# Overtopping Procedure
# Modeling and Mapping Non-Accredited Levees

## LEVEE ANALYSIS AND MAPPING PROCEDURES OVERVIEW

The Federal Emergency Management Agency's (FEMA) responsibilities include educating and helping a community understand their flood risk. One of the ways FEMA does this is by creating maps to help communities understand its flood risk and define this a high, moderate, or low risk of flooding. When FEMA conducts a flood mapping project and a non-accredited levee system is involved, there are specific considerations to take into account.

FEMA created a set of procedures for non-accredited levees to more accurately analyze and depict the flood hazard in an area impacted by a levee system. These procedures, known as the "levee analysis and mapping procedures," offer five different ways to analyze a levee reach (or section of levee). By applying one of these procedures, the community can more accurately understand their risk and take steps to reduce that risk. The Code of Federal Regulations (CFR) Section 65.10, also known as "65.10," is the guidance followed and will be referenced throughout this document.

## PROCEDURE OVERVIEW

One such procedure, called ***Overtopping***, can be used for levee systems, or portions of a levee system, where the crest of the levee is below the Base Flood Elevation (BFE)--the level that water is expected to reach during a 1-percent-annual-chance flood--but the levee reach is designed to remain in place during the overtopping event. In other words, in the event of a base flood, the levee would overflow because the top of levee is not high enough, but the actual levee would not fail.

*In the simplest terms, **Overtopping** is used when the levee is not tall enough to meet the BFE, but the levee itself would not break if it floods – the water would just flow overtop it. In addition, information must be submitted that demonstrates that the levee would remain in place during the overtopping event*


*This image shows that in the case of a 1-percent-annual-chance flood, the water would flow over the levee.*

The use of the ***Overtopping*** procedure will determine:

- Where the levee system will be overtopped during the 1-percent-annual-chance flood event;
- The length of time overtopping will occur;
- The average flow rate/volume overtopping the levee; and
- The extent of flooding on the landward side of the levee.

## RESULTING ZONE DESIGNATION

An analysis will be performed to determine the amount of water that will overtop the levee reach during the base flood event. This volume of water will be used to establish the Special Flood Hazard Area (SFHA). The possible SFHA includes Zone A/AE, which carries a federal flood insurance requirement. It is mandatory for property owners in an SFHA with mortgages from federally regulated or insured lenders to have flood insurance, and it is strongly recommended for all structures. These zone designations determined in each reach may be impacted by flooding from adjacent or other reaches, and also localized interior drainage flooding.

Given the mandatory insurance requirement, there are several options to help keep insurance costs low:

- **Newly Mapped Procedure**: This cost-saving rating option helps reduce the financial impact of a map change for properties newly mapped as high-risk.
- **Grandfathering**: This rating option may provide a lower cost by locking in the insurance rate associated with the current moderate- or low-risk flood zone or BFE when the policy renews in the future. The easiest way to take advantage of grandfathering is to buy a policy before the new flood maps take effect.
- **Community Rating System (CRS) credits:** This program recognizes communities for their additional efforts beyond the minimum standards to reduce flood damage to insurable property. Under the CRS, communities that choose to participate may reduce the flood insurance premium rates for property owners in the community by taking these additional actions.

### Overtopping Procedure Documentation

Levee documentation submitted to FEMA should include, but may not be limited to:

- Length of the levee system that is structurally sound and will not fail when overtopped during a 1-percent-annual-chance flood event.
- Where the top of the levee is below the BFE.
- That the levee system was designed, built, and is maintained to allow overtopping without failing.
- Survey or as-built data (recorded drawings) for the levee.
- Certified documents showing that the levee reach can withstand overtopping.
- Operations and Maintenance Plan information.
- Inspection Reports.

FEMA will use the documentation received to assist in applying this procedure.

To purchase flood insurance, individuals need to contact their insurance agent. Property owners with questions about flood insurance can call the National Flood Insurance Program, toll free, at 1-888-FLOOD29 (356-6329) or visit floodsmart.gov. See the *Levees and Flood Insurance Fact Sheet* for more information.

## OTHER CONSIDERATIONS

The ***Overtopping*** procedure requires more data than some other procedures. The financial commitment will depend on multiple factors, including the size of the levee and the availability of existing data.

An “interior drainage” analysis must be conducted for all levee systems. Interior drainage represents all water runoff, seepage (water going under the levee), and water collection on the landward side of the levee system. The analysis must identify and demonstrate the potential runoff paths from the impacted drainage area. Any areas of residual risk and interior drainage flooding that fall within these areas are

mapped as a SFHA, regardless of whether the levee system is accredited or not. This is a critical analysis because it shows that risk can still exist, even if the levee meets certain 65.10 requirements.

As a reminder, there is always more a community can do to reduce their risk, especially when it comes to floodplain management, building codes and zoning. See the *Levee Risk and Mitigation Fact Sheet* for more information.

***For more information on other procedures for analyzing and mapping hazards associated with non-accredited levees, visit: https://www.fema.gov/media-library/assets/documents/33587.***

***The Code of Federal Regulations can be accessed at: https://www.govinfo.gov/help/cfr***