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U.S. Army Corps of Engineers
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Engineer Regulation* 1110-2-1302

Effective 13 May 2026

CEEC

Engineering and Construction
Civil Works Cost Engineering

FOR THE COMMANDER:

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

Applicability. This regulation applies to all Headquarters, U.S. Army Corps of Engineers elements, divisions, and major subordinate commands, districts, laboratories, and field-operating activities involved in the Civil Works program. It applies to cost products prepared by U.S. Army Corps of Engineers 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.

Distribution statement. Approved for public release; distribution is unlimited.

Proponent and exception authority. The proponent of this regulation is Headquarters, U.S. Army Corps of Engineers, Directorate of Engineering and Construction. The proponent has the authority to approve exceptions or waivers to this regulation that are consistent with controlling law and regulations. Only the proponent of a publication or form may modify it by officially revising or rescinding it.

*This regulation supersedes ER 1110-2-1302, dated 30 June 2016.

SUMMARY of CHANGE

ER 1110-2-1302
Civil Works Cost Engineering

This revision dated 13 April 2026:

- Provides input and clarifications from the current leaders of the Cost Engineering Center of Expertise team regarding roles and responsibilities, processes, requirements, quality standards, and inflation risk.
- Updates the regulation, adding Appendix B, to include instructions for use of the Design Maturity Determination for Cost Certification form.
- Updates the regulation to include information from “The Guidance on Cost Engineering Products update for Civil Works Projects in accordance with Engineering Regulation 1110-2-1302 – Civil Works Cost Engineering” Memorandum dated 07 April 2023.
- Adds language regarding the Cost and Schedule Risk Analysis from the 2008 ER 1110-2-1302 to the Cost Estimating Classification Section.
- Updates the Class 3 Estimate Design Criteria for authorized or re-authorized projects to have a minimum design maturity of 35 percent.
- Adds language regarding seeking waivers for projects issued Conditional Certification or Non-Certification.
- Bring formatting into compliance with updated CIO/G-6 requirements.
- Updates the language to comply with federal Plain Language Guidelines.
- Updates the templates and figures with current information and/or details.
- Updates the guidance for marking cost estimates and cost data from “For Official Use Only” to “Controlled Unclassified Information,” consistent with current Department of Defense Office of Prepublication and Security guidelines.
- Updates the document to include proponent information.
- Updates the document to include associated publications.
- Updates the references.
- Updates the Glossary of Terms.

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Glossary of Terms

1. Purpose

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

2. Distribution statement

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3. References

See Appendix A.

4. Records management (recordkeeping) requirements

The records management requirement for all record numbers, associated forms, and reports required by this publication are addressed in the Army Records Retention Schedule. Detailed information for all related record numbers is located on the U.S. Army Corps of Engineers (USACE) Records Management Site https://usace.dps.mil/sites/INTRA-CIOG6/SitePages/Records-Management.aspx. If any record numbers, forms, and reports are not current, addressed, and/or published correctly, see DA Pam 25-403 for guidance.

5. Associated publications

Policy and/or procedures associated with this regulation are found in 33 U.S. Code (USC), 33 Code of Federal Regulations (CFR) Part 337, ER 11-1-321, ER 1105-2-103, ER 1110-2-1150, ER 1110-2-1156, ER 1180-1-9, EM 1110-2-1304, and EP 1110-1-8.

6. Policy

All cost engineering products required to support USACE-managed Civil Works projects must comply with this regulation and all referenced regulations, policy, and guidance, including engineer 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. Consistent with 33 USC Section 622 and Public Law 95-269 (92 Stat. 218-219), 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.

b. All construction cost estimates must comply with 33 USC Section 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 will be included in the cost estimate.

c. Civil Works projects are planned and approved consistent with ER 1105-2-103 and are designed to comply with ER 1110-2-1150. Civil Works projects specific to Dam Safety should also adhere to ER 1110-2-1156. Cost development within these regulations must also adhere to the policies and requirements outlined in this regulation.

d. Cost estimates are categorized into two types: budget estimates or Independent Government Estimates (IGEs).

(1) 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).

(2) IGEs 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 a protective sealed Controlled Unclassified Information (CUI) envelope.

(a) 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 as detail sheets. The back-up data is CUI and is not for release. 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.

(b) Consistent with Federal Acquisition Regulation (FAR) 36.203 and with USACE Acquisition Instruction, IGEs must be prepared with as much detail as though the Government were competing for award. All IGEs must be developed as completely and as accurately as possible, based on the latest available information. The cost estimate will represent the “fair and reasonable” cost to the Government.

(3) All estimates should include all allowable costs that 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 that would be part of the costs a prudent contractor would expect to incur.

(4) Cost estimates must be defensible documents that include: a 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.

e. Cost engineering product preparation and formatting must follow policy and guidance.

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

g. Quality control reviews must occur on all cost engineering products, whether prepared by the cost engineering office, by other authorized offices (Area Offices, Resident Offices, A-E firms, etc.), or by contract, as prescribed by the specific review procedures in this regulation and those referenced. Cost engineering products include quantities, estimates, schedules, risk analyses, total project costs, cost-related reports, appendices, etc.

h. Qualified government personnel in the cost engineering office who have not participated in the development of the cost product must perform the reviews. These products must be reviewed to confirm that each 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 major subordinate command (MSC), Headquarters, U.S. Army Corps of Engineers (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, coordinate with the Cost Engineering Center of Expertise (Cost MCX) 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 comprises everyone necessary for the 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 ability to execute a quality project successfully.

b. A member of the cost engineering office must be an integral PDT participant, supporting the PM in the developing, monitoring, and managing 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. The assigned PM provides support to the cost engineering element with sufficient funding and time to produce quality products consistent with federal law, FARs, and USACE regulations, guidance, and policies. In support of cost engineering product development, the PM is responsible for the following:

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

(2) Giving PDT leadership and facilitators the responsibility to confirm that the project stays focused on the public interest and on the customer's needs with resulting clarity in project scope that supports cost engineering product development.

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

(4) Supporting 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) Coordinating with and relying on cost engineering-approved data when reporting costs, schedules, and risks, both internally and externally.

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

(7) Coordinating the product delivery schedule to include enough time for products from all PDT members to provide adequate time for a quality District Quality Control (DQC), Technical ATR, and Cost ATR.

(8) Coordinating the project schedule and risk analysis within the PDT structure to develop the RMP and establish and justify chosen project contingencies with corresponding confidence levels, as applicable.

(9) Confirming each project has received a formal Cost ATR on the project cost products, and cost changes, when required.

(10) Coordinating and consulting with the Cost MCX technical experts and engaging their services as early as possible in the planning, design, and ATR processes. Communicating with the Cost MCX on high-visibility projects, or as required.

(11) Providing district Project Review Board technical support on project costs as required.

(12) Confirming 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 (WBS) and features, and cost-sharing agreements; and verifying the TPCS also includes the cost data from the PDT and other appropriate offices, including any sunk or spent costs, to provide a complete TPCS. PDT involvement must include spent and forecast costs for real estate; pre-construction, engineering, and design (PED); and construction management.

(13) Reviewing, approving, signing, and dating all TPCS documents.

(14) Facilitating timely coordination and collaboration with the programmer, economist, and project cost engineer at critical milestones.

(15) Confirming the cost PDT member communicates with the PM on the requirements concerning update of cost engineering products.

(16) Ensuring cost engineering receives annual funding to support cost management practices and controls and program updates for review and concurrence. For mega projects (see paragraph 27.g of this document), verifying the allocation of appropriate resources for project controls and earned-value management practices, as required.

b. Project Delivery Team. The PDT bears critical responsibility to support 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 cost engineering products at various project development phases. Coordinate with the cost engineer to determine the appropriate level of project detail. The PDT and design personnel must work with the cost engineer to determine the design level required for function, safety, and risk reduction.

(2) Establish a project acquisition plan at the 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. Additionally, help identify the cost and schedule threshold levels associated with the identified risks.

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

(5) Define 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, Engineering Division. The Chief of the Engineering Division is responsible for all engineering products, including the Design Maturity Determination for Cost Certification (DMDCC) (see Appendix B). Responsibilities include:

(1) Ensuring enough resources are provided to the cost engineering team based on size and scale of the project and other assignments.

(2) Encouraging and supporting the cost engineering team to produce cost products without any bias or undue influence from benefit-cost ratio (BCR), Non-Federal Sponsors (NFS) prioritization, or unnecessary political influence.

(3) Evaluating the DMDCC to determine the design maturity and coordinate with the Chief, Cost Engineering to establish the classification of the cost estimate, as well as the application of appropriate contingency. Cost classification must be determined from actual design maturity, not at an assumed state of design maturity, according to the project design schedule.

d. 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 CWWBS features, as a member of the PDT, and consistent with HQUSACE regulations, guidance, and policies. Responsibilities include:

(1) Adhering to the latest cost engineering regulations, manuals, pamphlets, 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, including: the mandatory Micro-Computer Aided Cost Estimating System (MCACES), Cost Engineering Dredge Estimating Program (CEDEP), quantity take-off, scheduling programs, and Oracle Crystal Ball risk analysis software, an add-on to Microsoft Excel.

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

(3) Overseeing the quality of cost engineering products during all phases of development. Quality responsibilities include those cost engineering products prepared by USACE or others, whether in-district, other districts, A-E community, or other organizations where USACE manages federal design and construction dollars.

(4) Verifying that cost products developed by others (A-Es, local sponsor, etc.) comply with USACE cost engineering regulations, policies, and guidance, including the support of ATRs.

(5) Confirming 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 signature of the Chief, Cost Engineering on the cost estimate before release or submission.

(6) Ensuring resource and budget 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) and consistent with the Project Management Body of Knowledge (PMBOK®) Guide (3rd edition, 2004).

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

(8) Documenting and reviewing bid data and results, protests, and mistakes in bids. Analyzing, evaluating, and making recommendations on proposed district actions for bid protests and mistakes in bids.

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

(10) Supporting 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 (IEPRs).

(11) Fostering and developing qualified cost engineers to support ATR cost product reviews.

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

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

(1) Supporting and coordinating with project management, program management, and economists at key milestones of study and cost reporting.

(2) Supporting the PM in the development of the PMP scope, as it pertains to cost engineering products associated with project execution.

(3) Providing the labor estimate for cost engineering services.

(4) Working 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.

(5) Developing all cost engineering products as a member of the PDT and consistent with HQUSACE regulations, policies, and guidance. The responsible PDT members will develop the non-construction costs (real estate; planning, engineering, and design; construction management; etc.), but the cost engineer will support the PM as the PDT member for data gathering and confirming adequate documentation for costs identified in the TPCS.

(6) Developing quantity take-offs for lump sum project features, CWWBS estimates, construction schedules, risk analyses, life cycle cost analyses, total project costs, cost product narratives and reports, quality control check records, and documentation supporting the contract negotiation process.

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

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

(9) Identifying a budget allowance to the PM for management control activities within the total project cost to assure cost, schedule, and risk are living documents and are used as a tool throughout the project life.

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

(11) Providing cost estimating support to the Value Engineer in conducting value engineering studies.

f. Cost engineering services by non-USACE or engineering firms. Preparation of budget estimates, IGEs, and associated cost engineering products is 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 by entities other than USACE will be provided to the Cost Engineering Office for review and approval. The Cost Engineering Office will assume ownership of the products for proper use of the cost information.

g. Cost Engineering Center of Expertise. The Cost 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), ATRs, and CEDEP.

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

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

(4) Providing 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) Serving as the proponent for CSRA development and policy.

(6) Serving as a quality assurance and quality review agent, as required by current USACE policies, on cost-related products; verifying that Cost ATR reviewers are qualified and technically competent, with the necessary technical experience; and maintaining 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 leading subcommittee efforts.

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

(10) Serving as a Mandatory Agency Technical Review Center and Support for Others Program for Civil Works Projects. This includes maintaining the Construction Equipment Ownership and Operating Expense Schedule database and the Civil Works Construction Cost Index System (CWCCIS) Database, as well as all accompanying research, development, and communication.

h. Division or MSC cost engineer. Responsibilities include:

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

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

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

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

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

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

(7) Confirming that all cost products supporting higher-level project reports meet quality standards, overseeing all cost processes involved in their preparation, and tracking the studies and their periodic updates using appropriate tools.

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

(9) Conducting and leading annual regional cost engineering meetings that include cost engineering supervisors and senior engineers. Meetings should address current regulations and cost-related programs, issues, findings, recommendations, resolutions, and progress.

(10) Providing technical assistance to districts, district subject matter experts (SME)/Regional Technical Specialists (RTS), and MSC elements on cost engineering issues and consolidating and disseminating MSC-wide historical cost data.

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

(12) Supporting the Department of Defense (DoD) Tri-Service Cost Engineering Certification Board in setting certification goals for Tri-Services cost engineers within the division or MSC area of responsibility and assisting the board with proctoring tests for candidates.

(13) Obtaining and maintaining, at a minimum, certification as a Tri-Services Certified Cost Consultant (TCCC) or Tri-Services Certified Cost Engineer (TCCE).

9. Cost engineering products and updates

Cost engineering products include quantities, estimates, schedules, escalation, risk analyses, 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 project cost estimate development and update is 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) PED phase.

(4) Construction phase.

(5) Operations and maintenance (O&M), repair, replacement, and rehabilitation phase.

b. In some cases, such as Continuing Authorities Program (CAP) projects, these phases are combined into two: a feasibility phase and an implementation phase.

c. Update of cost products is a key component of 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.), as well as updated construction schedules, risk register, and CSRA model.

(1) Regular updates (annually or more frequently) must be performed to verify the total project cost estimate is based on current information. The cost PDT member is required to evaluate changes on the project for the items listed above to determine appropriate methods for updating the cost products. Full updates (requiring updated cost pricing based on the factors listed above) must occur within a 2-year timeframe, measured from the previous estimate preparation date. Cost escalation (if deemed appropriate by the personnel responsible for cost development) may occur within the 2-year period.

(2) Total project cost estimates presented for budget or funding requests must have an estimate preparation date within 2 years of the date of submission. Every budget request from the district to the MSC or HQUSACE must include a copy of the current (within the last 2 years) Cost Certification for the authorized project.

(3) Total project cost estimates presented in Chief of Engineer's reports must have an estimate preparation date within 2 years of the report date, including a copy of the current (within the last 2 years) Cost Certification from the Cost MCX.

(4) For projects receiving appropriations on construction total project costs, the cost products must be updated annually, as identified above, and include spent costs within the TPCS.

(5) For authorized projects that have not received appropriations but are seeking funding appropriations, the product submittal must follow the above-listed requirements.

(6) HQUSACE reserves the right to require estimate product updates, regardless of timelines. Refer specific update requirements, including review requirements, to the Cost MCX.

d. EM 1110-2-1304 must be used to update unit prices and various project cost features to current or future price levels. The 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 an engineer circular for the Annual Program and Budget Request for Civil Works Activities.

10. Cost engineering software tools

The USACE-approved estimating software programs, MCACES and 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 analysis. Construction schedules must be developed using standard, industry-recognized, scheduling software. Statistics-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 the HQUSACE Cost Engineering Office.

a. MCACES is a cost-estimating program used by cost engineers to develop and prepare all Civil Works cost estimates. Using this system, estimates are prepared uniformly, allowing cost engineers throughout the 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. MCACES software is supported by the following cost-related databases:

(1) *Equipment library*. EP 1110-1-8 contains construction equipment hourly ownership and operating costs. These hourly rates 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 and application of operating costs, as applicable, for items such as fuel and applicable maintenance costs.

(2) *Labor library*. Per the labor market research, including the minimum by-law The Davis-Bacon Act (Public Law 107-217), wage determinations establish the prevailing hourly wage and fringe rate estimates for the supporting MCACES labor library local to each project location.

(3) *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 in national average pricing and require localization through published adjustment factors; re-pricing of labor, equipment, and materials through local market research; or a combination of methodologies, as appropriate.

b. CEDEP is a suite of three USACE programs that allows the user to estimate dredging projects using mechanical, pipeline, and hopper dredge plant.

11. Quantity development

Project scope, design documents, and associated assumptions are the basis for 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 confirm quantities are supported by a defensible, documented source that reflects the project scope and design level, that is traceable, and that can reasonably support an independent quality review. Design uncertainty and quantity variation must be considered within the CSRA study.

12. Civil Works Work Breakdown Structure

All project cost estimates must be organized according to the CWWBS format described in Appendix C. As a minimum, each cost estimate must be developed to the sub-feature level of the CWWBS. The TPCS and budget forms (for example, Engineer Form (ENG) 2202 (PB-3)) used for budgeting and programming purposes are required to be developed to at least the WBS feature level. The lower CWWBS 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 analysis.

13. Design maturity determination for cost certification for total project costs

a. The scope maturity and details of the technical information are the primary drivers in determination of an estimate's class. The class of the estimate does not define the scope maturity. In other words, the quality of the cost products is secondary to the design maturity and quality of technical scope definition.

b. In reference to Table 1, the PDT must be careful that determining the design maturity is the first step in determining the cost classification.

c. The project design maturity must also consider features beyond technical features that impact the total project cost, such as real estate, environmental mitigation, cultural resources, engineering during construction, supervision and overhead costs during construction, and construction schedule.

d. The PDT must be careful in determining the total project costs. The project construction schedule midpoint must be based on a realistic approach, which must consider available local resources and ability for these resources to execute the construction of the project once authorized. Consideration must also be given to the project scale and complexity and the ability of the construction industry to execute the construction of the project.

e. In addition, the PDT must consider realistic timelines for project design and contract acquisition strategies, to include timelines of various acquisition strategies and real estate acquisition, including the ability of NFS to provide real estate requirements on time, and their ability to budget the project to align local priorities to federal priorities.

f. The Chief of Engineering is responsible for the technical content and engineering sufficiency for all engineering products produced by the command. ENG Form 6307 The Design Maturity Determination for Cost Certification (also referred to as the Design Maturity form) was developed in 2024 to consolidate in one location vital information on percentage of design maturity for the Management Control Evaluation, per Appendix H of ER 1110-2-1150 and signature by the Chief of Engineering. The form can be found at https://www.publications.usace.army.mil/USACE-Publications/Engineer-Forms/. See Appendix B for instructions on the use of the form.

14. Cost estimate classifications

a. To support the Civil Works missions addressed in ER 1105-2-103, cost estimates are required for all phases of a project. Detailed cost estimates should be considered CUI and managed consistent with Executive Order (EO) 13556 (dated 4 November 2010); Department of Defense (DoD) Instruction 5200.48; and 32 CFR Part 2002.

(1) In a typical project life, cost estimates can be divided into two types: budget estimates and IGEs. The budget estimate supports funding requests, as well as comparisons made to current available funding. IGEs are estimates that are prepared to support a contract award.

(2) 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, considered Class 1).

(3) Level of estimate, schedule, and risk quality correspond directly to scope quality and many estimates can be a combination of quality, depending on the level of technical information for certain project construction elements. Class 3 estimates to Class 5 estimates carry greater risk in scope and estimate assumptions and details and fall into the category of budget estimates. Note that the use of CSRA will not reduce the uncertainties associated with the project cost estimate or solve the problems of cost variance due to insufficient investigations or design. This process more readily identifies areas in the study or design where additional effort could reduce the uncertainties and provide a more reliable cost estimate.

(4) The goal of any estimate is to develop it 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, or the use of quotes, detailed calculations, crew-based unit pricing, cost books, or historical data supported by sufficient explanation. All scope information, technical information, and cost estimates must be prepared, as a minimum, consistent 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. Contingencies are not a means of adding costs to the base estimate for

known scope, possible schedule slippage, future cost growth, or to cover items that are not specifically considered in the current scope.

(5) 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.

(6) Reference USACE engineering guidance and regulations for more in-depth explanations of design requirements.

b. The estimate class reflects the technical information. Quality and confidence are based on the project information provided, 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 to 5 percent) estimates are commonly referred to as Rough Order of Magnitude (ROM).

(a) There is considerable risk and uncertainty inherent in a Class 5 estimate, resulting in high contingencies.

(b) These estimates are NOT recommended in reports because the extremely limited information and high risk pose 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 items, cost engineering judgment, and parametric cost data. Development may consist of lump sum cost. Detailed cost items are not required or captured.

(c) 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.

(d) Establishing a credible contingency with qualifications is necessary. Typical Contingency Range could be 40 percent to 200 percent or higher.

(2) Class 4 – Early concept technical information is approaching 5 to 10 percent definition.

(a) There is still substantial lack of technical information and scope clarity, resulting in major estimate assumptions in technical information and quantities, and heavy reliance on cost engineering judgment, cost book items, parametric and historical data, and few specific, crew-based costs.

(b) While certain construction elements can be estimated in detail, there is still a great deal of uncertainty relative to major construction components.

(c) Although Class 4 estimates may be more accurate than Class 5 estimates, they are based on 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.

(d) Typical Contingency Range could be 30 percent to 100 percent or higher.

(3) Class 3 – Technical information (including designs) is approaching a 10 to 60 percent quality of project definition.

(a) There is greater confidence in project planning and scope, construction elements, and quantity development.

(b) The estimates rely less on generic cost book items and place greater reliance on quotes, recent historical, and site-specific, crew-based details.

(c) Class 3 estimates reflect improved technical documents. The estimates must include a supporting discussion on technical information (scope, design, acquisition, and construction methods, etc.) 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.

(d) Typical Contingency Range could be 20 percent to 50 percent or higher.

(4) Class 2 – Technical information (including designs), quality, and confidence are approaching 60 to 80 percent definition.

(a) There is a confident plan and quantity development with fewer broad-based assumptions.

(b) There is minor reliance on the cost book for low-value items, major reliance on quotes, detailed quantities, and site-specific, crew-based details.

(c) 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.

(d) A risk analysis is recommended as it better defines the PDT’s project path forward regarding risks and basis for determining contingencies.

(e) Typical Contingency Range could be 15 percent to 30 percent or higher.

(5) Class 1 – Technical information (including scope and designs), quality, and confidence are approaching 80 to 100 percent.

(a) The estimate is near IGE level.

(b) Quantity and installation confidence is strong.

(c) There is minimal reliance on generic cost book items, heavy reliance on quotes, and heavy reliance on site-specific, crew-based details.

(d) 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.

(e) Typical Contingency Range could be 5 percent to 15 percent or higher.

c. For more information, reference ASTM International's Standard Classification for Cost Estimate Classification System (ASTM E 2516-06).

Table 1
Civil Works estimates – class level designation, agency technical review, and cost certification requirements

Project Phase	Scope and Technical Definition	Risk Level	Minimum Estimate Class	Cost ATR Review	Cost Certification Required
Pre-Budget Development (not recommended for reports)	Extremely Limited	Extremely High	5*	No	No
Pre-Authorization Decision Documents					
Initial Alternatives	Very Limited	Very High	4*	No	No
Feasibility Alternatives	Very Limited	High	4*	Yes	No
Feasibility – Federal Recommended Plan	Limited-Fair	Moderate	3	Yes	Yes**
National Economic Development (NED)	Limited-Fair	Moderate	3	Yes	Yes**
Locally Preferred Plan (LPP)	Limited-Fair	Moderate	3	Yes	Yes**

Project Phase	Scope and Technical Definition	Risk Level	Minimum Estimate Class	Cost ATR Review	Cost Certification Required
Funding Request Decision Documents	Limited-Fair	Moderate	3	Yes	Yes** (less than 2 years old)
Post-Authorization Change Reports and Decision Documents					
Continuing Authorities Program	Limited	Moderate to High	3	Yes	Yes
Civil Emergency Management Program	Limited	Moderate to High	3–4	No	No
Alternative Studies	Limited	Moderate to High	3–4	Yes	No
General Re-evaluation Report	Limited-Fair	Moderate	3	Yes	Yes**
Limited Re-evaluation Report	Limited-Fair	Moderate	3	Yes	Yes**
Design Documentation Report	Limited-Fair	Moderate	3	Yes	Yes**
Engineering Decision Report	Limited-Fair	Moderate	3	Yes	Yes**
Other Funding Decision Documents	Limited-Fair	Moderate	3	Yes	Yes**
Pre-construction, Engineering, and Design (Working Estimates)					
PED 30%	Fair	Moderate	3	No	No
PED 60%	Fair-Good	Moderate to Low	2	No	No
PED 90%	Very Good	Low	1	No	No
IGE <100% Design	Fair-Good	Moderate to Low	2	No	No
IGE 100% Design	Very Good	Low	1	No	No
Construction/Post Award					
Budgets (modifications/ claims)	Fair-Good	Moderate to Low	2	No	No
IGEs (modifications/ claims)	Very Good	Low	1	No	No

Project Phase	Scope and Technical Definition	Risk Level	Minimum Estimate Class	Cost ATR Review	Cost Certification Required
Funding Requests	Very Good	Low	1	Yes	Yes** (less than 2 years old)

Notes:
*Do not use in formal/Chief of Engineers Reports.
**See paragraph 15.c for additional guidance on design maturity requirements.

15. Cost products by phase

The following phases/stages apply for all studies performed during both project pre-authorization and post-authorization.

a. Planning stage – alternative formulation.

(1) *Federal interest determination.* During this phase, many alternatives can be considered. Class 5 and Class 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.

(a) Use of MCACES software tools is recommended, but not required.

(b) The costs of Feature 30: Planning, Engineering, and Design feature and Feature 31: Construction Management are obtained through the PDT and may be a percentage based on historical cost data.

(c) The costs for Feature 01: Lands and Damages feature are obtained through the PDT from the real estate office.

(d) Alternatives are developed to the same constant dollar basis for fair comparison.

(e) Project-specific, risk-based contingencies are identified for each alternative under comparison.

(2) *Tentatively selected plan*.

(a) During the alternative formulation stage, a final group of potential alternatives are identified for further study and comparison. For comparison purposes, these alternatives, including the resulting tentatively selected plan (TSP), must be, at a minimum, Class 4 cost estimates and supported by risk analyses, to include reasonable contingencies as part of the comparison and formulation.

(b) At the alternative formulation stage, use of MCACES software tools is recommended, but not required.

(c) 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, 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.

(d) The cost estimate for each viable alternative must sufficiently describe the construction features and elements, the cost basis, and type and method of construction.

(e) Cost presentation must include all features at a consistent, effective price level, as well as risk-based contingencies.

(f) The TSP is an alternative used for comparison to the other alternatives. The TSP cost should be developed to the same level as other alternatives. Use of MCACES software tools is required for the TSP. Once the vertical team approves that TSP, it becomes the federal recommended plan.

(g) For further guidance on the planning stage, see Appendix D.

b. Feasibility phase – federal and local plans.

(1) The feasibility level, federal recommended plan supports funding requests within a Chief of Engineers Report. The federal recommended plan will identify a National Economic Development (NED) and National Ecosystem Restoration 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.

(2) The estimate(s) used to develop the total project cost must be, at a minimum, a Class 3 estimate supported by sufficient scoping documents.

(3) PDT involvement is necessary in establishing and communicating project construction scope and features for confident quantity development.

(4) The District Chief of the Engineering Division must determine the maturity of design prior to cost engineering developing the cost products. At a minimum, the District Chief of the Engineering Division, utilizing the project's risk register, must address the following basic areas in determining the level of design:

(a) Geotechnical data quality: likely unknowns and risks associated with using the available data, including the risk where there is little to no data.

(b) Hydrology and Hydraulics Model type: if a model has been run, quality of data, and risks associated with these models.

(c) Survey data quality and risks associated with this data.

(d) Design exceptions and waivers to USACE processes, which should be clearly identified along with the exception/waiver status.

(5) The estimate(s) must be prepared using the MCACES tools and the established CWWBS to at least the sub-feature level of detail.

(6) When the NFS requests a plan different from the federal recommended plan, it is referred to as a locally preferred plan (LPP).

(7) 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.

(8) In general, and preferably, 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.

(9) At the 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 estimates, corollaries and models, quotes and comparisons, and historic data, so long as the sources and assumptions are well documented and as recent as possible.

(10) If the federal recommended plan is not the LPP, then a separate TPCS is required for each of these plans. Both plans are updated as required for comparison and reimbursement.

c. Estimates submitted for Congressional authorization or re-authorization.

(1) All cost estimates submitted for Congressional authorization or re-authorization must be, at a minimum, a Class 3 estimate with 35 percent design maturity. Reference USACE guidance and regulations for more in-depth explanations of design requirements. See paragraph 26 for certifications and their definitions.

(2) 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.

d. Authorized and post-authorized projects.

(1) Funded authorized projects receive further study, more confident design, improved cost engineering products, and resulting lower risk.

(2) 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.

e. Smaller projects. 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, at a minimum, Class 3 estimates, using the MCACES software because they serve as the federal recommended plan. Coordinate design maturity requirements with the MSC Engineering and Construction Division.

f. Pre-construction, engineering, and design.

(1) 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 CWE. The most recent CWE serves as a comparison check to the Baseline Cost Estimate (BCE).

(2) 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 re-evaluation.

(3) A new cost risk analysis must be conducted on 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 the MSC or HQUSACE.

(4) The cost engineering product documentation for project submissions to the MSC or HQUSACE will be the same as estimate products for the feasibility phase.

g. Construction phase.

(1) 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.

(2) Development requirements for O&M estimates follow the same direction as “Authorized projects” (see paragraph 15.d).

h. Independent Government Estimate.

(1) Initial IGEs may fall into two categories: “Less than 100 percent design” and “Fully 100 percent design.” Less than 100 percent design includes IGEs (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 IGEs (such as design-bid-build) and has less risk; therefore, it must be developed as a Class 1 estimate.

(2) The IGE becomes the standard by which the Government determines whether contractor bid proposals appear fair and reasonable.

(3) The IGE is a representation of the best-detailed level of design information at the time of contract solicitation. The awarded contract becomes the construction contractor baseline in monitoring and management of the construction cost and schedule.

(4) Each IGE is based on 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 CWWBS that will allow tracking of the cost needs and expenditures reflecting the appropriations and TPCS.

(5) An IGE of costs must be prepared and provided to the contracting officer prior to receiving contractor proposals. The contracting officer may require an estimate when the cost of required work is anticipated to be less than the simplified acquisition threshold. The estimate must be prepared in as much detail as if 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.

16. Dredging estimates

a. Dredging estimates using floating plants must use the CEDEP to prepare the estimate (see paragraph 16.c below for special allowances). The CEDEP program contains proprietary data and is 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 (for example, 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. The use of regional dredge team members is recommended for consultation and the development of dredge cost estimates. Regional dredge team members can provide guidance on production rates, effective times, cost data, and other pertinent information. These teams can also be a valuable resource for estimate development, value engineering studies, and ATRs on projects requiring dredge estimating. The Cost MCX can provide information and coordination.

17. 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 USACE district Commander of the district that is executing the project in coordination with the PDT and acquisition leadership for the project. USACE, as a DoD construction agent, is responsible for selecting such methods. One of the requirements for proceeding with design-build contracting is that the project is 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 establish the physical components that comprise it.

(1) The engineering assessment of project components must be based on knowledge of standard analyses, operating experience, and sound engineering judgment.

(2) Senior engineering staff must be involved to provide experienced judgment in establishing the project scope and characteristics.

(3) 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.

(4) 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 assessments 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.

18. 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 cost engineering judgement. 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, 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. Regarding application of profit, 33 USC Section 624 states that river and harbor improvement projects must 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; however, 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 include profit, or profit should be included as directed by the contracting officer.

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

19. Schedules

a. Project and construction schedules are 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. It is the PM and PDT's responsibility to assist in construction schedule preparation.

(1) 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 CSRA.

(2) As the project further evolves, the schedules must be sufficient to establish contract duration for contract solicitations.

(3) When projects are in construction phase, schedules should be well developed, and 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.

(1) 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.

(2) The schedules must be sufficiently developed using standard, industry-recognized scheduling software.

(3) They must depict project constraints, major milestones, concurrent and sequential activities, predecessors, successors, and durations within a developed

calendar. They must also identify a critical path. The critical path is the sequence of activities that must be completed to make sure a project is finished on time.

(4) For projects requiring a Monte Carlo risk analysis, the schedule must be sufficiently developed to support the risk analysis in relation to seasonal risks, productivity assumptions, major construction elements, resourcing, acquisition strategy, environmental constraints, and assumed annual construction cost placement.

(5) Funding constraints, as well as district execution capability, should be considered for larger and more complex projects.

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, and construction of project contracts.

20. Project escalation and inflation

a. The EM 1110-2-1304 tables must be used to update unit prices and various project cost features to specific price levels. Indices used to escalate costs from the past to the present are developed from actual historical data. Indices for future escalation are developed using the “Updating Factors” in Table 1 of the annual engineer circular Civil Works Direct Program Development Policy Guidance, which are based on the current annual OMB inflation factors. The CWCCIS includes a table that depicts the historic construction escalation and the projected OMB escalation rates measured from the date of the most current table. The table also reflects the CWWBS construction elements and is updated every March and September, depicting current OMB annual escalation and semi-annual realized construction escalation.

b. For feasibility studies and budgetary updates (2-year cycle or sooner per updates to Section 902 of the Water Resources Development Act of 1986 (Public Law 99-662)) the CWCCIS inflation rates should be applied. In the near term, inflation risk may not be addressed with standard CWCCIS escalation tables; however, over the life of the project, future CWCCIS updates will correct any short-term uncertainty.

c. For fully funded projects (such as supplemental-funded projects seeking budget validations or funding requests), risk of inflation must be considered in the CSRA. Current and future inflation risk must be noted in the CSRA, with appropriate probability and impact, through PDT discussion and modeled, as necessary, to run Monte Carlo simulations to develop overall project contingencies. A risk item in the CSRA must be included to address the differences between CWCCIS projected inflation and the likely actual inflation (based on real-time market inflation data through readily available indices) to risk-based midpoint of construction of fully funded features.

d. Schedule risk in the CSRA must also include consideration for the inflation cost impacts due to risk-based schedule delays. A well-prepared project schedule is essential to address this risk element properly.

e. For IGE, the cost estimator should use judgment in establishing an appropriate escalation over the life of the contract, as well as the effects of any Economic Price Adjustment Contract Clause and its impacts to the assumed escalation rate.

21. Risk identification for determining uncertainties and contingencies

a. Risk analysis. All project phases include risk analysis, which is based on the level of information available.

b. Defining, expressing, and measuring risk. A broad definition of risk is a situation or event where something of value is at stake and the outcome is uncertain. Typically, risk is expressed as a combination of the likelihood or probability of an event occurring, and attendant consequences should the event unfold; however, it is too often used as the probability of an event occurring. Consequences are measured in the metrics of safety, cost, time, environmental harm, and property damage, among others. Choosing the appropriate risk metrics and actively using them in decision making is critical to effective risk management.

c. The Civil Works Risk Framework. The three components of the Civil Works Risk Framework are: risk assessment, risk communication, and risk management. As a project's life cycle unfolds, risks must be assessed continually, updated periodically, and communicated regularly to ensure they are understood and applied properly as project conditions change. Key activities within each element are summarized in Figure 1.

(1) Risk assessment is a systematic approach to describing the nature of the risk, including the likelihood and severity of consequences. Whenever possible, risk assessments are quantitative; however, qualitative assessments may be appropriate for some activities. A risk register is used to identify potential risk events. The PDT will support the cost facilitator in identifying the risk events. The risk register identifies probability of risk occurrence and severity of impact on cost variance and schedule variance. The Cost MCX CSRA risk template is used to assure consistency (variations from the standard template must be approved by the Director of the Cost MCX). The risk register is also 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 continuously throughout a project life cycle to facilitate 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. 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 lessen 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.

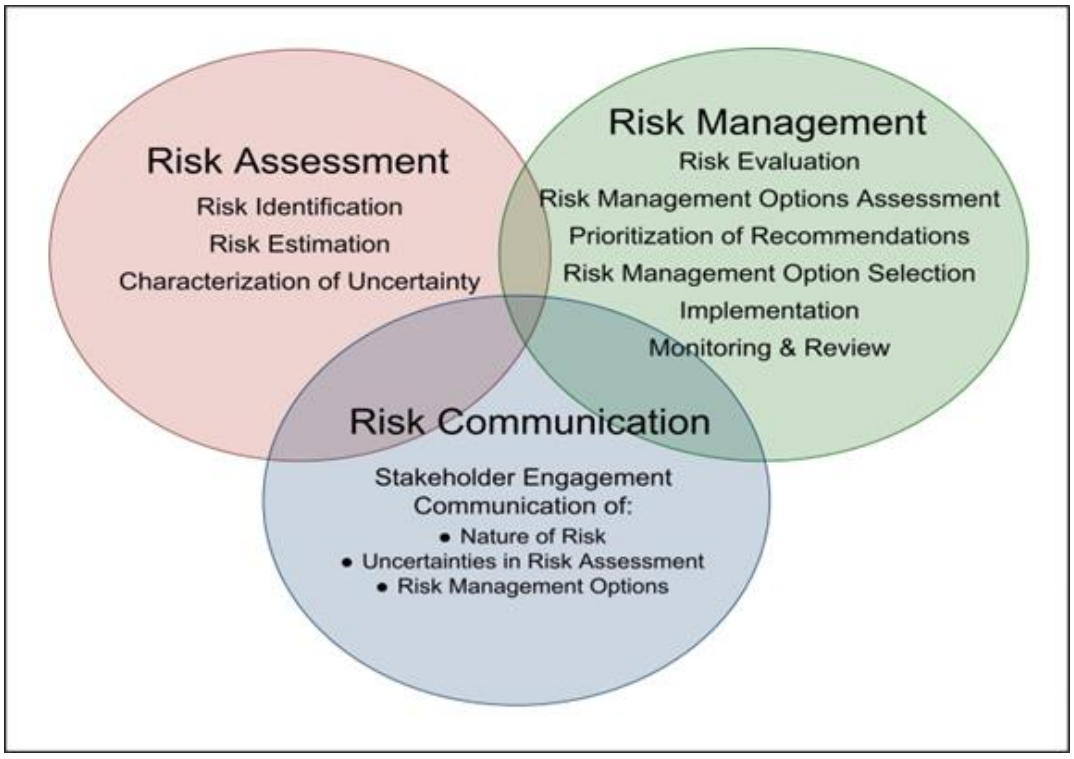

Figure 1. Risk framework

d. When a cost risk analysis is required. HQUSACE requires the use of a cost risk analysis to determine contingency amounts for decision documents or in support of necessary funding outside of the district funding authority. These include, but are not limited to, feasibility studies, design document reports, engineering documentation reports, general re-evaluation reports (GRRs), limited re-evaluation reports (LRRs), and post authorization change reports. A CSRA report and an RMP are required for all decision documents, regardless of project size.

e. Including contingencies. 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 that 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 allowance variation throughout project life. 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 typically will be reduced (Table 1). At construction contract award, a minimum contingency allowance of at least 5 percent of the contract amount must be available at the project level. The minimum contingency allowance for construction contracts with less than 100 percent design should be even greater, and possibly should be supported by a risk analysis. As a project nears completion, this contingency allowance must be reduced accordingly.

(1) A 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.

(2) 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, 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.

(3) The risk analysis must consider all project features of the CWWBS 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. Variance of risk analysis processes and details depending on the complexity and size of the project.

(1) 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.

(2) 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, consistent 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 the CSRA report, which includes PDT identifications, a risk register, and a risk model.

h. Developing contingencies. As project development progresses into design and construction, contingencies must be developed based on 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).

(1) For larger, more complex projects, in risk analysis studies using the Monte Carlo process, the contingencies should be presented with confidence levels and associated contingencies (with their own confidence levels) (10 percent confidence increments, as a minimum).

(2) For cost product development, contingencies reflecting the 80 percent confidence level will be used in reporting. 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.

(3) Items to consider in the chosen confidence level may include 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 the resulting report are not intended to serve as an RMP. Rather, the report serves as part of the RMP.

(2) The RMP must present the plan to manage, monitor, and mitigate risks accordingly. It assigns responsibilities to PDT members to ensure the RMP is used as a living document and management tool.

j. Risk analyses for the feasibility phase.

(1) During the feasibility phase (see Figure 2 for a flowchart on the feasibility process), 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.

(2) For larger projects (greater than $40 million), for both 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 complexity.

(3) A report is not required to accompany the abbreviated risk analysis; however, a report must be developed for larger projects. The risk analysis report should identify the risk-analysis processes and PDT member involvement, and include a record of discussions, a risk register, key assumptions, major concerns, justified contingencies, and recommended risk-mitigation plans. The report will serve as part of the PDT’s RMP.

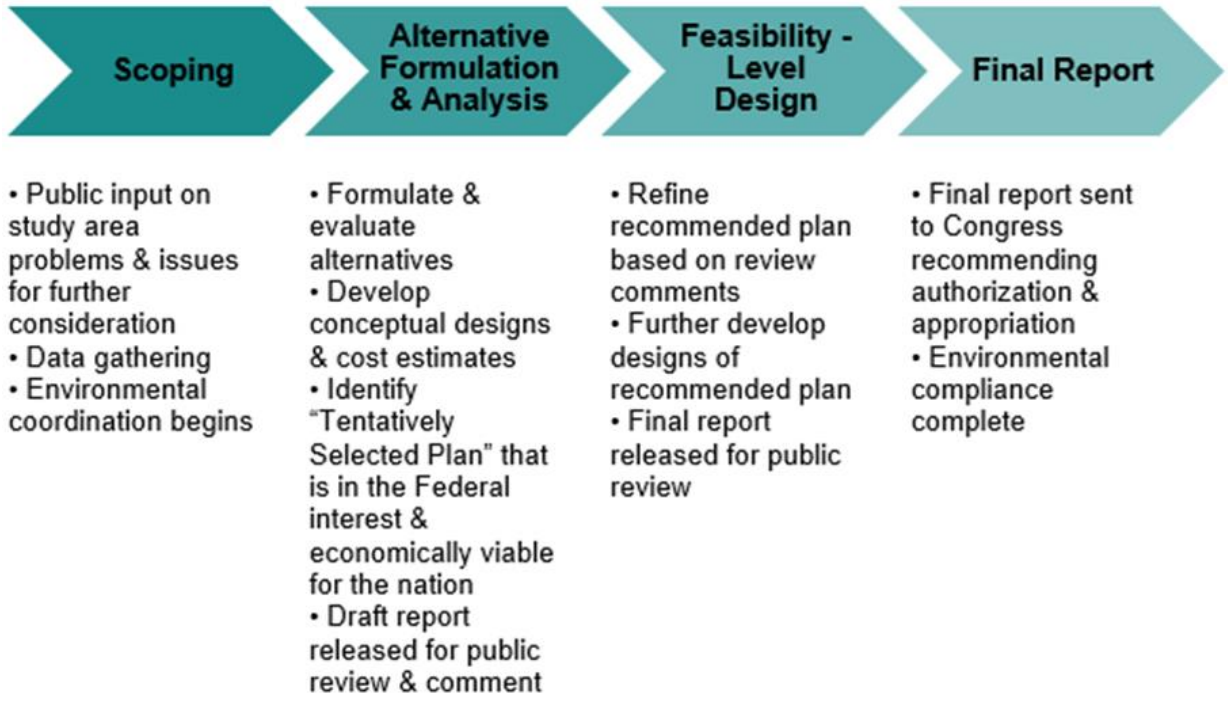

Figure 2. Feasibility process

k. Risk analyses for PED and construction phases. During the PED and construction phases, a risk analysis and updates must be conducted on the remaining costs, major construction elements, further funding requests, major milestones, 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 analysis 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 throughout the life of the project. The risk identified during the initial CSRA development will be monitored and addressed. Additionally, 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 likelihood of occurrence and cost impact. The cost engineer will evaluate the cost risk model and communicate to the PM and PDT members the overall impact to the total project cost. The PM, PDT members, and the Cost Engineer will collaborate to identify appropriate response actions to the risk events.

22. 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. Updates to the TPCS must include consideration for scope, current acquisition strategy, quantities, updated costs, schedules, inflation, risks, and contingencies. The standard TPCS templates are in Appendix E.

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 and optional for non-CAP projects).

(1) *Spent and future costs inclusion.* While the cost engineer prepares the basic construction cost elements of the form, the PM and the Real Estate and Construction offices play major roles in establishing program year, as well as federal and non-federal share, spent costs, Feature 01: Lands and Damages, Feature 30: Planning, Engineering, and Design, and Feature 31: Construction Management. The cost engineer 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 must be displayed in the feasibility report.

(2) *Constant dollar cost (price level)*. Constant dollar analyses are used to determine an equivalent cost, either in the future, or in the past, by price indexing using CWCCIS data. Constant dollar cost is the estimated cost adjusted to the effective price level. The constant dollar cost adjusted to current pricing levels is the cost estimate used in decision documents and chief's reports. The constant dollar cost does not include inflation to midpoint of design and construction.

(3) *Project first cost (price level)*. The project first cost serves as the basis for the cost estimate used to seek authorization for a project. The cost estimate used in chief's reports and other decision documents is the Estimated Cost presented at the current price level. The current price level is the current fiscal year based on the submittal date. Certain costs that are excluded from the TPCS include the following:

(a) The annualized estimate of OMRR&R.

(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.

c. 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 October 20XX in order to support the economic analysis and the budget request. The TPCS project first cost is used for the programming ENG 2202 (PB-3).

23. Cost product report submittals

a. Formal project reports and supporting documents are required for decision documents that are processed through the vertical team; that is, the district Commander, MSC/divisions, HQUSACE, the 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, LPP), design document reports, design deficiency reports, engineering documentation reports, GRRs, LRRs, and post authorization change reports.

b. The cost engineering product submission includes a project narrative or introduction, which comprises the following items: the key findings from the Design Maturity Memo, further documentation of any specific 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 CWWBS feature account level.

(a) The estimate prepared (using 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.

(b) For the MCACES estimate presentation, multiple CWWBS folder levels may be necessary to present the project scope and cost of construction elements in the project. However, certain cost information is sensitive and AR 25-55 and FAR 36.203 govern its release. Release under the Freedom of Information Act (FOIA) must be coordinated with the FOIA officer (see Appendix F).

(2) For reports and documents that will be released publicly, a high-level WBS summary must be used. Cost sensitive data (such as quantities, unit costs, quotes, productivity rates, and CEDEP) must be protected from public disclosure because 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, and major construction components, as well as the schedule relationships between these items.

(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 is part of the RMP. It should provide: an executive summary, a brief statement of purpose, project scope, applied methodology, identification of PDT members, key assumptions, risk register, sensitivity charts, contingency tables, confidence curves, cost and schedule contingency presentation, major findings, and mitigation recommendations.

24. 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; marked as CUI; and managed as such. (Reference EO 13556 (dated 4 November 2010); DoD Instruction 5200.48; and 32 CFR Part 2002.) Typically, this occurs near the 90 percent design phase; however, earlier well-developed detailed cost estimates can also include sensitive cost and pricing data, regardless of design phase.

(1) Sharing of this data must be restricted, as disclosure may easily compromise the integrity of competitive bidding processes.

(2) Sensitive data includes detailed quantities, detailed unit prices, crew or equipment productivity, subcontractor quotes, and supplier and material quotes. This data must be restricted to the USACE community. It should be shared only on a “need to know” basis within the district or USACE cost community in support of estimate development and ATRs. A “need to know” basis is determined by the contracting office and district command structure.

(3) Pre-bid and IGE cost information must be protected, with carefully controlled dissemination. Cost data sharing in and outside districts should include only higher-level cost information related to project scope and features in use for programming and budget purposes. IGEs and the cost data they contain must remain restricted and marked as CUI. The CUI marking must also be applied to any physical electronic storage media, such as CDs. Any deviation from CUI-handling protocol requires a signed non-disclosure agreement from parties with a clear “need to know.”

(4) After contract award, ordinarily, only the title page, signature page, and price schedule are disclosed outside the Government. The IGE back-up data must not be

released, as it contains sensitive cost data (for example, 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 must be submitted directly to the necessary USACE parties through secure means in compliance with FAR 36.203 and ER 1110-1-1300.

25. Cost quality management

Cost engineering offices must follow ER 1110-3-12 guidance. Qualified cost engineers, preferably certified estimators, must provide documented quality control reviews.

a. Accuracy and completeness of project scope and cost engineering products, including necessary cost product updates, must be a central focus throughout the project life. Even in early phases, cost estimates should represent as complete and accurate a picture as possible. This is necessary for both 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 confirm they comply with policy guidance. The division cost engineer, as a minimum, must sponsor an annual meeting with each constituent district's cost engineering chief and senior cost engineers to verify the quality of the division estimating procedures complies with current USACE policy.

26. Technical reviews for cost products

Consistent with ER 1110-2-1150 and ER 1165-2-217, technical reviews are required and/or recommended during various phases of project development throughout the life of the project. Technical reviews consist of three levels of review: a DQC, ATR, and IEPR. The Design Review Checking System (DrChecks^{SM}) must be used throughout USACE as the formal system for ATRs and IEPRs. Cost comments are to be treated as CUI. Refer specific update requirements, including review requirements, to the Cost MCX.

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

b. Agency Technical Review. All Cost ATR reviewers must be senior cost engineers, trained and certified by the Cost MCX, which will also assign all decision document reviewers. Qualified district cost personnel who are knowledgeable of the specific cost engineering products must address review comments and verify that the necessary revisions have been implemented prior to comment closure by the cost reviewer. This includes critical comments and/or comments that necessitate a change related to quality, cost, schedule, and/or contingencies.

(1) The Cost MCX is responsible 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 cost product ATRs. Review consideration is given to project reports, investigations, modeling, survey data, design, DQC records, quantities, estimates, construction schedules, contingencies, and resulting total project cost.

(2) The intent of a Cost ATR is to confirm that such work complies with established regulations and policies, professional principles, practices, codes, and criteria, and that it results in a confident total project cost.

(3) Regardless of product author (USACE, A-E, sponsor, or others), any report that is presenting cost or requesting federal funds from higher authority (such as MSC, divisions, HQUSACE, or Congress) must receive a Cost ATR and a Cost MCX Cost Certification.

(4) Other project milestone submissions may require a Cost ATR, as defined by current HQUSACE guidance, or as specifically requested by HQUSACE, MSC, or division offices.

(5) A Cost ATR Certification and its validity are based on the age of the estimate products, as discussed in paragraph 9 regarding cost engineering products and updates.

(6) For budget requests, Cost ATRs and resulting Cost MCX certifications must be current.

(7) 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.

(a) To accomplish this, the respective district's project submittal must include the draft main report and engineering products, such as photos, designs, drawings, and engineering appendices. The submission must also include the Design Maturity Memo for recommended plan and post authorization updates; MCACES estimates; a project

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

schedule depicting design, acquisition, and construction; risk-based contingency development; TPCS worksheets; and all native electronic files for the comparative estimates.

(b) Cost ATRs for the PED stage of project development must 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. An IEPR is conducted on projects that meet mandatory or discretionary triggers outlined in current HQUSACE guidance, similar to the ATR process, and a formalized comment resolution process must take place. Note this process may come under scrutiny through FOIA requests. Document submittal requirements located in paragraphs 22, 23, and 24 also apply to IEPRs. Often, the IEPR occurs at the same time as an ATR. IEPR funding commonly requires a contractual process, making IEPR schedule coordination critical.

d. Cost certification types. 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 accurate 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 certification-level authority. 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 that 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 quality has been developed consistent 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 to be at an insufficient level, based on regulations (including this ER, ER 1110-2-1150, and ER 1110-1-1300) and policy. The Conditional Certification Statement will highlight the basis for the Conditional Certification. This will allow the district to focus future resources on improvement. Conditional certifications should be coordinated with the HQUSACE PM, Engineering, and Planning prior to submittal for funding request by the project. Projects seeking multiple (more than one) conditional cost certifications will be referred to HQUSACE PM and HQUSACE Cost. For awareness, this coordination with HQUSACE will require additional time for Cost MCX certification.

(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 that 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.

(4) *Waiver.* For a project that is issued a Conditional Cost Certification or Cost Non-Certification, the district may seek a waiver(s) from the conditions placed on the project listed within the Conditional Certification or Non-Certification issued. The approval authority to grant waiver(s) is HQUSACE, DCG-CEO.

27. 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. Defense Federal Acquisition Regulation (DFAR) 234.201 presents the DoD 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 developed using the TPCS (reference paragraph 22 above) is required for documents supporting a funding request. This includes feasibility studies, design document reports, design deficiency reports, engineering documentation reports, GRRs, LRRs, 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 and 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 toward 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.

(1) To verify 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.

(2) Following 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.

(3) 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, and 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 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, that extend over a span of 3 years or more, that are unique, that have higher acquisition risk, that are of national significance, or that have multiple contractors and stakeholders, may be qualified as “mega projects.”

(1) Management of these projects requires 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 CSRA, cost estimating, and network scheduling.

(2) An IGE and the risk register 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 total project cost, authorizations, and appropriations.

i. Reasonable separation must be made within the cost products regarding WBSs, spent costs, ongoing efforts/contracts, and remaining efforts 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.

Appendix A
References

Section I

Required Publications

Unless otherwise indicated, Army and USACE publications are available at https://armypubs.army.mil and https://www.publications.usace.army.mil. Code of Federal Regulation (CFR) publications are available at https://www.ecfr.gov/. Federal Acquisition Regulation (FAR) publications are available at https://www.acquisition.gov/. U.S. Code (USC) publications are available at https://uscode.house.gov.

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

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.
(Available at https://www.astm.org)

DA Pam 25-403
Army Guide to Recordkeeping

DFAR Subpart 234.2
Earned Value Management System

DFAR Subpart 234.201
Policy

DoD Instruction 5200.48
Controlled Unclassified Information
(Available at
https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/520048p.PDF)

EM 1110-2-1304
Civil Works Construction Cost Index System (CWCCIS)

EO 13556
Controlled Unclassified Information (dated 4 November 2010)

EP 1110-1-8
Construction Equipment Ownership and Operating Expense Schedule

ER 5-1-11
U.S. Army Corps of Engineers Business Process

ER 11-1-321
Army Programs – Value Engineering

ER 1105-2-103
Policy for Conducting Civil Works Planning Studies

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

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

ER 1110-2-1156
Safety of Dams – Policy and Procedures

ER 1110-3-12
Quality Management

ER 1165-2-217
Civil Works Review Policy

ER 1180-1-9
Design-Build Contracting

FAR Part 15
Contracting by Negotiation

FAR Part 36
Construction and Architect-Engineer Contracts

FAR Subpart 19.202-6
Determination of Fair Market Price

FAR Subpart 36.203
Government Estimate of Construction Costs

FAR Subpart 36.204
Disclosure of the Magnitude of Construction Costs

Project Management Institute, Inc.
A Guide to the Project Management Body of Knowledge, PMBOK® Guide, 3rd edition, 2004. (Available at https://www.pmi.org)

Public Law 95-269 (92 Stat. 218-219)
Rivers and Harbors, Improvements
(Available at https://uscode.house.gov/statutes/pl/95/269.pdf)

Public Law 99-662 (H.R.6)
The Water Resources Development Act of 1986
(Available at https://www.congress.gov/bill/99th-congress/house-bill/6)

Public Law 107-217
The Davis-Bacon Act
(Available at https://www.dol.gov)

USACE Acquisition Instruction (UAI)
(Available at
https://www.usace.army.mil/Portals/2/docs/Contracting/UAI_UDG_30NOV2021.pdf?ver=n4Vv1YGUDe79Bq5M3HrFnw%3D%3D)

32 CFR Part 2002
Controlled Unclassified Information (CUI)
(Available at https://www.ecfr.gov)

33 CFR Part 337
Navigation and Navigable Waters: Practice and Procedure
(https://www.ecfr.gov/current/title-33/chapter-II/part-337)

5 USC 552, as amended by Public Law 104-231, 110 Stat. 3048
The Freedom of Information Act
(Available at https://www.congress.gov/104/statute/STATUTE-110/STATUTE-110-Pg3048.pdf)

33 USC 622
Contracts, etc., with Private Industry for Implementation of Projects for Improvements and Dredging; Reduction of Federally Owned Fleet (Available at https://www.govregs.com/uscode/title33_chapter12_subchapterV_section622)

33 USC 624
Limitation on Improvement Work by Private Contract

33 USC 701p
Flood Control Act of 1946

42 USC 4623
Replacement Housing for Homeowner; Mortgage Insurance

42 USC 4624
Replacement Housing for Tenants and Certain Others

54 USC 3001 et seq
Subtitle III-National Preservation Programs, Division A-Historic Preservation, Chapter 3001–Policy

54 USC 312501-312508
Subtitle III-National Preservation Programs, Division B-Organizations and Programs, Chapter 3125-Preservation of Historical and Archaeological Data

Section II

Prescribed Forms

ENG 2200 (PB-1)
Summary Construction Program

ENG 2201A (PB-2a)
Detailed Project Schedule

ENG 2202 (PB-3)
Project Cost Estimate

ENG 6307
Design Maturity Determination for Cost Certification

Appendix B
Design Maturity Determination for Cost Certification

B–1. Overview

The Chief of Engineering is responsible for the technical content and engineering sufficiency for all engineering products produced by the command. The development of the Design Maturity Determination for Cost Certification form (also referred to as the Design Maturity form) in 2024 consolidates in one location vital information on percentage of design maturity for the Management Control Evaluation, per Appendix H of ER 1110-2-1150 and signature by the Chief of Engineering. The form can be found at https://www.publications.usace.army.mil/USACE-Publications/Engineer-Forms/.

B–2. Use of the form

a. The information documented in this form includes design maturity of the following features:

(1) Hydrology and hydraulics modeling.

(1) Geotechnical data and subsurface investigations.

(2) Survey data.

(3) The aggregation of all features to reach a percentage for design maturity that determines the classification of the estimate (Class 1, 2, 3, 4, or 5).

(4) Other major technical and/or scope assumptions and risks, which will be refined as the design progresses.

(5) The total project baseline schedule in months.

(6) A contingency and confidence level for the defined project scope.

b. Instructions for using the form are located on the last page and include:

(1) Page 1 – Design Date: Use the drop-down menu to populate the date of the design.

(2) P2 Designation/Project Information: Enter the P2 Project number and Project name.

(3) Paragraph 1 – Engineering Waivers: Use the drop-down menu to populate this field with either “Does,” or “Does not.” If an engineering waiver is needed, or anticipated to be needed, provide the specific waiver required for the Project. A waiver is any deviation from current mandatory standards, as indicated.

(4) Paragraph 2 – Hydrology and Hydraulics: Populate this field with the percent of design maturity.

(5) Paragraph 3 – Geotechnical Information: Populate this field with the percent of design maturity.

(6) Paragraph 4 – Survey Data: Populate this field with the percent of design maturity.

(7) Paragraph 5 – Other Technical Assumptions and/or Scope: Enter any other major technical assumptions or scope assumptions here. Only include assumptions that pertain to design. Template discussion fields are provided as a courtesy. Please include additional pages as necessary.

(8) Paragraph 6 – Aggregate for all features: Populate this field with the percent of design maturity. Use the dropdown menu to choose which class of estimate is met by the design deliverables.

(9) Paragraph 7 – Total project baseline schedule: Populate this field with the total project baseline schedule for the project in months.

(10) Paragraph 8 – Contingency and confidence level for the defined project scope: Populate these fields with the contingency percentage and confidence level percentage for the defined project scope.

(11) Signature: Print the name and title and provide the signature for the District's Chief of Engineering. This authority cannot be delegated; however, the Deputy Chief of Engineering and Design may sign the form in the absence of the Chief of Engineering. All fillable fields must be populated (use N/A if not applicable) in order for the document to be signed.

(12) Page 2 – Remaining Work: Identify the current baseline design assumptions and the remaining design effort and risks to complete 100 percent design for the authorized project. If the project is to be broken into parts or phases, provide details on the aggregate design level of each phase and anticipated timeline for completion.

B–3. Point of Contact

For information regarding this form and its use, contact the Cost Community of Practice Leader, HQUSACE or the Chief of Engineering and Construction's office.

Appendix C
Civil Works Work Breakdown Structure

Table C–1
Civil Works Work Breakdown Structure

(Feature and Sub-feature Levels)

CWWBS Number		Description of Item
01	**–**	**LANDS AND DAMAGES**
01	18	GENERAL RE-EVALUATION REPORT (GRR)
01	19	LIMITED RE-EVALUATION 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**
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

(Feature and Sub-feature Levels)		
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 RE-EVALUATION REPORT(GRR)
30	19	LIMITED RE-EVALUATION 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**
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

C–1. Feature 01: Lands and Damages

a. This feature includes all costs of acquiring for the project (by purchase or condemnation) real property or permanent interests there, 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.

b. For projects that require that costs be incurred on real estate activities, that is, 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 ENG 2202 (PB-3) indicating the estimated costs of such real estate activities. These costs will be charged to Feature 30: Planning, 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 ENG 2200 (PB-1) and ENG 2201A (PB-2a) for all such projects.

c. 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 Feature 02: Relocations. Temporary interests (such as leases) are included in the feature or distributive item that benefits from them.

C–2. Feature 02: Relocations

a. 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.

b. The cost of removal of improvements from the reservoir area for disposal is included in Feature 03: Reservoirs. All alterations of railroad bridges consistent with Section 3 of the 1946 Flood Control Act (33 USC 701p) are also included in this feature.

C–3. Feature 03: Reservoirs

a. 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.

b. This feature also includes bank stabilization, shoreline improvement, firebreaks, fencing, boundary line survey and marking of land that 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.

c. Site clearing, grouting, etc., incidental to and required for specific construction features is included as part of the construction features.

C–4. Feature 04: Dams

a. 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.

b. In the case where the powerhouse is an integral part of the intake dam, the cost of the power intake dam is included in Feature 07: Power Plant.

c. Any auxiliary dams or spillways detached from the main structures and floating trash and drift booms and barriers are included in this feature.

d. The power intake works include such power items as forebay, penstocks, tunnels, surge tank, gates, operating equipment, and appurtenances.

e. 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 Feature 02: Relocations.

C–5. Feature 05: Locks

a. 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 required excavation. 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.

b. Excavation or dredging required in approaches outside of the limits defined above for the lock structure is included in Feature 09: Channels and Canals. The cost of a cofferdam or the properly allocable amount of such, 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 Feature 06: Fish and Wildlife Facilities.

C–6. Feature 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. It also includes provisions for wildlife preservation. In support of wildlife, this feature includes environmental mitigation and monitoring costs.

C–7. Feature 07: Power Plant

This feature includes those facilities specifically required for the production of power other than those included in Feature 04: 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 features. The cost of a cofferdam or appropriate part is charged to this feature.

C–8. 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 Feature 02: Relocations; access roads to recreation facilities and areas, which will be charged to Feature 14: Recreation Facilities; or service roads and service railroads on structures.

C–9. Feature 09: Channels and Canals

a. 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. It also includes deepening, providing new, or improving existing watercourses for flood control and major drainage.

b. Excavation of natural watercourses to provide adequate depths for navigation is included.

c. Excavation for specific structures (such as dams and locks used in the development of waterways and conservation of water resources) is included with these structures.

d. 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 of such for navigation are included in this feature.

e. Excavation, clearing, and removal of accumulated snags, drifts, debris, and vegetable growth from streams for flood control and major drainage purposes is also included.

f. Included in this feature are revetments, linings, dikes, and bulkheads constructed as channel improvement works for flood control or navigation. Items constructed for bank stabilization only are not included.

g. Also included are jetties constructed in connection with flood control channel improvements.

C–10. Feature 10: Breakwaters and Seawalls

This feature includes breakwaters, seawalls, piers, and similar 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, and tidewater reaches of rivers, canals, and harbors to control water flow and current, to maintain depth of channels, and to provide protection are included in this feature.

C–11. Feature 11: Levees and Floodwalls

a. This feature includes embankments and walls constructed to protect areas from inundation by overflow from creeks, rivers, lakes, canals, and other bodies of water.

b. This feature consists of such items as service roads on levee crown or landside berms; road ramps, closure structures, seepage control measures, and erosion protection measures on levee slopes, berms, and bank slopes when an integral part of the levees or floodwalls; and drainage facilities, constructed to provide means for the passage of accumulated drainage, 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.

c. Pumping plants are included in Feature 13: Pumping Plants.

d. Levees locally called dikes are included in this feature.

C–12. Feature 12: Navigation Ports and Harbors

a. 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.

b. 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.

C–13. 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.

C–14. Feature 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 connected essential safety measures. The latter includes, as appropriate, sheltered anchorage areas for small craft, readily accessible and reasonably safe bathing areas, 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 currently more economically than at a later date.)

C–15. Feature 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, either Feature 09: Channels and Canals or Feature 11: Levees and Floodwalls.

C–16. Feature 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 Feature 09: Channels and Canals.

C–17. Feature 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.

C–18. Feature 18: Cultural Resource Preservation

This feature includes all cultural resources activities to be completed in Pre-Construction, Engineering, and Design, and/or Construction, including monitoring; surveys and assessments to identify cultural resources and/or determine National Register of Historic Places Eligibility; documentation of historic properties; archaeological data recovery, as well as activities associated with the implementation of the stipulations, activities, and requirements in any project programmatic agreement or memorandum of agreement executed to satisfy compliance with the National Historic Preservation Act (54 USC 3001 et seq), particularly Section 106; the Archeological and Historical Preservation Act (54 USC 312501-312508); and all other historic preservation laws and regulations.

C–19. Feature 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 instead of construction of any of the above-mentioned buildings, such allocated space is not separated from the basic structure. Communication systems are included in Feature 20: Permanent Operating Equipment.

C–20. Feature 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 Feature 30: Planning, Engineering, and Design.

C–21. Feature 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 either Feature 01: Lands and Damages or Feature 02: Relocations, as applicable. Engineering and design performed by hired labor, or as a pay item under a contract, is included in this feature.

C–22. Feature 31: Construction Management

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, and Division Office Executive Direction and Management, are not charged to Construction, General but to the General Expenses appropriation title.

Appendix D
Cost Engineering Within the Planning Modernization Paradigm

D–1. Objective

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

D–2. Guidance

All Civil Works studies utilizing the new Planning Modernization Paradigm as directed must consider the uncertainty and level of detail, facilitate vertical team integration, determine federal interest, perform alternative comparison and selection, and procure necessary funding and resources.

D–3. Uncertainty and level of detail

a. The new paradigm will require increased use of critical thinking (that is, engineering judgment) in the analysis and cost estimates supporting plan formulation and selection at the alternative evaluation level, as well as final recommendation.

b. The 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).

c. The appropriate level of detail must be determined. Design personnel should lead in determining design/technical information levels for function and safety, and cost personnel should lead in determining the design/technical detail requirements pertaining to cost and schedule development.

d. Based on the previous requirements, corresponding PDT members will support cost personnel in defining technical assumptions, where needed. Within the design effort in feasibility, the PDT will develop a WBS that 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.

e. Each project will use a risk register, organized by project features, to assess their likelihood of impacting cost, schedule, and/or function/safety.

(1) The planning study risk register will be used for efforts required for the study execution.

(2) Risk events identified within the planning study risk-identification process that could have an impact on cost and/or schedule will be included in the cost and schedule risk register.

(3) The goal is to minimize data collection and analysis for low-impact features during the feasibility phase.

(4) High impact features should be carefully scoped, such that data collection and analysis are commensurate with risk and add value to the decision-making process, accuracy to the cost and schedule, or reduce risk.

(5) The PM, along with the PDT, must work closely with the cost engineer to identify areas where clarification/modification of design/technical information/details would be beneficial to reduce uncertainty.

(6) For items with significant cost and schedule risk, mitigation strategies will be identified and discussed in the project's RMP. While this approach must not lead the PDT to the acceptance of additional life-safety risk in projects, it may be appropriate to make a risk-informed decision to defer some details or analysis to the PED phase, provided that a proper plan can be formulated.

Appendix E
Total Project Cost Summary

E–1. Total Project Cost Summary: Continuing Authorities Program

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

b. 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.

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

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

e. 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 $100,000 is fully federally funded.

f. Figures E–1 and E–2 provide CAP TPCS examples.

E–2. Total Project Cost Summary: Non-Continuing Authorities Program examples

Projects specifically authorized by congress, or any projects that do not fall under the CAP/receive funding through CAP projects, are considered Non-CAP projects and will use the Non-CAP TPCS. Figures E–3, E–4, and E–5 provide examples of a Non-CAP TPCS.

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

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PROJECT: **Example Project (CAP)**
PROJECT NO: **P2 123456**
LOCATION: **Walla Walla, Washignton**

DISTRICT: **NWW-Walla Walla District** PREPARED: **10/1/2024**
POC: **CHIEF, COST ENGINEERING, XXX**

This Estimate reflects the scope and schedule in report; CAP Engineering Report - Feasibility Report Title

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC):				2025					
						Effective Price Level Date:				1-Oct- 24					
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: 1-Oct-24 ($K)	TOTAL FIRST COST ($K)	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
02	RELOCATIONS	$3,221	$741	23%	$3,962		$3,221	$741	$3,962		$3,962	3.2%	$3,324	$765	$4,089
06	FISH & WILDLIFE FACILITIES	$458	$165	36%	$623		$458	$165	$623		$623	3.2%	$473	$170	$643
			-			-						-			
			-			-						-			
	CONSTRUCTION ESTIMATE TOTALS:	$3,679	$906		$4,585		$3,679	$906	$4,585		$4,585	3.2%	$3,797	$935	$4,732
01	LANDS AND DAMAGES		-			-						-			
30	PLANNING, ENGINEERING & DESIGN	$976	$78	8%	$1,054		$976	$78	$1,054		$1,054	2.6%	$1,001	$80	$1,081
31	CONSTRUCTION MANAGEMENT	$534	$75	14%	$609		$534	$75	$609		$609	3.9%	$555	$78	$632
	PROJECT COST TOTALS:	$5,189	$1,058	20%	$6,247		$5,189	$1,058	$6,247		**$6,247**	3.2%	$5,353	$1,092	$6,445

_____ 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:		**$6,445**
ESTIMATED FEDERAL COST:	65%	$4,189
ESTIMATED NON-FEDERAL COST:	35%	$2,256
22 - FEASIBILITY STUDY (CAP studies):		**$2**
ESTIMATED FEDERAL COST:	50%	$1
ESTIMATED NON-FEDERAL COST:	50%	$1
ESTIMATED FEDERAL COST OF PROJECT		**$4,190**

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TPCS

Figure E–1. Continuing Authorities Program Total Project Cost Summary (example 1)

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

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

PROJECT: Example Project (CAP)
LOCATION: Walla Walla, Washington
This Estimate reflects the scope and schedule in report; CAP Engineering Report - Feasibility Report Title

DISTRICT: NWW-Walla Walla District
POC: CHIEF, COST ENGINEERING, XXX

PREPARED: 10/1/2024

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 6-May-16 Estimate Price Level: 1-Oct-24				Program Year (Budget EC): 2025 Effective Price Level Date: 1 -Oct-24								
				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		$3,221	$741	$3,962	2026Q2	3.2%	$3,324	$765	$4,089
16	BANK STABILIZATION	$458	$165	36.0%	$623		$458	$165	$623	2026Q2	3.2%	$473	$170	$643
	CONSTRUCTION ESTIMATE TOTALS:	$3,679	$906	24.6%	$4,585		$3,679	$906	$4,585			$3,797	$935	$4,732
01	LANDS AND DAMAGES			25.0%										
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	$92	$7	8.0%	$99		$92	$7	$99	2025Q4	2.3%	$94	$7	$102
1.0%	Planning & Environmental Compliance	$37	$3	8.0%	$40		$37	$3	$40	2025Q4	2.3%	$38	$3	$41
15.0%	Engineering & Design	$552	$44	8.0%	$596		$552	$44	$596	2025Q4	2.3%	$565	$45	$610
1.0%	Reviews, ATRs, IEPRs, VE	$37	$3	8.0%	$40		$37	$3	$40	2025Q4	2.3%	$38	$3	$41
1.0%	Life Cycle Updates (cost, schedule, risks)	$37	$3	8.0%	$40		$37	$3	$40	2025Q4	2.3%	$38	$3	$41
1.0%	Contracting & Reprographics	$37	$3	8.0%	$40		$37	$3	$40	2026Q2	3.9%	$38	$3	$41
3.0%	Engineering During Construction	$110	$9	8.0%	$119		$110	$9	$119	2026Q2	3.9%	$114	$9	$123
2.0%	Planning During Construction	$74	$6	8.0%	$80		$74	$6	$80	2025Q4	2.3%	$76	$6	$82
3.0%	Adaptive Management & Monitoring			8.0%										
1.0%	Project Operations			8.0%										
	Real Estate (All Federal Labor)			25.0%										
31	CONSTRUCTION MANAGEMENT													
10.0%	Construction Management	$368	$52	14.0%	$420		$368	$52	$420	2026Q2	3.9%	$382	$54	$436
2.0%	Project Operation:	$74	$10	14.0%	$84		$74	$10	$84	2026Q2	3.9%	$77	$11	$88
2.5%	Project Management	$92	$13	14.0%	$105		$92	$13	$105	2026Q2	3.9%	$96	$13	$109
	CONTRACT COST TOTALS:	$5,189	$1,058		$6,247		$5,189	$1,058	**$6,247**			$5,353	$1,092	**$6,445**

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Figure E–2. Continuing Authorities Program Total Project Cost Summary (example 2)

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

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PROJECT: Example Project (Non-CAP)
PROJECT NO: P2 123456
LOCATION: Walla Walla, Washington

DISTRICT: NWW - Walla Walla District
POC: CHIEF, COST ENGINEERING, xxx

PREPARED: 10/1/2024

This Estimate reflects the scope and schedule in report; Engineering Report for Project

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC): 2025 Effective Price Level Date: 1 OCT 24									
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST ($K) C	CNTG ($K) D	CNTG (%) E	TOTAL ($K) F	ESC (%) G	COST ($K) H	CNTG ($K) I	TOTAL ($K) J	Spent Thru: 1-Oct-24 ($K)	TOTAL FIRST COST ($K) K	INFLATED (%) L	COST ($K) M	CNTG ($K) N	FULL ($K) O
02	RELOCATIONS	$602	$175	29.1%	$777	0.0%	$602	$175	$777	$0	$777	4.0%	$629	$179	$808
06	FISH & WILDLIFE FACILITIES	$41,090	$17,231	41.9%	$58,321	0.0%	$41,090	$17,231	$58,321	$0	$58,321	8.7%	$44,651	$18,720	$63,372
09	CHANNELS & CANALS	$7,000	$2,545	36.4%	$9,545	0.0%	$7,000	$2,545	$9,545	$0	$9,545	17.2%	$8,205	$2,981	$11,185
	CONSTRUCTION ESTIMATE TOTALS:	$48,692	$19,951		$68,643	0.0%	$48,692	$19,951	$68,643	$0	$68,643	9.8%	$53,485	$21,881	$75,365
01	LANDS AND DAMAGES	$3,627	$876	24.1%	$4,503	0.0%	$3,627	$876	$4,503	$0	$4,503	2.1%	$3,705	$893	$4,598
30	PLANNING, ENGINEERING & DESIGN	$15,353	$6,278	40.9%	$21,631	0.0%	$15,353	$6,278	$21,631	$0	$21,631	4.3%	$16,019	$6,542	$22,561
31	CONSTRUCTION MANAGEMENT	$7,060	$2,925	41.4%	$9,985	0.0%	$7,060	$2,925	$9,985	$0	$9,985	11.9%	$7,905	$3,269	$11,174
	PROJECT COST TOTALS:	$74,732	$30,028	40.2%	$104,761		$74,732	$30,028	$104,761	$0	$104,761	8.5%	$81,114	$32,584	$113,698

ESTIMATED TOTAL PROJECT COST: $113,698

_____ 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

Figure E–3. Non-Continuing Authorities Program Total Project Cost Summary (example 1)

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

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

PROJECT: Example Project (Non-CAP)
LOCATION: Walla Walla, Washington
This Estimate reflects the scope and schedule in report; Engineering Report for Project

DISTRICT: NWW - Walla Walla District
POC: CHIEF, COST ENGINEERING, xxx

PREPARED: 10/1/2024

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 1-Oct-24 Effective Price Level: 1-Oct-24				Program Year (Budget EC): 2025 Effective Price Level Date: 1 OCT 24								
				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	INFLATED (%)	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													
02	RELOCATIONS	$500	$175	35.0%	$675	0.0%	$500	$175	$675	2026Q1	2.5%	$513	$179	$692
06	FISH & WILDLIFE FACILITIES	$41,025	$17,231	42.0%	$58,256	0.0%	$41,025	$17,231	$58,256	2028Q2	8.6%	$44,572	$18,720	$63,292
09	CHANNELS & CANALS	$2,500	$925	37.0%	$3,425	0.0%	$2,500	$925	$3,425	2028Q2	8.6%	$2,716	$1,005	$3,721
	CONSTRUCTION ESTIMATE TOTALS:	$44,025	$18,331	41.6%	**$62,356**		$44,025	$18,331	$62,356			$47,801	$19,905	$67,706
01	LANDS AND DAMAGES	$3,502	$876	25.0%	$4,378	0.0%	$3,502	$876	$4,378	2025Q4	2.0%	$3,573	$893	$4,466
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	$1,101	$462	42.0%	$1,563	0.0%	$1,101	$462	$1,563	2025Q2	0.8%	$1,109	$466	$1,575
1.0%	Planning & Environmental Compliance	$440	$185	42.0%	$625	0.0%	$440	$185	$625	2025Q2	0.8%	$444	$186	$630
15.0%	Engineering & Design	$6,604	$2,774	42.0%	$9,377	0.0%	$6,604	$2,774	$9,377	2025Q2	0.8%	$6,654	$2,795	$9,448
1.0%	Reviews, ATRs, IEPRs, VE	$440	$185	42.0%	$625	0.0%	$440	$185	$625	2025Q2	0.8%	$444	$186	$630
1.0%	Life Cycle Updates (cost, schedule, risks)	$440	$185	42.0%	$625	0.0%	$440	$185	$625	2025Q2	0.8%	$444	$186	$630
1.0%	Contracting & Reprographics	$440	$185	42.0%	$625	0.0%	$440	$185	$625	2025Q2	0.8%	$444	$186	$630
3.0%	Engineering During Construction	$1,321	$555	42.0%	$1,875	0.0%	$1,321	$555	$1,875	2028Q2	10.4%	$1,458	$613	$2,071
2.0%	Planning During Construction	$881	$370	42.0%	$1,250	0.0%	$881	$370	$1,250	2028Q2	10.4%	$972	$408	$1,381
3.0%	Adaptive Management & Monitoring	$1,321	$555	42.0%	$1,875	0.0%	$1,321	$555	$1,875	2028Q1	9.6%	$1,447	$608	$2,055
1.0%	Project Operations	$440	$185	42.0%	$625	0.0%	$440	$185	$625	2025Q2	0.8%	$444	$186	$630
	Real Estate (All Federal Labor)	$502	$126	25.0%	$628	0.0%	$502	$126	$628	2025Q4	2.3%	$514	$128	$642
31	CONSTRUCTION MANAGEMENT													
10.0%	Construction Management	$4,403	$1,849	42.0%	$6,252	0.0%	$4,403	$1,849	$6,252	2028Q2	10.4%	$4,861	$2,042	$6,903
2.0%	Project Operation:	$881	$370	42.0%	$1,250	0.0%	$881	$370	$1,250	2028Q2	10.4%	$972	$408	$1,381
2.5%	Project Management	$1,101	$462	42.0%	$1,563	0.0%	$1,101	$462	$1,563	2028Q2	10.4%	$1,215	$510	$1,726
	CONTRACT COST TOTALS:	$67,840	$27,652		$95,492		$67,840	$27,652	**$95,492**			$72,795	$29,707	**$102,502**

Figure E–4. Non-Continuing Authorities Program Total Project Cost Summary (example 2)

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

Printed:7/26/2024
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****** CONTRACT COST SUMMARY ******

PROJECT: Example Project (Non-CAP)
LOCATION: Walla Walla, Washington
This Estimate reflects the scope and schedule in report; Engineering Report for Project

DISTRICT: NWW - Walla Walla District
POC: CHIEF, COST ENGINEERING, xxx

PREPARED: 10/1/2024

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: / Effective Price Level:			1-Oct-24 / 1-Oct-24	Program Year (Budget EC): / Effective Price Level Date:			2025 / 1 OCT 24					
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	INFLATED (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	PHASE 2 or CONTRACT 2													
02	RELOCATIONS	$102	$0	0.0%	$102	0.0%	$102	$0	$102	2030Q1	13.6%	$116	$0	$116
06	FISH & WILDLIFE FACILITIES	$65	$0	0.0%	$65	0.0%	$65	$0	$65	2032Q4	22.0%	$79	$0	$79
09	CHANNELS & CANALS	$4,500	$1,620	36.0%	$6,120	0.0%	$4,500	$1,620	$6,120	2032Q4	22.0%	$5,488	$1,976	$7,464
	CONSTRUCTION ESTIMATE TOTALS:	$4,667	$1,620	34.7%	**$6,287**		$4,667	$1,620	$6,287			$5,684	$1,976	$7,659
01	LANDS AND DAMAGES	$125	$0	0.0%	$125	0.0%	$125	$0	$125	2027Q2	6.0%	$132	$0	$132
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	$117	$42	36.0%	$159	0.0%	$117	$42	$159	2028Q3	11.3%	$130	$47	$177
1.0%	Planning & Environmental Compliance	$47	$17	36.0%	$63	0.0%	$47	$17	$63	2028Q3	11.3%	$52	$19	$71
15.0%	Engineering & Design	$700	$252	36.0%	$952	0.0%	$700	$252	$952	2028Q3	11.3%	$779	$280	$1,059
1.0%	Reviews, ATRs, IEPRs, VE	$47	$17	36.0%	$63	0.0%	$47	$17	$63	2028Q3	11.3%	$52	$19	$71
1.0%	Life Cycle Updates (cost, schedule, risks)	$47	$17	36.0%	$63	0.0%	$47	$17	$63	2028Q3	11.3%	$52	$19	$71
1.0%	Contracting & Reprographics	$47	$17	36.0%	$63	0.0%	$47	$17	$63	2028Q3	11.3%	$52	$19	$71
3.0%	Engineering During Construction	$140	$50	36.0%	$190	0.0%	$140	$50	$190	2032Q4	26.6%	$177	$64	$241
2.0%	Planning During Construction	$93	$34	36.0%	$127	0.0%	$93	$34	$127	2032Q4	26.6%	$118	$43	$161
3.0%	Adaptive Management & Monitoring	$140	$50	36.0%	$190	0.0%	$140	$50	$190	2033Q4	30.5%	$183	$66	$248
1.0%	Project Operations	$47	$17	36.0%	$63	0.0%	$47	$17	$63	2028Q3	11.3%	$52	$19	$71
	Real Estate (All Federal Labor)	$0	$0	0.0%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0
31	CONSTRUCTION MANAGEMENT													
10.0%	Construction Management	$467	$168	36.0%	$635	0.0%	$467	$168	$635	2032Q4	26.6%	$591	$213	$803
2.0%	Project Operation:	$93	$34	36.0%	$127	0.0%	$93	$34	$127	2032Q4	26.6%	$118	$43	$161
2.5%	Project Management	$117	$42	36.0%	$159	0.0%	$117	$42	$159	2032Q4	26.6%	$148	$53	$201
	CONTRACT COST TOTALS:	$6,892	$2,376		$9,268		$6,892	$2,376	**$9,268**			$8,319	$2,877	**$11,196**

Figure E–5. Non-Continuing Authorities Program Total Project Cost Summary (example 3)

Appendix F
Release of Government Estimates Under the Freedom of Information Act

F–1. Purpose

a. 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 considered sensitive procurement information and should, in many cases, be withheld under the FOIA exemptions.

b. FAR 36.203 section (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.”

F–2. Definitions

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

b. 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 the 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 backup.

F–3. FOIA exemptions

Government estimates and Government estimate back-up data are intra-agency memoranda that may be withheld under FOIA exemptions 4 and 5, “confidential commercial information” and “deliberative process” privileges. Proper use of a FOIA exemption requires that it be shown 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 USACE's interests. In reviewing requests, the FOIA Officer will seek the assistance of the cost engineer. If the FOIA Officer determines that release will harm USACE's 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, consistent 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 is normally released when bids are opened. In some instances, however, the Government estimate is not released at that time, such as when all bids received are non-responsive and a re-procurement is likely to occur.

(3) In negotiated procurement for construction, under FAR Part 15 and FAR Part 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, section (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.

(a) 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.

(b) 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.

(c) 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.

(2) All sensitive information (such as actual quotes and contractor reference) must be redacted from the data. Situations where the information should not be released include multi-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 on the same or similar back-up data and the same or similar analysis of how to perform the work.

F–4. Bid protests and litigation

This guidance should be considered when USACE is involved in bid protests or litigation. If appropriate, and to the extent possible, Counsel should place the Government estimate and the Government estimate back-up data 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, on receipt of complete details of the protester’s estimate.

Glossary of Terms

Section I

Acronyms List

Term	Definition
A-E	Architect-Engineer
AR	Army Regulation
ASTM	ASTM International (formerly American Society for Testing and Materials)
ATR	Agency Technical Review
BCE	Baseline Cost Estimate
BCR	Benefit-Cost Ratio
CAP	Continuing Authorities Program
CEDEP	Cost Engineering Dredge Estimating Program
CEEC	Headquarters, U.S. Army Corps of Engineers, Directorate of Engineering and Construction
CFR	Code of Federal Regulations
Cost MCX	Cost Engineering Center of Expertise
CSRA	Cost and Schedule Risk Analysis
CUI	Controlled Unclassified Information
CWCCIS	Civil Works Construction Cost Index System
CWE	Current Working Estimate
CWWBS	Civil Works Work Breakdown Structure
DA Pam	Department of the Army Pamphlet
DCG-CEO	Deputy Commanding General for Civil and Emergency Operations
DFAR	Defense Federal Acquisition Regulation
DMDCC	Design Maturity Determination for Cost Certification
DoD	Department of Defense
DQC	District Quality Control
EM	Engineer Manual
ENG	Engineer Form
EO	Executive Order
EP	Engineer Pamphlet
ER	Engineer Regulation
EVMS	Earned Value Management System
FAR	Federal Acquisition Regulation
FOIA	Freedom of Information Act
GRR	General Re-evaluation Report
HQUSACE	Headquarters, U.S. Army Corps of Engineers
IEPR	Independent External Peer Review

Term	Definition
IGE	Independent Government Estimate
LPP	Locally Preferred Plan
LRR	Limited Re-evaluation Report
MCACES	Microcomputer Aided Cost Estimating System
MSC	Major Subordinate Command
NED	National Economic Development
NFS	Non-Federal Sponsors
O&M	Operations and Maintenance
OMB	Office of Management and Budget
OMRR&R	Operations, Maintenance, Repair, Replacement, and Rehabilitation
PB	Professional Bulletin
PDT	Project Delivery Team
PED	Pre-Construction, Engineering, and Design
PM	Project Manager
PMP	Project Management Plan
RMO	Review Management Organization
RMP	Risk Management Plan
ROM	Rough Order of Magnitude
RTS	Regional Technical Specialist
SME	Subject Matter Expert
TCCC	Tri-Services Certified Cost Consultant
TCCE	Tri-Services Certified Cost Engineer
TPCS	Total Project Cost Summary
TSP	Tentatively Selected Plan
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
WBS	Work Breakdown Structure

Section II

Terms

Agency Technical Review
A mandatory effort to improve and validate the quality and credibility of USACE decision and implementation documents by employing an independent review from subject matter experts outside the home district.

Architect-Engineer
Architectural/engineering firms that provide services such as planning, architecture, engineering, estimating, surveying, and other technical services related to planning, designing, and construction.

Baseline Cost Estimate
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).

Civil Works Construction Cost Index System
Historical and forecasted cost indices for use in escalating USACE Civil Works project costs.

Civil Works Work Breakdown Structure
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.

Constant Dollar Cost (Price Level)
Constant dollar analyses are used 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.

Continuing Authorities Program
Congress has given USACE 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 USACE 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 and Schedule Risk Analysis
A risk analysis is the process of identifying and measuring the cost and time impacts of project uncertainties on the estimated total project cost. The risk analysis results in two main products: identified risks and contingency dollars to fund risk occurrence.

Cost Engineering Center of Expertise
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 and to semiannually update EM 1110-2-1304. Walla Walla District's Cost Engineering Branch has been established as the Mandatory Center of Expertise for Agency Technical Review and 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 USACE and other government agencies.

Cost Engineering Dredge Estimating Program
A USACE program that allows the user to estimate dredging projects using mechanical, pipeline, and hopper dredge plant.

Current Working Estimate
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.

District Quality Control
All work products and reports, evaluations, and assessments must undergo necessary and appropriate district quality control/quality assurance.

DrChecks^{SM}
"Design Review and Checking System." Enables an actionable collaboration among the reviewers and design team of capital improvement projects.

Economic Cost
Monetary equivalent cost used by the economist in determining the benefit-cost ratio. 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
Date of the point in time of the pricing used in the cost estimate.

Estimated Cost (Price Level)
Initially developed cost estimate that includes contingencies. The effective price level date for estimated cost is usually the date of preparation of the cost estimate.

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 USC 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
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
Formal, approved cost estimate prepared to support a contract award, which is signed by the chief of cost engineering.

Microcomputer Aided Cost Estimating System (MCACES)
Mandatory USACE estimating software.

National Economic Development
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.

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
An interdisciplinary group formed from the resources of the implementing agencies, which develops the products necessary to deliver the project.

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 fiscal year based on the submittal date.

Project Management Plan
A formal, approved document used to guide both project execution and project control.

Project Manager
Responsible for the planning, execution, and closing of any project, typically relating to construction.

Risk management plan
A document that a project manager prepares to foresee risks, estimate impacts, and define responses to issues.

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.

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 general navigation features 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
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.