

# **REVIEW PLAN**

## **IMPLEMENTATION PHASE DESIGN DOCUMENTATION REPORT AND PLANS & SPECIFICATIONS**

**FOR**

**UNDERWOOD CREEK, ECOSYSTEM RESTORATION  
MILWAUKEE COUNTY, WISCONSIN**

*Initial MSC Approval Date*

**21 Mar 2016**

*Last Revision Date*

**TBD**

**U.S. ARMY CORPS OF ENGINEERS  
DETROIT DISTRICT**

CELRE-EC (1110)

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**REVIEW PLAN – IMPLEMENTATION PHASE**  
**DESIGN DOCUMENTATION REPORT AND PLANS & SPECIFICATIONS**  
**UNDERWOOD CREEK, ECOSYSTEM RESTORATION**  
**MILWAUKEE COUNTY, WISCONSIN**

**1. PURPOSE AND REQUIREMENTS**

a. **Purpose.** This Review Plan (RP) is for the implementation phase of the project and defines the scope, level of risk, and level of peer review for design and construction of the Underwood creek restoration project. Specifically, restoration efforts would include: removal of concrete bottom, improving in-stream fishery habitat and wildlife habitat by enhancing wetland and upland habitat within the creek corridor while also decreasing flooding impacts, enhancing water quality, and repairing bank erosion in Milwaukee County, Wisconsin.

**b. References**

- (1) Engineer Circular (EC) 1165-2-214, Civil Works Review, 15 December 2012
- (2) Engineer Regulation (ER) 1110-1-12, Quality Management, 31 July 2006
- (3) CELRE Quality Management Plan
- (4) CELRE DC 5-1-1 and, in particular, Appendix C-3 – Engineering Subplan dated November 30, 1998
- (5) Quality Management Plan (QMP) dated January 2016

c. **Requirements.** This review plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R). It provides the procedures for ensuring the quality and credibility of U.S. Army Corps of Engineers (USACE) decision, implementation, and operations and maintenance documents and work products. The EC outlines three levels of review: District Quality Control, Agency Technical Review, and Independent External Peer Review.

- (1) District Quality Control (DQC). DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). Basic quality control tools include a Quality Management Plan providing for seamless review, quality checks and reviews, supervisory reviews, Project Delivery Team (PDT) reviews, etc. It is managed in the home district. Quality checks may be performed by staff responsible for the work, such as supervisors, work leaders, team leaders, designated individuals from the senior staff, or other qualified personnel. However, they should not be performed by the same people who performed the original work, including managing/reviewing

the work in the case of contracted efforts. Additionally, the PDT is responsible for a complete reading of any reports and accompanying appendices prepared by or for the PDT to assure the overall coherence and integrity of the report, technical appendices, and the recommendations before approval by the District Commander. The Major Subordinate Command (MSC)/District Quality Management Plans address the conduct and documentation of this fundamental level of review. DQC is addressed later in this review plan.

- (2) Agency Technical Review (ATR). ATR is an in-depth review, managed within USACE, and conducted by a qualified team outside of the home district that is not involved in the day-to-day production of the project/product. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. The ATR team reviews the various work products and assures that all the parts fit together in a coherent whole. ATR teams will be comprised of senior USACE personnel, preferably recognized subject matter experts with the appropriate technical expertise such as regional technical specialists (RTS), and may be supplemented by outside experts as appropriate. To assure independence, the leader of the ATR team shall be from outside the home MSC.
- (3) Independent External Peer Review (IEPR). IEPR is the 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. For clarity, IEPR is divided into two types, Type I is generally for decision documents and Type II is generally for implementation documents.

A Type II IEPR (SAR) shall be conducted on design and construction activities for hurricane and storm risk management and flood risk management projects, as well as other projects where potential hazards pose a significant threat to human life. This applies to new projects and to the major repair, rehabilitation, replacement, or modification of existing facilities. External panels will review the design and construction activities prior to initiation of physical construction and periodically thereafter until construction activities are completed. The review shall be on a regular schedule sufficient to inform the Chief of Engineers on the adequacy, appropriateness, and acceptability of the design and construction activities for the purpose of assuring that good science, sound engineering, and public health, safety, and welfare are the most important factors that determine a project's fate.

## **2. REVIEW MANAGEMENT ORGANIZATION (RMO)**

The RMO is responsible for managing the overall peer review effort described in this review plan. The RMO for the implementation documents is the home MSC. The MSC maintains authority and oversight but delegates the coordination and management of

the implementation document ATR to the District. The home District will post the MSC approved review plan on its public website. A copy of the approved review plan (and any updates) will be provided to the appropriate Planning Center of Expertise to keep the PCX apprised of requirements and review schedules.

### 3. PROJECT INFORMATION

- a. **Project.** Underwood Creek Ecosystem Restoration, The purpose is to restore the creek to a more natural state, while maintaining its functionality as a floodway. Estimated Construction Cost = \$10,500,000
- b. **General Site Location and Description.** The project site is located at the lower end of Underwood Creek along the Western edge of the Milwaukee County Grounds area in the City of Wauwatosa, Wisconsin. The project begins where Underwood Creek flows under the CP Railroad crossing (approximately 100 ft southwest of southbound Highway 45) and extends downstream approximately 4,400 LF to a point approximately 150 ft southwest of the confluence of Underwood Creek and the Menomonee River. The proposed project will restore the creek to a more natural state, while maintaining its functionality as a floodway. The 4,400 LF of concrete lining will be removed and replaced with stone. The creek will be widened in some areas. Riffles and pools will be constructed to provide fish and invertebrates rest and spawning areas. The drop structures along the creek will be removed as well. This will allow for fish passage upstream.
- c. **Project Delivery Team (PDT).** The PDT in charge of designing this project includes the following:

NAME	FUNCTIONAL DISCIPLINE	PHONE
	Project Manager	
	Technical Coordinator	
	Geotechnical Engineer	
	Contract Administrator	
	Cost Estimator/Specifications	
	CADD Technician	
	Hydraulic Engineer	
	Contracting Specialist	
	Real Estate	
	Environmental Engineer	
	Area Engineer Kewanee	
	Planner	

#### **4. RISK INFORMED DECISIONS ON APPROPRIATE REVIEWS**

##### **a. Project Risks**

- (1) Weather impact to project cost and schedule. The project involves the removal of concrete lining and widening of the creek in some areas. During construction, periods of heavy rain and high water levels could impact the project schedule and therefore increase project costs. There is no flood plain issues/impacts associated with the proposed project.
- (2) Loss of Life. N/A
- (3) Modification to flood plain delineation N/A
- (4) Possible Dam Safety Concerns. N/A
- (5) Possible Levee Safety Concerns. N/A
- (6) Other. N/A
- (7) Construction and Operation Safety

**b. Risk Analysis.** The Underwood Creek Environmental Restoration project, despite an estimated construction cost of approximately 10.5 million dollars, has an overall low level of potential risks. There is no risk for potential life loss. The primary risk to the project will be weather impacts relating to heavy rain that could occur during construction. The project requires concrete lining removal and widening of the flood plain in some areas and thus, depending on construction methods, would be susceptible to high water levels that would impact project schedule and cost. This risk will be mitigated by allowing the project to be constructed during two construction seasons and, to reduce erosion impacts, limit the amount of areas disturbed and exposed during construction. In addition, technical risks to the project are low in the effort to develop a project that allows for the proper establishment of native vegetation and habitat in stream and on land since we will implement lessons learned from the phase 1 constructed project. It has been determined that the most appropriate level of review would be to conduct DQC/QA reviews including BCOES, Plan in Hand, and Supervisory reviews along with a ATR during the Implementation Phase. As required for the Feasibility Study process, ATR, LRD, and Public reviews have been completed. Despite the advanced level of the design documents during feasibility and low level of risk, it was determined that an additional ATR would be necessary during the implementation phase. In addition, a Type II IEPR will not be required. The project utilizes standard construction practices and schedules that have been proven in previous project phases. All lessons learned will be incorporated into the project plans and specifications. Overall, the Underwood Creek Restoration project has a very low risk level and the selected level of review is reflective of that.

#### **5. REVIEW TYPES AND REQUIRED DISCIPLINES**

##### **a. District Quality Control (DQC/QA).**

DQC/QA efforts will include the necessary expertise to address compliance with published Corps policy. The PDT will develop a Quality Management Plan (QMP) for this project. Throughout the design process the PDT is assigned the responsibility for production of a quality product. Branch Chiefs assign PDT

members to projects and are ultimately responsible for work performed by members of their team and for DQC/QA reviews. Review of this work, whether through informal or formal reviews, shall serve as quality control/assurance checks to ensure the work is technically complete and accurate before a product leaves a section team member. The Branch Chiefs will be responsible for quality control/assurance checks. The Detroit District will execute DQC/QA reviews which will include: DQC checklist, design check review, and/or formal DQC review, Plan-In-Hand (PIH) review, and Supervisory Review.

The following disciplines will be represented during the DQC process: Structural Engineering.

- (1) Level of DQC Review. Based on the level of risk and complexity of the design, the following quality review processes will be utilized: DQC checklist, design check review, and/or formal DQC review, as determined by the Chief of Engineering and Construction. These DQC review processes are defined below in paragraphs (a), (b), and (c). The DQC reviewer is as follows :

NAME	FUNCTIONAL DISCIPLINE	PHONE
	DQC Review (Geotech & Structural)	
	DQC Review (H&H)	

- (a) **DQC Checklist:** The DQC checklist is used by the Technical Coordinator to verify the quality and completeness of the design. The items that have been reviewed and verified will be initialed. The timing and execution of the DQC checklist will be conducted around the time of the 100% BCOES review. Depending on the scope of the project and level of complexity, the TC can choose to execute the DQC Checklist alone or establish a DQC team of reviewers to complete the checklist. The DQC reviewers are identified in the table above.

- (b) **Design Check Review:** A design check is a detailed evaluation of the engineering analysis and contract documents prepared by each engineering discipline. The checker will be the Branch Chief or an individual assigned by the Branch Chief. The checker will be qualified to originate the document that is being checked. The checked document such as drawings, computations, quantity estimates, and analyses will be annotated to show the initials of the designer and the checker and the date of action. The design check reviewers are identified in the table above. The design check will include a comprehensive evaluation of at least the following:

- (i) Appropriate period of performance, considering holidays/events/restrictions
- (ii) Lessons learned incorporated (if applicable)

- (iii) Correct application of methods
- (iv) Adequacy of basic data and assumptions
- (v) Correctness of calculations
- (vi) Quantity estimates
- (vii) Completeness of documentation
- (viii) Testing, modeling, assumptions, calculations, text, and graphic presentations in all documents are complete, satisfy appropriate design criteria, and utilize sound engineering practice.
- (ix) Compliance with guidance, standards, regulations, and laws
- (x) Biddability, constructability, operability, environmental and sustainability issues

**(c) Formal DQC Review:** A DQC review of the DDR will be done within the Detroit District to ensure that the design conforms to proper criteria, that appropriate design methods have been followed, that an internal check of the design has been completed and is indicated on the drawings and computation sheets and that the completed project design is adequately documented in the DDR. Comments from the DQC team will be inserted into DrChecks and reviewed according to EC 1165-2-214.

**(2) Plan-In-Hand (PIH) Review:** On-site review to ensure design engineers and CADD technicians have a proper understanding of existing site conditions, the new design will coordinate with existing conditions, and the design meets customer's requirements. A trip report will be prepared to document the plan-in-hand. The plan-in-hand review will be performed after the 50% plans and specifications review. If a project is halted after the performance of the PIH, an additional PIH can be held based on engineering judgment of the PDT and approved by the Chief of Engineering and Construction. The Plan-In-Hand reviewers are as follows:

NAME	FUNCTIONAL DISCIPLINE	PHONE
	Project Manager	
	Technical Coordinator	
	Geotechnical Engineer	
	Cost Estimator	
	CADD Technician	
	Geotechnical Engineer	
	Environmental Engineer	
	Area Engineer	
	Contract Administrator	

**(3) Supervisory Review:** Review to ensure Certified Final package is ready for final routing, all reviews have been completed and back checked, all files are properly labeled as dictated by project milestone and filed in ProjectWise, and



package is ready for advertisement. The immediate Supervisor of the Technical Coordinator will review the design package prior to 50% BCOES and both the immediate Supervisor of the Technical Coordinator and Project Manager will review the design package prior to 100% BCOES. These reviews should be conducted within the week prior to the review and is meant to ensure all major design elements are addressed accurately and that information is available to define CWEs accurately. Once the Certified Final package has been reviewed by all supervisors, it will be labeled Ready to Advertise (RTA). This Supervisory Review will include the following:

- ECIFP (at 100% BCOES only)
- Plans and Specifications
- Draft front end (at 100% BCOES only)
- CWE

The Supervisory reviewers are as follows:

NAME	FUNCTIONAL DISCIPLINE	PHONE
	Supervisor (Geotech & Structures)	
	Supervisor (C&GE)	

(4) **Certification of District Quality Control.** The “Certification of District Quality Control” will be prepared by the District Quality Control Team and signed by the Chief of Engineering and Construction. It will include the names and elements reviewed by design checkers, names of individuals that completed the DQC check list, and those that were involved in DQC reviews.

**b. Agency Technical Review (ATR)**

For this project an ATR will be required based on the Risk Analysis summarized in paragraph 4.a.

(1) **General.** ATR will be managed and performed outside of the Detroit District. EC 1165-2-214 requires the MSC to serve as the RMO for this project. As required, there will be appropriate coordination and processing through CoPs; relevant PCXs, and other relevant offices to ensure that a review team with appropriate independence and expertise is assembled and a cohesive and comprehensive review is accomplished. The ATR shall ensure that the product is consistent with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and the results in a reasonably clear manner for the public and decision makers. Members of the ATR team will be from outside the Detroit District. The ATR lead will be from outside the Great Lakes & Ohio River Division.

- (2) **Products to be Reviewed.** The ATR team will be reviewing the Design Documentation Report (DDR) and associated Plans & Specifications supporting the DDR.
- (3) **Documentation of ATR.** DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:
- (i) The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
  - (ii) The basis for the concern – cite the appropriate law, ASA (CW)/USACE policy, guidance or procedure that has not been properly followed;
  - (iii) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
  - (iv) The probable specific action needed to resolve the concern – identify the action(s) that must be taken to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist. The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, and lastly the agreed upon resolution. The ATR team will prepare a Review Report which includes a summary of each unresolved issue; each unresolved issue will be raised to the vertical team for resolution. Review Reports will be considered an integral part of the ATR documentation.

ATR may be certified when all ATR concerns are either resolved or referred to HQUSACE for resolution and the ATR documentation is complete. Certification of ATR should be completed, based on work reviewed to date, for the DDR and Plans and Specifications. A sample ATR certification form is included as Attachment 1.

- (4) **Required ATR Team Expertise.** ATR teams will be comprised of senior USACE personnel (Regional Technical Specialists (RTS), etc.), and may be supplemented by outside experts as appropriate. The disciplines represented on the ATR team will reflect the significant disciplines involved in the planning, engineering, design, and construction effort. These disciplines include H& H, Ecologist and geotechnical engineering. Specifically, the ATR team will need to have experience in structural design of walls, geotechnical Slope stability Analysis, hydraulic analysis for the flood plain assessment and

ecological analysis for the type of vegetation. To assure independence, the leader of the ATR team will be outside of the MSC. A list of the ATR members and disciplines is provided below. The chief criterion for being a member of the ATR team is knowledge of the technical discipline.

The ATR reviewers are as follows:

NAME	FUNCTIONAL DISCIPLINE	DISTRICT	PHONE
	ATR Team Lead		
	ATR Reviewer (Geotechnical)		
	ATR Reviewer (Ecologist)		
	ATR Reviewer (H&H)		
	ATR Reviewer (Civil)		

**c. Independent External Peer Review (IEPR)**

- (1) **General.** Type I and Type II IEPRs are conducted in accordance with the guidance promulgated in EC 1165-2-214. Type I IEPRs are conducted on project studies. It is of critical importance for those decision documents and supporting work products where there are public safety concerns, significant controversy, a high level of complexity, or significant economic, environmental and social effects to the nation. However, it is not limited to only those cases and most studies should undergo Type I IEPR. In accordance with EC 1165-2-214 a Type II IEPR (SAR) shall be conducted on design and construction activities for hurricane and storm risk management and flood risk management projects, as well as other projects where potential hazards pose a significant threat to human life. This applies to new projects and to the major repair, rehabilitation, replacement, or modification of existing facilities
- (2) **Decision on Type II IEPR.** In accordance with EC 1165-2-214 a Type II IEPR (SAR) is not required for the following reasons: The project is not a hurricane, storm risk management or flood risk management project. The evaluation of each factor follows the factor description
  - (i) The project involves the use of innovative materials or techniques where the engineering is based on novel methods, presents complex challenges for interpretations, contains precedent-setting methods or models, or presents conclusions that are likely to change prevailing practices

Evaluation: The construction of the Underwood Creek Environmental Restoration project doesn't have potential hazards that pose a significant threat to human life. Underwood Creek Environmental Restoration utilizes standard USACE details, design techniques, and design criteria. The methods used for the project have been utilized in

other USACE facilities with positive performance. No significant complexities are presented in the project.

- (ii) The project design requires redundancy, resiliency, and robustness.

Evaluation: The Underwood Creek wall structure and concrete removal will be designed with structural redundancy, resiliency, and robustness per AASHTO code. No additional requirements are needed for the structure.

- (iii) The project has unique construction sequencing or a reduced or overlapping design construction schedule; for example, significant project features accomplished using the Design-Build or Early Contractor Involvement (ECI) delivery systems.

Evaluation: The construction of the Underwood Creek wall structure and concrete removal will not require any unique or reduced construction scheduling. The design package sent out for advertisement will be complete and will not require any additional design or early involvement of the contractor.

Based on the assessment of the above answers and the overall Risk Analysis for this project, it has been determined that a Type II IEPR would not be required.

- (3) **Decision on Type I IEPR.** This document is not a decision document. Therefore, Type I IEPR is not required.

- d. **Value Engineering:** Value Engineering (VE) studies were performed for this project in January 2013 in accordance with ER 11-1-321, 01 Jan 2011, change 1 and ER 1110-2-1150, Para. 14.7, 31Aug 99. The VE study was completed on January 10, 2013.
- e. **BCOES Reviews:** Reviews to assure solicitation documents are readily understood; the product can be bid, built, operated and maintained efficiently; environmental concerns are protected, and sustainability is addressed. A Pre-Design BCOES, 50% and 100% BCOES review will be conducted for this project. The pre-design BCOES will be held within 2 weeks of the project kick-off meeting. Design team members will conduct the BCOES reviews utilizing DrChecks. All DrChecks comments must be resolved and closed out by the reviewer. Comments not entered in DrChecks, but discussed during the BCOES meeting will be recorded and inserted in the BCOES Technical Memorandum.

Prior to the start of the BCOES Review, the Technical Coordinator (TC) should contact each office element to ascertain the name(s) of their representative(s) participating in the review. The TC should also determine from each office element listed above the number of Certified Final Submittals – BCOES Review Plans and Specifications required for the review. The plans and specifications shall be

distributed to the office elements by memorandum or email link to the appropriate ProjectWise folder. As a minimum, the memorandum should state:

- (i) Whether the plans and specs were prepared in-house, by an A-E or both
- (ii) Start and end dates for the Review
- (iii) Review Comments will be entered into DrChecks
- (iv) Project Review Name in DrChecks
- (v) Labor Cost Codes and amounts (Provided by PM)

- (1) **Pre-Design BCOES:** The Pre-Design BCOES will be typically held within two weeks after the Kick-Off meeting. The TC will manage the meeting. During this meeting the scope of work will be reviewed and the budget will be discussed. A concept level CWE will be reviewed and information required to conduct the design will be established. Review execution will be defined and established. Options and base items will be defined and necessary design elements will be identified. Potential risks will be highlighted and plans to mitigate will be determined. A definition of what will be required for the 50% BCOES meeting will be created. The RCA will be initiated, sources sought scope will be developed, and thought will be put towards a list of potential contractors to conduct this work. This QMP will be finalized shortly after the meeting.
- (2) **50% BCOES:** During the 50% BCOES, the 50% plans and specifications, 95% DDR (if required) and other documents defined as being required during the pre-design BCOES will be reviewed and commented on. A 50% CWE will be created and major construction items will be defined for the follow-up CWE meeting that will be scheduled during this meeting. Prior to the meeting, the TC's supervisor will review the package and quantities will be forwarded to Cost for 50% CWE development. Risks will be analyzed during 50% BCOES. The RCA Construction Addendum will be developed, security clauses defined, and a bid schedule will be identified. Comments will be entered and resolved in Dr. Checks. Items that need to be investigated during the Plan-In-Hand will be identified. The major items that need to be included in the ECIFP will be discussed. Chiefs of EC and ETS will be invited to this meeting.
- (3) **100% BCOES:** The design team will review the entire solicitation package including the front end, plans and specifications, ECIFP, 100% CWE. A follow-up Backcheck meeting will be discussed as whether it will be required and scheduled if necessary. The TC's supervisor and the PM's supervisor will have reviewed the 100% solicitation package prior to dissemination to the team. CWE will be discussed and potential risks will be discussed and mitigation efforts will be defined. Chiefs of EC and ETS will be invited to this meeting.

2. The BCOES reviewers are as follows:

NAME	FUNCTIONAL DISCIPLINE	PHONE
	Real Estate	
	Technical Coordinator	
	Geotechnical & Structures	
	Cost Estimator	
	H&H	
	Environmental	
	Contract Administration Branch	
	Area Engineer Kewanee Office	

## 6. PUBLIC INVOLVEMENT

- a. **Public Comment Period:** This Review Plan will be posted to the LRE web site to allow the public an opportunity to comment. This will not result in a formal comment period and there is no set time frame for public comment. If and when comments are received, the PDT will consider them and decide if revisions to the review plan are necessary.

## 7. IN-KIND CONTRIBUTION BY SPONSOR

USFWS AND Consumers Energy will participate in reviewing the final design. In-kind contributions from the sponsor for the development of the implementation documents will be coordinated through an approved Project Partnership Agreement.

## 8. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models, for the purposes of the EC, are defined as any models and analytical tools that planners use to define water resource management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. The use of certified/approved planning model does not constitute technical review of the planning product. The selection and application of the model and the input and output data still are the responsibility of the users and is subject to DQC, ATR, and IEPR reviews (if required).

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE-developed and commercially available engineering software will continue and the

professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR reviews. All appropriate reviews will be conducted in accordance with policy during the implementation phase of the project.

**a. Model Certification/Approval Schedule and Cost**

- (1) For implementation documents prepared under the model National Programmatic Review Plan, use of existing certified or approved planning models is encouraged. Where uncertified or unapproved models are used, approval of the model for use will be accomplished through the ATR process. The ATR team will apply the principles of EC 1105-2-412 during the ATR to ensure the model is theoretically and computationally sound, consistent with USACE policies, and adequately documented. If specific uncertified models are identified for repetitive use within a specific district or region, the appropriate PCX, MSC(s), and home District(s) will identify a unified approach to seek certification of these models.
- (2) The models listed below were used in the design of the project name project. Any models required for new work packages will be identified in the package-specific QMP. This may include engineering and cost models. Certifications for those models will be addressed at that time.

<b>Model Name</b>	<b>Model description</b>	<b>Model Type</b>
MCACES or MII	These are cost estimating models. This is a cost estimating model that was developed by Building System Design Inc. Crystal Ball risk analyses software will also be used.	Cost Engineering
Microsoft Excel	Computational Analysis	Engineering
STAAD.Pro V8i	Structural analysis and design	Engineering
CBEAMC	Analysis of beam columns with non-linear supports	Engineering

**9. SCHEDULE AND COST OF REVIEWS**

- a. **DQC Schedule and Cost.** The cost for DQC is included in the costs for PDT activities. Cost is broken out separately for the PIH and BCOES reviews as indicated, below. DQC will occur seamlessly throughout the DDR and the P&S

development. Quality checks and reviews occur during the development process and are carried out as a routine management practice.

(1) **DQC Schedule and Cost:** The DQC is scheduled to occur in March 2016. The DQC is budgeted at \$5,000.

(2) **PIH Schedule and Cost:** The PIH is scheduled to occur in April 2016. The PIH is budgeted at \$5,000.00.

b. **ATR Schedule and Cost:** The ATR is scheduled to begin in the 2<sup>nd</sup> Quarter of FY16. The total ATR budget is \$20,000.

c. **IEPR Schedule and Cost.** N/A

d. **BCOES Schedule and Cost:** The 50% BCOES is scheduled to begin March, 2016, and the 100% BCOES is scheduled to begin in April, 2016. The total BCOES is budgeted at \$20,000.

## 10. MSC APPROVAL

The Great Lakes and Ohio River Division is responsible for approving the review plan. Approval is provided by the MSC Commander. The commander's approval should reflect vertical team input (involving district, MSC, and HQUSACE members) as to the appropriate scope and level of review for the project. Like the PMP, the review plan is a living document and may change as the project progresses. The review plan must be updated and approved by the MSC throughout the PED phase (and the construction Phase, as applicable). Changes to the review plan should be approved by following the process used for initially approving the plan. MSCs will review the changes and the appropriate level of review as they relate to project updates.

## 11. REVIEW PLAN POINTS OF CONTACT / VERTICAL TEAM CONTACTS

Questions and/or comments on this review plan can be directed to the following points of contact:

- Detroit District Project Manager



# ATTACHMENT 1: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECISION DOCUMENTS

## COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the <type of product> for <project name and location>. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks<sup>SM</sup>.

SIGNATURE

Name

ATR Team Leader

Office Symbol/Company

\_\_\_\_\_  
Date

SIGNATURE

Name

Project Manager (home district)

Office Symbol

\_\_\_\_\_  
Date

SIGNATURE

Name

Architect Engineer Project Manager<sup>1</sup>

Company, location

\_\_\_\_\_  
Date

SIGNATURE

Name

Review Management Office

Representative

Office Symbol

\_\_\_\_\_  
Date

## CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows:  
Describe the major technical concerns and their resolution.

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE

Name

Chief, Engineering Division (home district)

Office Symbol

\_\_\_\_\_  
Date

<sup>1</sup> Only needed if some portion of the ATR was contracted

ATTACHMENT 2: SAMPLE BCOES Certification

ER 415-1-11

Date

**BCOES Certification**

Name of Project: FY16 Underwood Creek Ecosystem Restoration

Scope of Work: The proposed project will restore the creek to a more natural state, while maintaining its functionality as a floodway. The 4,400 LF of concrete lining will be removed and replaced with stone. The creek will be widened in some areas. Riffles and pools will be constructed to provide fish and invertebrates rest and spawning areas. The drop structures along the creek will be removed as well. This will allow for fish passage upstream.

The Bid Package has been reviewed for Biddability, Constructability, Operability, Environmental, and Sustainability (BCOES) in accordance with ER 415-1-11. All appropriate BCOES comments have either been incorporated into the Bid Package or otherwise satisfactorily resolved. Comments, evaluations, and backchecks have been documented in DrChecks and are attached.

\_\_\_\_\_  
Chief, Engineering and Construction

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
Chief, Real Estate

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
Chief, Environmental Analysis Branch

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Date)

**ATTACHMENT 3: SAMPLE DQC Certification**

**Certification of District Quality Control (DQC)**

FY16 Underwood Creek Ecosystem Restoration

Design/Plans and Specifications

Date

Significant concerns and the explanation of the resolution are as follows:

(Add any concerns)

(List all DQC efforts with information on who conducted them and what was performed, such as DrChecks reviews. Identify level of DQC that performed, i.e., DQC checklist, design checks and/or formal DQC review.)

All concerns resulting from District Quality Control review of the project have been considered and resolved.

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Chief, Engineering & Construction Office

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(Date)

**ATTACHMENT 4: REVIEW PLAN REVISIONS**

<b>Revision Date</b>	<b>Description of Change</b>	<b>Page / Paragraph Number</b>

**ATTACHMENT 5: ACRONYMS AND ABBREVIATIONS**

<b>Term</b>	<b>Definition</b>	<b>Term</b>	<b>Definition</b>
AFB	Alternative Formulation Briefing	NED	National Economic Development
ASA(CW)	Assistant Secretary of the Army for Civil Works	NER	National Ecosystem Restoration
ATR	Agency Technical Review	NEPA	National Environmental Policy Act
CAP	Continuing Authorities Program	O&M	Operation and maintenance
CSDR	Coastal Storm Damage Reduction	OMB	Office and Management and Budget
DPR	Detailed Project Report	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
DQC	District Quality Control/Quality Assurance	OEO	Outside Eligible Organization
DX	Directory of Expertise	OSE	Other Social Effects
EA	Environmental Assessment	PCX	Planning Center of Expertise
EC	Engineer Circular	PDT	Project Delivery Team
EIS	Environmental Impact Statement	PAC	Post Authorization Change
EO	Executive Order	PMP	Project Management Plan
ER	Ecosystem Restoration	PL	Public Law
FDR	Flood Damage Reduction	QMP	Quality Management Plan
FEMA	Federal Emergency Management Agency	QA	Quality Assurance
FRM	Flood Risk Management	QC	Quality Control
FSM	Feasibility Scoping Meeting	RED	Regional Economic Development
GRR	General Reevaluation Report	RMC	Risk Management Center
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMO	Review Management Organization
IEPR	Independent External Peer Review	RTS	Regional Technical Specialist
LRR	Limited Reevaluation Report	SAR	Safety Assurance Review
MSC	Major Subordinate Command	USACE	U.S. Army Corps of Engineers
		WRDA	Water Resources Development Act