

OTHER WORK PRODUCT REVIEW PLAN

Levee System Evaluation Report

Louisville Metro Levee System

(P2# = 406657)

Louisville District

MSC Approval Date: 10 November 2014

Last Revision Date: None



**US Army Corps
of Engineers** ®

OTHER WORK PRODUCT REVIEW PLAN

**Louisville Metro Levee System
Levee System Evaluation Report**

TABLE OF CONTENTS

1. PURPOSE AND REQUIREMENTS.....3

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION 3

3. PROJECT INFORMATION.....3

4. DISTRICT QUALITY CONTROL (DQC).....4

5. AGENCY TECHNICAL REVIEW (ATR)5

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR).....6

7. POLICY AND LEGAL COMPLIANCE REVIEW 7

8. COST ENGINEERING MANDATORY CENTER OF EXPERTISE (MCX) REVIEW AND CERTIFICATION.....7

9. REVIEW SCHEDULES AND COSTS 7

10. PUBLIC PARTICIPATION 7

11. REVIEW PLAN APPROVAL AND UPDATES..... 7

12. REVIEW PLAN POINTS OF CONTACT 8

ATTACHMENT 1: PDT TEAM ROSTER & DQC CHECKERS9

ATTACHMENT 2: ATR TEAM ROSTER 10

ATTACHMENT 3: SAMPLE STATEMENT OF TECHNICAL REVIEW 11

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS12

ATTACHMENT 5: REVIEW PLAN REVISIONS 13

1. PURPOSE AND REQUIREMENTS

- a. Purpose. The purpose of this review plan is to identify the requirements and plan of action for the review of the Levee System Evaluation (LSE) report on the Louisville Metro Levee System. The report will document the conclusions regarding if adequate design, construction, operation and maintenance of this levee system provides reasonable assurance of excluding the base flood with 90% assurance from the leveed area and thus meet National Flood Insurance Program (NFIP) requirements. The local sponsor will provide the results of this report to FEMA for the purposes of how to map the flood hazard area behind the levee on the Flood Insurance Rate Maps (FIRM). This effort will not generate a decision or implementation document by USACE.
- b. References.
- EC 1165-2-214, Civil Works Review, 15 December 2012
 - 44 CFR 65.10, Mapping of areas protected by levee systems
 - EC 1110-2-6067, USACE Process for the National Flood Insurance Program (NFIP) Levee System Evaluation, 31 August 2010
- 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 all Civil Works projects from initial planning through design and construction, as well as operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC's outline includes four general levels of review: District Quality Control/quality assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and policy and legal compliance review.

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for this project is the Risk Management Center (RMC). The MSC will approve the Review Plan. The Louisville District will post the approved Review Plan on its public website.

3. PROJECT INFORMATION

- a. Project Description. The project is focused on flood risk management analyses for the existing Louisville Metro Levee System on the Ohio River. Specifically, the analyses being conducted support the preparation of an LSE report. This LSE is in support of the National Flood Insurance Program (NFIP) as administered by the Federal Emergency Management Agency (FEMA). The levee system evaluation is being accomplished in accordance with Title 44 Code of Federal Regulations, Section 65.10, Mapping of Areas Protected by Levee Systems, dated 1 October 2002, and USACE's Engineering Circular (EC) 1110-2-6067, Engineering and Design Process for the National Flood Insurance Program (NFIP) Levee System Evaluation, dated 31 August 2010.
- b. Louisville Metro Levee System Description. The Louisville Metro Levee System is located in Jefferson County, Kentucky, on the left descending bank of the Ohio River between river miles 602.0 and 628.6 below Pittsburgh, Pennsylvania. It is bounded upstream by Drescher Bridge Avenue in Jefferson County and downstream by high ground on the southern side of the Pond Creek Valley in Bullitt County. It consists of two segments, which are identified as the Louisville segment and the Southwestern Jefferson County segment. Even though this discussion talks about segment of

construction the overall system is operated and maintained by Louisville MSD. They are the operator for the entire system.

The Louisville segment was authorized under the general authorization for the Ohio River Basin contained in the Flood Control Act approved 28 June 1938. Construction on the Louisville segment began in March 1947 and was completed in 1954. The Louisville segment was transferred to local interests for operation and maintenance in two parts, with the first portion transferred on 2 January 1953 and the second portion transferred on 1 July 1954.

The Southwestern Jefferson County segment was authorized by the Flood Control Act of August 1968 and was constructed in six sections. Construction on the first section began in October 1973. Construction on the final section was completed in 1989.

The Louisville segment originally extended from high ground near Drescher Bridge Avenue downstream to just north of Upper Mill Creek, where the levee then continued along to high ground at Dixie Highway in the vicinity of Greenwood Road. Following the completion of the Southwestern Jefferson County segment, the section of levee following along Upper Mill Creek has been superseded. As the Louisville segment stands now, it consists of 10.12 miles of earthen levee and 3.78 miles of concrete floodwall and includes 11 pump stations, 70 closures, 13 ramps, and other necessary appurtenances.

The Southwestern Jefferson County segment extends from the intersection with the Louisville segment just north of Lower Mill Creek at approximately Ohio River mile 616.0 downstream to high ground to the south of the railroad closure on the south side of Pond Creek. The segment consists of 12.10 miles of earthen levee and 0.55 miles of floodwall and includes 4 pump stations, 8 closures, 11 ramps, and other necessary appurtenances.

The Louisville Metro Levee System was designed to reduce the risk of flooding equal to the maximum on record, which occurred in January 1937, with a minimum of 3 feet of design freeboard. The elevation of the 1937 flood was 458.2 NAVD88 at the upper gage of McAlpine Locks. The National Levee Database (NLD) survey indicates that the top elevation of the Louisville segment varies from 458.9 to 469.1 NAVD88 which equates to a 0.00035 ACE (2800-yr) and the top elevation of the Southwestern Jefferson County segment varies from 455.3 to 465.92 NAVD88 which equates to a 0.00043 ACE (2300-yr). The maximum river stage since completion of the system occurred 13 March 1964 at elevation 446.1 on the upper gage of the McAlpine Locks. This event equates to a 0.014 ACE (70-yr) elevation with a 33% loading on the Louisville Metro Levee System.

- c. Factors Affecting the Scope and Level of Review. The main factors affecting the scope and level of review are the expertise required in the following areas: a) Levee and Floodwall Design; b) Seepage and Piping Analysis; c) Pump Station Design.

4. DISTRICT QUALITY CONTROL (DQC)

The final LSE Report and all associated products, including all analyses, test results, etc. will undergo DQC. Products that will undergo DQC include, but are not limited to, the hydrologic and hydraulic analyses, inspections of the levee system's features, and the levee assessment. DQC is an internal review process by checkers in the respective disciplines of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage DQC. Documentation of DQC activities will be

performed by the project delivery team members (included as Attachment 1) and checkers and shall be performed in accordance with the Quality Manual of the District and the home MSC.

5. AGENCY TECHNICAL REVIEW (ATR)

It was determined that ATR is required for this project (including supporting data, analyses, etc.). The objective of ATR is to ensure consistency 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 results in a reasonably clear manner for the public and decision makers. Management of ATR reviews is dependent upon the phase of work and the reviews are conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC. See Attachment 2 for ATR members and disciplines.

- a. **Products to Undergo ATR.** The final LSE Report including all analyses, test results, etc.
- b. **Documentation of ATR.** DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments will 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:
 1. The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
 2. The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed;
 3. 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
 4. The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take 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 includes the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A sample Statement of Technical Review for the LSE Report is included in Attachment 3.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

IEPR may be required for decision documents under certain circumstances. 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. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

- **Type I IEPR.** Type I IEPR reviews are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.
- **Type II IEPR.** Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

IEPR is not applicable as per ER 1165-2-214, since the LSE report for the Louisville Metro Levee System is not an implementation or decision document.

7. POLICY AND LEGAL COMPLIANCE REVIEW

The LSE is a report provided to the Louisville MSD to submit to FEMA. This report is not a Corps implementation or decision document. The approval authority for the LSE is the District Levee Safety Officer. No higher level of concurrence is required for completing this work for Louisville MSD. No policy or legal compliance review is required.

8. COST ENGINEERING MANDATORY CENTER OF EXPERTISE (MCX) REVIEW AND CERTIFICATION

The LSE report does not involve a cost estimate; hence, there will be no need for the Cost Engineering DX to review the document.

9. REVIEW SCHEDULES AND COSTS

- a. DQC Schedule and Cost. The DQC for the Draft LSE Report is currently scheduled for August – September 2014. The approximate cost for the DQC is \$20,000.
- b. ATR Schedule and Cost. The ATR for the LSE Report is currently scheduled for October 2014. The approximate cost for the ATR is \$25,000.
- c. IEPR Schedule and Cost. Not applicable.
- d. Final Report Schedule. The Final LSE Report is scheduled for completion in November 2014.

10. PUBLIC PARTICIPATION

To ensure that the review approach is responsive to the wide array of stakeholders and customers, both within and outside the Federal Government, this Review Plan will be published on the district's public internet site following approval by LRD at <http://www.lrl.usace.army.mil/>. The opportunity for public comment remains open as there is no formal comment period and no set closure date at this time. If and when comments are received, the PDT will consider them and decide if revisions to the review plan are necessary. The public is invited to review and submit comments on the plan as described on the web site.

11. REVIEW PLAN APPROVAL AND UPDATES

The home MSC Commander is responsible for approving this review plan. The commander's approval reflects team input as to the appropriate scope and level of review for the report. The review plan is a living document and may change as the report progresses. The home district is responsible for keeping the review plan up to date. Significant changes to the review plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the review plan, along with the Commanders' approval memorandum, will be posted on the home district's webpage.

12. REVIEW PLAN POINTS OF CONTACT

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

- Barry Schueler, Project Manager, (502) 315-6780
- Steve Thibaudeau, Project Engineer, (502) 315-6434
- Roger Zemba, Senior Regional Engineer, Great Lakes and Ohio River, (513) 684-3018
- John Clarkson, Risk Management Center Review Manager (304) 399-5217

ATTACHMENT 1: PDT TEAM ROSTER & DQC CHECKERS

TEAM MEMBERS:	NAME:	OFFICE SYMBOL:
PROJECT MANAGER:		CELRL-PM-C
LOCAL SPONSOR:		LOUISVILLE MSD
PE/A:		CELRL-ED-T-C
MECHANICAL:		
ENGINEER:		CELRL-ED-D-M
CHECKER:		CELRL-ED-D-M
ELECTRICAL:		
ENGINEER:		CELRL-ED-D-M
CHECKER:		CELRL-ED-D-M
STRUCTURAL:		
ENGINEER:		CELRL-ED-D-S
CHECKER:		CELRL-ED-D-S
GEOTECHNICAL:		
ENGINEER:		CELRL-ED-T-G
CHECKER:		CELRL-ED-T-G
HYDROLOGY AND HYDRAULICS:		
ENGINEER:		CELRL-ED-T-H
CHECKER:		CELRL-ED-T-H

ATTACHMENT 2: ATR TEAM ROSTER

**PRIMARY AREA
OF REVIEW
RESPONSIBILITY:**

NAME:

OFFICE SYMBOL:

ATR LEADER

CEIWR-RMC-ED

GEOTECHNICAL:

CEMVS-EC-GD

MECHANICAL:

CEMVP-EC-D

STRUCTURAL:

CEIWR-RMC-ED

HYDROLOGY & HYDRAULICS:

CELRP-EC-DH

**ATTACHMENT 3: SAMPLE STATEMENT OF TECHNICAL REVIEW
COMPLETION OF AGENCY TECHNICAL REVIEW**

The Agency Technical Review (ATR) has been completed for the Levee System Evaluation (LSE) report on the Louisville Metro Levee System. 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 DrCheckssm.

SIGNATURE

Date

ATR Team Leader

SIGNATURE

Date

Project Manager

SIGNATURE

Date

Director, RMC

CERTIFICATION OF AGENCY TECHNICAL REVIEW

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

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

SIGNATURE

Date

Chief, Engineering Division

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

<u>Term</u>	<u>Definition</u>	<u>Term</u>	<u>Definition</u>
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	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
Home District/MSD	The District or MSD responsible for the preparation of the CAP project.	RMO	Review Management Organization
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RTS	Regional Technical Specialist
IEPR	Independent External Peer Review	SAR	Safety Assurance Review
ITR	Independent Technical Review	USACE	U.S. Army Corps of Engineers
LRR	Limited Reevaluation Report	WRDA	Water Resources Development Act
LSER	Levee System Evaluation Report		
MSC	Major Subordinate Command		

ATTACHMENT 5: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number