

# Benefit-Cost Analysis Technical Assistance for Eligible Communities: Data Needs

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FEMA is providing greater access to its Building Resilient Infrastructure and Communities (BRIC) and Flood Mitigation Assistance (FMA) grant programs for eligible communities by addressing one of the challenges identified by stakeholders– successful completion of a project Benefit-Cost Analysis (BCA).

## Background

For the fiscal year 2022 BRIC and FMA grant application cycle, federally recognized Tribal governments, communities with Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) score greater than 0.80 or (for BRIC only) Economically Disadvantaged Rural Communities (EDRC)<sup>1</sup>, can submit subapplications without completing a BCA. If their subapplication is competitive, and is otherwise eligible and technically feasible, FEMA may work with them to complete the BCA after project selection. In no case will FEMA award a hazard mitigation project that is not cost-effective.

While submitting a BCA is not a condition to apply in such circumstances for these grants, if an applicant or subapplicant has data that may help with completing their BCA, FEMA encourages these communities to submit it with their subapplication. This program support material describes the types of data eligible communities should provide and how to determine whether they qualify for this BCA assistance.

## Benefit-Cost Analysis Assistance – Eligibility Criteria

During the pre-award process, FEMA will review hazard mitigation project subapplications that are eligible for selection. As part of the selection process, FEMA may assist communities with developing a BCA when at least one of the following criteria is met:

- The community is a federally recognized Tribal government.
- The community has an average CDC SVI score greater than 0.8. The CDC SVI uses U.S. Census data to determine the social vulnerability of every census tract. Census tracts are subdivisions of counties for which the census collects statistical data. CDC SVI ranks each tract on 16 social factors, including poverty, lack of vehicle

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<sup>1</sup> This definition is derived from the definition of small, impoverished community found in Section 203(a) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Recovery Reform Act of 2018.



access and crowded housing, and groups them into four related themes. Possible scores range from 0 (lowest vulnerability) to 1 (highest vulnerability). CDC SVI scores can be found at [svi.cdc.gov/map.html](https://svi.cdc.gov/map.html).

- For BRIC only, the community is defined as an Economically Disadvantaged Rural Community (EDRC). An EDRC consists of 3,000 or fewer individuals, with residents having an average per capita annual income not exceeding 80% of the national per capita income (based on best available data).
- NOTE: If the project does not meet the eligibility criteria outlined for Benefit-Cost Analysis Assistance, an [Alternative Cost-Effectiveness Methodology for Fiscal Year 2022 BRIC and FMA Application Cycle](#) was issued in October 2022 and may be applicable.

## How to Determine the Social Vulnerability Index

County and census tract level SVI scores are available from the [CDC SVI interactive map](#). If the subapplicant is a non-county municipality and crosses multiple census tracts, they will need to determine the average SVI based on the census tracts included within the community boundary.

## Recommended Data to Support a Benefit-Cost Analysis

Eligible community subapplicants who meet the criteria defined above do not need to submit a BCA with their subapplication, but they should provide the best available data related to risk to structures and infrastructure from the natural hazard, level of protection provided by the project and documentation of historical damage, if available. This data will be leveraged by the subapplicant and FEMA in developing the BCA.

A summary of recommended data to include with the subapplication for all project types, as well as specific data for common project types, is listed below. While communities meeting the criteria described in this document are not required to submit a BCA with their subapplication, providing the data will allow for a more expeditious review of the application. FEMA will work with the sub-applicant to obtain the required data in event the sub-applicant is unable to provide the recommended data.

### Pre-Calculated Benefits

For all mitigation projects, a cost-effectiveness determination is required as a basic eligibility requirement. In many cases, this means completing a BCA using the FEMA BCA Toolkit (<https://www.fema.gov/grants/tools/benefit-cost-analysis>). However, under certain conditions, a project may be eligible for pre-calculated benefits and an analysis may not be required to be performed using the BCA Toolkit. Project types that may be eligible for pre-calculated benefits include:

- Acquisition projects
- Elevation projects
- Hospital generator projects
- Hurricane wind retrofits

- Individual tornado safe rooms
- Post-wildfire flood diversion, soil stabilization and/or reforestation projects

Specific data requirements for pre-calculated benefits can be found at [www.fema.gov/grants/guidance-tools/benefit-cost-analysis/streamlined-bca](https://www.fema.gov/grants/guidance-tools/benefit-cost-analysis/streamlined-bca).

## Data For All Other Projects

The following recommended data should be included in the subapplication:

- **Annual Maintenance Costs:** Annual maintenance costs are those costs necessary for the upkeep or repair of mitigation project components so that the project maintains its originally designed and approved level of effectiveness. Standard cost-estimating software, contractors, engineering documents or documentation from a reliable source such as a professional with relevant expertise can provide estimates.
- **Structure Information:** A map or geographic information system (GIS) data clearly identifying the structures mitigated by the project and available assessor data (structure latitude and longitude, building size, building replacement value [if greater than \$100 per square foot], building use, construction type and number of units for multifamily residences).
- **Level of Protection:** The level of protection provided by the project, such as the design flood elevation, design wind speed and other performance-based criteria.
- **Historical Damages:** Information on historical damage at the project location that will be mitigated by the proposed project. This includes the dates, locations and details about past events and information on historical damage. Information may include documented flood elevations or flood depths, documented wind speeds, insurance claims, work orders, descriptions of damage for a structure or infrastructure, repair costs, response costs (including labor), FEMA Public Assistance data and recurrence intervals for past events, if known.
- **Benefiting Area:** Information on the benefiting area of the project, such as maps, identified census tracts, or coordinates or addresses of structures benefiting from the project. Information may include a description of the benefiting area identified in the subapplication.

## Additional Data, As Applicable

There are several benefits that could be counted for a project, and any or all benefits may be needed to verify cost-effectiveness. Benefits may include avoided damage, loss of function, displacement costs and (for some projects) life safety. Subapplicants should consider the following questions and submit applicable supporting documentation:

- If there are any noncritical governmental services provided by the mitigated structures, provide the annual budget for the services delivered for each building. Provide the duration that service would be lost, based on past or estimated similar size events (e.g., estimated flood depths, wind speeds). Provide dates for past events, if applicable.

- If there are any critical services (e.g., police, fire, medical) provided by the mitigated structures, provide the following for each building:
  - Number of people served by the facility
  - Duration that service would be lost, based on past events or an estimated similar size event (e.g., estimated flood depths, wind speeds), including dates for past events, if applicable
  - For hospitals and fire services, distance to the next closest similar facility
  - For fire services, whether there are emergency medical services at the original and alternate location
  - For police services, number of police officers in the area, both pre- and post-disaster
  - For hospitals, population served at the next closest hospital
- If the project protects against loss of service to a utility, provide the following:
  - Type of utility (electrical, potable water, wastewater, information technology/communications, other)
    - If other, documentation that shows the economic value of the service in terms of dollars per person, per day. In these cases, the value of the service can typically be determined by the utility company, which can provide the documentation.
  - Number of customers served by the utility that the project will mitigate
  - Letters or technical studies from utilities that include engineering estimates or historical evidence of impact on the service caused by an event. Provide the duration that service would be lost, based on past events, or an estimated similar size event (estimated flood depths, wind speeds, etc.). Provide dates for past events, if applicable.
- If the project protects loss of service to a road, provide the following:
  - Maps of the impacted roads and the estimated number of one-way traffic routes per day for each impacted road
  - Additional time and miles per one-way detour trip
  - Duration that service would be lost based on past events, or an estimated similar size event (estimated flood depths, wind speeds, etc.). Provide dates for past events, if applicable.
  - Costs to repair road damage and any related response costs
- If the project eliminates or reduces the need for volunteer labor, provide the following:
  - Number of volunteers and number of volunteer days needed for past events or for an estimated similar size event (e.g., estimated flood depths, wind speeds). Provide dates of past events, if applicable.

- Description of how the need for volunteers will be reduced after the mitigation project has been completed
- If the project changes or enhances the land use of the project area to create beneficial environmental space, provide the following:
  - Area (in acres or square feet) that will be enhanced and a description of the enhancements
  - Percentage of land use within the enhancement area for the following categories: green open space, riparian, wetlands, forests, marine, estuary
  - Map or GIS files of the enhancement
  - Description of nature-based solution(s) or green infrastructure

## Project-Specific Considerations

This section discusses additional data that should be provided for common project types. For applicable project types, provide the following information:

### Acquisition/Elevation/Dry Floodproofing Projects

- Existing flood risk data. There are two ways to demonstrate the existing risk of flooding: using engineering analysis to estimate the risk or using historical information to demonstrate the risk.
  - In many flood-prone areas, FEMA has performed an engineering analysis of the risk, included in a Flood Insurance Study (FIS) and accompanying Flood Insurance Rate Map (FIRM). If the project is not in a FEMA Special Flood Hazard area, an independent study of the flood risk (e.g., a hydrologic and hydraulic [H&H] study) could provide the required data.
  - If the area has not been studied in detail, demonstrate flood risk through documentation of a historical flood event.
- Lowest floor elevation for each structure
- Design flood elevation (not applicable to acquisition projects)

### Flood Risk Reduction Projects

- Existing flood risk data. There are two ways to estimate the existing flood risk: engineering analysis or historical information.
  - In many flood-prone areas, FEMA has performed an engineering analysis of the risk, included in an FIS and accompanying FIRM. If the project is not in a FEMA Special Flood Hazard area, an independent study of the flood risk (e.g., H&H study) could provide the required data.

- If the area has not been studied in detail, demonstrate flood risk through documentation of a historical flood event. It is likely the project will need to be phased, allowing for development of an H&H study to demonstrate feasibility and effectiveness.
- Post-project flood risk data
  - Detailed documentation in the form of an engineering report that a professional engineer has sealed. The engineering report should clearly identify the proposed project conditions and include H&H calculations used to determine post-project water surface elevations. If these calculations were completed using modeling software, provide the engineering report documenting all model inputs and outputs. Calculate post-project flood elevations for similar flood scenarios (e.g., 10-, 50-, 100-year) as performed for the before-mitigation scenario. Inundation maps can support the analysis and document the structures and infrastructure at risk.
  - If detailed flood analysis is not available, clearly define the project's proposed level of protection and provide engineering calculations supporting the design. If this is the best available data, it is likely that the project will need to be phased, allowing for development of an H&H study to ensure post-project flood risk is accurate.
  - Lowest floor elevation for each structure

## Hurricane Wind Retrofit Projects

Provide the following for each building in the project:

- Photos of all sides of the building exterior
- Number of building stories and building size
- Primary building use
- Primary structural framing system (concrete, steel, masonry)
- Roof cover type (built-up roof, single-ply membrane)

## Tornado or Hurricane Safe Room Projects

- Safe room maximum occupancy
- Predominant structure type(s) (e.g., school, institutional building, single-family residence) to be evacuated to the safe room and the corresponding percentages of occupancy for:
  - Day (6 a.m. – 6 p.m.)
  - Evening (6 p.m. – midnight)
  - Night (midnight – 6 a.m.)

## Soil Stabilization Projects

- Documentation for the current risk at the site (e.g., estimated time to failure as provided by a qualified professional)

## Drought Projects

- Population served by the drinking water utility affected by drinking water use restrictions during a drought event
- Location- or utility-specific drought event(s) and impact data, specifically:
  - Recurrence intervals in years
  - Water demand in million gallons per day (MGD) (this will likely be the same value for each drought event)
  - Water supply yield pre-mitigation in MGD
  - Pre-mitigation drought duration in days
  - Water supply yield post-mitigation in MGD
  - Post-mitigation drought duration in days
- If the above data are not known, the following can be used to obtain the needed information:
  - Local or regional water supply plans, modeling results and/or reports
  - Historical utility supply yield data (e.g., groundwater pumping rates, streamflow levels, reservoir levels, treatment plant throughput)
  - Historical demand data

## Additional Information and Resources

Questions about data to support the BCA should be directed to the BCA Helpline at [bchelpine@fema.dhs.gov](mailto:bchelpine@fema.dhs.gov) or 855-540-6744 (toll free). Call the HMA Helpline at 866-222-3580 for BRIC and FMA grant program questions.