DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-1000

CECW-EC

ER 1110-2-1302

Regulation
No. 1110-2-1302

30 June 2016

Engineering and Design
CIVIL WORKS COST ENGINEERING

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1. Purpose. This engineer regulation (ER) provides policy, guidance, and procedures for cost engineering responsibilities for all Civil Works projects assigned to the U.S. Army Corps of Engineers (USACE).

2. Applicability. This regulation is applicable to all Headquarters USACE (HQUSACE) elements, divisions and major subordinate commands (MSCs), districts, laboratories, and field operating activities involved in the Civil Works program. It is applicable to cost products prepared by USACE representatives or others, Federal or non-Federal, in support of all authorization, appropriations, decision, and implementation reports and documents for all Civil Works projects that invest Federal dollars.

3. Distribution Statement. Approved for public release; distribution is unlimited.

4. References. References are in Appendix A.

5. Definitions. Various acronyms and terms are commonly used in this regulation to describe phases, types, and parts of cost products. For commonality, and to ensure understanding, definitions used in this regulation are described in the Glossary.

6. Policy. All cost engineering products required to support USACE managed Civil Works projects must be prepared in accordance with this regulation and all referenced regulations, policy and guidance, including engineering manuals, pamphlets and USACE memoranda. Cost engineering products are defined as those cost-related products performed and provided by the cost engineering office, including quantities, estimates, schedules, risk analyses, total project costs and cost-related reports.

a. By 33 U.S.C. 622, the Secretary of the Army, acting through the Chief of Engineers, will contract for improvements to the rivers and harbors in the manner most economical and advantageous to the United States. Contracts will be used for this work if private industry has the capability and the work can be done at reasonable prices and in a timely manner. All construction cost estimates are to be prepared in accordance

with 33 U.S.C. 624, in as much detail as though the Government were competing for the award. Therefore, all costs that a prudent and experienced contractor would expect to incur shall be included in the cost estimate. Civil Works projects originate when a state or city (local sponsor) requests assistance from USACE for an improvement to a national river or harbor. These projects are investigated and developed under the requirements of ER 1105-2-100 and ER 1110-2-1150. Congressional authorization and appropriations are required to start design or construction of most Civil Works projects.

b. Civil Works projects are planned and approved in accordance with ER 1105-2-100, Planning Guidance Notebook, and are designed in accordance with ER 1110-2-1150, Engineering and Design for Civil Works Projects. Civil Works projects specific to Dam Safety should also adhere to ER 1110-2-1156, Safety of Dams – Policy and Procedures, as well as these regulations. Cost development within these regulations must continue to adhere to this regulation (ER 1110-2-1302).

c. Budget Estimates and Independent Government Estimates. Cost estimates are categorized into two types: budget estimates or Independent Government estimates (IGEs). The budget estimate supports funding requests as well as comparisons made to current available funding. Updated costs during project execution and comparisons to the available funding are also referred to as current working estimates (CWE). IGE's are estimates that are prepared to support a contract award. The IGE consists of a title page, signature page, and price schedule, submitted to the Contracting Officer under protective sealed For Official Use Only (FOUO) envelope. The Government estimate back-up data is the detailed cost data, which includes production and crew development methodology, labor, equipment, and crew backup files, subcontractor quotes and all other data identified as detail sheets. The backup data is FOUO and is not to be released. Supporting documents that are publicly available as parts of the solicitation (such as plans, specifications, and project descriptions) are not part of the Government estimate.

(1) In accordance with Federal Acquisition Regulation (FAR) 36.203, Independent Government Estimates must be prepared in as much detail as though the Government were competing for award. All IGEs must be developed as complete and as accurately as possible based upon the latest available information. The cost estimate will represent the "fair and reasonable" cost to the Government.

d. All estimates should include within the cost estimate all allowable costs, which a prudent and experienced contractor would expect to incur. Design (if applicable) and

construction efforts needed for project completion must be included in the cost estimate. These costs might address such items as performance specifications, deliveries, site preparation, access, cleanup, and other such items not included in the plans and specifications but would be part of the costs a prudent contractor would expect to incur.

e. Cost estimates must be defensible documents that include description of project scope, major assumptions, sufficient rationale, and basis of costs presented within the estimate. Cost estimates are to be developed in as much detail as practical for the work involved for the specific design phase. At a minimum, the detail included in the cost estimate will make it a standalone and defendable document. Estimate data that includes unit prices, lump sums, and allowances must contain a basis for cost.

f. Detailed preparation requirements and the format of the cost engineering products must follow policy and guidance.

g. Cost engineering products developed by architect-engineer (A-E) contractors or by other offices (i.e., Area Offices, Resident Offices, etc.) must conform to all cost ERs, EMs, and other applicable regulations (shown at Appendix A).

h. Quality control reviews must occur on all cost engineering products (e.g., quantities, estimates, schedules, risk analyses, total project costs, cost-related reports and appendixes, etc.), whether prepared by the cost engineering office, by other authorized offices (i.e., Area offices, Resident Offices, A-E Firms, etc.), or by contract, as prescribed by the specific review procedures in this regulation and those referenced. Reviews will be performed by qualified government personnel in the cost engineering office, which have not participated in the development of the cost product. Cost engineering products must be reviewed to confirm that each estimate meets the project scope and associated USACE regulations and that the assumptions and logic used are valid in estimating the cost of all features.

i. Cost engineering products used to support decision documents for the MSC, HQUSACE and/or Congressional authorization/appropriation must undergo an agency technical review (ATR). HQUSACE mandates that the Review Management Organization (RMO), including National Planning Centers of Expertise (PCX), coordinate with the Civil Works Cost Engineering and Agency Technical Review Mandatory Center of Expertise (Cost MCX) currently located at the Walla Walla District.

7. Function of the Project Delivery Team.

a. USACE is committed to effective management of the scope, quality, cost, and schedule of each project by using project delivery teams (PDTs). ER 5-1-11 presents the requirements for establishing a PDT for all projects. A project manager (PM) leads each PDT, which is comprised of everyone necessary for successful development and execution of all phases of the project. The PDT may consist of individuals from more than one USACE district and may include specialists, consultants/contractors, stakeholders, or representatives from other Federal and state agencies. Team members are chosen for their skills and abilities to successfully execute a quality project.

b. A member of the cost engineering office must be an integral PDT participant, supporting the PM in developing, monitoring, and management of cost engineering products from the study phase through project completion.

c. The coordinated efforts of all PDT members must provide sufficient project information for development of all cost engineering products at the established project development level required within ER 1110-2-1150.

8. Responsibilities.

a. Project Manager (PM)/Planner. The assigned PM/planner provides support to the cost engineering element with sufficient funding and time to produce quality products in accordance with Federal law, Federal Acquisition Regulations, and USACE regulations, guidance, and policies. In support of cost engineering product development, the project team lead is responsible for the following:

(1) Ensure cost engineering representation is included as a full and active PDT member in the development and update of cost engineering products at all project phases and milestones from inception to completion.

(2) Provide PDT leadership and facilitation with responsibility for assuring that the project stays focused on the public interest and on the customer's needs with resulting clarity in project scoping that supports cost engineering product development.

(3) Ensure the PDT provides the cost engineer with all necessary data and information within their respective areas of responsibility to support development of quality cost products.

(4) Support cost engineering principles and applications relative to project scope development and management, quantity development, estimates, schedules, risk analyses, value engineering, cost updates, and cost management.

(5) Coordinate with and rely on cost engineering approved data when reporting costs, schedules and risks internally and externally.

(6) Develop a Risk Management Plan (RMP) which identifies planned measures for risk identification, and risk reduction actions utilizing the construction estimates, schedules and risk analyses to effectively manage the risk throughout implementation of the project; the RMP is a living document that is updated in coordination with the PDT and cost engineer as the project progresses through all phases of project execution.

(7) Coordinate the project schedule and risk analysis within the PDT structure to develop the risk management plan and establish and justify chosen project contingencies with corresponding confidence levels as applicable.

(8) Assure each project has received a formal Cost ATR on the project cost products, cost changes when required.

(9) Coordinate and consult with the Cost MCX technical experts and engage their services as early as possible in the planning, design, and agency technical review (ATR) processes. Communicate with the Cost MCX on high visibility projects or as required.

(10) Provide district project review board technical support on project costs as required.

(11) Ensure the Total Project Cost Summary (TPCS), Justification (J)-Sheet and all reports correctly reflect the costs developed within the cost engineering office, respective work breakdown structure and features and cost-sharing agreements. Ensure the TPCS also includes the cost data from the PDT and other appropriate offices, including any sunk or spent costs to ensure a complete TPCS. PDT involvement must include spent and forecast real estate, PED and construction management costs.

(12) Review, approve, sign, and date all TPCS documents.

(13) Ensure timely coordination and collaboration with programmer, economist, and project cost engineer at critical milestones.

(14) Assure the cost PDT member communicates with the PM, on the requirements concerning update of cost engineering products.

(15) Ensure cost engineering receives annual funding to support cost management practices and controls, program updates for review and concurrence. For mega-projects (see para. 26 g.), ensure the allocation of appropriate resources for project controls and earned-value management practices as required.

b. Project Delivery Team. The Project Delivery Team (PDT) carries critical responsibilities in supporting the cost engineering functions and cost engineering product development. The PDT must:

(1) Develop scope and technical information for delivery of a complete usable project. Develop sufficient design documents to support the cost engineering products at the various project development phases. Coordinate with the cost engineer to determine the appropriate level of project details. The PDT and design personnel must work with the cost engineer to determine the design level required for function, safety and risk reduction.

(2) Must establish a project acquisition plan at Feasibility phase to reduce acquisition risks and improve estimate assumptions and quality.

(3) Participate in risk meetings throughout the project life to develop and maintain the project risk register. Also, the PDT members must help identify the cost and schedule threshold levels associated with the identified risks.

(4) Support the cost engineer in development of the total project cost by providing the associated scope and estimated costs of non-construction elements within the CW-WBS. This includes the 01-Lands and Damages, 02-Relocations, 22-Feasibility, 30-Planning, Engineering and Design, 31-Construction Management and spent cost accounts.

(5) Responsible for defining confidence/risk levels associated with their office products. See information under “Risk Identification for Determining Uncertainties and Contingencies” for details regarding PDT participation in risk development and management.

c. Chief, Cost Engineering. The Chief of the Cost Engineering Office is responsible for the development of all cost engineering products including cost estimate, construction schedule and risk analysis for the construction CW-WBS features as a member of the PDT and in accordance with HQUSACE regulations, guidance, and policies. Responsibilities include:

(1) Responsible for adhering to the latest cost engineering regulations, manuals, and guidance. The chief manages the overall workload, which is subject to funding, ensuring a capable workforce by hiring adequate resources, and providing necessary training and software tools. Software includes the mandatory Microcomputer Aided Cost Estimating System (MCACES), Cost Engineering Dredge Estimating Program, quantity take-off, scheduling programs, and risk analysis (Crystal Ball).

(2) Responsible for assuring a cost engineering PDT member is actively engaged in the planning and execution of projects.

(3) Responsible for the quality of cost engineering products during all phases of development. Quality responsibilities include those cost engineering products prepared by self or others, whether in-district, other districts, architect-engineer (A-E) community, or other organizations where Federal design and construction dollars are USACE managed.

(4) When cost engineering products are to be prepared by others (AE's, local sponsor, etc.), ensure that cost products developed comply with USACE cost engineering regulations, policies and guidance, including the support of ATRs.

(5) Responsible for ensuring that cost engineering products prepared by A-E firms or others are reviewed and validated within the district cost engineering office. This will be evidenced by the chief of the cost engineering elements signature on the cost estimate before release or submission.

(6) Ensure resource needs for all appropriate estimating activities, including site visits prior to and during construction, are properly communicated to the PM to facilitate the provision of adequate funding and scheduling for cost engineering requirements within the Project Management Plan (PMP).

(7) Ensure cost engineering products are updated, reviewed, approved and signed by the cost engineering chief in accordance with applicable sections of this and other applicable regulations.

(8) Document and review bid data and results, protests, and mistakes in bids. Analyze, evaluate, and make recommendations on proposed district actions for bid protests and mistakes in bid.

(9) Support HQUSACE Cost Engineering initiatives that include but are not limited to cost engineering database development, usage, historical recording of cost estimate data, bid data results, and construction feature unit pricing.

(10) Support USACE, contracting, and PDT processes including bid schedule development, bid and proposal evaluations, source selection boards, project review boards, value engineering, quality management, quality reviews, ATRs, and independent external peer reviews.

(11) Foster and develop qualified cost engineers to support ATR cost product reviews.

(12) Support the PM and PDT members in the total cost management processes.

d. Cost Engineer. The cost engineer is responsible for development of the cost engineering products as defined within this regulation. Responsibilities include:

(1) Support and coordinate with project management, program management, and economists at key milestones of study and cost reporting. The cost engineer must support the PM in the development of the PMP scope as pertains to cost engineering products associated with project execution. The cost engineer will provide the labor estimate for cost engineering services.

(2) Work with all PDT members and local interests to sufficiently define and confidently include project scopes and construction, designs, drawings, quantities, pertinent environmental and permitting restrictions, project schedules and risks in preparing sound budget estimates.

(3) Responsible for the development of all cost engineering products as a member of the PDT and in accordance with HQUSACE regulations, policies and guidance. Non-construction costs (real estate, 30 PED, Construction Management, etc.) will be developed by the responsible PDT members but the cost engineer will support the project manager as the PDT member for gathering the data and ensuring adequate documentation for costs identified in the TPCS.

(4) Quantity development (take-offs) for lump sum project features, CW-WBS estimates, construction schedules, risk analyses, life cycle cost analyses, TPC, cost product narratives and reports, a documented record of quality control checks and documentation supporting the contract negotiation process.

(5) Confirming quantities provided by the PDT and developing sub-quantities for items requiring additional documentation.

(6) Performing quantity, cost, schedule and risk updates as required to support design changes, acquisition strategy changes, budget estimate requests and IGEs.

(7) Identification to the project manager a budget allowance for Management Control activities within the TPC to assure cost, schedule, and risk are living documents and are used as a tool throughout the project life.

(8) Provide cost engineering support in the development of Operations, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) costs in support of construction estimates and economic calculations.

(9) Provide cost estimating support to the value engineer in conducting value engineering studies.

e. Cost engineering services by Non-USACE or Engineering Firms. Preparation of budget estimates, Independent Government Estimates and associated cost engineering products are inherently the responsibility of the Government when Federal funds are to be requested, received or spent. When others develop cost engineering products for USACE projects, the tasking and product development are the responsibility of the USACE Cost Engineering Office. These services must be provided by personnel experienced in cost engineering, scheduling, and cost risk analysis. Cost products developed Non-USACE will be provided to the Cost Engineering office for review and subsequent approval. The Cost Engineering office will assume ownership of the products for proper use of the cost information.

f. Civil Works Cost Engineering Mandatory Center of Expertise. The MCX has certain USACE responsibilities to support the civil works mission. Responsibilities include:

(1) Assisting HQUSACE with policy development, policy/guidance review and enforcement, for Cost and Schedule Risk Analysis (CSRA), agency technical reviews, and Cost Engineering Dredge Estimating Program (CEDEP).

(2) Maintaining technical expertise related to current cost engineering regulations and guidance.

(3) Provide technical support to HQUSACE on development, upgrade, maintenance, and implementation of MCACES and related supporting databases.

(4) Provide technical assistance and resources to HQUSACE, division command, or MSC and/or district command on cost engineering issues and product development including quality control and technical reviews.

(5) Serve as the proponent for the CSRA development and policy.

(6) Serving as a quality assurance, and quality review agent as required by current USACE policies on cost related products. Ensure that the Cost ATR reviewers are qualified and technically competent with the necessary technical experience to perform the Cost ATR and maintain a database of qualified personnel.

(7) Receiving, interpreting, disseminating, and implementing cost engineering guidance, direction, and correspondence from higher authority in a timely manner.

(8) Participating in HQUSACE Cost Engineering Steering Committee and lead subcommittee efforts.

(9) Developing and providing cost engineering instructors at the national level to help develop and mentor the cost engineering community.

(10) Serve as Technical Center of Expertise for the Construction Equipment / Civil Works Cost Index Database. This includes all research, development and communication.

g. Division or MSC Cost Engineer.

(1) Serve as division or MSC point of contact in communicating with HQUSACE cost engineering offices.

(2) Receive, disseminate, and implement cost engineering guidance, direction, and correspondence from higher authority in a timely manner.

(3) Establish and maintain a cost engineering quality assurance program overseeing the district's quality control to ensure the accuracy and completeness of project cost engineering products prepared either in-house or by A-E firms.

(4) Conduct periodic field reviews of district commands' execution of cost quality management and recommend necessary corrective actions when warranted.

(5) Support and encourage technical development and training of USACE cost engineers in performing ATRs of cost engineering products.

(6) Review proposed project reports requiring approval above the authority delegated to district commanders. Where policy/guidance dictates, assure districts have obtained the required ATR certifications.

(7) Participate in HQUSACE Cost Engineering Steering Committee and lead subcommittee efforts.

(8) Conduct and lead annual regional cost engineering meetings that include cost engineering supervisors and senior engineers. Meetings should address current regulations, cost related programs, issues, findings, recommendations, resolutions, and progress.

(9) Provide technical assistance to districts and MSC elements on cost engineering issues. Consolidate and disseminate MSC-wide historical cost data.

(10) Provide technical support to HQUSACE on development, upgrade, maintenance, and implementation of MCACES and related supporting databases.

(11) Support the Department of Defense (DoD) Tri-Service Cost Engineering Certification Board by encouraging cost estimators within the division or MSC area of responsibility to obtain certification and assist the board with proctoring tests for candidates. At a minimum, certification as a Certified Cost Consultant or Certified Cost Engineer must be obtained and maintained.

9. Cost Engineering Products and Updates. Cost engineering products include quantities, estimates, schedules and escalation, risk analyses and contingencies, and

cost reports. These products are critical management tools used for establishing and monitoring costs, schedule, and risks over the project life cycle.

a. Cost engineering involvement in the project's cost estimate development and updates are continuous. The level of estimating intensity varies with progression through the different phases of project development and implementation. The five typical project phases are:

(1) Federal Interest Determination (Alternative Studies).

(2) Feasibility phase.

(3) Preconstruction, engineering, and design (PED) phase.

(4) Construction phase.

(5) O&M, Repair, Replacement, and Rehabilitation phase.

In some cases, such as Continuing Authorities Program (CAP) projects, phases are combined into Feasibility and Implementation.

b. Update of the cost products are a key component to project management controls. Cost engineering products must be updated to reflect project scoping changes, clarifying technical information, acquisition strategy identification or changes, construction element changes and current commodity cost (labor, equipment, materials, etc.). Update of construction schedule and cost and schedule risk update.

(1) Regular updates (annually or sooner) must be performed to ensure the total project cost estimate is based on current information. The cost PDT member is required to evaluate changes on the project for the above items to determine appropriate methods for updating the cost products. Full updates (requiring updated cost pricing based on the above factors must occur within a two-year timeframe measured from the previous estimate preparation date. Escalation of cost (if deemed appropriate by the cost development responsible personnel) may occur within the two-year period.

(2) Total project cost estimates presented for budget or funding requests must have an estimate preparation date within two years of the date of submission.

(3) Total project cost estimates presented in Chief of Engineer's reports must have an estimate preparation date within two years of the report date

(4) For active authorized total project costs, the cost products must be updated annually as identified above and include spent costs within TPCS. For projects that are currently not active and are attempting to seek funds to become active, the product submittal must follow the requirements from above. HQUSACE reserves the right to require estimate product updates regardless of timelines. Refer specific update requirements including review requirements to the Cost MCX.

c. The Civil Works Construction Cost Index System (CWCCIS), EM 1110-2-1304, must be used to update unit prices and various project cost features to current or future price levels. CWCCIS indices used for future projections are developed directly from the escalation factors provided to the Federal agencies by the Office of Management and Budget (OMB). The OMB factors are published by HQUSACE, Programs Division, in the Engineer Circular (EC) for the Annual Program and Budget Request for Civil Works Activities.

10. Cost Engineering Software Tools. The USACE approved estimating software programs, Microcomputer Aided Cost Engineering System (MCACES) and the Cost Engineering Dredge Estimating Program (CEDEP), are the required software programs for the preparation of Civil Works cost estimates throughout USACE. HQUSACE may mandate other industry software for applications in quantity development, project scheduling, and risk analyses. Construction schedules must be developed using standard industry recognized scheduling software. A statistically based Monte Carlo risk analysis software must be used for TPCS values greater than $40 million. Current mandated software systems should be confirmed from the latest guidance provided by HQUSACE, Cost Engineering office.

a. MCACES is a cost estimating program used by cost engineering to develop and prepare all Civil Works cost estimates. Using this system, estimates are prepared uniformly allowing cost engineering throughout USACE and the A-E community to function as one virtual cost engineering team. The latest HQUSACE approved version of MCACES is mandatory beginning at the feasibility phase for the Federal recommended plan.

(1) MCACES software is supported by the following cost-related databases:

(a) Equipment Library - Engineer Pamphlet (EP) 1110-1-8 presents construction equipment hourly ownership and operating costs. These hourly rates are one of the supporting databases in MCACES software and must be used in the preparation of all cost estimates. Public Law requires fair and reasonable costs are to be determined from Government estimates prepared as though the Government were a well-equipped contractor; as such, pamphlet hourly rates are based on ownership and operating costs, and are not rental rates. Rental costs typically found in modifications and claims are determined from the contractor's rental agreement.

(b) Labor Library. Labor market research including the minimum by law, Davis Bacon wage determinations establish the prevailing hourly wage and fringe rate estimates for the supporting MCACES labor library local to each project location.

(c) Unit Cost Book Library. The Unit Cost Book Library is a generic composition of construction tasks including associated crews (equipment and labor), materials, and assumed productivities. In general, these costs are presented at in national average pricing and require localizing through (1) published adjustment factors, (2) re-pricing of labor, equipment, and materials through local market research, or (3) a combination of methodologies as appropriate.

11. Quantity Development. Project scope, design documents, and associated assumptions are the basis of quantity take-offs and calculations. They are an important aspect of cost estimate development and serve as a critical basis of estimate data. Regardless of the source, the cost engineer must ensure quantities are supported by a defensible, documented source that reflects the project scope and design level that is traceable and can reasonably support an independent quality review. Design uncertainty and quantity variation must be considered within the cost and schedule risk analysis study.

12. Civil Works Work Breakdown Structure. All project cost estimates must be organized according to the CW-WBS format (Appendix B). As a minimum, each cost estimate must be developed to the sub-feature level of the CW-WBS. The TPCS and budget forms (for example, PB-3) used for budgeting and programming purposes are required to be developed to at least the WBS feature level. The lower CW-WBS estimate structure should be developed to reflect the required activity elements and the anticipated sequencing that logically support project schedule development and respective risks within a risk analyses.

13. Cost Estimate Classifications.

a. To support the Civil Works missions addressed in ER 1105-2-100, cost estimates are required for all phases of a project. Detailed cost estimates should be considered For Official Use Only (FOUO) and managed in accordance with AR 25-55 and FAR 36.203. In a typical project life, cost estimates can be divided into two types: budget estimates or IGEs. The budget estimate supports funding requests as well as comparisons made to current available funding. IGE's are estimates that are prepared to support a contract award. The basis of an estimate can range from no technical information (very high cost risk and contingencies for uncertainties, considered Class 5) to complete plans and specifications (very low cost risk and lower contingencies for uncertainties, Class 1). Level of estimate, schedule, and risk quality correspond directly to scope quality and many estimates can be a combination of quality, depending upon level of technical information for certain project construction elements. Class 3 estimates to Class 5 estimates (very limited technical information) carry greater risk in scope and estimate assumptions and details and fall into the category of budget estimates. The goal of any estimate is to develop to the greatest degree of confidence and accuracy for the given level of technical information. This can be accomplished through several estimating approaches such as parametric processes of various cost sources, using quotes, detailed calculations, crew-based unit pricing, cost books, or historical data supported by sufficient explanation. All scope, technical information, and cost estimates must be prepared, as a minimum, in accordance with the classes as prescribed in Table 1. Technical information quality, confidence and completion level must reflect requirements for project scope as the basis for estimate development. There can be circumstances, criteria or programs that require a greater degree of project development and cost product accuracy. Estimates must include not only costs, but also sufficient narrative and notes that clearly describe the estimated scope, anticipated acquisition strategy, estimate assumptions, methodology and intentions of constructing the major elements.

b. Estimate Class is a reflection of the technical information. Quality and confidence are based upon the provided project information, developed scope and ability to estimate quantities and make reasonable or confident assumptions in estimate preparation. Lesser confidence equals greater risks and resulting higher contingencies. Estimates of a Class 3 to Class 1 must be developed using MCACES software. Estimates developed to support funding requests must be developed in MCACES software, regardless of the cost value or the program.

(1) Class 5 – Preliminary technical information (0-5%). These estimates are commonly referred to as “Rough Order of Magnitude (ROM).” There is considerable risk and uncertainty inherent in a Class 5 estimate, resulting in high contingencies. These estimates are NOT recommended in reports because the extremely limited information and high risk poses credibility issues in quality and accuracy. Project designs, methods, and quantity development are unclear or uncertain. There is great reliance on broad-based assumptions, costs from comparable projects and data, cost book, cost engineering judgment and parametric cost data. Development may consist of lump sum cost. Detailed cost items are not required or captured. Each PDT must identify areas of risk and uncertainty in the project and describe them clearly in an effort to improve quality and confidence to a Class 4 estimate level for external reporting purposes. Establishing a credible contingency with qualifications is necessary. Typical Contingency Range could be 40% to 200%.

(2) Class 4 – Early concept technical information (5-10%). There is still substantial lack of technical information and scope clarity resulting in major estimate assumptions in technical information and quantities, heavy reliance on cost engineering judgment, cost book, parametric, historical, and little specific crew-based costs. While certain construction elements can be estimated in detail, there is still a great deal of uncertainty relative to major construction components. Although Class 4 estimates may be more accurate than Class 5 estimates, they are based on a very limited technical information. The PDT must identify areas of risk and uncertainty in the project and describe them to determine the amount of contingency that must be added to a cost estimate to reduce the uncertainty to an acceptable level of cost confidence. Typical Contingency Range could be 30% to 100%.

(3) Class 3 – Technical information (including designs) are approaching a 10-60% quality of project definition. There is greater confidence in project planning and scope, construction elements and quantity development. The estimates rely less on generic cost book items, greater reliance on quotes, recent historical and site-specific crew based details. Class 3 estimates are a reflection of improved technical documents. The estimates must be supported by a technical information (scope, design, acquisition and construction methods, etc.) discussion within the estimate and the uncertainties associated with each major cost item in the estimate. Special attention must be given to large construction elements and items that are sensitive to technical information change. Typical Contingency Range could be 20% to 50%.

(4) Class 2 – Technical information (including designs) quality and confidence approaching 60-80% definition. There is a confident plan and quantity development with fewer broad-based assumptions. There is minor reliance on cost book for low value items, major reliance on quotes, detailed quantities and site-specific crew based details. A Class 2 estimate may include a PDT project evaluation to determine if additional investigations or studies are necessary to reduce the uncertainties and refine the cost estimate. The evaluation must be accomplished as a joint analysis between the cost engineer and the designers or appropriate PDT members that have specific knowledge and expertise on all possible project risks. A risk analysis is recommended as it better defines PDT project path forward regarding risks and basis for determining contingencies. Typical Contingency Range could be 15% to 30%.

(5) Class 1 – Technical information (including scope & design) quality and confidence approaching 80-100%. The estimate is near IGE level. Quantity and installation confidence is strong. There is minimal reliance on generic cost book items, heavy reliance on quotes, heavy reliance on site-specific crew based details. Class 1 does not imply that all unknowns and risks are eliminated. Some estimates prepared to this level should include risk analysis to the degree described in Class 2 above. Results of the risk analysis will be the basis for determining contingencies which are used for the budgetary basis or special contract types. Typical Contingency Range could be 5% to 15%.

Table 1. Civil Works Estimates – Class Level Designation

Project Phase	Scope and Technical Definition		Risk Level	Minimum Estimate Class
Pre-Budget Development (not recommended for reports)	Extremely Limited		Extremely High	**5***
	Pre-Authorization			
Initial Alternatives	Very Limited		Very High	4*
Feasibility Alternatives	Very Limited		High	4*
Feasibility – Federal Recommended Plan	Limited-Fair		Moderate	3
National Economic Decision (NED)	Limited-Fair		Moderate	3
Locally Preferred Plan (LPP)	Limited-Fair		Moderate	3
Funding Request Decision Documents	Limited-Fair		Moderate	3
	Authorization			
Continuing Authorities Program	Limited		Moderate to High	3-4
Civil Emergency Management Program	Limited		Moderate to High	3-4
Alternative Studies	Limited		Moderate to High	3-4
General Re-Evaluation Report	Limited-Fair		Moderate	3
Limited Re-Evaluation Report	Limited-Fair		Moderate	3
Design Documentation Report	Limited-Fair		Moderate	3
Engineering Decision Report	Limited-Fair		Moderate	3
Post Authorization Change Reports	Fair		Moderate	2-3
Other Funding Decision Documents	Limited-Fair		Moderate	3
	Preconstruction, Engineering & Design (working estimates)			
PED 30%	Fair		Moderate	3
PED 60%	Fair-Good		Moderate to Low	2
PED 90%	Very Good		Low	1
IGE <100% Design	Fair-Good		Moderate to Low	2
IGE 100% Design	Very Good		Low	1
	Construction / Post Award			
Budgets (modifications / claims)	Fair-Good		Moderate to Low	2
IGEs (modifications / claims)	Very Good		Low	1

* Do not use in formal/Chief of Engineer's Reports

14. Cost Products by Phase.

a. Studies. For all studies during pre-authorization and post-authorization.

(1) Planning Stage – Alternative Formulation

(a) Federal Interest Determination. During this phase, many alternatives can be considered. Class 5 and 4 alternative cost estimates for this phase may be developed by applying parametric processes of various cost sources, using quotes, calculations, unit prices, cost books, or historical data as backup. Use of MCACES software tools is recommended but not required. The costs of the Planning, Engineering, and Design feature (30 account) and the Construction Management feature (31 account) are obtained through the PDT and may be percentage based upon historical cost data. The costs for the Lands and Damages feature are obtained through the PDT from the real estate office. Alternatives are developed to the same constant dollar basis for fair comparison. Project specific risk-based contingencies are identified for each alternative under comparison.

(b) Tentatively Selected Plan (TSP). During the alternative formulation stage, a final group of potential alternatives are identified for further study and comparison. For comparison purposes, this group of alternatives, including the resulting TSP must be minimum Class 4 cost estimates and supported by a risk analysis to include reasonable contingencies as part of the comparison and formulation. At the alternative formulation stage, use of MCACES software tools is recommended but not required. Estimates are developed to the same constant dollar basis. This screening process will likely determine the TSP, which the District will present to the vertical team for decision. Cost Engineering judgment with support from Parametric processes, properly escalated historical bid cost data, properly escalated corollaries and cost models, demonstrated experience, and/or unit prices adjusted to expected project conditions are acceptable methods of developing project costs for these alternatives. The cost estimate for each viable alternative must sufficiently describe the construction features and elements, the cost basis, type, and method of construction. Cost presentation must include all features at a consistent effective price level and risk-based contingencies. The TSP is an alternative, equal in development for comparison to the other alternatives. Use of MCACES software tools is required for the TSP. Once that TSP is approved by the vertical team, the TSP becomes the Federal Recommended Plan.

(2) Feasibility Phase. Federal and Local Plans. The feasibility level, Federal recommended plan supports funding requests within a Chief of Engineer's Report. The Federal recommended plan will identify a National Economic Development (NED) and the National Ecosystem Restoration (NER) plan. In the civil works project planning context, NED analysis can be generally defined as economic benefit-cost analysis for plan formulation, evaluation, and selection that is used to evaluate the federal interest in pursuing a prospective project plan. The estimate(s) used to develop the total project cost must be a minimum Class 3 estimate supported by sufficient scoping documents. PDT involvement in establishing and communicating project construction scope and features for confident quantity development is necessary. The estimate(s) must be prepared using the MCACES tools and the established CW-WBS to at least the sub-feature level of detail. When the non-Federal sponsor requests a plan different from the Federally recommended plan, it is referred to as a "locally preferred" plan (LPP). Cost engineering products for both plans must be prepared of equal quality by using the required software and processes for estimates, schedules, and risk-based contingencies for inclusion in the feasibility report. In general and preferred, the unit costs for the major construction features will be computed by estimating the equipment, labor, material, and production rates suitable for the element being estimated. At feasibility stage, key construction elements may not be sufficiently designed to support a full crew-based estimate. With PDT support in defining project scope, alternate estimate approaches for less developed construction elements can include parametric, corollaries and models, quotes and comparisons, and historic data so long as the sources and assumptions are well documented and as recent as possible. If the Federal recommended plan is not the locally preferred plan then a separate TPCS is required for each of these plans. Both plans are updated as required for comparison and reimbursement.

(3) Estimates Submitted for Congressional Re-Authorization. All cost estimates submitted for Congressional reauthorization must be minimum Class 3. If the authorization bill does not pass in that year, the total estimated cost, reflecting the Constant Dollar estimate, must be updated for the next authorization opportunity. Refer to the requirements for updating cost engineering products.

(4) Authorized Projects. Authorized projects that are funded receive further study, more confident design, improved cost engineering products, and resulting lower risk. Projects that are authorized may not yet have the needed funding for project execution and in some cases are subject to appropriations that incrementally fund the project. In

these cases, formal funding requests or decision documents are still required for submission to the MSC and/or HQUSACE.

(5) Smaller projects destined for approval and funding at the MSC or Division, such as CAP, emergency management program and special programs, must be developed to a minimum Class 3 estimate using the MCACES software because they serve as the Federal Recommended Plan.

(6) Preconstruction, Engineering, and Design. As design refinements are made, reflective estimates of an appropriate class quality must also be developed to establish the current total project cost. These are referred to as a Current Working Estimate (CWE). The most recent CWE serves as a comparison check to the Baseline Cost Estimate (BCE). The CWE estimate must be prepared using the MCACES tools and the TPCS form. This is included as a part of any report submitted for reevaluation. A new cost risk analysis must be conducted upon major changes in acquisition strategy, design, and each update in the total project cost. A cost risk analysis report must be included as part of any post authorization report that presents a total project cost to MSC or HQ. The cost engineering product documentation for project submissions to MSC or HQUSACE will be the same as estimate products for the feasibility phase.

(7) Construction Phase. Federal and Local Plans Construction / Post Award Phase Estimates. This refers to estimates for authorized projects that have gone through the solicitation process and have received an initial construction contract award. During the project construction phase, multiple construction contracts and modifications may be required.

b. Operations and Maintenance (O&M). Development requirements for O&M estimates follow the same direction as “Authorized Projects” (see para. 14.a(4)).

(1) Independent Government Estimate. Initial IGEs may fall into two categories: less than 100 percent design and fully 100 percent design. Less than 100 percent design includes those such as design-build that vary in range of design detail and resulting risks and reflect a Class 3 estimate. The fully 100 percent design includes those such as design-bid-build and has lesser risk; it therefore must be developed as a Class 1 estimate. The IGE becomes the standard by which the Government determines whether contractor bid proposals appear fair and reasonable. The IGE is a representation of the best detailed level of design information at time of contract solicitation. The awarded contract becomes the construction contractor baseline in monitoring and management of the construction cost and schedule.

(a) Each IGE is based upon a defined set of plans and specifications and represents the cost of performing the work in the time allocated by determining the necessary labor, equipment, and materials. The bid schedule must be structured for the specific contract in coordination with the cost engineer. Each bid item on the bid schedule must be identified by the appropriate CW-WBS that will allow tracking of the cost needs and expenditures reflecting the appropriations and TPCS.

(b) An IGE of costs must be prepared and provided to the contracting officer prior to receipt of contractor proposals. The contracting officer may require an estimate when the cost of required work is anticipated to be less than the SAT. The estimate must be prepared in as much detail as though the Government were competing for award (FAR 36.203). Prior to opening of bids, access to information concerning the IGE must be limited to Government personnel whose official duties require knowledge of the estimate.

15. Dredging Estimates.

a. Dredging estimates using floating plants must utilize the CEDEP to prepare the estimate (see paragraph 14.c. below for special allowances). The CEDEP program contains proprietary data and NOT to be released to non-Government entities. Due to the proprietary nature of CEDEP tools, when an A-E is involved with developing estimates for projects that include dredging costs, the responsible district cost engineering office must develop all of the dredging unit costs that are CEDEP-based.

b. CEDEP is a supporting estimate for budget estimates and IGE. Most projects have a mixture of non-dredging construction and dredging. For these mixed construction projects, CEDEP must be used to develop the dredging cost, and this cost must be included in the MCACES estimate to calculate total construction cost estimate.

c. Dredging estimates using land-based equipment installed on a floating plant (e.g., crawler dragline on floating platform used for dredging) may use MCACES instead of CEDEP, with the floating plant rates developed using chapter 4 of EP 1110-1-8.

d. Regional Dredge Teams. The use of regional dredge team members is recommended for consultation or the development of dredge cost estimates. Members of regional dredge teams can be contacted for guidance on production rates, effective times, cost data, or other pertinent information. The regional dredge teams can be a valuable resource for estimate development, value engineering studies, and ATRs on

projects requiring dredge estimating. Coordination and information can be made through the Cost MCX.

16. Estimating for Performance Specifications Contracts. This includes solicitations for Design-Build Contracting.

a. The selection of design-build or any other contracting method to acquire facilities is the responsibility of the contracting agency. USACE, as a Department of Defense construction agent, is responsible for selecting such methods. One of the requirements for proceeding with design-build contracting is that the project be fully defined, functionally and technically, by performance specifications as described in ER 1180-1-9.

b. For all design-build projects, district commanders will ensure that adequate funding and time are provided for all PDT members to fully develop both performance specifications and the design-build IGE.

c. PDT members must participate in assessing the functional and technical requirements of the project to determine and establish the physical components that comprise the project. The engineering assessment of project components must be based upon knowledge of standard analyses, operating experience, and sound engineering judgment. Senior engineering staff must be involved to provide experienced judgment in establishing the project scope and characteristics. Appropriate outside specialists should be consulted whenever the in-house engineering staff is not sufficiently trained or lacks experience in the type of work and components being considered. All members of the PDT must have input in the decision process for establishing the assumed physical properties to be used in preparing the cost estimate. These properties include size, dimensions, weights, amounts, and materials.

d. Project cost estimates and schedules should include cost and schedule risk-based assessment to address cost of work elements that could impact cost of project execution and construction. Preparation of a Monte Carlo simulated risk analysis is recommended for design-build projects that are deemed high risk, complex, or exceeding the project dollar limit established by USACE policy. A complete risk analysis must be conducted on the performance specifications, project physical properties, and schedule.

17. Profit.

a. Profit is defined as a return on investment and provides the contractor with an incentive to perform the work as efficiently as possible. Profit is applied for civil works budget estimates. Civil works IGE estimates do not include profit unless required to support a negotiated procurement.

b. For early design stage estimates such as feasibility, profit can be estimated as a percentage based on experience. For budget estimates of better developed projects, profit must be developed using an alternate structured approach, specifically the weighted guideline method, which considers the contractor's degree of risk, the relative difficulty of work, the monetary size of the job, the period of performance, the contractor's investment, assistance by the Government, and the amount of subcontracting.

c. Application of Profit. 33 U.S.C. section 624 provides that projects for river and harbor improvement not be performed by private contract if the contract price is more than 25 percent in excess of the estimated comparable cost of doing the work by Government plant or a fair and reasonable estimated cost (without profit) of a well-equipped contractor doing the work. The legislative history indicates profit is not included in the IGE. Profit is applied to negotiated procurement IGEs.

(1) Civil works construction contracts typically do not include profit. Refer to the contracting officer for recommendation of profit information.

(2) Non construction contracts should have profit included or as directed by contracting officer.

(3) For negotiated procurements, refer to the contracting officer.

18. Schedules.

a. Project and construction schedules are considered an integral part of cost development and the cost estimate is instrumental in defining the schedules. Simply stated, time is money relative to duration, escalation/inflation, delays, material lead-time, project acceleration and risks. As projects evolve, schedules become more critical in providing a clearer picture of anticipated events and expenditures. In early project development stages such as feasibility level, the schedule must be sufficiently developed to confidently present project duration to decision makers and partners, establish escalation/inflation, and support a Cost and Schedule Risk Analysis (CSRA).

As the project further evolves, the schedules must be sufficient to establish contract duration for contract solicitations. When projects are in construction phase, schedules should be well developed, possibly resource loaded, to support contractor schedule baselines, contractor progress payments, modifications, claims, project acceleration studies, and any further Federal funding needs.

b. The cost engineer must prepare reasonable construction schedules that reflect the construction estimates and timeframes used in the escalation/inflation calculations for the TPCS. The construction schedules must reflect the major construction elements and represent the MCACES estimate(s) including notice to proceed date, material lead-times, assumed productivities, work window limitations, etc. The schedules must be sufficiently developed using standard industry-recognized scheduling software, depicting major milestones, concurrent and sequential activities, predecessors, successors, and durations within a developed calendar and identifying a critical path. For projects requiring a Monte Carlo risk analysis, the schedule must be sufficiently developed to support the risk analysis related to seasonal risks, productivity assumptions, major construction elements, resourcing, acquisition strategy, environmental constraints, and assumed annual construction cost placement.

c. The PM may request the cost engineer to prepare the project schedule based on data developed by the PDT. Likely scheduling phases could include planning, receipt of funding, investigations and design, contract(s) acquisition, construction of project contracts.

19. Project Escalation and Inflation.

a. The CWCCIS must be used to update unit prices and various project cost features to specific price levels. Indexes used to escalate costs from the past to the present are developed from actual historic data. Indexes for future escalation are developed using the “Updating Factors” in Table 1, of the EC, Corps of Engineers Civil Works Direct Program – Program Development Guidance which are based on the current annual Office of Management and Budget (OMB) inflation factors. The CWCCIS presents a table that depicts the historic construction escalation and the projected OMB escalation rates measured from the date of the most current table. It reflects the CW-WBS construction elements. It is updated every March and September depicting current OMB annual escalation and semi-annual realized construction escalation.

20. Risk Identification for Determining Uncertainties and Contingencies.

a. Risk analyses will be performed during all project phases, appropriate to the level of available information.

b. Risk is broadly defined as a situation or event where something of value is at stake and the outcome is uncertain. Risk is typically expressed as a combination of the likelihood or probability of an event occurring, and attendant consequences should the event unfold, although it is too often used in actuality as a probability of an event occurring. Consequences are measured in terms of safety, cost, time, environmental harm, property damage and other metrics. Choosing the appropriate risk metrics and actively using them in decision making is critical to effective risk management in support of a vibrant economy, thriving ecosystems, and sustainable communities.

c. Risk Framework Components. The three components of the Civil Works Risk Framework are risk assessment, risk communication and risk management. As the life cycle of a project unfolds, risks must be continually assessed, then periodically updated and communicated in order to ensure the actual risks are accurately understood and properly applied as project conditions change. Key activities within each element are summarized in the diagram below.

(1) Risk Assessment is a systematic approach for describing the nature of the risk, including the likelihood and severity of consequences. Risk assessments are quantitative whenever possible; however, qualitative assessments may be appropriate for some activities. A risk register will be utilized to identify potential risk events. The PDT will support the cost facilitator in identifying the risk events. The risk register will identify probability of occurrence and severity of impact as relating to impacts on cost variance and schedule variance. The Cost MCX CSRA risk template will be utilized to assure consistency (or approved equal, by the chief Cost MCX). The risk register will also be the basis for identification of risk management decisions.

(2) Risk Communication is a two-way exchange of information between risk assessors and those who will use the risk assessment results or those who are affected by the risks and risk management actions. Open communication improves the understanding of the risks by all parties, and leads to improved risk assessments and risk management decisions and outcomes. Communication must occur early and repetitively throughout a project life cycle to ensure proper risk understanding and application.

(3) Risk Management is a decision-making process in which risk reduction actions are identified, evaluated, implemented, and monitored. The purpose of risk management is to take actions to effectively reduce and manage risks identified in the risk assessment. In simplest terms, there are four ways of adjudicating identified risks and often some combination of them is used for any given risk:

(a) Avoid the Risk. This may require a change in project scope or in program direction.

(b) Take Actions to Reduce (mitigate) the Risk. These actions would reduce the likelihood that the risk event occurs or the severity of impacts if the event does occur.

(c) Transfer the Risk Openly to Other Parties. Insurance is a common risk transfer mechanism for financial or hazard risks. Contracts are sometimes used to manage project risks, but a cost is typically incurred.

(d) Accept the Risk. This may be appropriate when consequences are not severe. Acceptance does not necessarily correlate to a lack of action. A response plan can be prepared and kept in hand, should the risk event occur.

Figure 1 - Risk Framework

d. HQUSACE requires using a cost risk analysis to determine contingency amounts for decision documents or in support of needed funding outside of the district funding authority. These include, but are not limited to, feasibility studies, design document reports, engineering documentation reports, general reevaluation reports, limited reevaluation reports, and post authorization change reports. A CSRA report and a risk management plan are required for all decision documents, regardless of project size.

e. Contingencies of cost and time must be included in the estimate and schedule to cover unknowns, uncertainties, and/or unanticipated conditions that are not possible to evaluate from the data on hand at the time the cost estimate is prepared but must be represented by a sufficient cost to cover the identified risks within the defined project scope. Added contingencies are not to be applied to project budgets as a means of replacing scope clarity of projects that fail to meet the required development stage or milestones.

f. Contingency values vary based on project phase and scope development. Limited information results in greater risks and higher contingencies. As projects evolve in scope and clarity, respective risks and contingencies will be typically reduced (Table 1, Civil Works Estimates – Class Level Designation). At construction contract award, a minimum contingency allowance of at least five percent of the contract amount must be available at the project level. Construction contracts with less than 100% design should be even greater, possibly supported by a risk analysis. As a project nears completion, this contingency allowance must be reduced accordingly. A cost and schedule risk analysis (CSRA) is the process of identifying, measuring, and forecasting the potential cost and time impacts of project uncertainties on the estimated total project cost during project delivery. Key components include record of PDT involvement, all cost features, a quality risk register, estimated contingencies and resulting report. As a minimum, a cost risk analysis is a formal process required for all Civil Works projects during the planning phase, regardless of project size or estimated cost value. It must be accomplished as a joint analysis between the cost engineer, PM or planner, real estate, contracting, engineering, construction, and other critical or appropriate PDT members that have specific knowledge and expertise on all possible project costs and risks. The risk analysis must consider all project features of the CW-WBS and four major project periods: funding, design and investigations, acquisition, and construction to complete. As a minimum, risks must include consideration for available or anticipated funding, known project scope and potential growth, acquisition strategy, construction complexity,

volatile commodities, quantity development, special equipment, cost estimating methods and assumptions, and external risk factors.

g. Risk analysis processes and details will vary depending upon the complexity and size of the project. At the lowest extreme, the risk analysis may result in a single contingency value based on a simplified qualitative risk-based method, also referred to as an “Abbreviated” method. The abbreviated method does not address schedule, generally because the smaller dollar amounts are less dependent on schedule impacts in the form of cost. For projects where the total project cost including inflation is $40 million or greater, or for complex smaller projects having numerous work elements with differing unknown conditions and uncertainties, a “Detailed” risk analysis will be performed in accordance with current USACE requirements. This “Detailed” method includes risk identification, quantitative and qualitative study, and sensitivity analysis using a Monte Carlo simulation method. The risk analysis identifies and documents the conditions, uncertainties, and the evaluation methodology used to determine the assignment of contingency. Product results include CSRA report which includes PDT identifications, a risk register, risk model.

h. As project development progresses into design and construction, contingencies must be developed based upon the risks related to the uncertainties or unanticipated conditions identified by the investigation data and design detail available at the time the estimate is prepared (ER 1110-2-1150). In risk analysis studies using the Monte Carlo process for the larger, more complex projects, the contingencies should be presented with confidence levels and associated contingencies and confidence levels (10 percent confidence increments as a minimum). For cost product development, the contingencies reflecting an 80 percent confidence level will be reported. Management does have flexibility to use a different confidence level (higher or lower) with detailed justification documenting the rationale for variance from the 80 percent confidence level. Items to consider in the confidence level chosen could be life safety, project complexity, national priority, and/or likelihood of mitigating risks. In any case, the chosen value should be justified within the risk analysis and main reports.

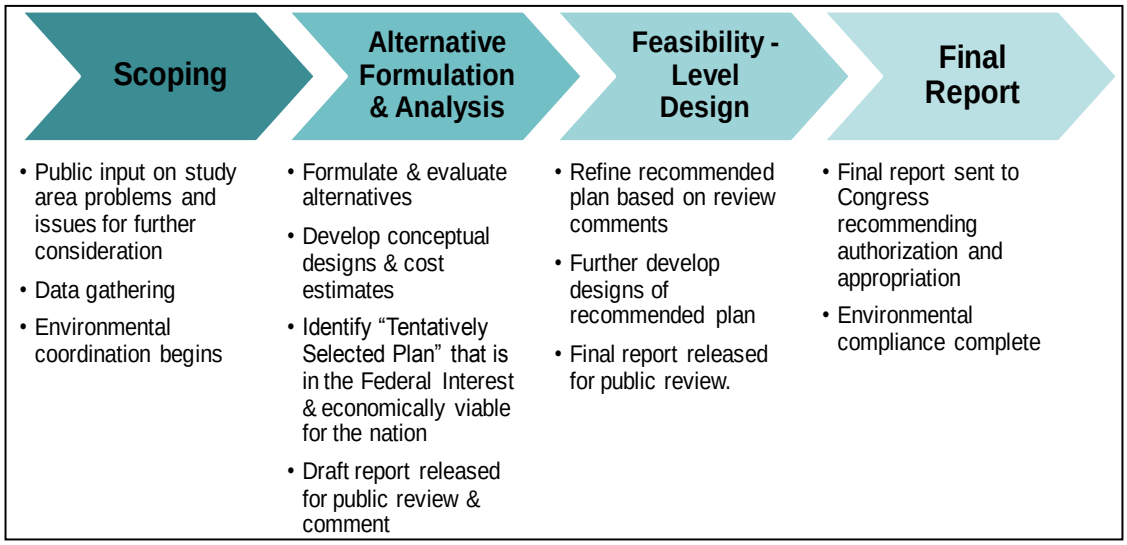
i. Estimates used for benefit-to-cost ratio calculation. The cost engineer will communicate with the economist to assure the economist understands the basis of the cost estimate and the corresponding confidence level. The goal is to assure the basis for the cost identification is comparable to the basis of the benefits.

(1) A CSRA and resulting report are not intended to serve as a risk management plan (RMP). Rather, the report serves as part of the RMP. The RMP must present the plan to manage, monitor, and mitigate risks accordingly; assigning responsibilities to PDT members to ensure the RMP is used as a living document and management tool.

j. Risk Analyses for Feasibility Phase.

(1) During the feasibility phase, a cost risk analysis approach and resulting contingencies must be applied to the final array of alternatives under a comparison study that establishes the tentatively selected or recommended plan. That final array is considered part of a decision document for the vertical team in establishing a Federal recommended plan. At this stage, a detailed Monte Carlo statistical method is not expected, but could be warranted for complex and large cost and schedule alternatives. The “Abbreviated” risk-based method is the recommended means to establish project alternative risks and contingencies for study comparison. For the Federal Plan, abbreviated processes can also be applied for projects where total project cost is less than the established $40 million threshold.

Figure 2 - Feasibility Process



(2) For the larger projects (greater than $40 million), the Federal recommended plan and the LPP, a Monte Carlo statistical method is required, addressing costs and schedules. The risk analysis must be performed, commensurate with project size and project complexity. The risk analysis must include a report that identifies the risk analysis processes, PDT member involvement, record of discussions, risk register, key assumptions, major concerns, justified contingencies, and recommended risk mitigation plans. The report will serve as part of the PDT's Risk Management Plan.

k. Risk Analyses for PED and Construction Phases. During the PED and construction phases, a risk analysis and updates must be conducted upon the remaining costs, major construction elements, further funding requests, major milestones, major changes in design scope, acquisition strategy, quantities, and contract acquisition strategy and for each update in the cost estimate. This is to satisfy the annual cost update requirements. The established project cost thresholds still apply for risk analyses processes during these phases relative to an abbreviated method or a Monte Carlo analysis. A cost risk analysis report must be included as part of any post authorization change report to support the revised authorized cost.

l. Risk Management. The project execution will be evaluated during the life of the project. The risk identified during the initial CSRA development will be monitored and responded to. In addition the PDT will identify potential new risk events during the various stages of development. The new risk events will be incorporated into the CSRA and analyzed for impact of likelihood of occurrence. The cost engineer will evaluate the cost risk model to communicate to the PM and PDT members the overall impact to the total project cost to decide response actions.

21. Total Project Cost Summary.

a. The TPCS is the product that is certified by the Cost MCX, because it presents the total project costs developed by the PDT rolled up into a single summary page. When the TPCS is updated, the update must include consideration for scope, current acquisition strategy, quantities, updated costs, schedules, inflation, risks, and contingencies.

b. The TPCS is prepared by the cost engineer with support from the PDT. The TPCS reflects all applicable project feature costs, contingencies, escalation and inflation to project completion and presents the Federal and non-Federal cost share (the cost share information is required for CAP projects, optional for Non-Cap). It includes spent and future costs. While the cost engineer prepares the basic construction cost elements

of the form, the PM, Real Estate, and Construction offices play a major role in establishing program year presentation and Federal and non-Federal share, spent costs, 01 Lands and Damages, 30 PED, and 31 Construction Management. The Cost engineering will work closely with the PM to identify the breakout of the total project cost including cost per feature and contingency development. The Project First Cost and the Constant Dollar are required to be displayed in the feasibility report.

(1) Constant Dollar Cost (Price Level). Constant dollar analyses are utilized to determine an equivalent cost in the future or in the past by price indexing using CWCCIS data. Constant dollar cost is the estimated cost BROUGHT TO THE EFFECTIVE PRICE LEVEL. Constant dollar cost at current price levels is the cost estimate used in decision documents and chief's reports. The constant dollar cost does not include inflation to midpoint design and construction.

c. Project First Cost (Price Level). The cost estimate that will serve as the basis for providing the cost of the project for which authorization is sought. The cost estimate to be used in Chief's Reports and other decision documents is Estimated Cost represented at the current price level. The current price level is the current FY based on the submittal date. Certain costs that are excluded from the TPCS include (Appendix D):

a. The annualized estimate of Operations, Maintenance, Repair, Replacement, and Rehabilitation.

b. Associated financial costs that are not part of the recommended Federal project but are a necessary non-Federal responsibility.

c. Local service facilities that are for Commercial Navigation Only.

d. For decision documents and budget submissions, typically the TPCS must be completed no later than 31 May of the submitting year. The Project First Cost (Constant Dollar in the second column set) must be presented in program year 1 Oct 20XX in order to support the economic analysis and the budget request. The TPCS Project First Cost is be used for the programming Form PB-3.

22. Cost Product Report Submittals.

a. Formal project reports and supporting documents are required for decision documents that are processed through the vertical team, i.e., district commander, MSC/divisions, HQ, Assistant Secretary of the Army, and Congress. The cost reports are a subset of the main report and should at least address cost, schedule and risks.

The formal reports occur at various stages of project development or as directed. These include, but are not limited to, feasibility studies (alternatives, Federal recommended plan, locally preferred plan), design document reports, design deficiency reports, engineering documentation reports, general reevaluation reports, limited reevaluation reports, and post authorization change reports.

b. The cost engineering product submission includes a project narrative or introduction: level of design information, major project construction features, acquisition assumptions, general cost assumptions and qualifications. It also includes summary level costs (alternatives, Federal recommended plan and LPP where applicable), project and construction schedule, risk-based contingency presentation, and TPCS. These documents are also required to support the ATRs and external reviews.

(1) For the MCACES estimate, summary sheets must be provided for direct costs, indirect costs, and project (owner) costs to the CW-WBS feature account level. The estimate prepared (utilizing the latest approved MCACES software) must contain a narrative that presents the level of design information, acquisition and market assumptions, the major project construction features, key construction assumptions, contractor assignments and markups, quantity confidence and unknowns, and identified risks or uncertainties used in the development of contingencies utilizing risk analysis processes. For the MCACES estimate presentation, multiple CW-WBS folder levels may be necessary to present the project scope and cost of construction elements in the project. However, certain cost information is considered sensitive and AR 25-55 and FAR 36.203 govern its release. Release under the Freedom of Information Act (FOIA) should be coordinated with the FOIA officer.

(2) For public release reports and documents, a high level WBS summary shall be used. Cost sensitive data, such as quantities, unit costs, quotes and productivity rates, and CEDEP must be protected from public disclosure since they may serve as a basis for the IGE. Sensitive cost data must be removed from public documents or presentations.

(3) In presenting the project schedules, address the major components related to design phase, contracting solicitation, major construction components and their time relationships.

(4) In addressing the risks for the abbreviated risk method, the report should include a brief discussion of major construction elements, major risks, input and results, risk register and risk matrix. For the Monte Carlo risk method, a standalone risk report,

as part of the risk management plan, should provide an executive summary, brief report purpose and project scope, applied methodology, identified PDT members involved, key assumptions, risk register, sensitivity charts, contingency tables, and confidence curves, cost and schedule contingency presentation, major findings, and mitigation recommendations.

23. Cost Estimate Confidentiality.

a. Mature or well developed cost estimate data that is likely to be used in support of bid estimates must be considered as confidential, sensitive, and proprietary, and marked as For Official Use Only (FOUO), and so managed (reference AR 25-55). Typically, this occurs near the 90% design phase; however, earlier well developed detailed cost estimates can also include sensitive cost and pricing data regardless of design phase. Sharing of this data must be restricted since disclosure may easily compromise the integrity of competitive bidding processes. Sensitive data includes detailed quantities, detailed unit prices, crew or equipment productivity, and supplier and material quotes. This data must be restricted to within the USACE community shared only on an “as need to know basis” within the district and USACE cost community in support of estimate development and ATRs. Need to know basis is determined by the Contracting office and district command structure. Pre-Bid and IGE cost information must be protected, dissemination made carefully. Cost Data Sharing in and outside districts should only include higher level cost information related to project scope and features in use for programming and budget purposes. IGEs and cost data therein must remain restricted and marked as “For Official Use Only” (FOUO). The FOUO marking shall also be applied to any physical electronic storage media such as CDs. Any deviation must require a signed non-disclosure agreement with parties on a clear “need to know” basis. After contract award, ordinarily, only the title page, signature page, and price schedule are disclosed outside the Government. The IGE backup data should not be released since it contains sensitive cost data (e.g. contractor quotes, crews, and productivity) that are proprietary or might compromise costs for future similar procurement.

b. Non-IGE data may be shared within the USACE cost community to support cost development.

c. Detailed estimate data and its distribution must be submitted directly to the needed USACE parties through a secure means.

24. Cost Quality Management. Cost engineering offices must follow the established USACE Quality Management Regulation, ER 1110-1-12. Only qualified cost engineers, preferably certified estimators, must provide documented quality control reviews.

a. Accuracy and completeness of project scope and cost engineering products, including the necessary cost product updates, must be emphasized throughout the project life. Even in early phases, cost estimates should represent as complete and accurate a picture as is practicable. This is necessary for Federal and non-Federal planning, budgeting and management processes.

b. The division cost engineer is responsible for quality assurance of division cost engineering products. Part of the quality assurance process is to review a sampling of estimating products to ensure they comply with guiding policy. The division cost engineer, as a minimum, must sponsor an annual meeting with each constituent district's cost engineering chiefs and senior estimators to ensure the quality of the division estimating procedures complies with current USACE policy.

25. Technical Reviews for Cost Products.

In accordance with ER 1110-2-1150 and the Civil Works Review Policy, technical reviews are required and/or recommended during various phases of project development through the life of the project. Technical reviews consist of three levels of review: a District Quality Control (DQC), Agency Technical Review (ATR), and Independent External Peer Review (IEPR). The Design Review and Checking System (DrChecks) must be used throughout USACE as the formal system for ATR and IEPR. Cost comments are to be treated as For Official Use Only (FOUO). Refer specific update requirements including review requirements to the Cost MCX.

a. District Quality Control: A DQC review is a district responsibility, which is a documented review by a technical element as a quality control measure on decision documents. The DQC is a critical element in confirming district PDT acceptance of product presentation, quality, completeness, and readiness to support the ATR and IEPR. The Cost DQC, including comment and resolution, must be formally documented and performed by a technically qualified senior cost engineer; all cost products must be addressed: quantities, estimate(s), schedules, risk analyses, total project cost and cost report.

b. Agency Technical Review: All qualified Cost ATR reviewers must be senior cost engineers, trained and certified by the Cost MCX. For decision documents all reviewers will be assigned by the Cost MCX. Review comments must be addressed by qualified district cost personnel knowledgeable of the specific cost engineering products. Closure of critical comments or comments that cause a necessary change to the cost engineering products related to quality, cost, schedule, and contingencies must rely upon verification of the necessary revisions prior to comment closure by the cost reviewer.

(1) The Cost MCX has the responsibility for the quality performance of the Cost ATR[1] and for issuing a cost certification of the project cost products as identified by current regulations and policies. The RMO is required to coordinate with the Cost MCX for cost reviewer assignments and ATR of cost products. Review consideration is given to the project reports, investigations and design, DQC records, quantities, estimates, construction schedules, contingencies, and resulting total project cost. A Cost ATR is intended to confirm that such work is performed in accordance with established regulations and policies, professional principles, practices, codes, and criteria that result in a confident TPC. Regardless of product author (USACE, A-E, sponsor, or others), any report that is presenting or requesting Federal funds from higher authority such as MSC, divisions, HQ or Congress, must receive a Cost ATR and a Cost MCX Cost Certification. Other project milestone submissions may require a Cost ATR as defined by current HQ guidance or as specifically requested by HQ, MSC, or division offices. A Cost ATR Certification and its validity are based upon age of the estimate products as discussed in Section 11 – Cost Engineering Products and Updates. Cost ATRs and resulting Cost MCX Certifications should be current for budget requests.

(2) The Cost ATR(s) for the feasibility phase, as a minimum, must verify that the level of engineering is sufficient to substantiate both the screening level alternative or comparative cost estimates and the BCE with contingencies to support selection of the recommended plan and to establish the baseline schedule and cost estimate with contingencies. To accomplish this, each project submittal by the respective district must include with the submittal the draft main report, engineering products such as photos, design, drawings, and engineering appendices. The submission must also include native electronic files for the comparative estimates, MCACES estimates, project schedule depicting design, acquisition and construction, risk based contingency development, and the TPCS worksheets. Cost ATR for a PED stage of project

[1] Cost ATR – includes requirement for providing Cost Certification unless as otherwise identified.

development must still address the same products: scope definition, designs, quality controls, quantity development, estimates, construction schedules, risk analyses, and contingencies.

c. Independent External Peer Review: An IEPR is an independent review of the technical efficacy of a decision document by a review organization external to USACE. The term “external” implies non-USACE or non-governmental review. IEPR is conducted on projects that meet mandatory or discretionary triggers outlined in current HQ guidance similar to the ATR process, and a formalized comment resolution process must take place. Note this process may come under scrutiny through Freedom of Information Act requests. Document submittal requirements of section 21 also apply to IEPRs. Often times, the IEPR occurs at the same time as an ATR. IEPR coordination is critical regarding timeliness and funding, because funding the IEPR commonly requires a contractual process.

d. Types of Cost Certifications. The Cost MCX uses a certification method to communicate analysis of project cost development. The Cost MCX and respective reviewers take into consideration many key factors that contribute to accurately identification of cost, schedule and risk. Project Scope, technical information (design, acquisition methods, unique construction methods, etc.) and quality of development are reviewed. The Cost MCX has the authority assignment of certification level. Since many unique combinations of product development may occur, the Cost MCX assignment is based on the overarching goal of “Does the process used by the district produce accurate cost products which provide the district a high probability of execution within the authorization limits and is the risk level (Contingencies) appropriate?”

(1) Cost Certification Statement. Project Scope has been identified to accurately estimate project cost and schedule. Technical information is sufficient to allow for cost development combined with risk identification to appropriately account for cost and schedule. Product has been developed in accordance with quality standards as identified within current cost regulations and policy.

(2) Conditional Cost Certification Statement. Portions of the project scope, technical information or product quality are deemed at an insufficient level in accordance with regulations and policy, however not to the level where project cost cannot be identified with inclusion of risk identification. The Conditional Certification Statement will highlight basis for the Conditional Certification. This will allow the district to focus future resources on improvement. Projects will not be allowed multiple conditional cost certifications, without HQUSACE PM and HQUSACE Cost approval.

(3) Cost Non-Certification Statement. In cases where the project scope, technical information or quality of product are deemed to be at such an insufficient level where cost and/or schedule cannot be accurately identified. Rationale for Cost Non-Certification will be identified on the statement. Cost products assigned the Cost Non-Certification Statement are generally not acceptable for final planning reports, funding requests, or other circumstances for which the Cost Certification Statement is required. The non-certification letter and all comments will be forwarded to the MSC for review and evaluation. The MSC will forward its recommendations to HQUSACE for a final determination on subsequent action.

26. Total Cost Management.

a. Total cost management is the effective application of professional and technical expertise to plan and control resources, costs, schedules, and risk throughout all project phases. Total cost management is a systematic approach to manage and forecast costs, schedules and risks throughout the life cycle of any project, product, or service. A major tool in this application is the development and update of the total project cost and then updating and managing the cost products that support the total project cost comparison to the BCE. Applicable terms include project management, project controls and earned value management.

b. DFAR 234.201 presents the Department of Defense Policy regarding Earned Value Management System (EVMS) requirements in contracts. EVMS is another way of referring to Total Cost Management and should be considered/incorporated within the day to day business practices and management of USACE projects. A total project cost estimate, (reference TPCS forms), is required for documents supporting a funding request. This includes feasibility studies, design document reports, design deficiency report, engineering documentation reports, general reevaluation reports, limited reevaluation reports, and post authorization change reports.

c. During any phase of the project, as the PDT becomes aware of information that impacts project cost, schedule, or risks, the cost engineering office must update the cost engineering products. For total project cost development and updates, cost engineering products must include current project scope, reflect current acquisition strategy,

quantities, labor, equipment, materials, escalation, schedules and risks. For cost engineering products older than 2 years, escalation application is not appropriate.

d. During the construction phase, the authorized BCE sets the target for managing and controlling project costs. As the design is refined, the uncertainties are reduced, and the costs associated with each feature become more specific towards satisfying the scope requirements. To identify these changing costs, a total project cost must be updated at each planning phase or milestone in the project development.

e. Project development can span multiple years. To ensure the project is still within the authorized or appropriated cost, annual total project cost estimates must be updated and compared with the BCE, current authorization, or appropriation. Subsequent to a Congressionally approved BCE (Section 902 of the Water Resources Development Act of 1986, Public Law 99-662), all total project costs must document the current computed total project cost at the appropriate price level, the total project cost escalated to the current programming year (constant dollar estimate), and the total project cost escalated through the construction periods based on a current project schedule. Estimate product updates must address current scope, current acquisition strategy, quantities, costs, schedules, and risks. The estimate must include re-pricing using current labor rates, equipment data, material rates, and use the appropriate cost indices found in EM 1110-2-1304.

f. For significant, ongoing construction projects that span multiple years, the cost engineering office must support in the monitoring, preparation, and update of quantities, Government cost estimates, schedules, and risk products. This is intended to support the project controls and monitoring of construction progress, invoice payments, potential modifications, negotiations, claims, and settlements.

g. Certain large projects that are greater than $300 million over a span of three years or more that are unique, higher acquisition risk, of national significance, multiple contractors and stakeholders may be qualified as “mega projects.” Management of these projects require greater oversight that includes Project Control teams utilizing experienced personnel responsible for managing project and integrated program schedules, project and program budgets, and document and communication controls. The team must include capable expertise in cost and schedule risk analysis, cost estimating and network scheduling. An independent Government estimate and related risks are still required to protect the Government’s interest in monitoring and reporting

contractor progress, defending against contract modifications and claims and to support fair and reasonable invoice payments.

h. Cost and schedule metrics must use earned value processes to analyze and compare scheduled project progress and construction placement to contractor actuals, invoice validation, current TPC, authorizations and appropriations.

i. Reasonable separation must be made within the cost products regarding work breakdown structure, spent costs, ongoing efforts/contracts, and remaining efforts in order to identify specific risks and calculate the differing contingencies between the three phases of design, advertising, and construction. During the construction phase, greater consideration should be given to known, project-specific data, cost changes, and trends.

j. Value engineering is a mandatory method that supports cost management objectives. It can be performed during any phase of project development and execution. Refer to ER 11-1-321, Army Program Value Engineering.

FOR THE COMMANDER:

6 Appendixes
(See Table of Contents)

D. PETER HELMLINGER
COL., EN
Chief of Staff

APPENDIX A

References

Public Law No. 95-269 (91 Stat. 218-1-219)
Pertains to preparation of construction cost estimates as though the Government were a prudent and well-equipped contractor.

Public Law No. 99-662 (H.R.6)
The Water Resources Development Act of 1986.

Title 33 United States Code Section 624
Section 624 provides that projects for river and harbor improvement shall be performed by private contract if the contract price is less than 25 percent in excess of the estimated comparable cost of doing the work by Government plant or less than 25 percent in excess of a fair and reasonable estimated cost of a well-equipped contractor doing the work. The legislative history indicates the IGE shall not include profit.

5 U.S.C. 552, as amended by Public Law No. 104-231, 110 Stat. 3048
The Freedom of Information Act

AR 25-55 The Department of the Army Freedom of Information Act Program

33 Code of Federal Regulations Parts 209 and 335-338
Operations and Maintenance Regulations for Activities Involving the Discharge of Dredged or Fill Material in Waters of the United States and Ocean Waters.

Davis – Bacon Act

Federal Acquisition Regulation (FAR), Subpart 36.203
Construction and Architect-Engineer Contracts.

FAR, Subpart 15.404-4
Profit.

FAR, Subpart 36
Construction and Architect-Engineer Contracts.

FAR, Subpart 1.602
Contracting Officers.

USACE Acquisition Instruction (UAI)

Engineer Regulation (ER) 5-1-11
U.S. Army Corps of Engineers Business Process.

ER 11-1-321
Army Programs Value Engineering.

ER 1105-2-100
Planning Guidance Notebook.

ER 1110-1-12
Engineering and Design Quality Management.

ER 1110-1-1300
Cost Engineering Policy and General Requirements.

ER 1110-2-1150
Engineering and Design for Civil Works Projects.

ER 1180-1-9
Design-Build Contracting.

Engineer Manual (EM) 1110-2-1304
Civil Works Construction Cost Index System.

Engineer Pamphlet 1110-1-8
Construction Equipment Ownership and Operating Expense Schedule.

ASTM E 2516-06
Standard Classification for Cost Estimate Classification System, Reprinted, with permission, from the Annual Book of ASTM Standards, copyright ASTM International,

100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM, www.astm.org.

Project Management Institute, Inc. A Guide to the Project Management Body of Knowledge. PMBOK® guide, 3rd ed, 2004.

WATER RESOURCES DEVELOPMENT ACT (WRDA) (various years)

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APPENDIX B

Civil Works Work Breakdown Structure

(Feature and Subfeature Levels)

CW-WBS Number		Description of Item
01	**--**	**LANDS AND DAMAGES**
01	18	GENERAL REVALUATION REPORT (GRR)
01	19	LIMITED REVALUATION REPORT (LRR)
01	20	PROJECT DESIGN MEMORANDUM
01	21	FEATURE DESIGN MEMORANDUM
01	23	CONSTRUCTION CONTRACT(S) DOCUMENTS
02	**--**	**RELOCATIONS**
02	01	ROADS, Construction Activities
02	02	RAILROADS, Construction Activities
02	03	CEMETERIES, UTILITIES, AND STRUCTURES, Construction Activities
03	**--**	**RESERVOIRS**
04	**--**	**DAMS**
04	01	MAIN DAM
04	02	SPILLWAY
04	03	OUTLET WORKS
04	04	POWER INTAKE WORKS
04	05	AUXILIARY DAMS
04	06	MUNICIPAL AND INDUSTRIAL WATER DELIVERY FACILITIES
05	**--**	**LOCKS**
06	**---**	**FISH AND WILDLIFE FACILITIES**
06	01	FISH FACILITIES AT DAMS
06	02	FISH HATCHERY, (Including Trapping and Release Facilities)
06	03	WILDLIFE FACILITIES AND SANCTUARIES
07	**--**	**POWER PLANT**
07	01	POWERHOUSE
07	02	TURBINES AND GENERATORS
07	03	ACCESSORY ELECTRICAL EQUIPMENT
07	04	MISCELLANEOUS POWER PLANT EQUIPMENT
07	05	TAILRACE
07	06	SWITCHYARD
08	**--**	**ROADS, RAILROADS, AND BRIDGES**

		(Feature and Subfeature Levels)
08	01	ROADS
08	02	RAILROADS
09	**--**	**CHANNELS AND CANALS (Except Navigation Ports and Harbors)**
09	01	CHANNELS
09	02	CANALS
10	**--**	**BREAKWATERS AND SEAWALLS**
11	**--**	**LEVEES AND FLOODWALLS**
11	01	LEVEES
11	02	FLOODWALLS
12	**--**	**NAVIGATION, PORTS AND HARBORS**
12	01	PORTS
12	02	HARBORS
13	**--**	**PUMPING PLANT**
14	**--**	**RECREATION FACILITIES**
15	**--**	**FLOODWAY CONTROL AND DIVERSION STRUCTURES**
16	**--**	**BANK STABILIZATION**
17	**--**	**BEACH REPLENISHMENT**
18	**--**	**CULTURAL RESOURCE PRESERVATION**
19	**--**	**BUILDINGS, GROUNDS, AND UTILITIES**
20	**--**	**PERMANENT OPERATING EQUIPMENT**
30	**--**	**PLANNING, ENGINEERING, AND DESIGN**
30	11	PROJECT COOPERATION AGREEMENT
30	12	PROJECT MANAGEMENT PLAN
30	18	GENERAL REEVALUATION REPORT (GRR)
30	19	LIMITED REEVALUATION REPORT (LRR)
30	20	PROJECT DESIGN MEMORANDUM
30	21	FEATURE DESIGN MEMORANDUM
30	23	CONSTRUCTION CONTRACT(S) DOCUMENTS
30	24	VALUE ENGINEERING ANALYSIS DOCUMENTS
30	25	PROJECT OR FUNCTIONAL ELEMENT CLOSEOUT
30	26	PROGRAMS AND PROJECT MANAGEMENT DOCUMENTS
31	**--**	**CONSTRUCTION MANAGEMENT**
31	12	PROJECT MANAGEMENT PLAN
31	23	CONSTRUCTION CONTRACT(S) DOCUMENTS
31	26	PROGRAMS AND PROJECT MANAGEMENT DOCUMENTS
33	**--**	**HAZARDOUS AND TOXIC WASTE**

(Feature and Subfeature Levels)		
33	01	MOB, DEMOB & PREPARATORY WORK
33	02	SYSTEMS STARTUP/OPERATIONS/MAINTENANCE
33	03	INSTITUTIONAL ACTIONS
33	04	SURFACE WATER CONTROL
33	05	COLLECTION & INJECTION OF GROUND WATER
33	06	COLLECTION & DISPOSAL OF WASTES
33	07	CONTAIN & RESTORE CONTAMINATED GROUND WATER
33	08	CONTAINMENT FOR WASTES
33	10	TREAT-WASTES/CONTAMINATED SOIL & WATER
33	11	AIR POLLUTION AND LANDFILL GAS CONTROL
33	12	INNOVATIVE TECHNOLOGIES
33	13	SUPPORTING FACILITIES
33	14	PRIME CONTRACTOR'S INDIRECT COST

01. Lands and Damages. This feature includes all costs of acquiring for the project (by purchase or condemnation) real property or permanent interests therein, including Government costs, damages, and costs of disposal of real estate. Government costs include planning expenses for the real estate portion of the General Design Memo and for the detailed Real Estate Memo; and project real estate office administration, surveys, and marking for land acquisition purposes and appraisals.

For projects which require that costs be incurred on real estate activities, i.e., for records search, appraisals, and field inspection to assure compliance by local interests in the provision of local requirements on projects where no Federal land acquisition is involved, a memorandum statement will be provided with the PB-3 indicating the estimated costs of such real estate activities. These costs will be charged to feature 30, Engineering and Design and that feature will be properly footnoted to show the amount of such costs. A similar footnote will be shown on the PB-1s and PB-2a's for all such projects. This feature is credited with disposal receipts from sale of such items as standing crops, standing timber, structures, and improvements in place and acquired with the land. Disposal receipts from sale of excess land not turned in to the U.S. Treasury as miscellaneous receipts are credited to this feature. Lands or interests purchased for relocations and conveyed to others are included in the feature "Relocations." Temporary interests such as leases are included in the feature or distributive item benefited thereby.

02. Relocations. This feature includes removing and relocating, or reconstructing property of others, such as roads, railroads, cemeteries, utilities, buildings, and other structures; and lands or interests purchased for such relocations and conveyed to others, including real estate planning and acquisition expenses. The cost of removal of improvements from the reservoir area for disposal is included in the feature “Reservoirs.” All alterations of railroad bridges in accordance with Section 3 of the 1946 Flood Control Act (22 USC 701p) are also included in this feature.

03. Reservoirs. This feature includes clearing lands in reservoirs and pools of debris, brush, trees, improvements, and structures. Any salvage, obtained by sale or disposal by the Government, of material removed in clearing operations is credited to this feature. This feature also includes bank stabilization, shoreline improvement, firebreaks, fencing, boundary line survey and marking of land which has been acquired or is to be acquired, rehabilitation of natural resources, erosion control, drainage, and rim grouting and mine sealing, etc., to prevent leakage. Site clearing, grouting, etc.,

incidental to and required for specific construction features is included as part of the construction features.

04. Dams. This feature includes dams and all other water collecting and storage facilities, whether man-made or natural, together with appurtenant diversion, regulation, and delivery facilities and spillways, outlet works, and power intake works, whether separate from the dam or not. In the case where the powerhouse is an integral part of the intake dam, the cost of the power intake dam is included in the feature "Power Plant." Any auxiliary dams or spillways detached from the main structures and floating trash and drift booms and barriers are included in this feature. The power intake works include such power items as forebay, penstocks, tunnels, surge tank, gates, operating equipment, and appurtenances. Service roads and service railroads on the dam are included in this feature. The additional cost of relocating highways and railroads across the dam is included in the feature "Relocations."

05. Locks. This feature includes facilities to provide for passage of waterborne traffic, including gates, valves, operating mechanisms, cribs, fills, lock walls, guide and guard walls, operating buildings, and excavation therefore. The lock structure is considered that part of the work within the limit lines extending from the upper end of the upper guide or guard walls to the lower end of the lower guide or guard walls, including dolphins within the lock approaches for tie up, guard, or guide purposes. Excavation or dredging· required in approaches outside of the limits defined above for the lock structure is included in the feature "Channels and Canals." The cost of a cofferdam or the properly allocable amount thereof, if required, is charged to this feature. Locks provided in connection with facilities for the prevention of encroachment of salt water are included in this feature. Locks in connection with fish facilities are included in the feature "Fish and Wildlife Facilities."

06. Fish and Wildlife Facilities. This feature includes items such as ladders, elevators, locks and related facilities for passage of fish at dams and navigation locks and maintenance of fish runs; and provision for wildlife preservation. In support of wildlife, this feature includes environmental mitigation and monitoring costs.

07. Power Plant. This feature includes those facilities specifically required for the production of power other than those included in the feature “Dams,” and consists of the following: powerhouse, turbines and governors, generators, accessory electrical equipment, miscellaneous power plant equipment, switchyard, and tailrace improvement for power. In the case where the powerhouse is an integral part of the

power intake dam, the cost of the power intake dam is included in this feature. Where the structure of a dam also forms the foundation of the powerhouse, such foundation is considered a part of the dam. Units for production of power for the operation only of power, for the operation only of navigation, flood control, or other purpose projects (excluding those projects with power as a feature) are included in other than this feature. The cost of a cofferdam or appropriate part is charged to this feature.

08. Roads, Railroads, and Bridges. This feature includes permanent roads, railroads, and bridges required for access and other purposes in connection with the construction and operation of the project. This feature does not include roads, railroads, and bridges chargeable to the feature "Relocations," access roads to recreation facilities and areas, which will be charged to the feature "14. Recreation Facilities," and service roads and service railroads on structures.

09. Channels and Canals. This feature includes all forms of excavation (including dredging, preparation of spoil disposal area, and attendant facilities) necessary for the development and construction of channels, harbors, and canals for navigation purposes; and deepening, providing new, or improving existing watercourses for flood control and major drainage. Excavation of natural watercourse to provide adequate depths for navigation is included. Excavation for specific structures, such as dams and locks used in the development of waterways and conservation of water resources, is included with such structures. The removal of trees, brush, accumulated snags, drift, debris, water hyacinths and other aquatic growths from canals, harbors, and channels in navigable streams and tributaries thereof for navigational included in this feature. Excavation, clearing, and removal of accumulated snags, drifts, debris, and vegetable growth from streams for flood control and major drainage purposes also is included. Included in this feature are revetments, linings, dikes, and bulkheads constructed as channel improvement works for flood control or navigation, as against such items constructed for bank stabilization only. Also included are jetties constructed in connection with flood control channel improvements.

10. Breakwaters and Seawalls. This feature includes breakwaters, seawalls, piers, and like improvements constructed in connection with the protection of beaches, harbors, shores, and port facilities against the force of waves and encroachment of seas or lakes by direct wave action. Jetties, groins, and like structures provided in seas, lakes, tidewater reaches of rivers and canals, and harbors to control water flow and current, to maintain depth of channels, and to provide protection, are included in this feature.

11. Levees and Floodwalls. This feature includes embankments and walls constructed to protect areas from inundation by overflow from creeks, rivers, lakes, canals, and other bodies of water. This feature consists of such items as: service roads on levee crown or landside berms, road ramps, closure structures, seepage control measures, erosion protection measures on levee slopes and on berms and bank slops when an integral part of the levees or floodwalls; and drainage facilities, constructed to provide means for the passage of accumulated drainage and seepage water and sewage from the protected area over or through levees and floodwalls, comprising such items as interceptor and collection sewers and ditches, and pressurized sewers and drainage structures, including outfalls through levees or floodwalls. Pumping plants are included in the feature "Pumping Plants." Levees locally called dikes are included in this feature.

12. Navigation Ports and Harbors. This feature includes all forms of excavation (including dredging, preparation of spoil disposal area, and attendant facilities) necessary for the development and construction of coastal ports and harbors for navigation purposes. This includes bulkheads, jetties, piers, and docks constructed in connection with navigation improvements and basins or water areas for vessel maneuvering, turning, passing, mooring, or anchoring incidental to the navigation improvements. It also includes dredged material disposal areas (except those for the inland navigation system, the Atlantic Intracoastal Waterway, and the Gulf Intracoastal Waterway), and sediment basins. These are eligible for development as general navigation features of harbor or waterway projects. The removal of trees, brush, accumulated snags, drift, aquatic, and vegetable growths, and debris from harbors, and ports for navigation are included in this feature.

13. Pumping Plants. This feature includes pumping plants construction to pass accumulated drainage and seepage water and sewage from the protected area over or through levees and floodwalls.

14. Recreation Facilities. This feature includes access roads; parking areas; public camping and picnicking areas, including tables and fireplaces; water supply; sanitary facilities; boat launching ramps; directional signs; and other facilities constructed primarily for public recreational use, including essential safety measures in connection therewith. The latter includes, as appropriate, sheltered anchorage areas for small craft, bathing areas readily accessible and reasonably safe, and safety provisions for visitors and fishermen in the project area. (Boat launching ramps, anchorage areas and beaches should be provided during construction to the extent they will definitely be needed and can be accomplished more economically than at a later date.)

15. Floodway Control and Diversion Structures. This feature includes floodway control and diversion structures to provide for the release of flood waters from streams where discharges exceed flood capacity of the stream, including items such as diversion dams, gated or ungated discharge structures, training walls, stilling basin, and those adjacent embankment sections forming part of the control structure. Construction of channels and levees not forming part of the main control structure, but necessary for operation of such structures is included in the appropriate feature "Channels and Canals" or "Levees and Floodwalls."

16. Bank Stabilization. This feature includes revetments, linings, training dikes, and bulkheads for stabilization of banks of watercourses to prevent erosion, sloughing, or meandering. Bank stabilization constructed in navigation channels or in connection with flood control channel improvement is included in the feature "Channels and Canals."

17. Beach Replenishment. This feature includes replacement of eroded beaches, for purposes of recreation and shore protection, by direct deposit of materials obtained by dredging or land excavation.

19. Buildings, Grounds, and Utilities. This feature includes permanent facilities such as operators' quarters, administration and shop buildings, storage buildings and areas, garage buildings and areas, community buildings, local streets and sidewalks, landscaping, and electric, gas, water, and sewage facilities. Where space in a dam, powerhouse, or other basic structure is used in lieu of construction of any of the above-mentioned buildings, such allocated space is not separated from the basic structure. Communication systems are included in the feature "Permanent Operating Equipment."

20. Permanent Operating Equipment. This feature includes all project-owned operation and maintenance tools and equipment, such as laboratory, shop, warehousing, communications, and transportation equipment, and office furniture and equipment. The cost of installing sedimentation and degradation measuring facilities, including the surveys requisite to locating and monumenting range layouts, is charged to this feature. The cost of planning the installation of sedimentation and degradation ranges is charged to the feature "Engineering and Design."

30. Planning, Engineering and Design. This feature includes all engineering, design, surveys, preparation of detailed plans and specifications, and related work required for the construction of the project, including relocations. Surveys and planning required in connection with land acquisition are charged to the features "Lands and Damages" or

"Relocations," as applicable. Engineering and design performed by hired labor or as a pay item under a contract is included in this feature.

31. Supervision and Administration. This feature includes such functions as inspection, supervision, project office administration, and distributive costs of area office and general overhead charged to the project. Costs for Office of the Chief of Engineers CE and Division Office Executive Direction and Management are not charged to Construction, General but to the General Expenses appropriation title.

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APPENDIX C

Total Project Cost Summary

Total Project Cost Summary

Project: **Example Project (Non-CAP)** | P2: **101010** | Authority: **Section 1135**
Location: Walla Walla River | Report Type: **Feas Stdy** | TPCS Preparation Date: 27-Oct-15
District: NWW -Walla Walla District | Contingency Development: Crystal Ball | FY: 2016
POC: Callan | CWCCIS Issue: **9/1/2015**
Scope Synopsis: Flood Control along upper reach of the Walla Walla River.

WBS		ESTIMATED COST				PROJECT FIRST COST *CONSTANT DOLLAR BASIS*				TOTAL PROJECT COST (FULLY FUNDED)			
Civil Works		Risk Based				Program Price Level Date: 2016-1Q							
WBS	Feature Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
02	RELOCATIONS	500	125	25%	625		500	125	625	6%	531	133	664
06	FISH & WILDLIFE FACILITIES	41.525	8,381	20%	49,906		41,525	8,381	49,906	4%	43,267	8,734	52,000
	S/T	42,025	8,506	20%	50,531		42,025	8,506	50,531	4%	43,798	8,866	52,664
01	LANDS AND DAMAGES	50	13	25%	63		50	13	63	6%	53	13	66
	S/T	50	13	25%	63		50	13	63	6%	53	13	66
30	PLANNING ENGINEERING AND DESIGN	10.716	2,170	20%	12,886		10,716	2,170	12,886	9%	11,673	2,364	14,038
	S/T	10,716	2,170	20%	12,886		10,716	2,170	12,886	9%	11,673	2,364	14,038
31	CONSTRUCTION MANAGEMENT	6.386	1,289	20%	7,675		6,386	1,289	7,675	9%	6,959	1,405	8,364
	S/T	6,386	1,289	20%	7,675		6,386	1,289	7,675	9%	6,959	1,405	8,364
	Totals	59,178	11,977	20%	71,155		59,178	11,977	71,155	6%	62,484	12,648	75,132

CHIEF, COST ENGINEERING
PROJECT MANAGER
CHIEF, REAL ESTATE
CHIEF, PLANNING
CHIEF, ENGINEERING
CHIEF, OPERATIONS
CHIEF, CONSTRUCTION
CHIEF, CONTRACTING
CHIEF, PM-PB
CHIEF, DPM

	Cost ($k)	Contingency ($k)	Totals ($k)
Project First Cost for Report:	$59,178	$11,977	$71,155
Total Project Cost used to provide Sponsor information:	$62,484	$12,648	$75,132

Project: *Example Project (Non-CAP)* Page 1 of 4 27-Oct-15

Contract Summary

WBS		ESTIMATED COST Estimate Class Level: Class 3				PROJECT FIRST COST CONSTANT DOLLAR BASIS				TOTAL PROJECT COST (FULLY FUNDED)				
Contract: Phase I		Est Preparation Date: 27-Oct-15 Est Price Level: 2016-1Q				Program Yr: 2016 Prog Level Date: 2016-1Q								
Location: Walla Walla River		Risk Based												
District: NWW -Walla Walla District		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
02 RELOCATIONS		500	125	25.0%	625	.%	500	125	625	2019-2Q	6.2%	531	133	664
06 FISH & WILDLIFE FACILITIES		25	6	25.0%	31	.%	25	6	31	2019-2Q	6.2%	27	7	33
Construction Activities	Total	525	131		656		525	131	656			558	139	697
01 LANDS AND DAMAGES		50	13	25.0%	63	.%	50	13	63	2019-2Q	6.2%	53	13	66
Lands and Damages	Total	50	13		63		50	13	63			53	13	66
30 Planning Engineering and Design														
Project Management	*2.5%*	13	3	25.0%	16	.%	13	3	16	2019-2Q	13.1%	15	4	19
Planning & Environmental Compliance	*1.0%*	5	1	25.0%	7	.%	5	1	7	2019-2Q	13.1%	6	1	7
Engineering & Design	*15.0%*	79	20	25.0%	98	.%	79	20	98	2019-2Q	13.1%	89	22	111
Engineering Tech Review ATR & VE	*1.0%*	5	1	25.0%	7	.%	5	1	7	2019-2Q	13.1%	6	1	7
Contracting	*1.0%*	5	1	25.0%	7	.%	5	1	7	2019-2Q	13.1%	6	1	7
Engineering During Construction	*3.0%*	16	4	25.0%	20	.%	16	4	20	2019-2Q	13.1%	18	4	22
Planning During Construction	*2.0%*	11	3	25.0%	13	.%	11	3	13	2019-2Q	13.1%	12	3	15
Planning Engineering and Design	Total	134	33		167		134	33	167			151	38	189
Construction Management	*10.0%*	53	13	25.0%	66	.%	53	13	66	2019-2Q	13.1%	59	15	74
Project Operation:	*15.0%*	79	12	15.0%	91	.%	79	12	91	2019-2Q	13.1%	89	13	102
Construction Management	Total	131	25		156		131	25	156			149	28	177
Phase I	Total	840	202		1,042		840	202	1,042			911	219	1,130

Contract Footnote: For Example Only

Contract Summary

WBS		ESTIMATED COST Estimate Class Level: Class 3				PROJECT FIRST COST CONSTANT DOLLAR BASIS				TOTAL PROJECT COST (FULLY FUNDED)				
Contract: Phase II		Est Preparation Date: 27-Oct-15 Est Price Level: 2016-1Q					Program Yr: 2016 Prog Level Date: 2016-1Q							
Location: Walla Walla River		Risk Based COST	CNTG	CNTG	TOTAL	ESC	COST	CNTG	TOTAL	MID-PT	INFLATED	COST	CNTG	TOTAL
District: NWW -Walla Walla District		($K)	($K)	(%)	($K)	(%)	($K)	($K)	($K)	(DATE)	(%)	($K)	($K)	($K)
06 FISH & WILDLIFE FACILITIES		40,000	8,000	20.0%	48,000	.%	40,000	8,000	48,000	2018-2Q	4.2%	41,663	8,333	49,995
Construction Activities	*Total*	40,000	8,000		48,000		40,000	8,000	48,000			41,663	8,333	49,995
30 Planning Engineering and Design														
Project Management	*2.5%*	1,000	200	20.0%	1,200	.%	1,000	200	1,200	2018-2Q	8.8%	1,088	218	1,306
Planning & Environmental Compliance	*1.0%*	400	80	20.0%	480	.%	400	80	480	2018-2Q	8.8%	435	87	522
Engineering & Design	*15.0%*	6,000	1,200	20.0%	7,200	.%	6,000	1,200	7,200	2018-2Q	8.8%	6,528	1,306	7,833
Engineering Tech Review ATR & VE	*1.0%*	400	80	20.0%	480	.%	400	80	480	2018-2Q	8.8%	435	87	522
Contracting	*1.0%*	400	80	20.0%	480	.%	400	80	480	2018-2Q	8.8%	435	87	522
Engineering During Construction	*3.0%*	1,200	240	20.0%	1,440	.%	1,200	240	1,440	2018-2Q	8.8%	1,306	261	1,567
Planning During Construction	*2.0%*	800	160	20.0%	960	.%	800	160	960	2018-2Q	8.8%	870	174	1,044
Planning Engineering and Design	*Total*	10,200	2,040		12,240		10,200	2,040	12,240			11,097	2,219	13,317
Construction Management	*10.0%*	4,000	800	20.0%	4,800	.%	4,000	800	4,800	2018-2Q	8.8%	4,352	870	5,222
Project Operation:	*5.0%*	2,000	400	20.0%	2,400	.%	2,000	400	2,400	2018-2Q	8.8%	2,176	435	2,611
Construction Management	*Total*	6,000	1,200		7,200		6,000	1,200	7,200			6,528	1,306	7,833
Phase II	*Total*	56,200	11,240		67,440		56,200	11,240	67,440			59,288	11,858	71,146

Contract Footnote: For Example Only

Contract Summary

WBS		ESTIMATED COST Estimate Class Level: Class 3				PROJECT FIRST COST CONSTANT DOLLAR BASIS				TOTAL PROJECT COST (FULLY FUNDED)				
Contract: Phase III		Est Preparation Date: 27-Oct-15 Est Price Level: 2016-1Q				Program Yr: 2016 Prog Level Date: 2016-1Q								
Location: Walla Walla River		Risk Based												
District: NWW -Walla Walla District		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
06 FISH & WILDLIFE FACILITIES		1,500	375	25.0%	1,875	.%	1,500	375	1,875	2018-4Q	5.1%	1,577	394	1,972
Construction Activities	*Total*	1,500	375		1,875		1,500	375	1,875			1,577	394	1,972
30 Planning Engineering and Design														
Project Management	*2.5%*	38	9	25.0%	47	.%	38	9	47	2018-4Q	11.%	42	10	52
Planning & Environmental Compliance	*1.0%*	15	5	30.0%	20	.%	15	5	20	2018-4Q	11.%	17	5	22
Engineering & Design	*15.0%*	225	56	25.0%	281	.%	225	56	281	2018-4Q	11.%	250	62	312
Engineering Tech Review ATR & VE	*1.0%*	15	4	25.0%	19	.%	15	4	19	2018-4Q	11.%	17	4	21
Contracting	*1.0%*	15	4	25.0%	19	.%	15	4	19	2018-4Q	11.%	17	4	21
Engineering During Construction	*3.0%*	45	11	25.0%	56	.%	45	11	56	2018-4Q	11.%	50	12	62
Planning During Construction	*2.0%*	30	8	25.0%	38	.%	30	8	38	2018-4Q	11.%	33	8	42
Planning Engineering and Design	*Total*	383	96		479		383	96	479			424	107	531
Construction Management	*10.0%*	150	38	25.0%	188	.%	150	38	188	2018-4Q	11.%	166	42	208
Project Operation:	*7.0%*	105	26	25.0%	131	.%	105	26	131	2018-4Q	11.%	117	29	146
Construction Management	*Total*	255	64		319		255	64	319			283	71	354
Phase III	*Total*	2,138	535		2,673		2,138	535	2,673			2,285	572	2,857

Contract Footnote: For Example Only

Total Project Cost Summary

Continuing Authorities Program

In addition to specifically authorized projects, Congress recognized a need to address small water resources and ecosystem restoration projects of limited scope and complexity.

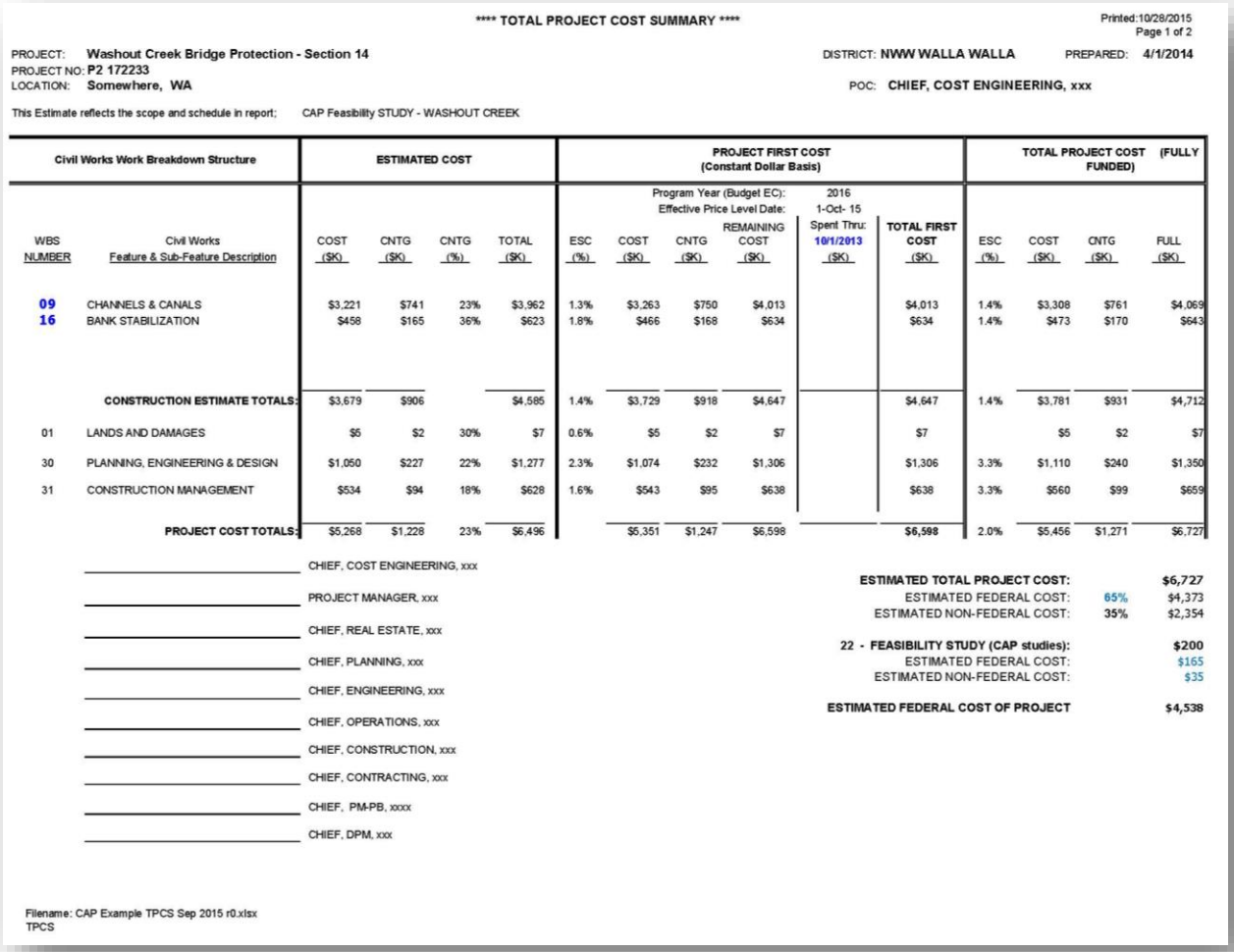
1. The continuing authorities program (CAP) provides the authority for the Secretary of the Army, acting through the Chief of Engineers, to plan, design, and construct projects of limited size, scope, cost, and complexity without additional specific Congressional authority.

2. Congress provides annual appropriations for legislative CAP authorities up to the annual program limit.

3. CAP projects must be implemented in two phases: Feasibility, and Design and Implementation. Each phase is carried out under a separate cost-sharing agreement.

4. Feasibility study costs are NOT included in the Project First Costs or the Total Project Costs of the WBS table. Check current CAP guidance for further information. In most cases the study cost is not part of the "total project cost" but IS included in the federal spending limit/ceiling. The cost share percentage may vary-often the first 100K is fully federally funded.

The following pages are an example of a CAP TPCS.



****** TOTAL PROJECT COST SUMMARY ******

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Page 1 of 2

PROJECT: **Washout Creek Bridge Protection - Section 14**
PROJECT NO: **P2 172233**
LOCATION: **Somewhere, WA**

DISTRICT: **NWW WALLA WALLA** PREPARED: **4/1/2014**
POC: **CHIEF, COST ENGINEERING, xxx**

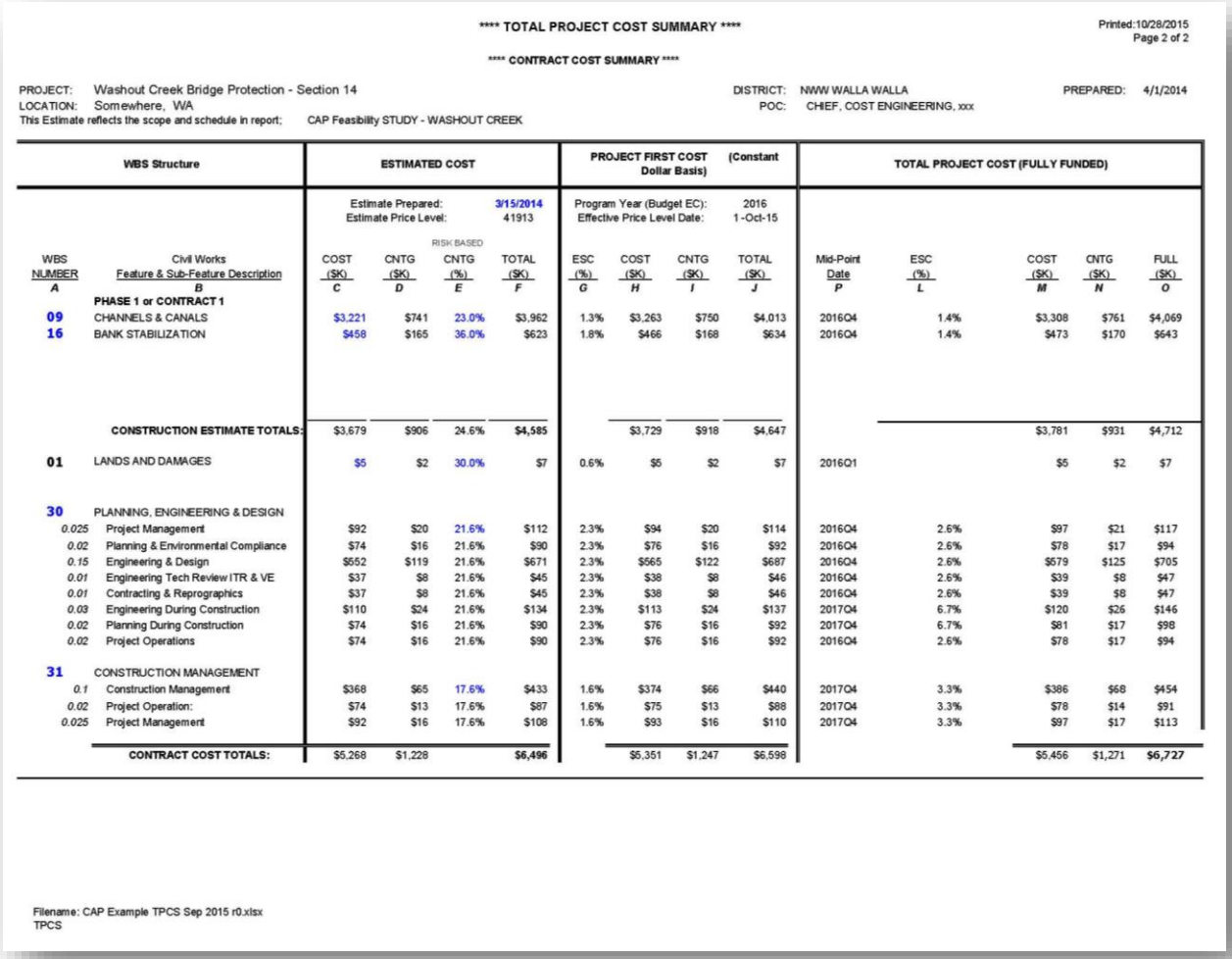
This Estimate reflects the scope and schedule in report; CAP Feasibility STUDY - WASHOUT CREEK

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC): 2016 Effective Price Level Date: 1-Oct- 15									
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	REMAINING COST ($K)	Spent Thru: 10/1/2013 ($K)	TOTAL FIRST COST ($K)	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
09	CHANNELS & CANALS	$3,221	$741	23%	$3,962	1.3%	$3,263	$750	$4,013		$4,013	1.4%	$3,308	$761	$4,069
16	BANK STABILIZATION	$458	$165	36%	$623	1.8%	$466	$168	$634		$634	1.4%	$473	$170	$643
	CONSTRUCTION ESTIMATE TOTALS:	$3,679	$906		$4,585	1.4%	$3,729	$918	$4,647		$4,647	1.4%	$3,781	$931	$4,712
01	LANDS AND DAMAGES	$5	$2	30%	$7	0.6%	$5	$2	$7		$7		$5	$2	$7
30	PLANNING, ENGINEERING & DESIGN	$1,050	$227	22%	$1,277	2.3%	$1,074	$232	$1,306		$1,306	3.3%	$1,110	$240	$1,350
31	CONSTRUCTION MANAGEMENT	$534	$94	18%	$628	1.6%	$543	$95	$638		$638	3.3%	$560	$99	$659
	PROJECT COST TOTALS:	$5,268	$1,228	23%	$6,496		$5,351	$1,247	$6,598		**$6,598**	2.0%	$5,456	$1,271	$6,727

_____ CHIEF, COST ENGINEERING, xxx
_____ PROJECT MANAGER, xxx
_____ CHIEF, REAL ESTATE, xxx
_____ CHIEF, PLANNING, xxx
_____ CHIEF, ENGINEERING, xxx
_____ CHIEF, OPERATIONS, xxx
_____ CHIEF, CONSTRUCTION, xxx
_____ CHIEF, CONTRACTING, xxx
_____ CHIEF, PM-PB, xxxx
_____ CHIEF, DPM, xxx

ESTIMATED TOTAL PROJECT COST:		**$6,727**
ESTIMATED FEDERAL COST:	65%	$4,373
ESTIMATED NON-FEDERAL COST:	35%	$2,354
22 - FEASIBILITY STUDY (CAP studies):		**$200**
ESTIMATED FEDERAL COST:		$165
ESTIMATED NON-FEDERAL COST:		$35
ESTIMATED FEDERAL COST OF PROJECT		**$4,538**

Filename: CAP Example TPCS Sep 2015 r0.xlsx
TPCS



****** TOTAL PROJECT COST SUMMARY ******

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****** CONTRACT COST SUMMARY ******

PROJECT: Washout Creek Bridge Protection - Section 14
LOCATION: Somewhere, WA
This Estimate reflects the scope and schedule in report; CAP Feasibility STUDY - WASHOUT CREEK

DISTRICT: NWW WALLA WALLA
POC: CHIEF, COST ENGINEERING, xxx

PREPARED: 4/1/2014

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 3/15/2014 Estimate Price Level: 41913				Program Year (Budget EC): 2016 Effective Price Level Date: 1-Oct-15								
				RISK BASED										
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
	PHASE 1 or CONTRACT 1													
09	CHANNELS & CANALS	$3,221	$741	23.0%	$3,962	1.3%	$3,263	$750	$4,013	2016Q4	1.4%	$3,308	$761	$4,069
16	BANK STABILIZATION	$458	$165	36.0%	$623	1.8%	$466	$168	$634	2016Q4	1.4%	$473	$170	$643
	CONSTRUCTION ESTIMATE TOTALS:	$3,679	$906	24.6%	**$4,585**		$3,729	$918	$4,647			$3,781	$931	$4,712
01	LANDS AND DAMAGES	$5	$2	30.0%	$7	0.6%	$5	$2	$7	2016Q1		$5	$2	$7
30	PLANNING, ENGINEERING & DESIGN													
0.025	Project Management	$92	$20	21.6%	$112	2.3%	$94	$20	$114	2016Q4	2.6%	$97	$21	$117
0.02	Planning & Environmental Compliance	$74	$16	21.6%	$90	2.3%	$76	$16	$92	2016Q4	2.6%	$78	$17	$94
0.15	Engineering & Design	$552	$119	21.6%	$671	2.3%	$565	$122	$687	2016Q4	2.6%	$579	$125	$705
0.01	Engineering Tech Review ITR & VE	$37	$8	21.6%	$45	2.3%	$38	$8	$46	2016Q4	2.6%	$39	$8	$47
0.01	Contracting & Reprographics	$37	$8	21.6%	$45	2.3%	$38	$8	$46	2016Q4	2.6%	$39	$8	$47
0.03	Engineering During Construction	$110	$24	21.6%	$134	2.3%	$113	$24	$137	2017Q4	6.7%	$120	$26	$146
0.02	Planning During Construction	$74	$16	21.6%	$90	2.3%	$76	$16	$92	2017Q4	6.7%	$81	$17	$98
0.02	Project Operations	$74	$16	21.6%	$90	2.3%	$76	$16	$92	2016Q4	2.6%	$78	$17	$94
31	CONSTRUCTION MANAGEMENT													
0.1	Construction Management	$368	$65	17.6%	$433	1.6%	$374	$66	$440	2017Q4	3.3%	$386	$68	$454
0.02	Project Operation:	$74	$13	17.6%	$87	1.6%	$75	$13	$88	2017Q4	3.3%	$78	$14	$91
0.025	Project Management	$92	$16	17.6%	$108	1.6%	$93	$16	$110	2017Q4	3.3%	$97	$17	$113
	CONTRACT COST TOTALS:	$5,268	$1,228		**$6,496**		$5,351	$1,247	$6,598			$5,456	$1,271	**$6,727**

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APPENDIX D

Cost Engineering Within the Planning Modernization Paradigm

1. Objective: The objective of preparing a feasibility report is to identify the recommended plan within the prescribed 3x3x3: project scope, economic benefit, and an accurate cost and schedule baseline identified with potential project risks. Analysis of specific design alternatives, selection of a final recommended technical design solution, and development of confident cost estimates, schedule products, and risk identification are part of project formulation, and are critical elements that enable informed decision making.

2. Guidance: For all Civil Works studies utilizing the new Planning paradigm as directed must consider the Uncertainty and Level of Detail, ensure Vertical Team Integration, determine Federal Interest, perform Alternative Comparison and Selection, and ensure necessary Funding and Resources.

    a. Uncertainty and Level of Detail. The new paradigm will require increased use of critical thinking (i.e. engineering judgment) in the analysis and cost estimates supporting plan formulation and selection for both alternative level as well as final recommendation. The Project Development Team (PDT) must analyze minimum design/technical information requirements to assure functionality and life safety for the project. The PDT must also determine minimum design/technical information requirements needed to develop accurate cost and schedule information (cost, schedule and risk). The appropriate level of detail must be determined with design personnel as the lead for determining design/technical information levels for function and safety, and cost personnel as the lead for the design/technical detail requirements pertaining to cost and schedule development. Based on the previous requirements corresponding PDT members will support cost personnel for defining technical assumptions where needed. Within the design effort in feasibility, the PDT will develop a work breakdown structure, which sufficiently identifies the project scope, features, and tasks to a level necessary to develop an accurate baseline cost and schedule, and enables identification and management of cost and schedule risks. Each project will utilize a “risk register” organized by project features to assess their likelihood of impacting cost, schedule and/or function/safety. The planning study

risk register will be utilized for efforts required for the study execution. Risk Events identified within planning study risk identification process which could have an impact on cost and/or schedule will be included in the cost and schedule risk register. The goal is to minimize data collection and analysis for low impact features during the feasibility phase. High impact features should be carefully scoped such that data collection and analysis is commensurate with risk and adds value to the decision making process, accuracy to the cost and schedule, or reduces risk. The Project manager along with PDT must work closely with the cost engineer to identify areas where clarifying/modification of design/technical information details would be beneficial to reduce uncertainty. For items with significant cost and schedule risk, mitigation strategies shall be identified and discussed in the project's Risk Management Plan. While this approach must not lead us to accept additional life safety risk in projects, it may be appropriate to make a risk informed decision to defer some details or analysis to the Preconstruction Engineering and Design (PED) phase, provided that proper plan formulation can be accomplished.

APPENDIX E

Release of Government Estimates under Freedom of Information Act (FOIA)

1. This guidance establishes procedures for responding to FOIA requests for *Government estimates* and *Government estimate back-up data.* The *Government estimate* and *Government estimate back-up data,* prepared for construction contracts and modifications, are sensitive procurement information and should in many cases be withheld under the FOIA exemptions. FAR 36-203(c) states "Access to information concerning the Government estimate shall be limited to Government personnel whose official duties require knowledge of the estimate. An exception to this rule may be made during contract negotiations to allow the contracting officer to identify a specialized task and disclose the associated cost breakdown figures in the Government estimate, but only to the extent deemed necessary to arrive at a fair and reasonable price. The overall amount of the Government's estimate shall not be disclosed except as permitted by agency regulations."

2. Definitions:

a. Government estimate. The Government estimate consists of a title page, signature page and bid schedule.

b. Government estimate back-up data. The Government estimate back-up data is the detailed cost data, which includes production and crew development methodology, labor, equipment and crew back-up files, subcontractor quotes and all other data identified on MCACES software as detail sheets.

c. Fair market price determinations, under the Small Business Program (FAR 19.202 6), will be treated as Government estimates for purposes of this guidance.

d. Supporting documents that are publicly available, as part of the solicitation, such as plans, specifications and project description, or that contain no cost information, such as sketches, soil borings and material classifications, are not part of the Government estimate or back-up.

3. Government estimates and Government estimate back-up data are intra-agency memoranda which may be withheld under FOIA Exemption 4 and 5,

"confidential commercial information" and "deliberative process" privileges. Proper use of FOIA Exemption requires a showing that release of information will harm the Government's interests. Therefore, requests for Government estimates and back-up data will be reviewed on a case-by-case basis, based on the following guidance, to determine whether release will harm the Corps' interests. In reviewing requests the FOIA Officer will seek the assistance of the cost engineer. If the FOIA Officer determines that release will harm the Corps' interests, the information will be withheld.

a. Before Contract Award.

(1) When sealed bidding is used, neither the Government estimate nor the Government estimate back-up data should be released prior to bid opening, in accordance with FAR 36.203 and 36.204. It is well established that release of Government estimates and back-up data before contract award would harm the interests of the Government.

(2) The Government estimate will normally be released when bids are opened. In some instances, however, the *Government estimate* will not be released at that time, such as when all bids received are non-responsive and a re-procurement is envisioned.

(3) In negotiated procurement for construction under FAR Parts 15 and 36, the Government estimate should not be released prior to contract award, except that Government negotiators may disclose portions of the Government estimate in negotiating a fair and reasonable price, see FAR 36-203(c).

(4) Government estimate back-up data should not be released.

b. After Contract Award Through Contract Completion.

(1) The Government estimate may be released.

(2) The Government estimate back-up data should not be released. Release of Government estimate back-up data after contract award and before completion of a construction contract may also result in harm to the Government. The Government estimate back-up data is used to develop cost estimates for modifications and claims. Release of the back-up data prior to contract completion provides the contractor with the details of the Government's position and would

allow the contractor to develop a biased price proposal. This could harm the Government's ability to negotiate a fair and reasonable price for the modification or claim, putting the Government at a serious commercial disadvantage. Moreover, knowledge of the construction methods contemplated by the Government might reduce the contractor's incentive to discover less expensive methods. This could also reduce the contractor's incentive to locate and charge out materials at a lower cost, or to achieve project goals using less labor and equipment.

c. After Contract Completion (and after all claims have been resolved).

(1) Generally, the Government estimate back-up data may be released after the contract is completed. All sensitive information such as actual quotes and contractor reference shall be redacted from the data. Situations where the information should not be released include multiple-phased projects where a series of similar contracts are awarded in sequence and frequently recurring contracts (for example: dredging contracts). In those cases, each Government estimate is based upon the same or similar back-up data and the same or similar analysis of how to perform the work.

4. Bid Protests and Litigation. This guidance should be considered when the Corps is involved in bid protests or litigation. If appropriate and to the extent possible, Counsel should have the Government estimate and the Government estimate back-up data placed under a "protective order." There are valid reasons for not releasing the back-up data supporting the Government estimate to the contractors. In the case of a bid protest, there is a possibility that the contract could be re-advertised or converted to a negotiated procurement . Release of the back-up data would provide bidders with the detailed cost data that supports the Government estimate. If, however, the apparent low bidder protests the reasonableness of the Government estimate, the Command may provide the details of the Government estimate and Government estimate back-up data, to the protester only, upon receipt of complete details of the protester's estimate.

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GLOSSARY

Terms and Abbreviations

GLOSSARY

Term	Definition
Architect-Engineer (A-E)	Architectural/engineering firms that provide services such as planning, architecture, engineering, estimating, surveying, and other technical services related to planning, designing, and construction.
Agency Technical Review (ATR)	A mandatory effort to improve and ensure the quality and credibility of U.S. Army Corps of Engineers decision and implementation documents by employing an independent review from subject matter experts outside the home district.
Baseline Cost Estimate (BCE)	The cost estimate based on constant dollars is used for authorization/appropriation purposes. The congressionally authorized amount becomes the baseline cost estimate and may differ from the total project cost.
Budget Estimate	The budget estimate supports funding requests as well as comparisons made to current available funding. Comparisons to the available funding are also referred to as current working estimates (CWE).
Continuing Authorities Program (CAP)	Congress has given the U.S. Army Corps of Engineers the authority to plan, design, and construct certain flood risk management and navigation improvements without specific congressional authorization. The basic objective of this program is to allow the Corps to respond more quickly to problems or needs where the apparent project scope and costs are small. The amount of federal participation is limited by congress, and varies for each individual authority.
Cost Engineering Dredge Estimating Program (CEDEP)	A U.S. Army Corps of Engineers program that allows the user to estimate dredging projects using mechanical, pipeline, and hopper dredge plant.

Term	Definition
	The center is established to develop new cost database items that represent the current construction practices and technologies, to maintain and biennially update EP 1110-1-8, Construction Equipment Ownership and Operating Expense Schedule, and to semiannually update EM 1110-2-1304, Civil Works Construction Cost Index System (CWCCIS).
Civil Works Cost Engineering and Agency Technical Review Mandatory Center of Expertise (Cost MCX)	Walla Walla District's Cost Engineering Branch has been established as the Mandatory Center of Cost Engineering for Civil Works Review. The Cost MCX serves a critical role in all Civil Works and Support for Others Program cost support activities for the USACE cost community. The Cost MCX provides the cost community estimating services for the construction features on all projects from the planning phases through construction, maintenance, and rehabilitation of facilities. Walla Walla's diversified cost team strives to provide expert technical support for all customers, both Corps and other governmental agencies.
Constant Dollar Cost (Price Level)	Constant dollar analyses are utilized to determine an equivalent cost in the future or in the past by price indexing using CWCCIS data. Constant dollar cost is the estimated cost BROUGHT TO THE EFFECTIVE PRICE LEVEL. Constant dollar cost at current price levels is the cost estimate used in decision documents and chief's reports. The constant dollar cost does not include inflation to midpoint design and construction.
Cost and Schedule Risk Analysis (CSRA)	A risk analysis is the process of identifying and measuring the cost and time impacts of project uncertainties on the estimated TPC. The risk analysis results in two main products: Identified risks and contingency dollars to fund risk occurrence.
Civil Works Work Breakdown Structure (CW-WBS)	A hierarchical structure that defines tasks that can be completed independently of other tasks, facilitating resource allocation, assignment of responsibilities, and measurement and control of the project.
Civil Works Construction Cost Index System (CWCCIS)	Historical and forecasted cost indexes for use in escalating U.S. Army Corps of Engineers civil works project costs.

Term	Definition
Current Working Estimate (CWE)	An update comparison to the appropriated amount or BCE. Commonly referred to as total project cost, the update reflects the total project scope and estimated cost with current effective date pricing plus spent cost from authorization amount. The CWE reflects the associated project costs in quantities, estimates and supporting databases, duration, and risk at any point in time within the funded project's life.
DrChecks[SM]	"Design Review and Checking System." Enables an actionable collaboration among the reviewers and design team of capital improvement projects.
District Quality Control (DQC)	All work products and reports, evaluations, and assessments shall undergo necessary and appropriate district quality control/quality assurance.
Economic Cost	Monetary equivalent cost used by the economist in determining the benefit-to-cost ratio (BCR). The economic cost includes all of the opportunity costs, both explicit (out of pocket to realize project benefits) and implicit (noncash), of using the resource and is expressed in average annual equivalent terms. It is also referred to as the constant dollar cost. The economic cost should not be confused with the financial cost and should be clearly and separately described in reports.
Effective Price Level (EPL)	Date of the point in time of the pricing used in the cost estimate.
Estimated Cost (Price Level)	Initially developed cost estimate which includes contingencies. The effective price level date for estimated cost is usually the date of preparation of the cost estimate.

Term	Definition
Financial Cost	Monetary outlay, both federal and non-federal, of constructing a project. It includes design and construction outlays, transfer payments such as replacement housing payments as specified in 42 United States Code 4623 and 4624, and the value of lands, easements, rights-of-way, relocations, and dredged or excavated material disposal areas (LERRD) and work in kind provided by non-federal sponsors. This cost is developed by cost engineering, in close coordination with the economist and other members of the PDT, and is typically presented in the TPCS.
Independent External Peer Review (IEPR)	Most independent level of review and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted.
Independent Government Estimate (IGE)	Formal, approved cost estimate prepared to support a contract award, which is signed by the chief of cost engineering.
Independent technical review (ITR)	A review by a qualified person or team not involved in the day-to-day production of a project/product, for the purpose of confirming the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. Predecessor to agency technical review on civil works .
Microcomputer Aided Cost Estimating System (MCACES)	Mandatory U.S. Army Corps of Engineers estimating software.
MII	MCACES second generation
National Economic Develop-ment (NED)	In the civil works project planning context, NED analysis can be generally defined as economic benefit-cost analysis for plan formulation, evaluation, and selection that is used to evaluate the federal interest in pursuing a prospective project plan.

Term	Definition
Peer Review	The process of subjecting research, assumptions, analyses, and conclusions to the scrutiny of others who are experts in the same field. Peer review requires a community of experts in a given (and often narrowly defined) field, who are qualified and able to perform impartial review.
Project	Each project is a temporary endeavor undertaken to create a unique product, service, or result. Internal services are discrete projects when they are unique and non-recurring (ER 5-1-11).
Project Delivery Team (PDT)	An interdisciplinary group formed from the resources of the implementing agencies, which develops the products necessary to deliver the project.
Project Manager (PM)	Responsible for the planning, execution, and closing of any project, typically relating to construction.
Project Management Plan (PMP)	A formal, approved document used to guide both project execution and project control.
Project First Cost (Price Level)	The cost estimate that will serve as the basis for providing the cost of the project for which authorization is sought. The cost estimate to be used in chief's reports and other decision documents is estimated cost represented at the current price level. The current price level is the current FY based on the submittal date.
Risk management plan (RMP)	A document that a project manager prepares to foresee risks, estimate impacts, and define responses to issues.
Simplified acquisition threshold (SAT)	As defined in FAR 2.101
Total Cost Management	The effective application of professional and technical expertise to plan and control resources, costs, schedules, and risk. A systematic approach to managing cost throughout the life cycle of any project, product, or service.

Term	Definition
Total Project Cost	The constant dollar cost FULLY FUNDED WITH ESCALATION to the estimated midpoint of construction. Total project cost (or total cost of construction of GNFs when discussing navigation projects) is the cost estimate used in project partnership agreements and integral determination reports. Total project cost is the cost estimate provided non-federal sponsors for their use in financial planning as it provides information regarding the overall non-federal cost sharing obligation.
Total Project Cost Summary (TPCS)	The required cost estimate document to be submitted with all projects sent for either division or HQUSACE approval. Since it addresses all project features, it is considered a PDT product. Both the PM and chief of the cost engineering office must review, approve, sign, and date all TPCS documents. Real estate estimates included in the TPCS must be reviewed, approved, and the TPCS signed by the chief, or their designee, of the real estate office.