




**FEMA**

September 2, 2010

**MEMORANDUM FOR:** Mitigation Division Directors  
Regions I - X

**FROM:**   
Doug Bellomo, Director  
Risk Analysis Division

**SUBJECT:** Procedure Memorandum No. 63  
Guidance for Reviewing Levee Accreditation Submittals

**EFFECTIVE DATE:** Encouraged for all levee accreditation requests  
submitted prior to October 1<sup>st</sup>, 2010; required after  
October 1<sup>st</sup>, 2010

**Background:** In accordance with the National Flood Insurance Program (NFIP) regulations, communities or other parties seeking recognition of a levee system as providing protection on NFIP maps must provide data and documentation demonstrating compliance with regulations set forth in the Code of Federal Regulations (CFR) at Title 44, Chapter 1, Section 65.10 (44 CFR Section 65.10). Once compliance with 44 CFR Section 65.10 is demonstrated, the levee system will be accredited on NFIP maps, reflecting the appropriate risk zones for levee-impacted areas. Accreditation by itself is not a guarantee or warranty of performance of levee/levee systems during a flooding event. It is a determination that the levee system meets the minimum design, operation, and maintenance standards set forth in 44 CFR Section 65.10, to be shown on the NFIP maps as providing protection from the base (1-percent-annual-chance) flood.

**Issue:** By regulations, communities and levee owners have the responsibility to provide 44 CFR Section 65.10-compliant data and documentation, when seeking recognition of a levee system on an NFIP map. Following issuance of Procedure Memorandum (PM) Nos. 34 and 43, dated August 22, 2005, and September 25, 2006, respectively, and revised PM 43 dated March 16, 2007, the Federal Emergency Management Agency (FEMA) has seen an increase in the number of accreditation request submittals. Therefore guidance is being provided to improve and clarify the process of review for compliance with 44 CFR Section 65.10. These reviews must be consistent for all accreditation submittals including, but not limited to new and continued accreditation requests as part of a mapping project, requests submitted as Letters of Map Change (LOMCs), Physical Map Revisions (PMRs), and Provisionally Accredited Levees (PALs).

**Action Taken:** The attached guidelines are being issued to improve and clarify the process of review for compliance with 44 CFR Section 65.10. Please note that a FEMA

determination of a levee system meeting the minimum regulatory requirements for accreditation on an NFIP map does not constitute a determination by FEMA as to how a levee system will perform in a flood event. The review process, henceforth referred to as the “completeness check”, is described in detail in the attached document, entitled “Guidelines for Reviewing Levee Accreditation Submittals.”

The completeness check is to be implemented by all FEMA Regions and contractors. This check can also be shared with levee system owners and communities to further clarify the FEMA role in the accreditation process. The completeness check is intended only for structures designed to serve as levee systems, and shall not be implemented for any other lateral structure, or non-levee embankment, without consultation with FEMA Headquarters (HQ). These guidelines may be used for reviewing coastal levee accreditation submittals; however, due to the complexity and uniqueness of each coastal levee, coordination and consultation must occur with FEMA HQ for each coastal submittal.

**Attachments:**

Guidelines for Reviewing Levee Accreditation Submittals  
Checklist and Contact Information for Levee Accreditation Submittals  
Title 44, Chapter 1, Section 65.2, of the Code of Federal Regulations  
Title 44, Chapter 1, Section 65.10 of the Code of Federal Regulations

cc: See Distribution List

**Distribution List** (electronic distribution only):

Office of the Acting Assistant Administrator for Flood Insurance and Mitigation  
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## **Guidelines for Reviewing Levee Accreditation Submittals**

### **Introduction**

This document outlines the process FEMA will follow when reviewing levee accreditation submittals. This process, *i.e.*, the completeness check, is the same for all types of submittals, including those for new and existing levee systems that have not yet been evaluated in accordance with Procedure Memorandum (PM) No. 34, Provisionally Accredited Levees (PALs), Letters of Map Change (LOMCs), Physical Map Revisions (PMRs), and new studies that include accredited levee systems impacted by changes in the Base Flood Elevations (BFEs). Please note that for PAL reviews, PM 53 requires a mapping action to be initiated upon expiration of the PAL period if the submittal is not complete. Any dialogue regarding additional data after the expiration of the 24-month timeframe cannot delay the initiation of such a mapping action without consultation with FEMA HQ.

The completeness check is not a technical review, or an evaluation of design, nor is it performed to determine how a levee will perform in a flood event. The incoming data supporting 44 CFR 65.10 requirements must be certified by a registered Professional Engineer (P.E.), licensed by their respective states, or by a Federal agency with responsibility for levee design. The completeness check is performed to ensure that all data demonstrating compliance with 44 CFR Section 65.10 is submitted, so FEMA can delineate the appropriate risk zones on NFIP maps. However, if FEMA is presented with conflicting data, a more in-depth review can be performed. This additional and more in-depth review would require approval and consultation with FEMA HQ. Although FEMA performs a completeness check for 44 CFR Section 65.10 compliance, submittals must include back-up data and supporting information for all calculations, in case a more detailed review is needed/warranted. Certified summary reports without all back-up data are not acceptable.

The three tiered approach described below is structured so that each tier represents a different level of review, and subsequently an opportunity for additional data to be requested. This approach is intended to make the levee accreditation process more efficient. The reviewer shall not move forward to subsequent tiers if data is missing for the previous tier. A data request should be compiled and sent to the requestor noting the extent of what has already been reviewed and that additional data requests might be forthcoming once the review is restarted.

### **Tier 1 Review**

#### **STEP 1: All Items Signed by a registered P.E.**

The reviewer will evaluate the submitted materials to ensure that all of the components required in 44 CFR Section 65.10 are included in the submittal and are stamped, as appropriate, by a registered P.E.

While the complete submittal for levee accreditation must be certified by a registered P.E., the submittal may include several subsets of engineering data, dealing with separate portions of 44 CFR Section 65.10, certified by different P.E.s. Certifications are subject to the definition provided in 44 CFR Section 65.2. In such cases, the P.E. who certifies the completed package, will be considered the requestor and will be contacted if additional information is needed.

P.E. certification is required for data showing compliance with the design criteria set forth under 44 CFR Section 65.10(b), as well as the as-built plans. For existing levees, there are no restrictions on the age of certifications or the engineering data and as-built plans, as long as the overall certification of the accreditation submittal is new and references the data used to make this determination. It is the P.E.'s responsibility to ensure that the supporting data is still valid.

Certified as-built plans must be submitted as required by 44 CFR Section 65.10(e). A new levee survey may be required if certified as-built plans are missing, or do not cover the entire length of the levee. The new survey must include all the necessary information for the review, including but not limited to topographic information, location and dimensions of all structures, pipes and utilities crossing the levee, and all the facilities that are part of the interior drainage system. Additionally, each submittal must include officially adopted maintenance plans and operation plans. (See step 4)

#### **STEP 2: Freeboard Check**

The submitted report must contain a profile of the currently effective BFE and levee crest (top of levee) elevation that shows adequate freeboard exists. The reviewer will verify the submittal contains information showing that the levee ties into high ground and that the levee's elevation at the tie-in location is within a tenth of a foot of the levee crest at the upstream and downstream ends. The report must provide freeboard information showing the levee meets the requirements of 44 CFR Section 65.10(b)(1), including freeboard requirements for structures, constrictions, and ice jam situations (where warranted). In certain circumstances, exceptions to the minimum riverine freeboard requirement may be approved by FEMA when a minimum of 2-foot freeboard exists throughout the levee as described under 44 CFR Section 65.10(b)(1)(ii). Requests for exceptions, however, shall be coordinated with FEMA HQ prior to submittal of the accreditation request.

Sandbags or any other temporary structure or measures used solely to reach freeboard requirements generally will not be considered for accreditation. In certain situations, where the inverts of closures are above the BFE, sandbags can be used to reach the required freeboard with FEMA HQ's approval. This activity must be part of the adopted operations plan.

## **Tier 2 Review**

### **STEP 3: Regulations**

The submittal must adequately address all applicable Federal, State, and local laws, regulations and requirements, including, but not limited to, Federal and local floodplain management laws, environmental laws, and permit requirements. This can be verified through communication with the requestor. A record of these communications must be kept in file for future reference.

### **STEP 4: Operations and Maintenance Plan**

As required by regulation, the submittal must include a maintenance plan that has been officially adopted by the community. This plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained. At a minimum the maintenance plans shall specify the maintenance activities, the frequency with which they will be performed, and the name or title of the person who will be responsible for ensuring that maintenance activities are accomplished. The activities and the frequency of their performance should conform to the risk associated with the levee. The maintenance plan should address the type of vegetation on and adjacent to the levee, the activities required to maintain the flood characteristics represented in the hydrologic and hydraulics (H&H) analyses and any special environmental considerations. Plans should also include provisions for inspection of the levee and maintenance of any mechanical systems, such as closure devices, pumps, valves and relief wells. Maintenance must be under the jurisdiction of federal or state agencies, an agency created by Federal or State law, or an NFIP participating community.

The submittal must include an officially adopted operation plan that includes information on both interior drainage systems and any closure structures or devices. The plan must include specific actions, assignments and personnel responsibilities and the name or title of the person responsible for each item. It must include provisions for inspection and testing of any mechanical systems. If flood fighting activities are listed in an operation plan, it must be ensured that these activities are not intended to be performed to stabilize any part of the levee system during a flood event, in lieu of meeting 44 CFR Section 65.10 requirements. The operation plan must document a flood warning system that triggers emergency operation activities. It must be demonstrated that there is sufficient warning time for activation and operation of the mechanized drainage system components. Operations must be under the jurisdiction of Federal or State agencies, an agency created by Federal or State law, or an NFIP participating community.

Officially adopted plans must be signed by the CEO of the community or the appropriate head of the agency that is accepting the ultimate responsibility of all the tasks and actions listed in those plans. Both the operation and maintenance plans must be prepared for the specific levee for which accreditation is being evaluated. Generic operations and maintenance plans, non-specific to the levee system, *i.e.*, plans that cover an entire county or state, are not acceptable.

**STEP 5: “With Levees” and Without Levees” Analysis**

The “with levee” analysis is used to determine the BFEs on the riverine side of the levee. If the levee is accredited to provide protection from the base flood, the “without levee” analysis is used to determine the area that is protected by the levee. In accordance with FEMA’s current standard mapping procedure if the levee is not accredited, the “without levee” analysis is used to determine the flood hazards on the landward side of the levee. If new hydrologic and/or hydraulic analyses are submitted as part of a levee accreditation package, then both “with levee” and “without levee” analyses must be submitted by the requestor. In certain situations, the area protected by a levee could be different from the “without levee” analysis floodplain due to the effects of interior drainage.

**Tier 3 Review**

**STEP 6: Levee System and Cross Reference Check**

The reviewer will verify that all components, as described in 44 CFR Section 65.10, use the same flooding elevations and conditions, and that the entire levee system (if a system consists of different segments) is considered in the submittal. A levee system must constitute a “complete system” not reliant on any segments/systems that are not accredited. Partial accreditation is only acceptable for segments along a system that are hydraulically independent from upstream and downstream segments. The area protected by a hydraulically independent segment is not impacted by failure or interior drainage of upstream or downstream segments. Partial accreditation, however, needs to be coordinated through consultation with FEMA HQ.

**STEP 7: Interior Drainage Analysis**

The submittal must include an H&H study identifying the source(s) and extent of flooding due to interior drainage for any ponding area greater than 1-foot in depth, and a topographic work map showing the extent of these areas. A thorough H&H review must be performed for all flooding sources identified within the interior drainage area. The submittal must include the joint probability of interior and exterior flooding, describe storage and pumping systems, and identify the capacity of these facilities to evacuate interior flood waters. Operation information related to these facilities, including but not limited to pumping stations, must be included in the operation and maintenance plans submitted for the levee system. New BFEs resulting from the interior drainage analysis are subject to the appeal process set forth under 44 CFR Section 67.

**STEP 8: Structural Design Requirements**

The reviewer will verify that data for the structural design requirements of 44 CFR Section 65.10 have been submitted, including but not limited to:

- 1) **Closure Structure Data:** The submittal must include information for all levee openings and low points where closure structures are structurally part of the levee.
- 2) **Embankment Protection:** The design report must include an analysis addressing protection of the levee embankment from erosion. This analysis should include the embankment side slope, calculated flood water velocity,

expected duration of the flood at various stages, wind and wave action, and ice and debris flow where applicable.

- 3) **Embankment and Foundation Stability:** The report must include an analysis of the embankment and foundation stability. This should include an examination of component material characteristics of the foundation and levee embankment, compaction design, seepage at critical locations, and penetrations and their associated filter materials. Additionally, the impact of any structure, including but not limited to bridges and roads crossing the levee must be addressed.
- 4) **Settlement:** The report must provide an engineering investigation that assesses the potential settlement of the levee and reduced freeboard over time. Consideration should be given to embankment loads, compressibility of foundation soils, age of the levee, and the construction methods used.

#### **STEP 9: Inspection Reports**

Documentation or reports on tests and inspections that are required by regulation under 44 CFR Section 65.10(c)(1)(iii) and Section 65.10(c)(2)(iv) must be provided.

All other applicable inspection reports from either the United States Corps of Engineers (USACE) or other sources must be considered as part of the FEMA review to ensure that any issues related to 44 CFR Section 65.10 have been addressed.

#### **Mapping the Levee**

##### **STEP 10: Final Completeness Check**

Once the completeness check is finished and all required components have been submitted and deemed complete, FEMA will accredit the corresponding levee on the NFIP maps. If any component is found to be missing or erroneous and the requestor cannot provide missing data to show compliance with 44 CFR Section 65.10, FEMA will not accredit the levee and reserves the right to suspend or deny the request.

Checklist and Contact Information for Levee Accreditation Submittals

- |   | <u>Passed</u>                |                             |
|---|------------------------------|-----------------------------|
| • Tier 1 Review                                       |                              |                             |
| ▪ STEP 1: All Items Signed by a registered P.E.       | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| ▪ STEP 2: Freeboard Check                             | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| • Tier 2 Review                                       |                              |                             |
| ▪ STEP 3: Regulations                                 | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| ▪ STEP 4: Operations and Maintenance Plan             | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| ▪ STEP 5: "With Levees" and "Without Levees" Analysis | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| • Tier 3 Review                                       |                              |                             |
| ▪ STEP 6: Levee System and Cross Reference Check      | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| ▪ STEP 7: Interior Drainage Analysis                  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| ▪ STEP 8: Structural Design Requirements              |                              |                             |
| 1) Closure Structure Data                             | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2) Embankment Protection                              | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3) Embankment and Foundation Stability                | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4) Settlement   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| 5) All Other, as Applicable                           | <input type="checkbox"/> Yes | <input type="checkbox"/> NA |
| ▪ STEP 9: Inspection Reports                          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| • Mapping the Levee                                   |                              |                             |
| ▪ STEP 10: Final Completeness Check                   | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

Comments:

Reviewer

- Name: \_\_\_\_\_
- Phone No.: \_\_\_\_\_
- E-mail: \_\_\_\_\_

FEMA Regional Contact

- Name: \_\_\_\_\_
- Phone No.: \_\_\_\_\_
- E-mail: \_\_\_\_\_

FEMA Headquarters Contact (if applicable)

- Name: \_\_\_\_\_
- Phone No.: \_\_\_\_\_
- E-mail: \_\_\_\_\_