Project Title: ***THOMAS J. O'BRIEN LOCK MAJOR REHAB***

Authority: ***CONSTRUCTION GENERAL***

P2/Project Number: ***478508***

Review Plan

PREPARED *Original Signed*
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USACE, Rock Island District

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USACE, Great Lakes and Ohio River Division

DOCUMENT HISTORY

Document	Description and location of Revision	Date Approved
Original	N/A	20 September 2022
Revision #		
Revision #		

MSC APPROVAL DATE: 20 September 2022

REVIEW PLAN
ENGINEERING AND DESIGN PRODUCTS
THOMAS J. O'BRIEN LOCK MAJOR REHAB
CHICAGO DISTRICT

Current Version Date: 7/29/2022
Mandatory Revision Date: 7/29/2025

1. PURPOSE AND REFERENCES

a. Purpose. This review plan describes necessary quality reviews for engineering and design (E&D) products for the Thomas J. O'Brien Lock Major Rehabilitation project. This review plan is a living document and will be updated as the project progresses.

b. References.

(1) Engineering Regulation (ER) 415-1-11, Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Reviews, 1 January 2013
(2) Engineering Regulation (ER) 1165-2-217, Civil Works Review Policy, 01 May 2021
(3) Qualtrax 08504 LRD, Supplemental Quality Procedures for Civil Works (CW) Engineering and Design (E&D) Products
(4) Thomas J. O'Brien Lock Major Rehabilitation Project Management Plan (PMP) (MS Teams)
(5) Thomas J. O'Brien Lock Major Rehabilitation PI and OCA Reports (MS Teams)
(6) Starved Rock and La Grange Lock Rehabilitation Project as a Reference for M&E (MS Teams)

2. REVIEW MANAGEMENT ORGANIZATION (RMO). The RMO for this project is the Inland Navigation Design Center (INDC). The RMO has provided the District with written concurrence for this review plan.

3. PROJECT SCOPE AND PRODUCTS

a. Project Description and Scope of Work. The T.J. O'Brien Lock and Controlling Works is located at the entrance to Lake Michigan (River Mile 326.0), Calumet River, in Chicago, Illinois. The facility is a unit of the Inland Waterway Navigation System and is one of nine such facilities between Chicago and Versailles, Illinois. T.J. O'Brien Lock is a low lift sector gate lock. It provides a maximum lift of 5.0 feet for traffic passing from Lake Michigan to the Little Calumet River. The lock chamber is 1,000 feet long by 110 feet wide. The adjacent dam is 257 feet in length and comprised of two sections. The fixed section is 204 feet of steel sheet pile cellular construction. The controlling segment, a reinforced concrete structure with four slide gate sections, is 53 feet in length. The existing lock mechanical and electrical systems are original equipment installed in the 1960s. The sheet piling for the lock chamber walls have also been in service since the original construction of the lock.

Acquisition Strategy Meeting is to be conducted. Based on initial discussions, the current plan is to complete the design in multiple phases.

- The first phase includes investigations and inspections. A scope of work is being completed to detail the physical testing and inspections to be completed and is also being reviewed by both the LRC District and INDC.
- The second phase will include design charette and recommendations.
- The third phase includes completion of the design and solicitation package for the recommended alternatives. The design will be completed through an existing AE IDIQ (MATOC).

Project Number	487506
Business Line	Construction General / O&M
Project Type	Lock Major Rehabilitation/Maintenance
Geographic Location	Chicago, IL; 41.651509385, -87.566926463
Main Project Features	Significant features of the work will include rehabilitation of the electrical distribution system, mechanical equipment, guide wall, and lock chamber.
Estimated Construction Cost	TBD $52M funded in CG, $22.67M O&M expected FY23
E&D Product Delivery Method	A-E Investigation and Design
Construction Delivery Method	RFP lowest price technically acceptable (LPTA)

b. Products. The E&D products to be reviewed include the following:
   (1) SOW - AE Task Order 1 -Investigations
   (2) Investigation Reports (Structural, Geotechnical, Mechanical, Electrical)
   (3) SOW - AE Task Order 2 – Preliminary Design Efforts
   (4) Design Charrette and Report
   (5) SOW - AE Task Order 3 – Completed P&S
   (6) Design Documentation Report (DDR)
   (7) Plans and Specifications (P&S)
   (8) Engineering Considerations and Instructions for Field Personnel (ECIFP)
   (9) E&D Products for Construction Contract Modifications

4. DOCUMENTATION OF RISKS AND ISSUES

a. Life Safety Assessment: The District Chief of Engineering has reviewed the project requirements and determined there is not a significant threat to human life if the project were to fail.

b. Technical Complexities and Risks. The project delivery team (PDT) performed a thorough risk analysis of the anticipated project construction and operations activities and identified the following key technical complexities and risks. Quality reviews will be focused to manage these risks.

   (1) Determining the extent of lock wall rehabilitation.
   (2) Determining the appropriate rehabilitation measures for the lock wall.
   (3) Avoiding impacts to lock operations during construction.
      a. Ensuring that work is completed within the allotted time frame.
      b. Temporarily relocating utilities as required.
   (4) Encountering unanticipated subsurface soil and groundwater conditions that could be problematic for existing structure and/or potential rehabilitation methodologies (including but not limited to soft, loose, unsuitable debris/ existing fill, corrosive soils, etc.)
   (5) Encountering unanticipated conditions of electrical components.
      a. Project changes not documented in as-builts, hazardous materials various components that effect demolition and disposal.
   (6) Encountering unanticipated conditions of mechanical components.
      a. Project changes not documented in as-builts, hazardous materials various components that effect demolition and disposal.

(7) Encounter unanticipated conditions of structural components.
    a. Material compatibility (welding), project changes not documented in as-builts, hazardous materials in coatings and other components that effect demolition and disposal.
(8) Instrumenting/monitoring of existing structures during construction may be required to ensure dam safety is not impacted.
(9) Incorporating standardized components to the extent possible without creating incompatibility with existing features that are not rehabilitated as part of this project.
(10) Use of different A/E contracts for Phase 1 and Phase 2 complicate DOR designation.
(11) Use of in-the-wet construction or other unique construction methods may be required to rehabilitate lock walls.
(12) There is a limited construction season due to winter conditions at the project
(13) The is a limited construction season due to coordination with other projects on the river system to minimize impacts to navigation industry.
(14) Availability of USACE labor resources for design and review efforts.
    a. IIJA workload
    b. Turnover given project duration
(15) Availability of construction industry resources (labor and materials) for construction efforts.
(16) Also consider the below common items taken from the Qualtrax 08504 LRD document and incorporate/expand as appropriate.
(17) Project delivery team members may need additional expert level mentoring.
(18) Outside expertise may be needed to perform appropriate QC/QA reviews.
(19) The PDT will continually evaluate risk during the project. The above risks and future risks that are identified will be captured in the project risk register.

5. REVIEW EXECUTION

a. Project Delivery Team (PDT): The Chicago District has responsibility for Project Management, Environmental, Contracting, Construction, Operations and Dam Safety aspects of the project. The Inland Navigation Design Center (INDC) will be the Engineer of Record and assumes responsibility for technical aspects of the design in accordance with ER 1110-1-8168, ROLES AND RESPONSIBILITIES OF THE INLAND NAVIGATION DESIGN CENTER MANDATORY CENTER OF EXPERTISE. Design team staff will utilize-members from the INDC Community of Practice (INDCoP). PDT members are listed in Attachment 1. PDT members will work collaboratively with review team members to ensure effective execution of quality reviews. The PDT is drafting the Task Orders and portions of it are performing Quality Assurance Reviews on the AE Design Submittals

b. District Quality Control (DQC) is an internal review process of basic science and engineering work products. DQC is an integrated review approach that provides for seamless review, Quality Checks (first line supervisory reviews, PDT reviews), a detailed peer review/checking of the documents, computations, and graphics, etc. Reliance on subsequent levels of review by external teams is not an acceptable substitute for DQC. DQC is a continuous process in project team delivery. It is performed through the project with shorter review times as the product approaches final stages.

c. QA for review of A/E deliverables will be performed in accordance with ER-1165-2-217. The AE will be performing their own quality control as identified in their QCP. We will review\approve the AE QCP and LRC will be providing Quality Assurance Review. When we have worked with other Districts, they have a District QA team in addition to ATR. The same occurs for AE Task Orders. Paragraph 8.2.1 provides guidance on District QA activities and paragraph 9.2.2 provides guidance on A-E engagement.

d. Biddability, Constructability, Operability, Environmental, Sustainability (BCOES): BCOES review procedures in ER 415-1-11 and District local work instructions will be followed as required. The Engineering Technical Lead and DQC Lead will collaborate to oversee and ensure effective BCOES execution.

e. Agency Technical Review (ATR): ATR is required for all products and will follow ATR procedures in Chapter 5 of ER 1165-2-217. ATR will address the technical risks described in sub-section 4.b. Required senior technical disciplines and expertise needed for ATR are shown in Table 1. Assigned ATR team members are listed in Attachment 1. ATR members in engineering disciplines are verified as certified in the Corps of Engineers Review and Certification Access Program (CERCAP) [Command Training Plan & CERCAP Tool (CTP) - PROD v2.5.2 - Home (army.mil)]. PDT and review team leaders will collaborate to oversee and ensure effective execution.

Table 1. ATR Technical Discipline(s) and Required Expertise	
Technical Discipline	Expertise Required
ATR Team Leader (Structural)	Experience in design for rehabilitating and replacing structural components in Locks. Specialized experience in assessing and evaluating conditions in corrosivity of sheet pile.
Geotechnical	Retaining structures, deep and shallow foundations, site characterization, ground improvement, grouting, corrosivity, dam safety, seepage.
Mechanical	Experience in design for rehabilitating and replacing mechanical systems in Locks. Specialized experience in HPU desired.
Electrical	Experience in design for rehabilitating and replacing electrical systems in Locks. Specialized experience in control systems desired.
Note Additional disciplines may be added upon completion of Phase 1 and the full definition of project scope.	

f. Safety Assurance Review (SAR): Per sub-section 4.a, an SAR is not required. When required, SAR will be performed per Chapter 6 of ER 1165-2-217.

f. Review Charge. Reviewers will refer to and perform ATR per Section 5.7 of ER 1165-2-217, Objectives, Scope and Review Criteria. Reviews shall check to confirm the design addresses the technical complexities and risks described in paragraph 4.b.

6. REVIEW SCHEDULE AND BUDGETS. The schedule and budgets for reviews are shown in Table 2. BCOES reviews will not be scheduled /performed concurrently with DQC and ATR review periods.

Table 2. Review Schedule and Budgets			
Review Activities (Note 1)	Start Date	Finish Date	Budget ($)
Phase 1 SOW and Review Plan	19 May 2022	20 Jun 2022	$15k

Table 2. Review Schedule and Budgets			
DQC Review	28 June 2022	1 Jul 2022	$10k
Task Order SOW ATR Review	5 July 2022	1 Aug 2022	$25k
Investigations Report Review (QA and ATR)	15 Jun 2023	28 Jun 2023	$25k
Design Charrette Participation (QA ATR)	13 Jul 2023	26 Jul 2023	$80k
Design Charrette Report Review (QA and ATR)	24 Aug 2023	30 Aug 2023	$40k
Phase 2	Schedule will be determined by completion of Phase 1 and tasks are TBD		
Task Order SOW DQC Review	TBD	TBD	TBD
Task Order SOW ATR Review	TBD	TBD	TBD
Concept Submittal (30%) QA and ATR Review	TBD	TBD	TBD
Intermediate Submittal (60%) QA, ATR, BCOES, SAR Review	TBD	TBD	TBD
Final Submittal (90%) QA, ATR, BCOES Review	TBD	TBD	TBD
Final Submittal Backcheck QA, ATR, BCOES Review	TBD	TBD	TBD
RTA Submittal QA Review	TBD	TBD	TBD
Notes: (1) Review activities may be scaled to project size and scope;			

7. REVIEW DOCUMENTATION. The ATR leader will prepare an ATR report per Section 5.10 of ER 1165-2-217. The ATR report, with certification form, will be provided to the approval signatories, including the RMO representative. Review documents will be stored with the official project records.

8. REVIEW PLAN POINTS OF CONTACT. Questions and comments relating to this review plan can be directed to the following points of contact:

a. Project Leaders
   (1) Project Manager: [redacted]
   (2) Project Manager: [redacted]
   (3) Technical Lead: [redacted]

b. ATR Team Leader: [redacted]

c. Review Management Organization (RMO) Representative: [redacted]

9. DISTRICT APPROVAL SIGNATURES:

	Original Signed
RECOMMEND FOR APPROVAL:	[redacted] Chief, Design Branch

	Original Signed
DISTRICT APPROVAL:	[redacted] Chief, Engineering and Construction Division

ATTACHMENT 1 – TEAM MEMBERS

*INDC is the Designer of record and will have approval authority for team-members.

Project Management

Discipline	Name	Office
Project Manager	[redacted]	LRC
Project Manager Assistant	[redacted]	LRB
INDC Technical Manager	[redacted]	INDC
Operations	[redacted]	LRC

Project Delivery Team

Discipline	Name*	Office
Technical Lead	[redacted]	INDC
Structural Lead	[redacted]	LRC
Mechanical Lead	[redacted]	LRC
Electrical Lead	[redacted]	LRC
Cost Engineer Lead	[redacted]	TBD
Geotechnical Lead\COR	[redacted]	LRC
Civil Lead	[redacted]	TBD
Materials Lead	[redacted]	TBD
Operations Lead	[redacted]	TBD
Construction Lead	[redacted]	LRC
Risk Lead	[redacted]	TBD
CAD/BIM Lead	[redacted]	TBD
VE Lead	[redacted]	TBD
Office of Council	[redacted]	LRC
Environmental Lead	[redacted]	TBD
Public Affairs Lead	[redacted]	LRC
Safety Lead	[redacted]	LRC

DQC Review Team– Phase 1 SoW – If individuals change, a minimum of 5 years of experience with inland navigation design is required for replacements and will be approved by the INDC.

Function	Name*	Office
DQC Lead / Structural	[redacted]	LRC
Geotechnical	[redacted]	LRC
Electrical	[redacted]	LRC
Mechanical	[redacted]	LRC
Geotechnical	[redacted]	LRC
Geospatial \ CADD	[redacted]	LRC
Cost Engineering	[redacted]	LRC
Geotechnical \ DSPM	[redacted]	LRC
General	[redacted]	LRC
General	[redacted]	LRC

BCOES Review Team

Function	Name*	Office
Biddability	[redacted]	LRC
Constructability	[redacted]	LRC
Operability	[redacted]	LRC
Environmental	[redacted]	LRC
Environmental (NEPA)	[redacted]	LRC
Sustainability	[redacted]	TBD

*BCOES team to be further resourced.

ATR Review Team

Function	Name	Office
Structural\ATR Lead	[redacted]	INDC
Mechanical	[redacted]	CECW-HQ
Electrical	[redacted]	MVS
Geotechnical	[redacted]	MVN

Senior Review Team– Responsible for QA of AE deliverables.

Function	Name*	Office
DQC Lead / Structural	[redacted]	LRC
Geotechnical	[redacted]	LRC
Electrical	[redacted]	LRC
Mechanical	[redacted]	LRC
Geotechnical	[redacted]	LRC
Geospatial \ CADD	[redacted]	LRC
Cost Engineering	[redacted]	LRC
Geotechnical \ DSPM	[redacted]	LRC
General	[redacted]	LRC
General	[redacted]	LRC