	--	--	(523)
Antiterrorism Measures	LS	--	--	(1,150)
Building Information Systems	LS	--	--	(1,400)
SUPPORTING FACILITIES				3,228
Electric Service	LS	--	--	(405)
Water, Sewer, Gas	LS	--	--	(278)
Steam And/Or Chilled Water Distr	LS	--	--	(0)
Paving, Walks, Curbs and Gutters	LS	--	--	(508)
Storm Drainage	LS	--	--	(159)
Site Imp (410) Demo (559)	LS	--	--	(969)
Information Systems	LS	--	--	(850)
Antiterrorism Measures	LS	--	--	(59)

ESTIMATED CONTRACT COST	33,399
CONTINGENCY PERCENT (5.00%)	1,670
SUBTOTAL	35,069
SUPERVISION, INSPECTION, & OVERHEAD (5.70%)	1,999
DESIGN/BUILD - DESIGN COST	1,403
TOTAL REQUEST	38,471
TOTAL REQUEST (ROUNDED)	38,000
INSTALLED EQT-OTHER APPROPRIATIONS	(725)

10. Description of Proposed Construction
Construct a modified standard-design General Instruction Building to include elevators, antiterrorism measures, building information systems, fire protection, and alarm systems. Supporting facilities include all utilities and mechanical systems support, paving, walks, curbs and gutters, storm drainage, information/network support systems, and site improvements.
Access for persons with disabilities will be provided. Antiterrorism (AT) measures include laminated glazing, pressure rated doors, mass notification system and site limiting landscaping features. Due to physical siting constraints, the facility will not be able to meet the minimum setback distance per antiterrorism criteria. Heating and air conditioning will be provided by self contained systems. Project will include comprehensive building and furnishings related interior design services. Air conditioning is estimated at 500 Tons.

"EXAMPLE"

2010 98989CF P REVISION DATE: 25 OCT 2007
ARMY MCA (AS OF 10/25/2007 AT 17:05:39) 25 MAR 2007
LAF = 1.29 UM=E

Fort Irwin
California

General Instruction Building 98989

11. REQ: 838,608 SF ADQT: 407,757 SF SUBSTD: 181,283 SF
PROJECT:
Construct a modified standard design General Instruction Building. (Current Mission)

REQUIREMENT:
The Instructional Center (IC) is transforming learning instruction to increase proficiency requirements of the Commands. As a result of increasing requirements, IC will experience a 40% increase in student population projections by FY 2010. Additionally, the Secretary of Defense directed IC to increase the proficiency of the students based on needs assessments from the Commands. To meet these needs, IC initiated a program to reduce the students per classroom. This reduction will improve student-to-instructor ratios, and ultimately enhance reading, listening, and speaking proficiency of our students. The total growth for staff and faculty by FY10, will be approximately 600 new employees. Transforming current practice and incorporating significant growth will require a sizable expansion of offices and classrooms, yielding an increase in classroom requirements by nearly 200 additional classrooms over the next 3 years.

CURRENT SITUATION:
Instruction, faculty, and support offices are housed in substandard, converted barracks buildings that lack adequate amenities. Many of the structures date from 1903. Present facilities do not provide the adequate classroom and staff/faculty office space necessary for intensive learning activities. IC schools and support functions are widely separated across the base. This situation prevents the consolidation of activities and leads to logistical and management span of control problems in both classrooms and support offices. Increases in learning requirements have required temporary leasing of classrooms off-post.

IMPACT IF NOT PROVIDED:
If this project is not provided, the ability of IC to raise learning proficiency will be at risk. The lack of additional classrooms will prevent reduction of student-to-instructor ratio which is the most critical cornerstone of IC's 3-year transformation plan. This continued shortage of space will severely limit language curriculum, evaluation, and faculty development. IC will continue to attempt less than desirable temporary measures unlikely to meet the desired language proficiency in accordance with the Secretary of Defense's directives.

"EXAMPLE"

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ARMY MCA (AS OF 10/25/2007 AT 17:05:39) 25 OCT 2007
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Fort Irwin
California

General Instruction Building 98989

ADDITIONAL:

In the event that a utility system is privatized (under 10 USC 2688 or other authority) prior to award of this project or during construction of this project, MILCON funds appropriated for the MILCON project herein may be transferred to the utility privatization contractor involved for the utility infrastructure. Title to the utility infrastructure constructed as a result of this MILCON project may be transferred to the utility privatization contractor notwithstanding any other provision of law. This project has been coordinated with the installation physical security plan, and all physical security measures are included. All required antiterrorism protection measures are included. An economic analysis has been prepared and utilized in evaluating this project. This project is the most cost-effective method to satisfy the requirement. The Deputy Assistant Secretary of the Army (Installations and Housing) certifies that this project has been considered for joint use potential. The facility will be available for use by other components. Sustainable principles will be integrated into the design, development, and construction of the project in accordance with Executive Order 13123 and other applicable laws and Executive Orders.

/S/ Johnson Z. Johnson

Colonel, U.S. Army

Garrison Commander

ESTIMATED CONSTRUCTION START: MAR 2010 INDEX: 2530
ESTIMATED MIDPOINT OF CONSTRUCTION: SEP 2010 INDEX: 2555
ESTIMATED CONSTRUCTION COMPLETION: MAR 2011 INDEX: 2581

"EXAMPLE"

2010 98989CF P REVISION DATE: 25 OCT 2007
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LAF = 1.29 UM=E

Fort Irwin
California

General Instruction Building 98989

			U/M	Qty	Unit Cost	Cost ($000)
PRIMARY FACILITY.						
GENERAL.						
1.0)	17120	General Instruction Building	SF	100,000	260.93	(26,093)
1)	17120	General Instruction Building	SF	100,000	260.93	26,093
2.0)	17120	Conc Retaining Walls, Spec Fdn	LS	--	--	(375)
1)		Conc Retaining Walls, Spec Fdn	CY	1,500	250.00	375
3.0)	17120	Bldg Pad Engr'd Fill, Spec Fdn	LS	--	--	(450)
1)		Bldg Pad Engr'd Fill, Spec Fdn	CY	15,000	30.00	450
4.0)	89220	EMCS Connections	LS	--	--	(80)
1)		EMCS Connections	EA	160	500.00	80
5.0)	88040	IDS Connections	LS	--	--	(100)
1)		IDS Connections	EA	100	1,000.00	100
6.0)	00005	SDD and EPAct05	LS	--	--	(523)
1)		SDD and EPAct05	LS	--	--	523
7.0)	88041	Antiterrorism Measures	LS	--	--	(1150)
1)		Blast Resistant Windows	SF	5,000	65.00	325
2)		Blast Harden Exterior Walls	SF	55,000	15.00	825
INFORMATION SYSTEMS.						
1.0)		Building Information Systems	LS	--	--	(1,400)
SUPPORTING FACILITIES.						
Electric Service			LS	--	--	(405)
1)	81242	Connect to Exist Elec Line	LS	--	--	10
2)	81360	XFMR 500 KVA	EA	1	24,277	24
3)	81360	XFMR 1000 KVA	EA	1	43,841	44
4)	81360	Manual Transfer Switch	EA	2	25,000	50
4)	81241	Elec Overhead w/ Poles	LF	500	39.39	20
6)	81242	UG Ducts 4-way-4"	LF	1,000	44.64	45
7)	81242	Undergrnd Elec Conductors	LF	4,000	27.00	108
8)	81242	Parking Lot Lighting	EA	30	3,500	105
Water, Sewer, Gas			LS	--	--	(278)
1)	84210	Potable Water, Tap In	EA	1	5,000	5
2)	84210	Potable Water, 6" PVC, Sch 40	LF	1,000	32.83	33
3)	84210	Potable Water, 6" Valves	EA	4	1,500	6

"EXAMPLE"

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Fort Irwin
California

General Instruction Building 98989

			U/M	Qty	Unit Cost	Cost ($000)
4)	84330	Fire Prot Water, Tap In	EA	1	5,000	5
5)	84330	Fire Prot Water, 8" PVC	LF	2,500	38.00	95
6)	84330	Fire Prot Water, 8" Valves	EA	4	2,500	10
7)	83210	Sanitary Sewer, Tap In	EA	1	5,000	5
8)	83210	Sanitary Sewer Piping, 8" PVC	LF	1,000	52	52
9)	83210	Conc Manholes, PCST, Over 8' Deep	LF	40	555	22
10)	82410	Gas Dist, Tap In	EA	1	3,500	4
11)	82410	Gas Dist Piping, 4"	LF	1,000	35.45	36
12)	82410	Gas Dist, 4" Valves	EA	4	1,500	6
Steam And/Or Chilled Water Dist			LS	--	--	(0)
Paving, Walks, Curbs and Gutters			LS	--	--	(508)
1)	85210	A/C Surface, 3"	SY	10,000	12.74	127
2)	85210	Base Course (Crushed Stone), 6"	SY	10,000	13.13	131
3)	85220	Concrete Pavers	SF	10,000	6.70	67
4)	85220	Sand Base Layer, 2"	SF	10,000	1.5	15
5)	85220	Concrete Sidewalk, 4'	SF	25,000	5	125
6)	85220	Base Course (Bank Run Gravel), 6'	SY	2,777	7.09	20
7)	85211	Curb/Gutter 6"x8"	LF	1,000	22.32	22
Storm Drainage			LS	--	--	(159)
1)	87110	Connect to Exist Storm Drain Syst	EA	1	5,000	5
2)	87110	Concrete Reinf Piping, 18"	LF	2,000	47.79	96
3)	87110	Catch Basins	EA	20	1,200	24
4)	87110	Storm Drainage Manholes	EA	4	3,500	14
5)	87110	Concrete Drainage Swales	LF	1,000	20	20
Site Improvements/Demolition			LS	--	--	(969)
1)	93310	Remove 2" Bitum Pvmt	SY	1,000	19.70	20
1)	93310	Remove 4" Conc Pvmt	SY	500	21.01	11
2)	93310	Remove Conc Curb & Gutter	LF	500	4.75	2
3)	93310	Remove Fire Hydrants	EA	2	650	1
4)	93310	Remove Water Line	LF	1,000	12	12
5)	93310	Demo Building Masonry D	SF	50,000	6.17	309
6)	93310	Demo Building Fdn & SOG D	SF	50,000	5	250
7)	93210	Site Grading	SY	14,250	1.71	24
8)	85225	Concrete Dumpster Pads	EA	1	2,500	3
9)		CMU Dumpster Enclosure	EA	1	10,000	10
10)		Courtyard Canopy Shade Structure	SF	1,500	50	75
11)	87210	Conc Retaining Walls, 15' High	LF	250	650	163
12)	93220	Seeding/Grass Hyd w/Fertilizer	SY	10,000	1.05	11
13)	93220	Trees	EA	30	150	5
14)	93220	Haul and Spread Topsoil	CY	1,000	27.57	28
15)	93220	Irrigation Sprinkler System	EA	1	35,000	35
Information Systems			LS	--	--	(850)
1)	80800	Information Systems	LS	--	--	850

"EXAMPLE"

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LAF = 1.29 UM=E

Fort Irwin
California

General Instruction Building 98989

			U/M	Qty	Unit Cost	Cost ($000)
Antiterrorism Measures			LS	--	--	(59)
1)	88042	Accent Bollards	EA	20	1,500	30
2)	88042	Boulders	EA	23	500	12
3)	88042	Turf Mounds 3'High	CY	500	35	18