



Expanding Local Understanding of Flood Risk With Base Level Engineering

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FEMA

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What Is Base Level Engineering?

Base Level Engineering (BLE) creates flood data through an automated process. It combines detailed ground elevation data with the latest flood models. The results give communities a better understanding of their flood hazards. Engineering models from a BLE analysis produce data that meet FEMA's standards for flood risk analysis and mapping.

BLE analyses can cost-effectively cover large areas (e.g., an entire county or a watershed). The results of the analyses—including flood elevations—help communities learn more about their flood-prone areas.

BLE data do not replace a community's Flood Insurance Rate Map (FIRM). However, they can help communities identify previously unknown flood-prone areas. They can also identify flood elevations in Zones A and D. A FIRM does not show Base Flood Elevations (BFEs) in those zones. Local officials can use these datasets to make floodplain management decisions.



What Is BLE?

BLE is a cost-effective engineering approach. It uses advanced software and detailed ground data. Its engineering and flood hazard data are credible and increase community understanding of their flood hazard. BLE data can also be used to guide work in Zone A or areas where the flood hazards are not known or mapped.

How Does BLE Benefit My Community?

BLE analyses provide a more thorough picture of flood hazards for large areas. The results, backed by models, support flood mitigation tactics and projects. Many local departments can use BLE data for planning and building decisions. They can also use it to advise local, tribal and regional emergency planning and response. BLE information strengthens local communication about flood risk. Table 1 lists some ways to use BLE.

TABLE 1. SAMPLE USES OF BLE DATA

FLOODPLAIN MANAGEMENT, DEVELOPMENT REVIEW, AND PERMITTING –Use BLE data as best available information in Zone A. Use it to regulate areas without mapped Special Flood Hazard Areas. Use water surface elevation data from BLE to plan and design new buildings. It can also be used to guide substantial improvements and repairs to substantially damaged buildings. See [Floodplain Management Bulletin 1-98. Use of Flood Insurance Study \(FIS Data\) as Available Data](#). This explains how to use draft data (like BLE) or preliminary FIS data to regulate floodplain development.

COMMUNITY PLANNING, LAND USE, AND ZONING – Use BLE data to write stricter land-use regulations to prevent building in flood-prone areas. Use BLE for transportation planning and to find sites for critical and emergency facilities.

EMERGENCY MANAGEMENT –Use BLE data to plan for emergency response and recovery. It can help you map evacuation routes and place signs and emergency shelters wisely.

LETTERS OF MAP CHANGE – In Zone A, use the 1%-annual-chance flood elevations from BLE as BFEs. This applies to Letters of Map Amendment or Letters of Map Revision Based on Fill.

RISK COMMUNICATION –Use BLE information for better communication. BLE depth grids can make flood hazards more relatable. The data can be publicly available on a web viewer platform or from your community.

BLE Data and Your Current FIRM

BLE data do not immediately replace the information on a FIRM. However, they do give communities more data to inform both permitting and development. If the local risk level is high, and the current FIRM data no longer reflects that, FEMA may update or replace the FIRM.

BLE data supplement the information communities are already using. They can use BLE results to update their FIRM. This may be appropriate for communities with an ordinance that requires the use of an adopted FIRM for local development regulation and floodplain management (see next section).

Local officials can use BLE data when a BFE is not available. On a FIRM, this pertains to Zone A or areas without flood information. If the area has been studied by more enhanced methods (Zone AE), use the FIRM and flood profiles in the FIS report instead.



Adopting BLE Data as Best Available Information

Communities may use BLE results as best available information. Consult your local bylaws, ordinances or codes before using BLE data for decision making. The data may need to be adopted first.

Using BLE Data When Updating FIRMs

Communities can use BLE data for outreach activities during the Discovery phase of Risk MAP. During Discovery, each community works with FEMA to determine mapping needs. BLE analyses can provide flood hazard data to communities without a FIRM. They also offer those communities a digital entry tool.

BLE data and mapping can be used effectively in many ways:

- Address stakeholder interests when new flood hazard information becomes available.
- Identify areas of risk and potential projects to reduce it.
- Inform floodplain management and disaster recovery.
- Show where floodplain boundaries or BFEs may change and what areas will be affected.
- Identify streams where an enhanced analysis may be needed.

A BLE analysis does not automatically replace the information on the effective FIRM. However, when BLE data are more restrictive than the community's current flood map, officials can use it immediately in the following tasks:

- Floodplain management
- Local land use
- All-hazard mitigation planning
- Mitigation strategies
- Flood risk communication

For more information on how to use BLE data, visit FEMA's Base Level Engineering Analyses and Mapping Guidance at <https://go.usa.gov/xsMka>.