WHAT IS BASE LEVEL ENGINEERING (BLE)?

BLE PRODUCES QUALITY DATA

The BLE production approach combines high-resolution ground elevation data with enhancements in modeling technology to create engineering models and flood hazard data. These analyses are produced at a watershed scale, as opposed to targeting individual stream reaches. The flood hazard information prepared is based off engineering models that determine flood elevations along each stream reach studied. The data prepared provide flood hazard information to community officials and allow them to interact with analysis results and review areas identified as prone to flooding.

BLE IS COLLABORATIVE

FEMA worked with federal, state, regional, and local entities to develop the BLE concept. FEMA has interacted with a variety of state and local officials to further refine the concept and inform the identification of prepared flood risk datasets. BLE assessments produce datasets that can be shared publicly to broaden conversations about flood risk and inform opportunities for disaster-resilient growth and restoration. The data produced by these assessments can be used across a variety of FEMA programs to assist in the identification and prioritization of projects. This effort allows increased transparency and data availability at all levels of government, growing the efficiency and integration of agencies working in the realm of flood risk.

WHY IS FEMA INVESTING IN BLE?

Currently, a large portion of the national flood hazard inventory of stream miles is unknown or unverified. Investing in BLE helps address these gaps. FEMA is required to review and validate each stream mile on a Flood Insurance Rate Map (FIRM) every five years. The flood hazard information is reviewed to determine if there have been changes in expected flood flows, land use or development since the previous study was performed.

TWO TYPES OF BLE: 1D VERSUS 2D

BLE data can be developed with either one-dimensional (1D) or two-dimensional (2D) modeling. The main difference is the type of hydraulic modeling used, or how water moves through streams, channels, and rivers. 1D modeling uses a step-backwater approach that assumes that floodwaters are moving in one direction along a pre-determined path for riverine flooding. This works best for watersheds with well-defined streams and rivers, and in areas with hydraulic structures such as bridges or culverts. 2D modeling uses a rain-on-grid approach that accounts for water moving horizontally and in more than one direction. This approach works best for modeling large areas with unconfined rivers and flat areas where flow directions can be unpredictable; this includes riverine flooding and flooding caused by rainfall. The two methods enable engineers to produce quality data that are tailored to a community based on the characteristics of the watershed.

USING BLE TO UPDATE FIRMS

The engineering approach used to prepare BLE meets all modeling and mapping standards outlined in FEMA's Standards for Flood Risk Projects, and the results may be used to rapidly update Zone A areas. The models developed during these assessments can be refined by communities or FEMA to include survey and structure information to efficiently update the detailed study (Zone AE) areas experiencing growth.

Developers can download and refine engineering models to identify the floodplain changes and determine Base Flood Elevations in project areas near streams analyzed with BLE.

DOES BLE REPLACE THE FIRM FOR MY COMMUNITY?

BLE information **does not** replace the information shown on any current effective FIRM panel in a community. BLE is used to assess the current validity of the existing flood hazard inventory. It also helps local communities estimate Base Flood Elevations (BFEs) in Zone A areas.

BLE INCREASES PUBLIC AWARENESS

Producing and sharing these data provides FEMA an opportunity to broaden and expand risk awareness conversations with local communities, ultimately strengthening disaster resilience, and reducing public spending on recovery efforts after a flood event. The Estimated Base Flood Elevation (estBFE) Viewer, an interactive web portal, allows federal, state, regional, and local entities; industry professionals; and the public at large to interact with BLE results. This tool increases FEMA's ability to present comprehensive flood hazard information to the public; providing additional risk assessment resources where there are currently gaps in the national flood hazard data inventory.

BLE WILL LEAD TO FLOOD RISK REDUCTION

Communities can access and use data prior to updates to their regulatory FIRMs. Once a BLE assessment is completed, FEMA releases the flood risk information on the estBFE Viewer, providing flood risk information that may be immediately used for community floodplain management activities, local land use discussions, all-hazard mitigation planning, identification of mitigation strategies, as well as providing a basis for more informed community development. The datasets may be used to inform future land use decisions, support grant submissions, generate flood risk assessments, prioritize flood risk reduction projects, and evaluate, design, and prioritize capital improvement projects. The approach will allow FEMA to build a more robust network of flood risk information, expedite the process to update regulatory products, and enable future expansion to risk-based analysis and future risk scenario modeling opportunities.

CAN I USE BLE TO DETERMINE BFES IN MY COMMUNITY?

Yes, in most cases, the data made available through the estBFE Viewer can be used to inform local community identification of BFEs.

The data on the viewer can be used if the stream is shown as a Zone A flood zone and the floodplains are similar in shape and width OR if the stream is shown on the current effective FIRM.

If the stream has been studied by more detailed methods (Zone AE), then the current effective FIRMs and stream profiles in the Flood Insurance Study text should be used to determine the BFE in detailed study areas.

IMPLEMENTING LOCAL USE OF BLE INFORMATION

Where BLE data are available, BLE can be used as a data source to supplement effective FIRMs with the following review and use procedure.

Communities should use BLE information when:

- ☑ BLE coverage shows an area as flood prone, but that area is NOT currently depicted on the FIRM.
- ☑ BLE coverage is similar in width, shape and alignment to the Zone A depicted on FIRM.
- ☑ BLE coverage is larger than Zone A areas shown on FIRM.

Communities should NOT use BLE information in the following instances:

- ☒ BLE coverage is smaller in width and shape than Zone A areas shown on FIRM.
- ☒ In coastal impact areas. Talk with your floodplain administrator before using BLE in these areas.

COMMUNITY AND PUBLIC ACCESS TO RESULTS

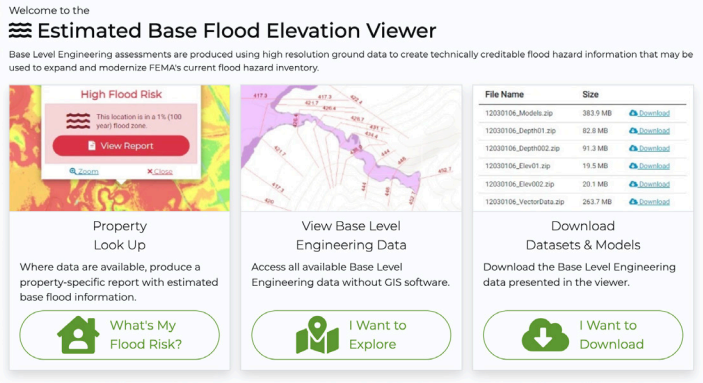
BLE results are available for use by the public on the estBFE Viewer at https://webapps.usgs.gov/infrm/estBFE/.

Through the online portal, users can interact with and view data in a singular or side-by-side window.

Users may also view and download:

- Engineering models.
- Floodplain extents.
- Estimated flood depths.
- Water surface elevations.

Users may also run a site-specific report to review flood risk in their vicinity at their convenience.



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