



# Blue Book

Cooperating Technical Partners Blue Book: Estimating  
the Value of Partner Contributions to Flood Mapping  
Projects

Version Five

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**FEMA**

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# Blue Book Background and History

## History of the Blue Book

In 1999, FEMA began an effort to eliminate the backlog of outdated Flood Insurance Rate Maps. One of FEMA's key goals was to increase local involvement in the development and long-term maintenance of its flood hazard maps. To meet this long-standing objective, FEMA created the Cooperating Technical Partners (CTP) program.

The CTP program allows state agencies, regional organizations, tribal nations, local communities, universities, and national non-profits that have the interest and capability to become active partners in FEMA's flood hazard mapping effort. To date, more than 246 partners have entered into formal agreements with FEMA to provide specific contributions to the flood hazard mapping effort for their communities. Through these partnerships, local knowledge and expertise are incorporated into the process to identify and assess flood hazards and risks in communities, and partners' contributions are maximized to leverage federal funding to the fullest extent possible, while maintaining national standards.

To enhance the usability and value of flood hazard mapping, FEMA developed the Risk Mapping, Assessment, and Planning (Risk MAP) program. Risk MAP combines flood hazard mapping, risk assessment tools, and mitigation planning into one seamless program. The intent of this integrated program is to encourage beneficial partnerships and innovative uses of flood hazard and risk assessment data to maximize flood loss reduction. As FEMA moves forward with the Risk MAP implementation, the CTP program continues to be an essential component.

FEMA has been tracking the extent to which its mapping funds have been leveraged through the CTP program since the first partnership agreements were signed in 1999. The Blue Book, first published in 2002, is a living document. Because of changing conditions in technologies, processes, and the economy, this publication will be evaluated on a regular basis to see if updates or amendments are needed.

In 2016, FEMA reviewed a range of tasks and grouped similar items to create a series of unit costs by level of effort to help FEMA estimate each partner's contribution to ongoing activities. These estimates are indicative of the cost savings FEMA might see in production of flood hazard products (Flood Insurance Rate Map FIRM, FIRM Database, Flood Insurance Study (FIS) Report), flood risk products (Flood Risk Map, Flood Risk Database, Flood Risk Report), community outreach initiatives, and other associated activities. Although the leverage of studies is generally associated with the CTP program, other partners who are not members of the CTP program can provide FEMA with flood risk and hazard-related data and thus leverage their engagement.

## How to Use the Blue Book

FEMA's Blue Book is a tool CTPs can use to better understand the value their mapping activities contribute to Risk MAP Projects.

The unit-cost approach described in this document is a normalized average from across the nation used to determine the value of a partner's contribution. Because the actual costs associated with individual projects may vary significantly, **under no circumstances should these unit costs be used to estimate the cost of individual projects.** These values are very high-level aggregations of multiple sources of information to be able to make a like comparison from one partner to the next as to the level of effort and resources being provided to a project. To help partners, resources are available through FEMA's regional offices to assist in estimating the cost of individual projects. Please contact the appropriate FEMA CTP Regional Coordinator for more information (<https://www.fema.gov/flood-maps/cooperating-technical-partners/about/contacts>).

## Updates to the Pricing Methodology

Pricing was adjusted as follows:

- In 2003, unit costs were adjusted for inflation. An inflation rate of 2.2% was assumed and used to update the unit costs.
- In 2006, unit costs were adjusted based on the availability of additional cost data, and the update was not merely an adjustment for inflation.
- In 2009, new unit costs were developed for the Topographic Data Development and Perform Coastal Analysis mapping project elements.
- In 2011, input on new units and the corresponding costs was collected from FEMA Headquarters, 10 FEMA regional offices, FEMA's Program Management contractor, and the Production and Technical Services contractors. Each entity provided updates to cost data that took into account changes in guidance applicable to the Risk MAP Program, changes in technology, and inflation. FEMA obtained consensus from all contributors before proceeding with the release of the 2011 version of this document.
- In 2017, new unit costs were adjusted based on updated market rates. The project elements were aligned with the Project Planning and Purchasing Portal (P4) Tool. Additional elements were added that are part of the flood hazard mapping process, and redundant elements were removed. Leverage elements were separated by type (data leverage and in-kind services).

Highlights of the 2023 CTP Blue Book update includes:

- Updated the formatting of the CTP Blue Book to comply with new FEMA standards.

- Tasks were separated into individual sections with descriptive language and estimated leverage values.
- Unit price data informed by updated market rates.



# Project Task Costs and Assumptions

The following section includes estimated costs and assumptions for project tasks. Each project task is broken down into project phases and project elements/sub-elements as applicable. Task descriptions, relevant background information, and costing assumptions have been incorporated into each section so the reader can better understand the origin of the estimated costs. Please note that all costs provided in the Blue Book are intended as guidelines rather than exact metrics, and all estimated costs will require future updates.

## 1. Discovery

**Table 1. Discovery Task Leverage Table**

Project Element	Unit	Cost
Discovery – Data	Community	\$1,000
Discovery – In-Kind Services <sup>1</sup>	Community	\$1,600

### 1.1. Discovery – Data

Existing data, mined or previously prepared at the expense of the community/state, meet the requirements for community data collection in the Discovery effort. The data mining process can include reviewing existing topography, orthophotography, local levees, high water marks, local gauges, community study requests, historic and current floods, climate change and social vulnerability, and other types of data. Data should provide adequate information for the Cooperating Technical Partner (CTP) to perform a needs assessment for data development and capacity building project identification as outlined in Standards for Flood Risk Analysis and Mapping (SID29). This document states the Discovery effort should be used to identify areas needing mapping updates through data collection and/or Base Level Engineering (BLE) and to share these results with all stakeholders.

### 1.2. Discovery – In-Kind Services

Coordinate local meeting location and/or online meeting platform and equipment, signage for meeting location, and sign-in materials. Develop invitation language and coordinate invitations, RSVPs, and calendar invitations; meeting promotion; and any survey materials for a Discovery meeting. Develop a contact list and an engagement plan. Schedule and hold pre-Discovery interviews, webinars, and events during the Discovery effort. Develop Community Summary Sheets

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<sup>1</sup> Assumes one Discovery meeting will be held for each community. No travel costs are included in this assumption.

and an agenda, and refine the presentation and assignments for facilitators and note-takers. Give review comments on the Discovery report, Community Engagement Strategy and Plan (CESP), map and/or database including flood study needs gathered. Tasks may also include support for the Discovery kickoff meeting/webinar.

## 2. Mitigation and Community Outreach

**Table 2. Mitigation and Community Outreach Task Leverage Table**

Project Element	Unit	Cost
Mitigation and Community Outreach (not associated with a specific Risk MAP meeting) <sup>2</sup>	Community	\$2,000

### 2.1. Mitigation and Community Outreach (not associated with a specific Risk MAP meeting)

This task is relevant to any communication touchpoints outside of required meetings throughout the Risk Mapping, Assessment, and Planning (Risk MAP) project. Additionally, continued coordination effort with local communities on follow-up items, project status updates, and the collection and review of local data shared at any Risk MAP project meeting are also components of this task. In general, the goal of this task is to retrofit existing tools and resources to account for the diversity of community needs and risks as well as updating or developing new materials to integrate equity. Examples of this work include:

- Updating outreach and risk communication materials to be translated into multiple languages
- Making online resources available in print for those without a reliable internet connection.
- Converting National Flood Hazard Layer (NFHL) information (for communities with older static mapping products) into formats that are easier to use (e.g., KMZ files) and providing project-specific outreach or technical assistance.

## 3. Data Development (DD) – Survey

This project element includes collection of structural data within an area of study, which may include conditions along floodplain, types and numbers of hydraulic and/or flood-control structures,

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<sup>2</sup> Note: for any mitigation action funded through another federal/FEMA grant, the portion of the cost of the action that can be reported as leverage is only the percentage supplied as local match, as the remainder of the funding is sourced from another FEMA grant.

apparent maintenance (or lack thereof) of existing hydraulic structures, data along cross-sections, and other parameters needed for the hydrologic and hydraulic analyses.

**Table 3. DD-Survey Task Leverage Table**

Project Element	Sub-element	Unit	Cost
Riverine and Channel Field Survey	Full Survey for Stream Crossings (top of road, stream invert, culvert, or bridge). Includes all variance of flooding sources.	Cross-Section or Structure	\$2,000
Riverine and Channel Field Survey	Limited Survey for Stream Crossings (top of road, stream invert, culvert, or bridge). Including leveraging analysis for certified As-Built Drawings	Cross-Section or Structure	\$1,000
Coastal Field Survey	Field Survey meeting requirements outline in Technical Reference or Coastal Transect Field Visit or As-Built Drawings	Structure or Transect	\$1,350
Survey Independent Quality Assurance (QA)/Quality Control (QC)	Assume 10% of Analysis Costs	Percent Calculation	10% of total cost

### 3.1. Riverine and Channel Field Survey

Riverine field survey data for structures along flooding sources are prepared at local/partner's expense and:

- (1) Meet accuracy requirements for field survey and positional accuracy outlined in Guidance for Flood Risk Analysis and Mapping; and
- (2) Match or exceed base map information shown on the current effective Flood Insurance Rate Map (FIRM).

This includes a vast range of data collection from simple structure to bridges and railroads. More detail should be provided for a clearer understanding of project needs.

Channel field survey data are prepared at local/partner's expense and:

- (1) Meet accuracy requirements for field survey and positional accuracy outlined in Guidance for Flood Risk Analysis and Mapping;
- (2) Match or exceed base map information shown on the current effective FIRM; and

(3) Include field collection of parameters needed for study (structure dimensions, photos, and sketches).

Channel surveys are highly dependent on the terrain and access. More detail should be gathered for specific project needs.

### 3.2. Coastal Field Survey

Coastal structure survey data are prepared at local/partner's expense and;

(1) Meet accuracy requirements for field survey and positional accuracy outlined in Guidance for Flood Risk Analysis and Mapping; and

(2) Match or exceed base map information shown on the current effective FIRM.

Costs do not include travel to the locations.

### 3.3. Coastal Transect Field Visit

Field survey data for transects are prepared at local/partner's expense and:

(1) Meet accuracy requirements for field survey and positional accuracy outlined in Guidance for Flood Risk Analysis and Mapping;

(2) Match or exceed base map information shown on the current effective FIRM; and

(3) Include field collection of parameters needed for study (structure dimensions, photos, and sketches).

### 3.4. Survey Independent QA/QC

Quality review of submittals for the field survey task.

## 4. DD –Terrain

**Table 4. DD - Terrain Task Leverage Table**

Project Element	Sub-element	Unit	Cost
Lidar	QL1 Lidar	Square Mile	\$250
Lidar	QL2 Lidar	Square Mile	\$180
Lidar Independent QA/QC	Lidar Independent QA/QC	Square Mile	15% of total cost

## 4.1. Lidar

The topographic data development task is purchased when FEMA funds collection of new topographic data (e.g., lidar, photogrammetry) directly. If lidar data are to be acquired, new topographic data must:

- (1) Follow United States Geological Survey (USGS) 3DEP requirements for lidar acquisition, data processing, and vertical accuracy with certain exceptions as defined by SID40;
- (2) Meet data capture requirements defined in the most recent version of FEMA's data capture technical reference; and
- (3) Meet criteria for topographic dataset delivery to the Mapping Information Platform (MIP) based on file size. *[Minimum established to facilitate the gathering new lidar collection. Quality Level (QL) 1 is considered 8 points per square meter; 10cm RMSEz; QL2 is 2 points per square meter; 10cm RMSEz (current 3DEP standard)].*

If bathymetric data are to be acquired, new data must:

- (1) Meet data capture requirements defined in the most recent version of National Oceanic and Atmospheric Administration's (NOAA) coastal Mapping Strategy;
- (2) Meet accuracy class standard for elevation data as specified in the American Society for Photogrammetry and Remote Sensing (ASPRS) Positional Accuracy Standards for Digital Geospatial Data Edition 1, Version 1.0; and
- (3) Meet criteria for dataset delivery to the MIP based on file size.

## 4.2. Lidar Independent QA/QC

Independent QA/QC of the Lidar Task.

# 5. DD – Base Map

**Table 5. DD-Base Map Leverage Table**

Project Element	Unit	Cost
Base Map	Panel	\$300
Base Map Independent QA/QC	County	\$3,000

## 5.1. Base Map

Base map data are prepared at local/partner's expense and:

- (1) Meet accuracy requirements outlined in Standards for Flood Risk Analysis and Mapping;
- (2) Match or exceeds base map information shown on the current effective FIRM;
- (3) Are more current than that readily available through the National Agriculture Imagery Program (NAIP) or Topologically Integrated Geographic Encoding and Referencing (TIGER) data sources; and
- (4) Must be available for free distribution in support of FIRM release (no release constraints).

Square miles are computed by areas within printed panels and county/parish boundaries for update areas only.

## 5.2. Base Map Independent QA/QC

This task includes a quality review of submittals for the base mapping task.

# 6. DD – Hydrology

**Table 6. DD-Hydrology Leverage Table**

Project Element	Sub-element	Unit	Cost
Statistical/Historical Gage Analysis <sup>3</sup>	Bulletin 17C (Statistical/Historical Analysis)	Gage	\$2,000
Fluvial Analysis <sup>2</sup>	Rainfall Run-Off Methodologies	Linear Mile	\$1,600
Fluvial Analysis <sup>2</sup>	Regression Equations with Gage Analysis (miles up to 50)	Linear Mile	\$160
Fluvial Analysis <sup>2</sup>	Regression Equations with Large-Scale Economy (miles > 1,500)	Linear Mile	\$50
Pluvial + Fluvial Analysis <sup>2</sup>	2D Rain-on-Mesh Hydrology (square miles up to 200)	Square Mile	\$40
Pluvial + Fluvial Analysis <sup>2</sup>	2D Rain-on-Mesh Hydrology with Large-Scale Economy (square miles > 600)	Square Mile	\$20
Hydrology Independent QA/QC	Assume 10% of Analysis Costs	Percent Calculation	10% of total leverage for Hydrology Analysis

<sup>3</sup> Analysis for all five events as outlined in SID84.

## **6.1. Statistical/Historical Gage Analysis**

Hydrology data should:

- (1) Use engineering approaches outlined in Standards for Flood Risk Analysis and Mapping;
- (2) Use software on the approved model list;
- (3) Match or exceed current hydrologic approach as outlined in the effective Flood Insurance Study text; and
- (4) Be available for the five events outlined in SID84.

## **6.2. Fluvial Analysis**

Hydrology data should:

- (1) Use engineering approaches outlined in Standards for Flood Risk Analysis and Mapping;
- (2) Use software on the approved model list;
- (3) Match or exceed current hydrologic approach as outlined in the effective Flood Insurance Study text; and
- (4) Be available for the five events outlined in SID84.

## **6.3. Pluvial + Fluvial Analysis**

Hydrology data should:

- (1) Use engineering approaches outlined in Standards for Flood Risk Analysis and Mapping;
- (2) Use software on the approved model list;
- (3) Match or exceed current hydrologic approach as outlined in the effective Flood Insurance Study text; and
- (4) Be available for the five events outlined in SID84.

## **6.4. Hydrology Independent QA/QC**

This task includes a quality review of submittals for the hydrology task. This cost is assumed to be 10% of the total cost of the Hydrology Analysis, regardless of method.

## 7. DD – Hydraulics

**Table 7. DD-Hydraulics Leverage Table**

Project Element	Sub-element	Unit	Cost
1-D Modeling	Option A/B (Base Level) – Zone A	Linear Mile	\$175
1-D Modeling	Option C (Base Level) – Zone A	Linear Mile	\$300
1-D Modeling	Option D (Enhanced) – Zone A or AE	Linear Mile	\$800
1-D Modeling	Option E (Enhanced) – Zone AE w/ Floodway	Linear Mile	\$3,000
2-D Modeling	Option A/B (Base Level) – Zone A	Square Mile	\$100
2-D Modeling	Option C (Base Level) – Zone A	Square Mile	\$140
2-D Modeling	Option D (Enhanced) – Zone A or AE	Square Mile	\$1,000
2-D Modeling	Option E (Enhanced) – Zone AE w/ Floodway	Square Mile	\$6,000
Combined Coastal and Riverine Floodplain	Coastal/Levee	Tributary	\$1,750
Combined Coastal and Riverine Floodplain	Coastal/Riverine (Multi-Frequency Tie-in)	Tributary	\$1,500
Combined Coastal and Riverine Floodplain	Levee/Riverine	Tributary	\$1,250
Combined Coastal and Riverine Floodplain	Coastal/Riverine (Mapping Tie-in)	Tributary	\$1,000
Alluvial Fan Determination & Analysis	Alluvial Fan Determination	Square Mile	\$2,900
Alluvial Fan Determination & Analysis	Probabilistic Analysis	Square Mile	\$1,500
Alluvial Fan Determination & Analysis	Geomorphic Analysis	Square Mile	\$1,900



Project Element	Sub-element	Unit	Cost
Alluvial Fan Hydraulic Analysis	Active Fan (2D Analysis)	Square Mile	\$4,700
Alluvial Fan Hydraulic Analysis	Alluvial Fan (1D Analysis)	Linear Mile	\$3,600
Hydraulic Analysis Independent QA/QC	Assume 10% of Analysis Costs	Percent Calculation	<i>10% of total leverage for Hydraulic Analysis</i>

### 7.1. 1-D Modeling

Hydraulic data should:

- (1) Use standard engineering approaches;
- (2) Meet requirements outlined in Standards for Flood Risk Analysis and Mapping;
- (3) Use software on the approved model list;
- (4) Match or exceed current zone designation on the effective FIRM; and
- (5) Have been prepared at the local/partner's expense.

The leverage values provided in Table 7 are normalized averages. A project that procures high quantities of miles might be expected to have lower unit costs than what are shown in the table. Projects that procure only a few miles might be expected to have a higher unit cost.

### 7.2. 2-D Modeling

Hydraulic data should:

- (1) Use standard engineering approaches;
- (2) Meet requirements outlined in Standards for Flood Risk Analysis and Mapping;
- (3) Use software on the approved model list;
- (4) Match or exceed current zone designation on the effective FIRM; and
- (5) have been prepared at the local/partner's expense.

The leverage values provided in Table 7 are normalized averages. A project that procures high quantities of square miles might be expected to have lower unit costs than what are shown in the table. Projects that procure only a few square miles might be expected to have a higher unit cost.

### 7.3. Combined Coastal and Riverine Floodplain

Data available will provide combined probability calculations based on riverine and coastal/levee derived statistical water surface elevations for the 10%, 2%, 1%, and 0.2% events and provide a calculated joint probability elevation.

### 7.4. Alluvial Fan Determination & Analysis

**Determination** - Identify and characterize the alluvial fan and its extent with the potential risk of flood, active erosion, massive sediment transport, and deposition.

**Probabilistic Analysis** - Analyze the tendency of flow path change below the hydrographic apex, ensuing erosion, and abrupt deposition of sediment under certain hydrologic and geographic/geologic conditions within the study area.

**Geomorphic Analysis** - Analyze the potential of channel change and floodplain elevation change within the study area as a result of the alluvial fan flooding based on 1-D/2-D modeling result.

### 7.5. Alluvial Fan Hydraulic Analysis

This task includes an analysis that is available for leverage which has analyzed the flood flow, sediment transport, mudflow, or debris flow for the study area to determine the 100-year recurrence interval alluvial flooding using an approved modeling approach. Alluvial analysis will use standard engineering approaches and use software on the approved model list.

### 7.6. Hydraulic Analysis Independent QA/QC

This includes a quality review of submittals for the hydraulics task. This cost is assumed to be 10% of the total cost of the Hydraulic Analysis, regardless of the selected method.

## 8. DD – Coastal

**Table 8. DD-Coastal Leverage Table**

Project Element	Sub-element	Unit	Cost
Extreme Wave and Water Level Analysis	Pacific	Linear (Coastal) Mile	\$800,000
Extreme Wave and Water Level Analysis	Great Lakes	Linear (Coastal) Mile	\$550,000

Project Element	Sub-element	Unit	Cost
Extreme Wave and Water Level Analysis	Atlantic & Gulf Coast	Linear (Coastal) Mile	\$1,200,000
Coastal Wave Hazard Analysis & Erosion	Pacific	Linear (Coastal) Mile	\$9,500
Coastal Wave Hazard Analysis & Erosion	Great Lakes	Linear (Coastal) Mile	\$6,000
Coastal Wave Hazard Analysis & Erosion	Atlantic & Gulf Coast	Linear (Coastal) Mile	\$1,400
Other Coastal Hazard Analysis	Tsunami Modeling	Linear (Coastal) Mile	\$8,500
Other Coastal Hazard Analysis	Wave Hindcast Data	Linear (Coastal) Mile	\$7,900
Other Coastal Hazard Analysis	Tidal Frequency Analysis	Gage	\$3,500
Other Coastal Hazard Analysis	Revised Statistical Analysis	Linear (Coastal) Mile	\$125,000
Wave Hazard Analysis & Erosion QA/QC	Assume 10% of Analysis Costs	Percent Calculation	10% of total leverage for Coastal Analysis

## 8.1. Extreme Wave and Water Level Analysis

Coastal data should:

- (1) Include data and parameters that meet National Flood Insurance Program (NFIP) standards;
- (2) Use standard engineering approaches;
- (3) Meet requirements outlined in Standards for Flood Risk Analysis and Mapping; and
- (4) Use software on the approved model list.

## 8.2. Coastal Wave Hazard Analysis & Erosion

Coastal data should:

- (1) Include data and parameters that meet NFIP standards;

- (2) Use standard engineering approaches;
- (3) Meet requirements outlined in Standards for Flood Risk Analysis and Mapping;
- (4) Use software on the approved model list; and
- (5) Match or exceed current zone designation on the effective FIRM.

Coastal data should be based on geographic location and regional guidelines for conducting the coastal analysis.

### 8.3. Other Coastal Hazard Analysis

Coastal data should:

- (1) Include data and parameters that meet NFIP standards;
- (2) Use standard engineering approaches;
- (3) Meet requirements outlined in Standards for Flood Risk Analysis and Mapping, (4) use software on the approved model list; and
- (5) Match or exceed current zone designation on the effective FIRM.

### 8.4. Wave Hazard Analysis & Erosion QA/QC

This task includes a quality review of submittals for the coastal task.

## 9. DD – Levee

All deliverables under this section refer to the mapping of a levee system for flood hazard maps and are unrelated to levee evaluation and accreditation.

**Table 9. DD-Levee Leverage Table**

Project Element	Sub-element	Unit	Cost
Levee Analysis and Mapping Plan <sup>4</sup>	High Complexity with Multiple Levee Systems	Plan Document	\$50,000
Levee Analysis and Mapping Plan <sup>3</sup>	Moderate Complexity with 1 or 2 Levee Systems	Plan Document	\$25000

<sup>4</sup> Note: Number of reaches and mileage is accounted for in the different levels of complexity in the categories listed.

Project Element	Sub-element	Unit	Cost
Levee Analysis and Mapping Plan <sup>3</sup>	Simple Complexity with 1 Levee System	Plan Document	\$15,000
Levee Analysis Procedures	Natural Valley Analysis (1D)	Linear Mile (of Levee)	\$2,200
Levee Analysis Procedures	Natural Valley Analysis (2D)	Linear Mile (of Levee)	\$3,000
Levee Analysis Procedures	Review Data for Sound Reach or Freeboard Deficient	Reach	\$4,000
Levee Analysis Procedures	Overtopping Procedure	Linear Mile (of Levee)	\$8,250
Levee Analysis Procedures	Structural Based Inundation <sup>5</sup>	Linear Mile (of Levee)	\$4,000
Levee Data Review	Assume 10% of Plan and/or Analysis Costs	Percent Calculation	<i>10% of total leverage for Analysis</i>

### 9.1. Levee Analysis and Mapping Plan

This plan takes the format of a report documenting non-accredited levee system data availability, meeting notes, and suggested approach for analysis and mapping based on input from the Local Levee Partnership Team including the local community, levee owners, and operators. Tasks associated with this plan include data collection efforts, in-person meetings, field visits of the levee system(s), and estimation of report compilation costs.

### 9.2. Levee Analysis Procedures

The levee analysis should be prepared at a partner's expense and included in ongoing or future Flood Risk Projects.

### 9.3. Levee Data Review

This task includes a quality review of submittals for the levee or Levee Analysis and Mapping Procedures (LAMP) data capture tasks.

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<sup>5</sup> FEMA traditionally pays for this service.

## 10. DD – Floodplain Mapping

**Table 10. DD-Floodplain Mapping Leverage Table**

Project Element	Unit	Cost
Create and Clean Flood Layers including Tie-ins (Flood Insurance Study [FIS] Elements- Profiles, Floodway Data Table [FDT])	Stream mile	\$50
Redelineation and Workmaps	Stream mile	\$350

### 10.1. Create and Clean Flood Layers including Tie-ins (Profiles, FDT)

Floodplain mapping is conducted at local/partner's expense for use and inclusion in Flood Risk Projects. Floodplain mapping creation and cleaning of all flood layers include tie-ins, profiles, and FDT. Factors to consider in level of effort are: 1D vs 2D modeling, number of tie-ins, confluence, length of stream, back water, and floodway.

### 10.2. Redelineation and Workmaps

Work maps should include updated floodplain/effective data layers and updated topographic information. Topographic relief and land use type (urban vs. rural area) are to be considered under the redelineation task.

## 11. Risk Review and Resilience Outreach

**Table 11. Risk Review and Resilience Outreach Leverage Table**

Project Element	Unit	Cost
Meeting Logistics Support <sup>6</sup>	Community	\$3,000

### 11.1. Meeting Logistics Support

**Task Overview:** This task includes all meeting support associated with preparing for a Resilience Meeting. CTP staff will coordinate local meeting venue and/or online meeting platform and equipment, signage for meeting location, and sign-in materials. They will also develop invitation language; coordinate invitations, RSVPs, and calendar invitations; market the meeting in

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<sup>6</sup> Note: for any mitigation action funded through another federal/FEMA grant, the portion of the cost of the action that can be reported as leverage is only the percentage supplied as local match, as the remainder of the funding is sourced from another FEMA grant.

coordination FEMA's External Affairs team; and provide any surveying materials in support of a Flood Risk Review meeting. This would include the SID 621 outreach needs.

## 12. DD – Preliminary FIS Products

**Table 12. DD-Preliminary Leverage Table**

Project Element	Sub-element	Unit	Cost
QA/QC of Automated Map Production (AMP) Floodplain Mapping	Levee	Linear Mile x # of LAMP Approaches	\$175
Create and Clean Flood Layers including Tie-ins (FIS Elements- Profiles, FDT)	n/a	Stream mile	\$50
Redelineation, Work Map	n/a	Stream mile	\$350
Prepared and Compiled Quality Checked/Quality Assured Preliminary Products as Referenced in Section 6.13 of the Data Capture Technical Reference (Nov 2021)	n/a		\$8,250
FIS Text	Current Effective is Old Format or Current Effective Does Not Exist Current Effective is New Format	Volume	\$6,500

### 12.1. QA/QC of AMP Floodplain Mapping

Quality review of AMP submittals is required for the floodplain mapping task.

### 12.2. Preliminary Deliverable Product and Quality Assurance

Confirm preliminary products are all prepared, compiled, and quality checked/quality assured as referenced in the current Data Capture Technical Reference document.

### 12.3. Flood Insurance Study Text

The FIS text is prepared and compiled at the local/partner's expense.

## 13. DD – Flood Risk Products

**Table 13. DD – Flood Risk Product (FRP) Leverage Table**

Project Element	Sub-element	Unit	Cost
Areas of Mitigation Interest	n/a	Community	\$2,000
Changes Since Last FIRM <sup>7</sup>	n/a	Linear Mile	\$10
1-D Flood Risk Depth and Analysis Rasters	Flood Depth & Water Surface Elevation Rasters (simple area)	Linear Mile	\$100
1-D Flood Risk Depth and Analysis Rasters	Flood Depth & Water Surface Elevation Rasters (complex area)	Linear Mile	\$3,500
1-D Flood Risk Depth and Analysis Rasters	Percent Annual Chance & 30-Year Chance Rasters	Linear Mile	\$750
2-D Flood Risk Depth and Analysis Rasters	Flood Depth & Water Surface Elevation Rasters (single or multi-frequency)	Square Mile	\$10
2-D Flood Risk Depth and Analysis Rasters	Percent Annual Chance & 30-Year Chance Rasters	Square Mile	\$5
Other Datasets	Enhanced Datasets	Linear Mile	\$50
Multi-Hazard and Flood Risk Assessment	Structure Based Flood Risk Assessment	Structure	\$15
Multi-Hazard and Flood Risk Assessment	Enhanced (Updated Aggregate Census Blocks)	Structure	\$5
Multi-Hazard and Flood Risk Assessment	Multi-Hazard	Project	\$4,000
Multi-Hazard and Flood Risk Assessment	Default Census Block	Project	\$2,800
Flood Risk Products	Flood Risk Database	Project	\$2,500

<sup>7</sup> Changes Since Last FIRM only has this leverage value for initial digitization. Otherwise, this is completed in AMP.



### **13.1. Areas of Mitigation Interest**

Flood risk or other datasets highlight mitigation opportunities or concerns prepared in support of an ongoing watershed or other Flood Risk Study.<sup>8</sup>

### **13.2. Changes since Last FIRM**

Changes Since Last FIRM coverage dataset is prepared at local/partner's expense in support of an ongoing watershed or other Flood Risk Study.

### **13.3. 1-D Flood Risk Depth and Analysis Rasters**

Flood Risk datasets are prepared at local/partner's expense in support of an ongoing watershed or other Flood Risk Study.

### **13.4. 2-D Flood Risk Depth and Analysis Rasters**

Flood Risk datasets are prepared at local/partner's expense in support of an ongoing watershed or other Flood Risk Study.

### **13.5. Other Datasets**

Other types of Flood Risk datasets for coastal, dam, levee, or riverine situations are developed according to FEMA guidance.

### **13.6. Multi-Hazard and Flood Risk Assessment**

A Flood Risk Assessment is prepared at local/partner's expense in support of an ongoing watershed or other Flood Risk Study.<sup>9</sup>

### **13.7. Flood Risk Products**

Flood Risk Products are prepared at local/partner's expense in support of a Flood Risk Study. A Flood Risk Database can be used to create a Flood Risk Map or Flood Risk Report.

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<sup>8</sup> Note: for any mitigation action funded through another federal/FEMA grant, the portion of the cost of the action that can be reported as leverage is only the percentage supplied as local match, as the remainder of the funding is sourced from another FEMA grant.

<sup>9</sup> Note: Note: for any mitigation action funded through another federal/FEMA grant, the portion of the cost of the action that can be reported as leverage is only the percentage supplied as local match, as the remainder of the funding is sourced from another FEMA grant.

## 14. CNMS Update

**Table 14. CNMS Update Leverage Table**

Project Element	Unit	Cost
Coordinated Needs Management Strategy (CNMS) Updates	Per evaluation	\$800

### 14.1. CNMS Updates

Updates to CNMS database capture study needs, study scope, and associated information at each milestone: BLE/Discovery, Scoping Funded, Preliminary Issuance, and Letter of Final Determination (LFD) Issuance. See CNMS touchpoints in the CNMS technical reference.

## 15. Meeting Outreach

**Table 15. Meeting Outreach Leverage Table**

Project Element	Unit	Cost
Consultation Coordination Officer (CCO)/ Preliminary Digital Flood Insurance Rate Map (DFIRM) Communication Coordination (PDCC) Meeting Logistics, Attendance, and Support	Meeting	\$6,500

### 15.1. CCO/PDCC Meeting Logistics, Attendance, and Support

CTP staff will coordinate local meeting venue and/or online meeting platform and equipment, signage for meeting location, sign-in materials, and any surveying materials in support of a CCO meeting. Meeting support may include development of materials such as meeting invitations, PowerPoint presentation, and meeting notes. Includes preparation and attendance associated with a Flood Risk Review meeting.

Leverage not available if CTP uses FEMA Community Assistance Program (CAP) funds to support CCO/PDCC meeting.

## 16. Post-Preliminary FIS Products

**Table 16. Post-Prelim Leverage Table**

Project Element	Unit	Cost
Revised Preliminary	Panel	\$700
Initiate Appeal Period	Community	\$600

Project Element	Unit	Cost
Capture Appeals and Comments	Community	\$500
Final Map Production	Panel	\$350
Final FIS	Volume	\$650
Final Summary of Map Actions (SOMA) and LFD	Community	\$650
Revalidation Letter	Community	\$250
Final Technical Study Data Notebook (TSDN) and Archiving	County	\$1,500

### 16.1. Revised Preliminary FIS Products

Develop revised preliminary products as needed. Includes mailing of revised products to communities. Includes database, FIS, panels, and delivery, as well as QA/QC. Assumes one panel and mailing to one community. Assumes a single FIS volume update.

### 16.2. Initiate Appeal Period

CTP will populate the Flood Hazard Determination (FHD) on the Web, complete Quality Review (QR) 4 Part 1, publish Federal Register proposed notice, and initiate local printings required to initiate appeal period. Tasks also include the preparation and submittal of Appeal Start documents and completion of QR4 - Part 2. Includes mailing approved appeal letters with tracking. Assumes mailing and publication per community.

### 16.3. Capture Appeals and Comments

Compile all appeals and comments, work with FEMA Region to resolve, mail acknowledgement and resolution letters. Assumes 4 hours per inquiry.

### 16.4. Final Map Production

Submit and complete all elements related to QR5, QR7, and QR8. Includes all revisions and submittals to receive a pass for each QR step.

### 16.5. Final SOMA and LFD

Submit and complete all tasks required for QR6. Assumes 10 Letter of Map Changes (LOMCs) for review in a community.

### 16.6. Revalidation Letter

Prepare and submit revalidation letters for review. Address revalidation letter comments. Includes mailing of all letters. Assumes 10 LOMCs for review in a community.

## **16.7. Final TSDN and Archiving**

Complete the TSDN checklist and upload all final study-related materials to MIP.

# Acronym List

AMP	Automated Map Production
ASPRS	American Society for Photogrammetry and Remote Sensing
BLE	Base Level Engineering
CAP	Community Assistance Program
CCO	Consultation Coordination Officer
CESP	Community Engagement Strategy and Plan
CNMS	Coordinated Needs Management Strategy
CTP	Cooperating Technical Partner
DD	Data Development
DFIRM	Digital Flood Insurance Rate Map
FDT	Floodway Data Table
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FHD	Flood Hazard Determination
FRP	Flood Risk Product
LAMP	Levee Analysis and Mapping Procedure
LFD	Letter of Final Determination
Lidar	Light Detection and Ranging
LOMC	Letter of Map Change
MIP	Mapping Information Platform
NAIP	National Agriculture Imagery Program

NFHL	National Flood Hazard Layer
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
PDCC	Preliminary DFIRM Communication Coordination
QA/QC	Quality Assurance, Quality Control
QL	Quality Level
QR	Quality Review
Risk MAP	Risk Mapping, Assessment and Planning
SOMA	Summary of Map Actions
TIGER	Topologically Integrated Geographic Encoding and Referencing
TSDN	Technical Study Data Notebook
USGS	United States Geological Survey