

Map
MODERNIZATION
Federal Emergency Management Agency



FEMA's Flood Hazard Mapping Program

**Guidelines and
Specifications**
for
**Flood Hazard
Mapping Partners**

Glossary



FEDERAL EMERGENCY MANAGEMENT AGENCY

www.fema.gov/fhm/dl_cgs.shtm

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All policy and standards in this document have been superseded by the FEMA Policy for Flood Risk Analysis and Mapping. However, the document contains useful guidance to support implementation of the new standards.

Glossary of Terms

The terms listed below are used throughout this document and in other FEMA Flood Hazard Mapping Program documents.

0.2-Percent-Annual-Chance Flood—The flood that has a 0.2-percent chance of being equaled or exceeded in any given year.

1-Percent-Annual-Chance Flood— The flood that has a 1-percent chance of being equaled or exceeded in any given year.

2-Percent-Annual-Chance Flood—The flood that has a 2-percent chance of being equaled or exceeded in any given year.

10-Percent-Annual-Chance Flood—The flood that has a 10-percent chance of being equaled or exceeded in any given year.

10-Year Flood—See 10-Percent-Annual-Chance Flood.

50-Year Flood—See 2-Percent-Annual-Chance Flood.

100-Year Flood—See 1-Percent-Annual-Chance Flood.

500-Year Flood—See 0.2-Percent-Annual-Chance Flood

Accuracy—The degree of correctness attained in a measurement.

Alluvial Fan—The sedimentary deposit located at a topographic break, such as the base of a mountain front, escarpment, or valley side, that is composed of streamflow and/or debris flow sediments and has the shape of a fan, either fully or partially extended. These characteristics can be categorized by composition, morphology, and location.

Alluvial Fan Flooding—The flooding that occurs on an alluvial fan as defined above. The term *alluvial fan flooding* encompasses both active alluvial fan flooding and inactive alluvial fan flooding.

Alluvial Fan Flooding (Active)—Flooding that occurs only on alluvial fans and is characterized by flow path uncertainty so great that this uncertainty cannot be set aside in realistic assessments of flood risk or in the reliable mitigation of the hazard. An active alluvial fan flooding hazard is indicated by three related criteria: (1) flow path uncertainty

below the hydrographic apex; (2) abrupt deposition and ensuing erosion of sediment as a stream or debris flow loses its ability to carry material eroded from a steeper, upstream source area; and (3) an environment where the combination of sediment availability, slope, and topography creates an ultrahazardous condition for which elevation on fill will not reliably mitigate the risk.

Alluvial Fan Flooding (Inactive)—Flooding that is similar to traditional riverine flood hazards, but occurs only on alluvial fans. Inactive alluvial fan flooding is characterized by flow paths with a higher degree of certainty in realistic assessments of flood risk or in the reliable mitigation of the hazard. Unlike active alluvial fan flooding hazards, an inactive alluvial fan flooding hazard is characterized by relatively stable flow paths. However, like areas of active alluvial fan flooding, inactive alluvial fan flooding, may be subject to sediment deposition and erosion, but to a degree that does not cause flow path instability and uncertainty.

Alphanumeric Data—Data consisting of both letters and numbers, and possibly symbols such as punctuation marks.

American Standard Code for Information Interchange (ASCII)—A popular standard for the exchange of alphanumeric data.

Appeal—The formal objection to proposed or proposed modified Base Flood Elevations (BFEs), submitted by a community official or an owner or lessee of real property within the community during the statutory 90-day appeal period. An appeal must be based on data that show the proposed or proposed modified BFEs are scientifically or technically incorrect.

Appeal Period—The statutory period, beginning on the date of second publication of proposed BFEs and/or proposed modified BFEs in the local newspaper, during which community officials or owners or lessees of real property within the community may appeal proposed or proposed modified BFEs by submitting data to show those BFEs are scientifically or technically incorrect.

Application/Certification Forms—The comprehensive, easy-to-use forms that were implemented by FEMA in October 1992 to facilitate the processing of requests for revisions or amendments to National Flood Insurance Program maps.

Approved Model—A numerical computer model that has been accepted by FEMA for use in performing new or revised hydrologic or hydraulic analyses for National Flood Insurance Program purposes. All accepted models must meet the requirements set forth in Subparagraph 65.6(a)(6) of the National Flood Insurance Program regulations.

Approximate Study—A flood hazard study that results in the delineation of floodplain boundaries for the 1-percent-annual-chance (100-year) flood, but does not include the determination of BFEs or flood depths.

Area—The level of spatial measurement referring to a two-dimensional defined space

Area Not Included (ANI)—An area that is excluded from the mapping for a subject community because (1) the area is under the jurisdiction of another community and is shown on the mapping for that community, or (2) access to the area is limited for security reasons (e.g., military installations).

Artwork—The various layers prepared by the cartographic staff that are components of the manually produced Flood Insurance Rate Map and/or Flood Boundary and Floodway Map.

As-Built—A term used to describe mapping and mapping-related data that reflect conditions within a floodplain based on flood-control and other structures being completed.

Assistance Officer (AO) —The FEMA Regional Office staff person that is responsible for the administration of funding and funding-related activities for a specific contract or agreement.

Area of Special Consideration (ASC) —The name given to a special floodprone area around closed-basin lakes. The ASC is an area that is known to be subject to flooding, but the percent chance of the area being flooded in any given year is not defined.

Attribute—The descriptive characteristic or quality of a feature. An attribute value is a measurement assigned to an attribute for a feature instance.

Backwater—Water backed up or retarded in its course as compared with its normal or natural condition of flow.

Base Flood—The flood that has a 1-percent chance of being equaled or exceeded in any given year.

Base Flood Elevation (BFE) —The elevation of a flood having a 1-percent chance of being equaled or exceeded in any given year.

Base Map—The map of the community that depicts cultural features (e.g., roads, railroad, bridges, dams, culverts), drainage features, and corporate limits.

Batch Processing—The system by which computers process, without operator intervention, all input for an application at one time to produce the desired output, even though input data might have been collected periodically.

Bench Mark (BM)—A permanent monument established by any Federal, State, or local agency, whose elevation and description are well documented and referenced to the National Geodetic Vertical Datum of 1929 or the North American Vertical Datum of 1988.

Bit—An abbreviation for binary digit, a number that can have only a value of 0 or 1.

Block—A group of bytes treated as one unit of information, sometimes called a physical record.

Buffer Zone—An area of specified distance (radius) around a map item or items.

Building—See Structure.

Byte—A group of bits that can be stored and retrieved as a unit.

Cell—The defined geometric shape that stores data or defines an area that is labeled. The most common mapping cell is a square. Also the basic element of spatial information in raster data structures.

Centroid—The point interior to a polygon whose coordinates are the averages of the corresponding coordinates for all points included in the polygon.

Channel—A naturally or artificially created open conduit that periodically or continuously contains moving water or which forms a connecting link between two bodies of water.

Chief Executive Officer (CEO)—The official of a community who has the authority to implement and administer laws, ordinances, and regulations for that community.

Choropleth Map—A map with shaded or hatched areas. (Choro = place and pleth = value.)

Coastal Barrier Resources System (CBRS)—A system of protected coastal areas (including the Great Lakes). The areas within the CBRS are defined as depositional geologic features consisting of unconsolidated sedimentary materials; subject to wave, tidal, and wind energies; and protecting landward aquatic habitats from direct wave attack.

Coastal Flooding—Flooding that occurs along the Great Lakes, the Atlantic and Pacific Oceans, and the Gulf of Mexico.

Coastal High Hazard Area—An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high-velocity wave actions from storms or seismic sources.

Code of Federal Regulations (CFR)—The codification of the general and permanent rules published in the *Federal Register* by the Executive Departments and agencies of the Federal

Government. National Flood Insurance Program regulations are printed in Parts 59 through 77 of Title 44 of the CFR.

Community—Any State or area or political subdivision thereof, or any Indian tribe or authorized tribal organization, or Alaska Native village or authorized native organization, which has the authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction.

Community Assistance Call (CAC)—A telephone call made by FEMA Regional Office staff or the State National Flood Insurance Program Coordinator to a community to supplement or replace a Community Assistance Visit.

Community Assistance Program (CAP)—A FEMA program, funded by the National Flood Insurance Program (NFIP), under which cost-shared funds are provided to States to provide technical assistance support to communities participating in the NFIP. The purpose of the CAP is to identify, prevent, and resolve floodplain management issues in NFIP participating communities before a flood occurs, or before poor performance or noncompliance warrant enforcement and intervention by FEMA.

Community Assistance Visit (CAV)—A visit by FEMA Regional Office staff or the State National Flood Insurance Program Coordinator to a community to assess whether the community's floodplain management program meets National Flood Insurance Program participation requirements.

Community Coordination Meeting—A meeting during which Flood Hazard Mapping Partners discuss plans for a Flood Map Project, interim results of a Flood Map Project, and final results of a Flood Map Project for a particular community or group of communities.

Community Identification Number (CID)—A six-digit code used by FEMA to identify each community that is potentially subject to flood hazards.

Community Information System (CIS)—An Oracle database system used by FEMA to track and report on all communities identified by FEMA as potentially floodprone, especially with regard to mapping actions, including Letters of Map Change, taken by FEMA to identify flood hazards in each community.

Community Rating System (CRS)—A FEMA initiative, established under the National Flood Insurance Program, to recognize and reward communities that have implemented floodplain management measures beyond the minimum required by National Flood Insurance Program regulations. Under the CRS, those communities that choose to participate voluntarily may reduce the flood insurance premium rates for property owners in the community by taking these additional actions.

Compliance Period—The period that begins with the issuance of a Letter of Final Determination and ends when a new or revised Flood Insurance Rate Map becomes effective. During the compliance period, a community must enact and adopt new or revised floodplain management ordinances required for participation in the National Flood Insurance Program.

Computer-Assisted Drafting and Design (CADD)—Software with the capability of assisting the operator with the performance of standard engineering and architecture design functions.

Conditional Letter of Map Amendment (CLOMA)—The FEMA response to a requester who believes his or her proposed structure, when constructed on natural ground at or above the BFE, will be outside the 1-percent-annual-chance floodplain. CLOMAs may not be issued for unimproved or undeveloped property.

Conditional Letter of Map Revision (CLOMR)—The FEMA response to a community request for FEMA's comment on proposed alterations to the floodplain conditions within that community. The CLOMR describes the effect of the proposed project, if constructed as proposed, on the effective FIRM, FBFM, and/or FIS report. A CLOMR often contains detailed information on conditions that must be met by a requester before FEMA will issue a final determination regarding revising the FIRM, FBFM, and/or FIS report.

Conditional Letter of Map Revision Based on Fill (CLOMR-F)—The FEMA response to a community request for FEMA's comment on the effect(s) that a proposed project involving the placement of earthen fill within the SFHA will have on the Special Flood Hazard Area designation for one or more legally defined parcels of land or one or more proposed structures.

Consultation Coordination Officer (CCO)—The individual on the FEMA Regional Office staff who is responsible for coordinating with a community on activities related to National Flood Insurance Program.

Contracting Officer (CO)—The FEMA Headquarters staff person that is responsible for the administration of funding and funding-related activities for a specific contract or agreement.

Control Point—Any station in a horizontal or vertical control network that is identified in a dataset of photograph and used for correlating the data shown in the data set or photograph.

Cooperating Technical Partners (CTP) Initiative—An innovative FEMA program to create partnerships between FEMA and participating National Flood Insurance Program communities, regional agencies, and State agencies that have the interest and capability to become more active participants in the FEMA Flood Hazard Mapping Program.

Coordinate Geometry (COGO)—The use of bearings and distances, azimuths, and coordinate locations to enter and describe graphic data. COGO is usually used for civil engineering and survey applications.

Coordinate Pair—A set of cartesian coordinates describing the location of a point, line or area (polygon) feature in relation to the common coordinate system of the data base.

Coordinate System—A particular kind of reference frame or system, such as plane rectangular coordinates or spherical coordinates, which use linear or angular quantities to designate the position of points within that particular reference frame or system (e.g., State Plane).

Countywide Format—A format used by FEMA to show flooding information for the entire geographic area of a county, including the incorporated communities in the county, on one map and in one report.

Cultural Features—Railroads, airfields, streets, roads, highways, levees, dikes, seawalls, dams and other flood-control structures, and other prominent manmade features and landmarks shown on a National Flood Insurance Program map.

Database—A collection of information related by a common fact or purpose.

Database Management System (DBMS) —A systematic approach to maintaining, accessing, and manipulating data base files. A DBMS may consist of a single program or a collection of task-specific programs.

Data Capture—The series of operations required to encode data in a computer-readable form (digitizing).

Data Layer—Refers to data having similar characteristics being contained in the same plane or overlay (e.g., roads, rivers) of a Geographic Information System. Usually information contained in a data layer is thematically related and is designed to be used with other layers.

Dataset or Datafile—A named collection of logically related data records arranged in a prescribed manner. The physical set of data of one data type being referred to or being used in the context of a data processing operation.

Detailed Study—A flood hazard study that, at a minimum, results in the delineation of floodplain boundaries for the 1-percent-annual-chance (100-year) flood and the determination of BFEs or flood depths.

Differential Global Positioning System (DGPS)—Global Positioning System (GPS) positioning techniques that use two or more GPS receivers, with a base station on a position of known location, and one or more roving receivers taking GPS measurements at unknown locations.

Digital Data—Data displayed, recorded, or stored in binary notation.

Digital Elevation Model (DEM)—A file with terrain elevations recorded for the intersection of a fine-grained grid and organized by quadrangle as the digital equivalent of the elevation data on a topographic base map.

Digital Flood Insurance Rate Map (DFIRM)—A Flood Insurance Rate Map that has been prepared as a digital product, which may involve converting an existing manually produced FIRM to digital format, or creating a product from new digital data sources using a Geographic Information System environment. The DFIRM product allows for the creation of interactive, multi-hazard digital maps. Linkages are built into an associated database to allow users options to access the engineering backup material used to develop the DFIRM, such as hydrologic and hydraulic models, Flood Profiles, data tables, Digital Elevation Models, and structure-specific data, such as digital elevation certificates and digital photographs of bridges and culverts.

Digital Flood Insurance Rate Map–Digital Line Graph (DFIRM-DLG)—The product created by extracting the flood risk thematic data from the DFIRM. The format of this product is the U.S. Geological Survey Digital Line Graph Level 3 optional format. The DFIRM-DLG does not include base map information, or graphic data required to create a FIRM in hardcopy format. The DFIRM-DLG is intended to be the primary means of transferring flood risk data depicted by FIRMs to Geographic Information Systems through a public domain data exchange format. The DFIRM-DLGs are tiled the to U.S. Geological Survey 1:24,000 scale topographic map series.

Digital Flood Insurance Rate Map (DFIRM) Spatial Database—A database designed to facilitate collecting, storing, processing, and accessing data developed by FEMA, enabling Mapping Partners to share the data necessary for the DFIRM production and conversion process. Where possible, all mapping and engineering data elements are linked to physical geographic features and georeferenced. The use of a Geographic Information System as a component of the DFIRM spatial database provides the ability to georeference and overlay the mapping and engineering data, allowing the database to support a wide variety of existing and forthcoming FEMA engineering and mapping products.

Digital Line Graph (DLG)—A computer file format for mapping data that provides a topological structure to describe points, lines, and polygons. FEMA has adopted the U.S. Geological Survey (USGS) Digital Line Graph Level 3 optional format for National Flood Insurance Program mapping and engineer requirements. A DLG may contain lists of point coordinates describing boundaries, drainage lines, transportation routes, and other linear features, which are organized by USGS quadrangle areas. These data are the digital equivalent of the linear hydrographic and cultural data on a topographic base map. The flood risk thematic layers developed by FEMA will fit the quadrangle as an overlay.

Digital Line Graph Level 3 (DLG-3)—Data files that are fully topologically structured and are designed to be integrated into Geographic Information Systems.

Digital Orthophoto Quadrangle (DOQ)—Photographic maps distributed by the U.S. Geological Survey. A DOQ is an aerial photograph that is adjusted to remove distortions caused by variations in terrain and the camera lens to produce a photograph that displays features in their planimetrically correct location. This term is sometimes used loosely to mean any photographic map produced by this process.

Digital Terrain Model (DTM)—A land surface represented in digital form by an elevation grid or lists of three-dimensional coordinates.

Digitizing—A process of converting an analog image or map into a digital format usable by a computer.

Disaster Field Office (DFO)—The term used to describe the office that is the central coordinating point for all response and recovery efforts by State and Federal agencies as a result of widespread damage caused by a disaster. The DFO does not directly serve the public, but functions as a headquarters from which emergency managers operate.

Drawing Exchange File (DXF)—A commonly used format for the exchange of graphic data.

Edge Matching—The comparison and graphic adjustment of features to obtain agreement along the edges of adjoining map sheets.

Effective Date—The date on which the National Flood Insurance Program Map for a community becomes effective and all sanctions of the National Flood Insurance Program apply.

Effective Map—The National Flood Insurance Program map issued by FEMA that is in effect as of the date shown in the title block of the map as “Effective Date,” “Revised,” or “Map Revised.”

Elevation Reference Mark (ERM) — Temporary vertical control monument established by a FEMA Study Contractor during the performance of a study or restudy.

Elevation Reference Point (ERP)—A temporary mark, the elevation of which is determined by levels or Differential Global Positioning System positioning from a bench mark or

elevation reference mark. For purposes of the National Flood Insurance Program, ERPs are submitted with copies of field notes or a documented summary of procedures.

Emergency Phase—The phase of the National Flood Insurance Program that was implemented, on an emergency basis, to provide a first-layer amount of insurance on all insurable structures before the effective date of the initial Flood Insurance Study and Flood Insurance Rate Map.

Emergency Preparedness and Response Directorate—The component of the U.S. Department of Homeland Security that, among other responsibilities, administers the National Flood Insurance Program.

Emergency Program—See **Emergency Phase**.

Encroachment—Construction, placement of fill, or similar alteration of topography in the floodplain that reduces the area available to convey floodwaters.

Engineering Study Data Package (ESDP) Project—A project designed to maintain archival engineering data and other pertinent flood hazard data in hardcopy and electronic form and to distribute these data to interested parties.

Engineering Study Data Package Facility (ESDPF) —The facility, maintained for FEMA by a contractor, where archival engineering data and other pertinent flood hazard data, are prepared in final form ready for distribution to interested parties.

Exporting—The process of transferring digital data or software from one system to another system.

Existing Data Study (XDS)—This term is used to describe the process by which FEMA uses previously published flood hazard information to prepare a Flood Insurance Study report and Flood Insurance Rate Map for a community that does not have a FIRM using previously published flood hazard information. This flood hazard information comes from reports prepared by Federal agencies for purposes other than the National Flood Insurance Program, such as Flood Hazard Analyses Reports and Floodplain Information reports; other engineering reports prepared by Federal, State, or local agencies; or Flood Insurance Study reports and maps issued by FEMA for adjacent communities (especially previously unincorporated areas of a county).

Existing Data Restudy (RXDS)—An Existing Data Study for a community that is already participating in the Regular Phase of the National Flood Insurance Program without a flood map.

External Data Request (EDR)—A request from a State, community, or other non-FEMA source for the archived technical and administrative support data developed and maintained by FEMA for the National Flood Insurance Program.

Extraterritorial Jurisdiction (ETJ) Limits—Areas outside of a community's corporate limits where the community has authority to regulate zoning and issue building permits.

Federal Contractors—The five Federal agencies that conduct flood studies, under contract with FEMA, for the Limited Map Maintenance Program: U.S. Army Corps of Engineers, U.S. Geological Survey, U.S. Soil Conservation Service, U.S. Bureau of Reclamation, and Tennessee Valley Authority.

Federal Emergency Management Agency (FEMA)—The component of the Emergency Preparedness and Response Directorate within the U.S. Department of Homeland security that oversees the administration of the National Flood Insurance Program.

FEMA Levee Inventory System (FLIS)—A Web-based database and information retrieval system used by FEMA to collect and maintain information on structures shown on effective and soon-to-be-effective Flood Insurance Rate Maps, including levees, dikes, floodwalls, and road and railroad embankments.

Federal Register—The document, published daily by the Federal Government, that presents regulation changes and legal notices issued by Federal agencies. FEMA publications in the Federal Register include Proposed, Interim, and Final Rules for BFE determinations; Compendium of Flood Map Changes published twice each year; and Final Rules concerning community eligibility for the sale of flood insurance.

Fee-Charge System Administrator—The individual that is responsible for processing and maintaining records of payments submitted to the National Flood Insurance Fund for conditional and final map change requests and requests for technical and administrative support data.

FEMA Lead—FEMA staff member (usually the Regional Project Officer or the Flood Map Production Coordination Contractor Project Officer at FEMA Headquarters) that oversees project scope, schedule, and budget, and coordinate the Project-related activities of the various Flood Hazard Mapping Partners.

Fill—Soil that is brought in to raise the level of the ground. Depending on where the soil is placed, fill may change the flow of water or increase flood elevations. Fill may be used to elevate a building to meet National Flood Insurance Program requirements. Sometimes fill is combined with other methods of elevation such as pilings or foundation walls. Placement of fill requires a local permit from the community.

Fiscal Year—The 12-month period that begins on October 1 and ends on September 30.

Flood—A general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters or (2) the unusual and rapid accumulation or runoff of surface waters from any source.

Flood Boundary and Floodway Map (FBFM)—The floodplain management map issued by FEMA that depicts, based on detailed flood hazard analyses, the boundaries of the 1-percent-annual-chance (100-year) and the 0.2-percent-annual-chance (500-year) floodplains and, when appropriate, the regulatory floodway. The FBFM does not show flood insurance risk zones or BFEs.

Flood-Control Storage—Storage of water in reservoirs to abate flood damage.

Flood Elevation Determination Docket (FEDD) — A file maintained by FEMA that includes all correspondence between FEMA and the community concerning a flood study; reports of meetings held among FEMA representatives, community representatives, the State NFIP Coordinator, private citizens, FEMA and community contractors, or other interested parties; relevant publications (e.g., newspaper notices, Federal Register notices); Letter of Final Determination; a copy of the Flood Insurance Study report; and a copy of the Flood Insurance Rate Map and FBFM.

Floodflow-Frequency Curve—A graph showing the number of times per year on the average that floods of certain magnitudes are equaled or exceeded.

Flood Hazard Analyses Report (FHAR) — A flood hazard report prepared by the Natural Resources Conservation Service (formerly, the U.S. Soil Conservation Service) for purposes other than the National Flood Insurance Program.

Flood Hazard Boundary Map (FHBM)—The initial insurance map issued by FEMA that identifies, based on approximate analyses, the areas of the 1-percent-annual-chance (100-year) flood hazard within a community.

Flood Hazard Mapping Program—The program undertaken by FEMA to conduct FISs and prepare reports and maps delineating flood hazards in floodprone communities throughout the United States.

Flood Insurance Rate Map (FIRM)—The insurance and floodplain management map produced by FEMA that identifies, based on detailed or approximate analyses, the areas subject to flooding during a 1-percent-annual-chance (100-year) flood event in a community. Flood insurance risk zones, which are used to compute actuarial flood insurance rates, also are shown. In areas studied by detailed analyses, the FIRM shows Base Flood Elevations (BFEs) to reflect the elevations of the 1-percent-annual-chance flood. For many communities, when detailed analyses are performed, the FIRM also may show areas inundated by 0.2-percent-annual-chance (500-year) flood and regulatory floodway areas.

Flood Insurance Rate Zones— See Flood Insurance Risk Zones.

Flood Insurance Restudy (RFIS)—A revised study of flood hazards performed for a community that already has an effective FIRM (and, in some cases, FBFM). An RFIS also may be referred to as a “Type 19 RFIS” or a “Type 19 restudy.” FEMA Study Contractors have traditionally performed RFISs. However, communities, regional agencies, and States that are participating in the Cooperating Technical Partner initiative also may perform these types of Flood Map Projects.

Flood Insurance Risk Zones—The zones, also referred to as “risk premium rate zones” and “flood insurance rate zones,” shown on a FIRM or FHBM that are used to determine flood insurance premium rates for properties in the community covered by the FIRM or FHBM. The flood insurance risk zones include Special Flood Hazard Areas (i.e., Zones A, A1-30, AE, A0, A99, AH, AR, AR/A, AR/A1-30, AR/AE, AR/A99, V, V1-30, VE, V0) and areas outside Special Flood Hazard Areas (i.e., Zones B, X, D, M, N, P, E).

Flood Insurance Study (FIS)—The initial study of flood hazards performed for a community that does not have an effective Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map (FBFM). An FIS also may be referred to as a “Type 15 FIS” or a “Type 15 study.” FEMA Study Contractors have traditionally performed FISs. However, communities, regional agencies, and States that are participating in the Cooperating Technical Partners initiative also may perform these types of Flood Map Projects.

Flood Insurance Study (FIS) Report—A document, prepared and issued by FEMA, that documents the results of the detailed flood hazard assessment performed for a community. The primary components of the FIS report are text, data tables, photographs, and Flood Profiles.

Flood Map Production Coordination Contractor (MCC)—A private-sector engineering firm that, under contract to FEMA, reviews and processes new and revised flood studies, appeals and protests related to the new and revised flood studies, conditional and final map amendments, conditional and final map revisions, and requests for Letters of Determination Review; performs activities related to program development and program support; and maintains regional archives of flood hazard mapping and related data.

Flood Map Project—Any activity undertaken by FEMA or a Flood Hazard Mapping Partner to create a new flood map or update an existing flood map, including detailed studies, approximate studies, and redelineations of floodplain boundaries based on updated topographic information.

Floodplain—Any land area that is susceptible to being inundated by water from any source.

Floodplain Information Report (FPI)—A flood hazard report prepared by a Federal agency (usually, the U.S. Army Corps of Engineers or U.S. Geological Survey) for purposes other than the National Flood Insurance Program.

Floodplain Management—The operation of a program of corrective and preventative measures for reducing flood damage, including, but not limited to, emergency preparedness plans, flood-control works, and floodplain management regulations.

Floodplain Management Regulations—The zoning ordinances, subdivision regulations, building codes, health regulations, special-purpose ordinances, and other applications of enforcement used by a community to manage development in its floodplain areas.

Floodprone Area—See Floodplain.

Floodprone Community—Any community that is subject to inundation by the base (100-year) flood.

Flood Profile—A graph showing the relationship of water-surface elevation to location, with the latter generally expressed as distance above the mouth for a stream of water flowing in an open channel.

Flood Protection System—Those physical works for which funds have been authorized, appropriated, and expended and which have been constructed specifically to modify flooding in order to reduce the extent of the area subject to a “special flood hazard” and the extent of the depths of the associated flooding. Flood protection systems typically include hurricane tidal barriers, dams, reservoirs, levees, or dikes.

Floodway—See Regulatory Floodway.

Floodway Fringe—The portion of the 1-percent-annual-chance (100-year) floodplain that is not within the regulatory floodway and in which development and other forms of encroachment may be permitted under certain circumstances.

Frame—Refers to the size of a FIRM or FBFM panel as follows: A Frame (28"x21"); B Frame (28"x24"); C Frame (28"x28"); D Frame (28"x32"); E Frame (28"x40").

Freeboard—A factor of safety usually expressed in feet above a flood level for purposes of floodplain management.

Fully Analytical Aerial Triangulation (FAAT)—A process for the extension of horizontal and vertical control whereby the measurements of angles and/or distances on overlapping photographs are related into a spatial solution using the perspective principles of the photographs, obtained totally by computational routines.

Future-Conditions Floodplain or Flood Hazard Area—The land area that would be inundated by the 1-percent-annual-chance (100-year) flood based on future-conditions hydrology.

Future-Conditions Hydrology—The flood discharges associated with projected land-use conditions based on a community’s zoning maps and/or comprehensive land-use plans and without consideration of projected future construction of flood detention structures or projected future hydraulic modifications within a stream or other waterway, such as bridge and culvert construction, fill, and excavation.

Geocoding—The process of associating geographic coordinates or grid cell identifiers to data, points, lines, and shapes.

Geographic Information System (GIS)—A system of computer hardware, software, and procedures designed to support the capture, management, manipulation, analysis, modeling, and display of spatially referenced data for solving complex planning and management problems.

Geographic Resources Analysis and Support System (GRASS)—Geographic Information System software that was developed by the U.S. Army Corps of Engineers and is used by several Federal agencies.

Georeference System—An X,Y or X,Y,Z coordinate system that locates points on the surface of the earth as a reference to points on a map.

Global Positioning System (GPS)—A satellite-based navigation and positioning system that enables horizontal and vertical positions to be determined

Grid—A network of uniformly spaced horizontal and perpendicular lines that enclose an area with an associated value assigned. A defined aggregate spatial object.

Hazard—An event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, and other types of loss or harm.

Hazard Mitigation Grant Program (HMGP)—The program, authorized under Section 404 of the Stafford Act, under which FEMA provides grants to States and local governments to implement long-term hazard mitigation measures after a presidential disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a presidentially declared disaster.

Headquarters (HQ) —The FEMA office in Washington, DC.

Horizontal Control—A network of stations of known geographic or grid positions referred to a common horizontal datum, which control the horizontal positions of mapped features with respect to parallels and meridians, or northing and easting grid lines shown on the map.

Hydraulic Analysis—An engineering analysis of a flooding source carried out to provide estimates of the elevations of floods of selected recurrence intervals.

Hydraulic Computer Model—A computer program that uses flood discharge values and floodplain characteristic data to simulate flow conditions and determine flood elevations.

Hydraulic Methodology—Analytical methodology used for assessing the movement and behavior of floodwaters and determining flood elevations and regulatory floodway data.

Hydrograph—A graph showing stage, flow, velocity, or other properties of water with respect to time.

Hydrologic Analysis— An engineering analysis of a flooding source carried out to establish peak flood discharges and their frequencies of occurrence.

Hydrology—The science encompassing the behavior of water as it occurs in the atmosphere, on the surface of the ground, and underground.

Ice Jam—An accumulation of ice in a stream that reduces the cross-sectional area available to carry streamflow and increases the water-surface elevation of the stream.

Importing—The process of bringing data or software into a dissimilar system.

Initializing—The process of setting program variables to their starting values, commonly zero, at the beginning of a program.

Interior Drainage Systems—Systems associated with levee systems that usually include storage areas, gravity outlets, pumping stations, or a combination thereof.

Island—A closed two-dimensional figure. In a GIS, an island is a unit of land cover lying completely within another land-cover unit.

Kilobyte—A unit of memory representing 1,024 bytes and often designated with the symbol K, as 4Kb or 4 kilobytes. The symbol K is also used to refer to 1,024 words of any specified size.

Layer—The various "overlays" of data, each of which normally deals with one thematic topic. The overlays are registered to each other by the common coordinate system of the database. In a GIS, a layer or a theme represents a specific kind of data.

Legally Defined Parcel of Land—A parcel of land for which a metes and bounds description or a plat has been recorded. Structure may exist on legally defined parcels of land.

Letter of Determination Review (LODR)—A FEMA response to a request from a borrower and lender that FEMA provide its concurrence or disagreement with the lender's determination on whether the borrower's building is in the SFHA shown on the effective National Flood Insurance Program map.

Letter of Final Determination (LFD)—The letter in which FEMA announces its final determination regarding the flood hazard information, including (when appropriate) proposed and proposed modified BFEs, presented on a new or revised FIRM, FIS report, and (when appropriate) FBFM for a particular community. In the LFD, FEMA begins the compliance period and establishes the effective date for the new or revised FIRM, FIS report, and/or

Letter of Map Amendment (LOMA) —An official determination by FEMA that a property has been inadvertently included in an SFHA as shown on an effective FHBM or FIRM and is not subject to inundation by the 1-percent-annual-chance flood. Generally, the property is located on natural high ground at or above the BFE or on fill placed prior to the effective date of the first National Flood Insurance Program map designating the property as within an SFHA. Limitations of map scale and development of topographic data more accurately reflecting the existing ground elevations at the time the maps were prepared are the two most common bases for LOMA requests.

Letter of Map Change—A collective term used to describe official amendments and revisions to National Flood Insurance maps that are accomplished by a cost-effective administrative procedure and disseminated by letter.

Letter of Map Change Revalidation (LOMC-VALID) Letter—A letter issued by FEMA, immediately before the effective date of a revised FIRM, to notify community officials about LOMAs, LOMR-Fs, and LOMRs that will remain in effect after the FIRM is published.

Letter of Map Revision (LOMR)—A letter issued by FEMA to revise the FIRM, FBFM, and/or FIS report for a community to change in BFEs, floodplain and floodway boundary delineations, and coastal high hazard areas.

Letter of Map Revision Based on Fill (LOMR-F)—A Letter of Map Change issued by FEMA when FEMA determines that a legally defined parcel of land or structure has been elevated above the BFE based on the placement of earthen fill after the date of the first National Flood Insurance Program map.

Levee—A manmade structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.

Light Detection and Ranging (LIDAR) System—An airborne laser system, flown aboard rotary or fixed-wing aircraft, that is used to acquire x, y, and z coordinates of terrain and terrain features that are both manmade and naturally occurring. LIDAR systems consist of an airborne Global Positioning System with attendant base station(s), Inertial Measuring Unit, and light-emitting scanning laser.

Limited Map Maintenance Program Project Revision (LMMP)—A limited-scope restudy of flood hazards that generally involves a single community and one watercourse. The data submitted to FEMA by the SC for an LMMP are similar in format and level of detail to those submitted for an RFIS.

Line—A level of spatial measurement referring to a one-dimensional defined object having a length, direction, and connecting at least two points.

Local Newspaper—The community newspaper, identified by the CEO or other designated community official, in which FEMA publishes notices at the beginning of a Flood Map Project, at the beginning of the appeal period, and at other times during the processing of a new or revised FIRM when required.

Lot—A parcel of land for which a metes and bounds description or a plat has been recorded and on which one or more structures may be built.

Lowest Adjacent Grade (LAG)—The lowest natural elevation of the ground surface next to a structure.

Lowest Finished Floor Elevation (LFFE)—The lowest floor of the lowest enclosed area (including basement) of a structure.

Manning's n—A coefficient of roughness, used in a formula for estimating the capacity of channel to convey water.

Manufactured Home—Any building that is transportable in one or more sections, which is built on a permanent chassis and designed to be used with or without a permanent foundation when connected to the required utilities. Park trailers, recreational vehicles, and other similar vehicles are not considered manufactured homes.

Map Amendment—A change to an effective National Flood Insurance Program map that results in the exclusion from the Special Flood Hazard Area of an individual structure or legally defined parcel of land that has been inadvertently included in the Special Flood Hazard Area (i.e., no alterations of topography have occurred since the date of the first National Flood Insurance Program map that showed the structure or parcel to be within the Special Flood Hazard Area.

Map Assistance Center—A FEMA customer service center staffed by Map Specialists that are specially trained to answer specific questions about the status of active and completed studies, restudies, conditional and final map revision requests, and conditional and final map amendment requests; answer questions about technical and administrative support data available from the FEMA archives; link callers with other FEMA service and fax numbers and the FEMA website; and provide information regarding, or copies of, FEMA products, brochures, and publications.

Map Needs Update Support System (MNUSS)—The computerized database system that is used by FEMA and its Flood Hazard Mapping Partners to compile information on mapping needs nationwide collected using the Mapping Needs Assessment Process.

Mapping Activity Statement (MAS)—An agreement signed by FEMA and a participant (community, regional agency, or State agency) in the CTP initiative under which the participant will complete specific mapping activities.

Mapping Needs Assessment Process (MNAP)—The process by which FEMA identifies mapping needs nationwide by contacting States, regional agencies, and mapped participating communities for information; verifies the validity of the identified needs; and compiles information on those needs into a computerized database.

Map Revision—A change to an effective National Flood Insurance Program map that is accomplished by a LOMR or a Physical Map Revision.

Memorandum of Agreement—See Partnership Agreement.

Minimally Floodprone Community—A community that FEMA has determined to be subject to inundation by the 1-percent-annual-chance (100-year) flood, but for which existing conditions indicate that the area is unlikely to be developed in the foreseeable future. The criteria used by FEMA to evaluate a community's development potential are as follows: (1) Floodplains are publicly owned and designed for open space or preservation; (2) Zoning laws, sanitary codes, subdivision regulations, shore land regulations, or community regulations effectively prohibit floodplain development; (3) Surrounding land use or topography effectively limits the development potential; (4) Population is decreasing or stable, and there is no foreseeable pressure for floodplain development; and (5) Floodplains are remote and uninhabited, and future development is unlikely.

Mitigation—A sustained action taken to reduce or eliminate long-term risk to people and property from flood hazards and their effects. Mitigation distinguishes actions that have a long-term impact from those more closely associated with preparedness for, immediate response to, and short-term recovery from specific events.

National Flood Insurance Fund (NFIF) —The fund used as the funding mechanism for the National Flood Insurance Program.

National Flood Insurance Program (NFIP) — Federal Program under which flood-prone areas are identified and flood insurance is made available to the owners of the property in participating communities.

Network Analysis—Analytical technique concerned with the relationships between locations on a network, such as the calculation of optimal routes through road networks, capacities of network systems, best locations for facilities along networks.

Node—A point at which two or more lines meet; called an edge or vertex in graph theory.

Non-Floodprone Community—A community that FEMA has determined not to be subject to inundation by the 1-percent-annual-chance (100-year) flood. The FEMA guidelines employed for determining whether a community is designated as non-floodprone are that all of its SFHAs are less than 200 feet wide and all drain less than 1 square mile, or physiographic features that preclude floodplain development exist in the community.

Non-Participating Community—A community that has been identified by FEMA as being floodprone but has chosen not to participate in the National Flood Insurance Program.

Notice-To-User Revision—A revision made by FEMA to correct a non-technical problem with a published FIS Report, FIRM, or FBFM quickly and inexpensively. These types of revisions are intended solely to correct a noted defect with the product and cannot be used to establish new or revised flood hazard information.

Operating System—The master control program that governs the operation of a computer system, running job entry, input/output services, data management, and supervision or housekeeping.

Otherwise Protected Area (OPA)—An undeveloped coastal barrier within the boundaries of an area established under Federal, State, or local law, or held by a qualified organization, primarily for wildlife refuge, sanctuary, recreational, or natural resource conservation purposes.

Participating Community—Any community that voluntarily elects to participate in the National Flood Insurance Program by adopting and enforcing floodplain management regulations that are consistent with the standards of the National Flood Insurance Program.

Partnership Agreement—An agreement, also referred to as a Memorandum of Agreement, that is signed by FEMA and a community, regional agency, or State agency that wishes to participate in the Cooperating Technical Partners initiative. The Partnership Agreement is a broad statement of principle, emphasizing the value of the National Flood Insurance Program's three components of insurance, floodplain management, and mapping.

Permanent Identifier (PID)—The six-character alphanumeric code used by the National Geodetic Survey to identify control points and stations.

Physical Map Revision (PMR)—A revision made by FEMA to a FIRM, FBFM, or FIS report based on community-supplied data. FEMA issues PMRs when (1) changes resulting from the requested revision are extensive, affecting significant portions of a FIRM panel or multiple FIRM panels; (2) revision will add significant SFHAs to the effective FIRM; or (3) revision will result in an increase in the BFEs and/or regulatory floodway.

Pixel—The smallest discrete element that makes up a digital image. (Short for "picture element".)

Planimetric Map—A map representing only horizontal positions from features represented; distinguished from a topographic map by the omission of relief in measurable form. A planimetrically accurate map shows accurate horizontal distances between features.

Point—A level of spatial measurement that refers to an object that has no dimension.

Point Data—In a vector structure, the data that consist of a single, distinct X,Y coordinate. In a raster structure, the data that consist of single cells.

Polygon—A two-dimensional figure with three or more sides intersecting at a like number of points. (In GIS, a polygon is an area.)

Ponding—The result of runoff or flows collecting in a depression that may have no outlet, subterranean outlets, rim outlets, or manmade outlets such as culverts or pumping stations. Impoundments behind manmade obstructions are included in this type of shallow flooding as long as they are not backwater from a defined channel or do not exceed 3.0 feet in depth.

Position Dilution of Precision (PDOP)—In a study area, an indicator of the positional accuracy that can be derived from the current Global Positioning System satellite geometry, which varies continuously; the smaller the PDOP number, the higher the data quality.

Primary Airport Control (PAC) Stations—The geodetic control station that provides the reference frame for the positioning of all critical features on an airport.

Primary Frontal Dune—A continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms.

Probability Density Function (PDF)—A distribution of probability for a continuous random variable.

Project Officer (PO)—A FEMA Headquarters staff member who performs contract monitoring functions, which include providing technical direction to FEMA contractors, monitoring the progress of contractors' work, and evaluating contractor performance.

Proposed Base Flood Elevations/Depths and Proposed Modified Base Flood Elevations/Depths—Those Base Flood Elevations and base flood depths that FEMA publishes in a local newspaper and in the *Federal Register* at the start of the 90-day appeal period.

Protest—An objection to any information, other than BFEs, shown on an NFIP map that is submitted by community officials or interested citizens through the community officials during the 90-day appeal period.

Q3 Flood Data Product—A digital representation of certain features of the FIRM that is intended for use with desktop mapping and Geographic Information System technology. The Q3 Flood Data product is created by scanning the effective FIRM paper maps and digitizing selected features and lines.

Quadrangle—A U.S. Geological Survey (USGS) topographic map;

Quality Assurance/Quality Control (QA/QC) Reviews—The reviews of the Flood Insurance Study reports, maps, and related products and data performed to ensure compliance with FEMA standards.

Raster—The pattern of horizontal, parallel scan lines comprising the image on a CRT screen, on which each scan line consists of segments varying in intensity.

Record—A group of items in a file treated as a unit.

Recurrence Interval—The average interval of time within which a given flood will be equaled or exceeded once.

Regional Offices (ROs)—The FEMA offices located in Boston, Massachusetts; New York, New York; Philadelphia, Pennsylvania; Atlanta, Georgia; Chicago, Illinois; Denton, Texas; Kansas City, Missouri; Denver, Colorado; San Francisco, California; and Bothell, Washington.

Regional Project Officer (RPO)—A FEMA Regional Office staff member in the who performs contract monitoring functions, which include providing technical direction to FEMA contractors, monitoring the progress of contractors' work, and evaluating contractor performance.

Regression Equation—An experimentally determinable equation of a regression curve; that is, an approximate, generally linear relation connecting two or more quantities and derived from the correlation coefficient.

Regular Phase—The phase of a community's participation in the National Flood Insurance Program when more comprehensive floodplain management requirements are imposed and higher amounts of insurance are available. The FIRM forms the basis for this phase of participation in the National Flood Insurance Program.

Regular Program—See Regular Phase.

Regulatory Floodway—A floodplain management tool that is the regulatory area defined as the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the base flood discharge can be conveyed without increasing the BFEs more than a specified amount. The regulatory floodway is not an insurance rating factor.

Riverine Flooding—The overbank flooding of rivers and streams.

River Mile Marker (RMM) —A marker that indicates the distance in miles from a reference point on a river or other major watercourse.

Root Mean Square Error (RMSE) —The square root of the average of the set of squared differences between dataset coordinate values and coordinate values from an independent source of higher accuracy for identical points RMSE is used to estimate both horizontal and vertical accuracy.

Scale—A representative fraction of a paper map distance to ground distance.

Scanner—Any device that systematically decomposes a sensed image or scene into pixels and then records some attribute of each pixel.

Scanning—The process of using an electronic input device to convert analog information into a digital format usable by a computer.

Secondary Airport Control (SAC) Stations—The geodetic control stations that, together with the PAC Station, provide the reference frame for the positioning of all critical features on an airport.

Sediment—Fragmental material that originates from the weathering of rocks and is transported by, suspended in, or deposited by water or air or is accumulated in beds by other natural occurrence.

Scientifically Incorrect Base Flood Elevations—Those Base Flood Elevations determined through analyses in which the methodologies used and/or assumptions made are inappropriate for the physical processes being evaluated or are otherwise erroneous.

Shallow Flooding— Unconfined flows over broad, relatively low relief areas, such as alluvial plains; intermittent flows in arid regions that have not developed a system of well-defined channels; overbank flows that remain unconfined, such as on delta formations; overland flow in urban areas; and flows collecting in depressions to form ponding areas. For National Flood Insurance Program purposes, shallow flooding conditions are defined as flooding that is limited to 3.0 feet or less in depth where no defined channel exists.

Sheet Runoff—The broad, relatively unconfined downslope movement of water across sloping terrain that results from many sources, including intense rainfall and/or snowmelt, overflow from a channel that crosses a drainage divide, and overflow from a perched channel onto deltas or plains of lower elevation. Sheet runoff is typical in areas of low topographic relief and poorly established drainage systems.

Special Conversion—An action taken by FEMA to convert a community to the Regular Phase of the National Flood Insurance Program without preparing a FIRM with detailed flood risk zones. The exact action taken depends on whether FEMA determines the community is “non-floodprone” or “minimally floodprone.”

Special Conversion Recommendation Report (SCRR) —A report, prepared by the FEMA Regional Office and submitted to FEMA HQ, that documents the reasons a community should be converted to the Regular Phase of the National Flood Insurance Program without a detailed engineering study being performed and recommends a specific conversion action.

Special Flood Hazard Area (SFHA)—The area delineated on a National Flood Insurance Program map as being subject to inundation by the base flood. SFHAs are determined using statistical analyses of records of riverflow, storm tides, and rainfall; information obtained through consultation with a community; floodplain topographic surveys; and hydrologic and hydraulic analyses.

Special Problem Report (SPR) —A report, prepared by the Flood Hazard Mapping Partner that is performing an engineering study or other mapping activity, that documents special problems or issues encountered during the performance of the work.

Stage—The height of a water surface above an established datum plane.

Standard Interchange Format (SIF)—A commonly used format for the exchange of alphanumeric data.

State—Any State, the District of Columbia, the territories and possessions of the United States, the Commonwealth of Puerto Rico, and the Trust Territory of the Pacific Islands.

State Coordinating Agency— See State National Flood Insurance Program Coordinator.

State National Flood Insurance Program (NFIP) Coordinator—The agency of the State government, or other office designated by the Governor of the State or by State statute at the request of FEMA to assist in the implementation of the National Flood Insurance Program in that state.

State Plane Coordinates—A system of X,Y coordinates defined by the U.S. Geological Survey for each state. Locations are based on the distance from an origin within each state.

Stillwater Flood Elevation (SWEL)—Projected elevation that flood waters would assume, referenced to National Geodetic Vertical Datum of 1929, North American Vertical Datum of 1988, or other datum, in the absence of waves resulting from wind or seismic effects.

Stillwater Flood Level (SWFL)—Rise in the water surface above normal water level on the open coast due to the action of wind stress and atmospheric pressure on the water surface.

Structure—For floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured home. For flood insurance purposes, a walled and roofed building, other than a gas or liquid storage tank, that is principally above ground and affixed to a permanent site, as well as a manufactured home on a permanent foundation.

Study Contractor (SC)—An architectural and engineering firm or a Federal, State, or local agency that performs flood hazard studies under contract with FEMA.

Subcritical Flow—Flow with a mean velocity that is less than the critical velocity; in other words, tranquil flow.

Summary of Map Actions (SOMA)—A list, generated by FEMA and delivered to the community that summarizes the LOMAs, LOMR-Fs, and LOMRs that are or will be affected by a physical update to a FIRM.

Supercritical Flow—Flow with a mean velocity that is greater than the critical velocity; in other words, rapid flow.

Tagged Information File Format (TIFF)—The technical exchange format for raster or image files.

Technical Evaluation Contractor (TEC)—See Flood Map Production Coordination Contractor.

Technical Support Data Notebook (TSDN)—The format for the FEMA-maintained file that contains all of the technical and administrative support data for a community for which FEMA published an National Flood Insurance Program map and all revisions to that map.

Technically Incorrect Base Flood Elevations (BFEs)/Depths—Those BFEs and base flood depths determined through analyses in which the methodologies used have not been applied properly, are based on insufficient or poor-quality data, or do not account for the effects of physical changes that have occurred in the floodplain.

Temporary Bench Mark (TBM)—Benchmark established for a particular Flood Map Project or community.

Topologically Integrated Geographic Encoding and Referencing System (TIGER)—The nationwide digital database of planimetric base map features developed by the U.S. Bureau of the Census for the 1990 Census.

Topology—A branch of geometric mathematics that is concerned with order, continuity, and relative position, rather than actual linear dimensions.

Transect—Cross section taken perpendicular to the shoreline to represent a segment of coast with similar characteristics

Transformation—The conversion of coordinates between alternative referencing systems.

Triangulated Irregular Network (TIN)—A set of non-overlapping triangles developed from irregularly spaced points that are used to represent the facets of a surface.

Undeveloped Coastal Barrier—Any land area adjacent to the Atlantic Ocean, Pacific Ocean, or Great Lakes, where flood insurance will not be available for new or substantially improved structures. These areas are protected by law to discourage development in an attempt to preserve dunes, beaches, and wildlife habitats.

Unit Hydrograph—The hydrograph of direct runoff from a storm uniformly distributed over a drainage basin during a specified unit of time.

Universal Transverse Mercator (UTM) Grid—A system of plane coordinates based on 60 north-south trending zones, each 16 degrees of longitude wide, that circle the globe.

Unnumbered A Zones—Flood insurance rate zones, designated “Zone A” on a FIRM, that are based on approximate studies.

Vector—A directed line segment with magnitude commonly represented by the coordinates for the pair of endpoints.

Vector Data—Data in the form of an array with one dimension.

Vector Product Format (VPF)—A standard format, structure, and organization, used by the National Imagery and Mapping Agency, for large geographic databases that are based on a georelational data model and are intended for direct use. VPF is designed to be compatible with a wide variety of applications and products. VPF uses tables and indexes that permit direct access by spatial location and thematic content and is designed to be used with any digital geographic data in vector format that can be represented using nodes, edges, and faces. VPF defines the format of data objects, and the georelational data model provides a data organization within which software can manipulate the VPF data objects.

Velocity Zone—See Coastal High Hazard Area.

Violation—The failure of a structure or other development to be fully compliant with a community's floodplain management regulations. A structure or other development without an Elevation Certificate, other certifications, or other evidence of compliance required in Section 60.3 of the National Flood Insurance Program regulations is presumed to be in violation until such time as that documentation is provided.

Watershed—An area of land that drains into a single outlet and is separated from other drainage basins by a divide.

Water-Surface Elevations (WSEs)—The heights of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas, in relation to a specified vertical datum.

Wave Height—Vertical distance between the wave crest and the wave trough.

Wave Runup—Rush of wave water up a slope or structure.

Wave Setup—The Increase in the still water surface near the shoreline, due to the presence of breaking waves.

Work Map—Floodplain mapping submitted to FEMA by a Mapping Partner, reflecting the results of a flood study or other mapping activity. The work map depicts floodplain boundaries, regulatory floodway boundaries, BFES, and cross sections, and provides the basis for the presentation of this information on a FIRM.

Zone Gutter—Boundary, shown on a FIRM, dividing SFHAs of different BFES, base flood depths, flow velocities, or flood insurance risk zone designations.

Map
MODERNIZATION
Federal Emergency Management Agency



FEMA's Flood Hazard Mapping Program

Guidelines and Specifications
for
Flood Hazard Mapping Partners
Acronyms & Abbreviations



FEDERAL EMERGENCY MANAGEMENT AGENCY

www.fema.gov/fhm/dl_cgs.shtm

April 2003

All policy and standards in this document have been superseded by the FEMA Policy for Flood Risk Analysis and Mapping. However, the document contains useful guidance to support implementation of the new standards.

List of Acronyms and Abbreviations

The following acronyms and abbreviations will be encountered by the Federal Emergency Management Agency (FEMA) and its Flood Hazard Mapping Partners throughout these *Guidelines* and in the completion of activities under of the Flood Hazard Mapping Program:

A

AML	ARC Macro Language
AAER	Average Annual Erosion Rate
ACSM	American Congress of Surveying and Mapping
ANI	Area Not Included
AO	(FEMA) Assistance Officer
ASC	Area of Special Consideration
ASCE	American Society of Civil Engineers
ASCII	American Standard Code for Information Interchange
ASFPM	Association of State Floodplain Managers
ASPRS	American Society of Photogrammetry and Remote Sensing
AT	Area Triangulation

B

BERD	Blocked Erosion Rate Database
BFE	Base Flood Elevation
BIL	Band Interleaved by Line (Format)
BM	Bench Mark
BSQ	Band Sequential Format
BU	Building (Line)

C

CAC	Community Assistance Call
CAD	Computer-Assisted Drafting
CADD	Computer-Assisted Drafting and Design
CAP	Community Assistance Program
CAV	Community Assistance Visit
CBN	Cooperative Base Network
CBRA	Coastal Barrier Resources Act (of 1982)
CBRS	Coastal Barrier Resources System
CCO	Consultation Coordination Officer
CD-ROM	Compact Disk Read-Only Memory
CEO	Chief Executive Officer
CERC	Coastal Engineering Research Center (U.S. Army)
CFR	Code of Federal Regulations
CID	Community Identification Number
CIS	Community Information System
CLOMA	Conditional Letter of Map Amendment
CLOMR	Conditional Letter of Map Revision
CLOMR-F	Conditional Letter of Map Revision Based on Fill
CMA	Community Map Action (Form)
CMAS	Circular Map Accuracy Standard
CO	Contracting Officer
COGO	Coordinate Geometry
CORS	Continuously Operating Reference Stations
CRS	Community Rating System
CSIS	Credited Structures Inventory System
CTP	Cooperating Technical Partners (Program)

D

DBMS	Database Management System
DEM	Digital Elevation Model
DFIRM	Digital Flood Insurance Rate Map
DFO	Disaster Field Office
DGN	Design (File)
DGPS	Differential Global Positioning System
DHL	Delft Hydraulic Laboratory
DLG	Digital Line Graph
DLG-3	Digital Line Graph Level 3
DMRS	Data Management and Retrieval System
DOI	U.S. Department of the Interior
DOQ	Digital Orthophoto Quadrangle
DTM	Digital Terrain Model
DU	Dune (Line)
DWG	Drawing (File)
DXF	Drawing Exchange (Interchange) File

E

EDR	External Data Request
EO	Exterior Orientation (Parameter)
EPA	U.S. Environmental Protection Agency
EP&R	Emergency Preparedness and Response Directorate
ERM	Elevation Reference Mark
ERP	Elevation Reference Point
ESDP	Engineering Study Data Package
ESDPF	Engineering Study Data Package Facility
ESF	Emergency Support Function
EST	Emergency Support Team
ET	End-of-Transect (Line)
ETJ	Extraterritorial Jurisdiction (Limits)

F

FAAT	Fully Analytical Aerial Triangulation
FBFM	Flood Boundary and Floodway Map
FBN	Federal Base Network
FCSA	Fee-Charge System Administrator
FEDD	Flood Elevation Determination Docket
FEMA	Federal Emergency Management Agency
FGCC	Federal Geodetic Coordinating Committee
FGDC	Federal Geographic Data Committee
FHAR	Flood Hazard Analyses Report
FHBM	Flood Hazard Boundary Map
FIPS	Federal Information and Processing Standards (Code)
FIRM	Flood Insurance Rate Map
FIRM-DLG	Flood Insurance Rate Map-Digital Line Graph
FIS	Flood Insurance Study
FLIS	FEMA Levee Inventory System
FOIA	Freedom of Information Act
FPI	Floodplain Information Report
FTP	File Transfer Protocol

G

GeoTIFF	Georeferenced Tagged Image File Format
GIS	Geographic Information System
GLWRM	Great Lakes Wave Runup Model
GPO	U.S. Government Printing Office
GPS	Global Positioning System
GRASS	Geographic Resources Analysis and Support System
GRS	Geodetic Reference System

H

HARN	High Accuracy Reference Network
HEC	Hydrologic Engineering Center (U.S. Army Corps of Engineers)
H&H	Hydrologic and Hydraulic (Analyses)
HMGP	Hazard Mitigation Grant Program
HQ	Headquarters (FEMA)
HS	Human Services (Applications)
HSLD	Historic Shoreline Location Database
HSPCD	Historic Shoreline Positional Change Database
HWL	High Water Line

I

IE	Initial Elevation (Line)
IF	Inland Fetch (Line)
ILGD85	International Great Lakes Datum of 1985
IMU	Inertial Measurement Unit
INS	Inertial Navigation System

L

LAG	Lowest Adjacent Grade
LAN	Local Area Network
LFD	Letter of Final Determination
LFFE	Lowest Finished Floor Elevation
LIDAR	LIght Detection and Ranging (System)
LIDEF	Levee Inventory Data Entry Form
LLS	Licensed Land Surveyor
LMMP	Limited Map Maintenance Program Project Revision
LODR	Letter of Determination Review
LOMA	Letter of Map Amendment
LOMC	Letter of Map Change

LOMC-VALID	Letter of Map Change Revalidation (Letter)
LOMR	Letter of Map Revision
LOMR-F	Letter of Map Revision Based on Fill

M

MAS	Mapping Activity Statement
MCC	Flood Map Production Coordination Contractor
MHWL	Mean High Water Line
MICS	Monitoring Information on Contracted Studies (System)
MIS	Management Information System
MNAP	Mapping Needs Assessment Process
MNUSS	Map Needs Update Support System
MOA	Memorandum of Agreement
mph	Miles per Hour
MRR	Measurement Residual Ratio
MSC	Map Service Center (FEMA)
MV	Marsh Vegetation (Line)

N

NAD27	North American Datum of 1927
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NAS	National Academy of Sciences
NASA	National Aeronautic and Space Administration
NCSSA	National Cartographic Standards for Spatial Accuracy
NCP	Network Control Point
NDEP	National Digital Elevation Program
NDOP	National Digital Orthophoto Program
NFIF	National Flood Insurance Fund

NFIP	National Flood Insurance Program
NFIRA	National Flood Insurance Reform Act of 1994
NGVD29	National Geodetic Vertical Datum of 1929
NGRS	National Geodetic Reference System
NGS	National Geodetic Survey
NMAS	National Map Accuracy Standard
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Survey
NP	Navigation Processor
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NSRS	National Spatial Reference System
NSSDA	National Standard for Spatial Data Accuracy
NWS	National Weather Service

O

ODC	Other Direct Cost
OF	Over-water Fetch (Line)
OGC	Office of General Counsel
OPA	Otherwise Protected Area

P

PAC	Primary Airport Control
pdf	Portable Document Format
PDF	Probability Density Function
PDOP	Position Dilution of Precision
PE	Professional Engineer
PID	Permanent Identifier
PLSS	U.S. Public Land Survey System
PMR	Physical Map Revision
PO	Project Officer (FEMA HQ)

Q

QA	Quality Assurance
QC	Quality Control
QA/QC	Quality Assurance/Quality Control

R

RDBMS	Relational Database Management System
RFIS	Flood Insurance Restudy
RLE	Run Length Encoding
RLS	Registered Land Surveyor
RMM	River Mile Marker
RMS	Root Mean Square
RMSE	Root Mean Square Error
RO	Regional Office (FEMA)
ROC	Regional Operations Center (FEMA)
RPO	Regional Project Officer (FEMA RO)
RTK	Real Time Kinematic
RXDS	Existing Data Restudy

S

SAC	Secondary Airport Control
SC	Study Contractor
SCRR	Special Conversion Recommendation Report
SDTS	Spatial Data Transfer System
SFHA	Special Flood Hazard Area
SFHDF	Standard Flood Hazard Determination Form
SIF	Standard Interchange Format
SOMA	Summary of Map Actions
SOS	Status of Studies
SOW	Statement of Work
SPR	Special Problem Report
SWEL	Stillwater Flood Elevation
SWFL	Stillwater Flood Level

T

TBM	Temporary Bench Mark
TCS	(Standard Flood Hazard) Tracking and Correspondence System
TIGER	Topologically Integrated Geographic Encoding and Reference (System)
TIN	Triangulated Irregular Network
TSDN	Technical Support Data Notebook
TVA	Tennessee Valley Authority

U

USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USGS-DLG	U.S. Geological Survey Digital Line Graph (Format)
UTM	Universal Transverse Mercator

V

VAX	Virtual Address Extension
VE	Rigid Vegetation Line
VMAS	Vertical Map Accuracy Standard
VMS	Virtual Memory System
VPF	Vector Product Format

W

WAN	Wide Area Network
WHAFIS	Wave Height Analyses for Flood Insurance Studies (Computer Program)
WIS	Wave Information Study
WORM	Write Once Read Many (CD-ROM Drive)
WSEL	Water-Surface Elevation
WWL	Wind/Water Line

X

XDS	Existing Data Study
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Map
MODERNIZATION
Federal Emergency Management Agency



FEMA's Flood Hazard Mapping Program

**Guidelines and
Specifications**
for
**Flood Hazard
Mapping Partners**
Executive Summary



FEDERAL EMERGENCY MANAGEMENT AGENCY

www.fema.gov/fhm/dl_cgs.shtm

April 2003

All policy and standards in this document have been superseded by the FEMA Policy for Flood Risk Analysis and Mapping. However, the document contains useful guidance to support implementation of the new standards.

Executive Summary

This summary provides background information on the purpose and scope of these *Guidelines and Specifications for Flood Hazard Mapping Partners* (hereinafter referred to as “these Guidelines”). These Guidelines define the technical requirements, coordination and documentation activities, and product specifications for Flood Hazard Maps and related products. The guidelines and specifications documented herein are to be followed by Federal Emergency Management Agency (FEMA) Regional and Headquarters Office staff and the staff of other Flood Hazard Mapping Partners involved in producing and maintaining Flood Hazard Maps and related products under the National Flood Insurance Program (NFIP).

For decades, the national response to flood disasters was generally limited to constructing flood-control works, such as dams, levees, and seawalls, and to providing disaster relief to flood victims. This approach did not reduce all monetary flood losses, nor did it discourage unwise floodplain development. To compound the problem, the public could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs to the general taxpayer for disaster relief, the U.S. Congress created the NFIP with the passage of the National Flood Insurance Act of 1968. The U.S. Congress broadened and modified the NFIP with the passage of the Flood Disaster Protection Act of 1973, the National Flood Insurance Reform Act of 1994, and other legislative measures. In enacting each piece of legislation, the U.S. Congress focused on reducing future flood damage and providing an insurance mechanism that allows a premium to be paid for protection by those most in need of the protection.

To meet the community participation and flood hazard assessment objectives of the NFIP, the U.S. Congress initially assigned the following responsibilities to the Secretary of the U.S. Department of Housing and Urban Development:

- (1) identify and publish information with respect to all flood plain areas, including coastal areas located in the United States, which have special flood hazards, within five years following the date of the enactment of this Act, and (2) establish flood-risk zones in all such areas, and make estimates with respect to the rates of probable flood-caused loss for the various flood-risk zones for each of these areas, within fifteen years following each date.

Those responsibilities are now assigned to FEMA.

For more than two decades as the agency responsible for administration of the NFIP, FEMA has been engaged in a massive and unprecedented effort to identify and assess flood hazards and present flood hazard information on community-based mapping. To date, FEMA has produced over 90,000 Flood Hazard Map panels for approximately 19,000 communities representing approximately 150,000 square miles of floodplain. The net effect of this work is that it has protected citizens’ lives, properties, and personal finances by providing an insurance mechanism

for those at risk and flood hazard data to minimize the flood risk for new and existing development.

In the enabling legislation that created and amended the NFIP, FEMA has been authorized to consult with, receive information from, and enter into agreements or other arrangements with the head of any State, regional, or local agency in order to identify floodplain areas. Therefore, FEMA has encouraged strong Federal, State, regional, and local partnerships for the purposes of reducing flood losses and disaster assistance.

Over the years, FEMA has established and implemented initiatives to build on Federal, State, regional, and local partnerships and, where appropriate, formalize the partnerships. Through these initiatives, FEMA and its Federal, State, regional, and local public- and private-sector partners have formalized improved cooperation in the flood hazard identification and mapping processes. Building on these partnerships, FEMA has envisioned implementing a new “optimized” process for producing new and revised Flood Hazard Maps that will take advantage of Flood Hazard Mapping Partners’ contributions.

As FEMA joins the new Department of Homeland Security, the Emergency Preparedness and Response Directorate retains the responsibility to modernize and update the nation’s flood maps. Recognizing that the contributions of FEMA and the Flood Hazard Mapping Partners may evolve as the optimized process is implemented, these Guidelines do not emphasize the traditional roles of the various Flood Hazard Mapping Partners. Instead, these Guidelines specify the requirements that the Flood Hazard Mapping Partner that agrees to complete a specific mapping-related task must meet to ensure consistent and accurate flood hazard information is provided to U.S. citizens nationwide.

To provide a sound basis for floodplain management and insurance rating, the Flood Hazard Maps must present flood hazard information that is accurate and up to date. However, funding levels for flood hazard mapping have not been sufficient for FEMA to update the entire inventory of Flood Hazard Maps. As a result, nearly 75 percent of the Flood Hazard Map panel inventory is over 10 years old. For Fiscal Year 2003, \$150 million was appropriated for Flood Map Modernization. This boost in funding will enable FEMA to begin to convert the current Flood Hazard Map panel inventory from paper to digital format.

FEMA relies on the combined contributions of FEMA staff and the following Flood Hazard Mapping Partners to obtain and maintain accurate, up-to-date flood hazard information:

- Community officials;
- Regional agency officials;
- State agency officials;
- Communities, regional agencies, and State agencies participating in the FEMA Cooperating Technical Partners Program;
- Other Federal agencies;
- FEMA Contractors;

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- Contractors for communities, regional agencies, and State agencies;
- Community residents and property owners; and
- Other program constituents, including U.S. Congress, insurance, lending, real estate, and land development industries; and
- Federal, State, and local disaster and emergency response officials.

These *Guidelines* combine FEMA technical, programmatic, and administrative procedure publications, guidance documents (listed below), and memorandums regarding Flood Hazard Mapping. These *Guidelines* also reflect recent changes to processes and products associated with the implementation of the FEMA [Map Modernization Program](#), including the [Cooperating Technical Partners](#) Program and the [Flood Map Project Scoping](#) procedures.

Unless specifically indicated otherwise by FEMA for a particular contract/agreement, these Guidelines supersede previous FEMA guidelines and specifications documents regarding the preparation of Flood Hazard Maps, including, but not limited to, the following:

- [Flood Insurance Study Guidelines and Specifications for Study Contractors](#) (FEMA 37, January 1995) and any previous versions thereof;
- “[Airborne Light Detection and Ranging Systems](#)” (Appendix 4B to FEMA 37, May 2000);
- [Guidelines and Specifications for Flood Map Production Coordination Contractors](#) (Final Draft, February 17, 1999);
- [Guide for Preparing Technical Support Data Notebook](#) (January 1990);
- [Guidelines for Determining Flood Hazards on Alluvial Fans](#) (February 23, 2000);
- [Guidance for Scoping Flood Mapping Projects](#) (January 12, 2001);
- [Guidelines and Specifications for Wave Elevation Determination and V Zone Mapping](#) (March 1995);
- *Guidelines and Specifications for Wave Elevation Determination and V Zone Mapping – Great Lakes* (October 1994);
- “Procedures for Collecting Depositing, and Reporting Fees Under Part 72 of the NFIP Procedures” (undated);
- “Procedures for the Administration of FEMA’s Fee-Charge System” (undated);
- “[DFIRM Graphic Specifications](#)” (November 2000);
- “[DFIRM Base Map Standards](#)” (November 1998); and
- “[Standard DFIRM Database Guidelines and Specifications](#)” (May 2001).

These Guidelines are organized into three volumes and 13 appendices as described below.

Volume 1 explains the activities involved in the completion of Flood Map Projects and provides guidelines for performing those activities in the following phases:

- Mapping Needs Assessment;
- Project Scoping;
- Topographic and Flood Hazard Data Development;
- Map and Report Production; and
- Preliminary/Post-Preliminary Processing.

Additional information on the types of Flood Map Projects undertaken by FEMA and Flood Hazard Mapping Partners nationwide, the products generated as a result of the Flood Map Projects, and the processes that must be followed to generate those products is provided in the Introduction to these Guidelines, in Subsections INT.6 and INT.7.

Volume 2 provides guidelines for the processing of revisions and amendments to Flood Hazard Maps initiated by communities and other Flood Hazard Mapping Partners, including the following:

- Letters of Map Amendment;
- Letters of Map Revision Based on Fill;
- Letters of Map Revision; and
- Physical Map Revisions.

Additional information on the products generated as a result of these revisions and amendments and the processes that must be followed to generate those products is provided in the Introduction to these Guidelines, in Subsections INT.6 and INT.7.

Volume 3 provides guidelines and specifications for support activities performed for FEMA by various Mapping Partners in the following general categories: program coordination, special technical and program support, public outreach activities, special correspondence support, and other program support.

Appendices A through M provide additional guidelines and specifications for the processes and products covered in Volumes 1, 2, and 3. These appendices cover the following topics:

- Aerial mapping and surveying, including airborne Light Detection and Ranging systems;
- Datum conversions;
- Hazard analyses and mapping of coastal, shallow, ice-jam, and alluvial fan flooding (four separate appendices);
- Evaluation and mapping of flood protection systems;
- Scoping for Flood Map Projects;

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- Flood Insurance Study report format guidelines and specifications;
- Flood Hazard Map format guidelines and specifications;
- Digital Flood Hazard Map database guidelines and specifications; and
- Technical and administrative support data preparation and processing requirements.

For the convenience of all Mapping Partners, a **List of Frequently Encountered Acronyms and Abbreviations** and a **Glossary of Frequently Encountered Terms** also have been included in these Guidelines.

These Guidelines are a “living” document that will be updated whenever FEMA determines that changes to the product and processing requirements documented herein are appropriate. Each October, FEMA will post a new version of these Guidelines on the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/fhm/gs_main.shtm as a collection of PDF files that mirror the structure of the three volumes and 13 appendices. The versions of these Guidelines posted annually will reflect all updates made by FEMA over the course of the year.

FEMA Regional and Headquarters Office staff will notify Mapping Partners when changes are made. Such changes may be frequent as FEMA proceeds with implementation of the Map Modernization Program. Therefore, FEMA encourages all Mapping Partners to remain familiar with, and cognizant of, FEMA’s progress in implementing the Map Modernization Program. Details on FEMA’s implementation activities may be found on the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/fhm/mm_main.shtm.

To ensure Mapping Partners are provided with a controlled and current version of these Guidelines for Flood Hazard Mapping activities, the following document control procedures have been implemented:

- A header on each page identifies the document (i.e., *Guidelines and Specifications for Flood Hazard Mapping Partners*) and the version date (e.g., February 2002).
- A footer on each page provides the page number and major section number (e.g., 1.1, 1.2).
- A date (month and year) reflecting the last time the section or subsection was revised appears at the end of each **numbered** section and subsection.

Mapping Partners will also be able to keep up to date on changes to these Guidelines through a Web site with the following features (currently under development):

- An “Overview Paragraph,” which explains the functionality of the site and which provides the yearly update schedule;
- A “Diary of Revisions,” which provides the date implemented, a brief summary, and links to the new and superseded section or subsection for significant revisions made to these Guidelines since they were last revised; and
- An “Archive,” which contains previous versions of these Guidelines.

For the convenience of users of these Guidelines, a Summary of Changes also appears at the beginning of each volume or appendix. The Summary of Changes documents all significant changes made to the particular volume or appendix since these Guidelines were last issued or revised. For both Diary of Revisions on the Web site and the Summaries of Map Changes in the volumes and appendices, a “significant” change or revision is defined as a change that may have an impact on the level of effort or scope of work for a Mapping Partner or may substantially enhance Mapping Partners’ understanding of FEMA requirements.

Because these Guidelines are a living document, new technologies and methodologies deemed applicable to Flood Map Projects undertaken by or for FEMA can be included in future updates. Therefore, FEMA encourages Mapping Partners to submit ideas for improving these Guidelines in writing.

These written comments may be submitted electronically by sending an e-mail message to FEMACG&S@floodmaps.net. Alternatively, they may be sent to the following address or transmitted by facsimile to the number provided:

Federal Emergency Management Agency
Emergency Preparedness and Response Directorate
Mitigation Division
500 C Street, SW
Washington, DC 20472
Facsimile: 202-646-4596

Attention: Allyson Lichtenfels, FEMA G&S Coordinator

FEMA welcomes the contributions of its many and varied Flood Hazard Mapping Partners and looks forward to the mutually beneficial efforts that will further promote FEMA’s mission—to reduce loss of life and property and protect our Nation’s critical infrastructure from all types of hazards through a comprehensive, risk-based, emergency management program of mitigation, preparedness, response, and recovery.

Map
MODERNIZATION
Federal Emergency Management Agency



FEMA's Flood Hazard Mapping Program

**Guidelines and
Specifications**
for
**Flood Hazard
Mapping Partners**
Introduction



FEDERAL EMERGENCY MANAGEMENT AGENCY

www.fema.gov/fhm/dl_cgs.shtm

April 2003

All policy and standards in this document have been superseded by the FEMA Policy for Flood Risk Analysis and Mapping. However, the document contains useful guidance to support implementation of the new standards.

Summary of Changes for Introduction

The Summary of Changes below details changes to the Introduction that were made subsequent to the initial publication of these *Guidelines* in February 2002. These changes represent new or updated guidance for Flood Hazard Mapping Partners.

Date	Affected Section(s)/ Subsection(s)	Summary of Changes
01/31/2003	INT.4	Revised this section to document the current plan for FEMA updating and maintaining these Guidelines.
01/31/2003	INT.7.1.7	Revised this subsection to clarify “mappable” LOMCs and to introduce determination documents.
01/31/2003	INT.7.2.1	Revised this subsection to indicate requests for PMRs must be routed through the community CEO, or an official designated by the CEO, and sufficient supporting data and documentation must be submitted.

Introduction

INT.1 Purpose and Scope of Document

[February 2002]

The Federal Emergency Management Agency (FEMA), as the Federal agency responsible for administration of the National Flood Insurance Program (NFIP), conducts flood hazard studies and prepares Flood Hazard Maps and related products. These *Guidelines and Specifications for Flood Hazard Mapping Partners* (hereinafter referred to as “these Guidelines”) define technical requirements, product specifications for Flood Hazard Maps and related NFIP products, and associated coordination and documentation activities.

These Guidelines are to be followed by FEMA Regional Office and Headquarters staff and the staff of other Flood Hazard Mapping Partners involved in producing and maintaining Flood Hazard Maps and related products of the NFIP. Information on the Flood Hazard Mapping Partners (hereinafter referred to as “Mapping Partners”) involved in the Flood Hazard Mapping Program is provided in Section INT.9.

These *Guidelines* combine FEMA technical, programmatic, and administrative procedure publications, guidance documents (listed below), and memorandums regarding Flood Hazard Maps. These *Guidelines* also reflect recent changes to processes and products associated with the implementation of the FEMA [Map Modernization Program](#), including the [Cooperating Technical Partners](#), or “CTP,” Program and the new [Flood Map Project Scoping](#) procedures.

Unless specifically indicated otherwise by FEMA for a particular contract/agreement, these Guidelines supersede previous FEMA guidelines and specifications documents regarding the preparation of Flood Hazard Maps, including, but not limited to, the following:

- [Flood Insurance Study Guidelines and Specifications for Study Contractors](#) (FEMA 37, January 1995) and any previous versions thereof;
- “[Airborne Light Detection and Ranging Systems](#)” (Appendix 4B to FEMA 37, May 2000);
- [Guidelines and Specifications for Flood Map Production Coordination Contractors](#) (Final Draft, February 17, 1999);
- [Guide for Preparing Technical Support Data Notebook](#) (January 1990);
- [Guidelines for Determining Flood Hazards on Alluvial Fans](#) (February 23, 2000);
- [Guidance for Scoping Flood Mapping Projects](#) (January 12, 2001);
- [Guidelines and Specifications for Wave Elevation Determination and V Zone Mapping](#) (March 1995);

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- *Guidelines and Specifications for Wave Elevation Determination and V Zone Mapping – Great Lakes* (October 1994);
- “Procedures for Collecting Depositing, and Reporting Fees Under Part 72 of the NFIP Procedures” (undated);
- “Procedures for the Administration of FEMA’s Fee-Charge System” (undated);
- “[DFIRM Graphic Specifications](#)” (November 2000);
- “[DFIRM Base Map Standards](#)” (November 1998); and
- “[Standard DFIRM Database Guidelines and Specifications](#)” (May 2001).

INT.2 Organization of Document

[February 2002]

These Guidelines have been organized into three volumes and 13 appendices as described in Subsections INT.2.1 through INT.2.4. For the convenience of all Mapping Partners, a **List of Frequently Encountered Acronyms and Abbreviations** and a **Glossary of Frequently Encountered Terms** also have been included in these Guidelines.

INT.2.1 Volume 1

[February 2002]

Volume 1 explains the activities involved in the completion of Flood Map Projects and provides guidelines for performing those activities in the following phases:

- Mapping Needs Assessment;
- Project Scoping;
- Topographic and Flood Hazard Data Development;
- Map and Report Production; and
- Preliminary/Post-Preliminary Processing.

Additional information on the products generated as a result of Flood Map Projects and the processes required to generate the products is provided in Sections INT.6 and INT.7.

INT.2.2 Volume 2

[February 2002]

Volume 2 provides guidelines for revisions and amendments to Flood Hazard Maps initiated by communities and other Flood Hazard Mapping Partners, including the following:

- Letters of Map Amendment;
- Letters of Map Revision Based on Fill;
- Letters of Map Revision; and
- Physical Map Revisions.

Additional information on the products generated as a result of these revisions and amendments and the processes that must be followed to generate those products is provided in Sections INT.6 and INT.7.

INT.2.3 Volume 3

[February 2002]

Volume 3 provides guidelines and specifications for support activities performed for FEMA by various Mapping Partners in the following general categories:

- Program coordination, including development and maintenance of FEMA databases and management information systems, courier service, library archiving and maintenance, and distribution of archived mapping-related materials;
- Special technical and program support, including meeting and conference support, hazard identification and mapping activities, risk assessment activities, post-flood hazard verification and mapping activities, and policy development and implementation assistance;
- Public outreach activities, including FEMA Map Assistance Center support, Web site content development and maintenance activities, training assistance, CTP Program support, and Mapping Needs Assessment Process activities;
- Special correspondence support, including Congressional Responses, Director Responses, Mapping Responses, E-Mail Responses, Freedom of Information Act Responses, and Letters of Determination Review; and
- Other program support, including Map Service Center assistance, Q3 Flood Data maintenance, fee-charge system maintenance, Map Modernization Program support, and Engineering Study Data Package Facility maintenance.

INT.2.4 Appendices

[February 2002]

Additional guidelines and specifications for the processes and products covered in Volumes 1, 2, and 3 are presented in 13 appendices covering the following topics:

- Aerial mapping and surveying, including airborne Light Detection and Ranging systems;
- Datum conversions;
- Hazard analyses and mapping of riverine flooding;
- Coastal flooding;
- Shallow flooding;
- Ice-jam flooding;

Guidelines and Specifications for Flood Hazard Mapping Partners [April 2003]

- Alluvial fan flooding;
- Evaluation and mapping of flood protection systems;
- Scoping for Flood Map Projects;
- Flood Insurance Study report format guidelines and specifications;
- Flood Hazard Map format guidelines and specifications;
- Digital Flood Hazard Map database guidelines and specifications; and
- Technical and administrative support data preparation and processing requirements.

INT.3 General Performance Requirements [February 2002]

Although they are printed separately, these Guidelines are considered to be a part of any Contract Statement of Work (SOW) or other agreement signed by a Mapping Partner with FEMA to perform work in support of the NFIP and will be incorporated in said contract SOW or other agreement. Performance in accordance with these Guidelines is required, unless otherwise specified in the Contract SOW or other agreement.

Mapping Partners shall provide all data and other materials necessary to prepare and process new and revised Flood Hazard Maps, reports, and related supporting documents in accordance with the requirements detailed in these Guidelines. Selected Mapping Partners also shall provide program support services and products in accordance with the requirements detailed in these Guidelines when requested to do so by FEMA. Specific performance requirements, most notably with respect to deliverable items, also will be detailed in the Contract SOW or other similar agreement, such as Mapping Activity Statements (MASs) for Flood Map Projects undertaken under the CTP Program.

INT.3.1 Resolution of Inconsistencies in Contract Documents [February 2002]

In the event of inconsistencies between the requirements detailed in these Guidelines and Contract SOWs, MASs, or other agreements with FEMA, Mapping Partners shall resolve the inconsistencies through consultation with the FEMA Regional Project Officer (RPO), FEMA Regional Assistance Officer (AO), Project Officer (PO) at FEMA Headquarters, and/or Contracting Officer (CO) at FEMA Headquarters. In most cases, inconsistencies shall be resolved in the following priority order:

1. Formal exceptions by the RPO, AO, PO, or CO documented and made a part of the case file for the mapping activity undertaken;
2. Contract SOW, MAS, or other agreement schedule;
3. Special terms and conditions of the contract or other agreement;
4. General provisions of the contract or other agreement;
5. Other provisions of the Contract SOW, MAS, or other agreement, whether incorporated by reference or otherwise; and
6. These Guidelines.

The FEMA RPO and/or PO shall ensure that Mapping Partners achieve the technical requirements of the contract or agreement. To accomplish this, the FEMA RPO or PO shall provide direction on technical and programmatic issues, monitor the progress of work, and evaluate performance. The FEMA RPO and/or PO may issue written or verbal instructions to

expand on the details of the Contract SOW or agreement, or these Guidelines. The FEMA RPO and/or PO also shall make recommendations to the AO or CO whenever the Contract SOW or other agreement, period of performance, or other technical provisions of the contract SOW or other agreement should be amended to accomplish the objectives of the contract or agreement.

The FEMA RPO and/or PO shall **not** direct a Mapping Partner to undertake any activity that will affect the price, period of performance, scope, or administrative provisions of the contract SOW or other agreement. If required, the FEMA AO and/or CO at the recommendation of the FEMA RPO and/or PO shall authorize these activities.

In the event of inconsistencies between the requirements documented in these Guidelines and any FEMA operating policies or procedures, the inconsistencies shall be resolved in the following priority order:

1. Statutes governing the NFIP;
2. NFIP regulations;
3. Issuance of memorandums of policy or procedure, criteria, or guidelines that post-date these Guidelines;
4. Written guidance provided by the FEMA RPO and/or PO; and
5. These Guidelines.

INT.3.2 Documentation of Exceptions

[February 2002]

The responsible Mapping Partner and/or FEMA shall document all exceptions to standard procedures and specifications contained herein in the case file for the specific mapping activity. At the request of the FEMA RPO or PO, the responsible Mapping Partner also shall document exceptions in periodic monitoring reports, which should contain a description of the issue and resolution as appropriate for all such exceptions. These monitoring reports are discussed in Volume 3, Subsections 3.2.1 and 3.2.6 of these Guidelines

INT.3.3 Engineering, Mapping, and Report Standards

[February 2002]

The engineering, mapping, and report standards documented in these Guidelines reflect current policy and procedures. The flood hazard information presented on the maps and in the related reports and other products of the Flood Hazard Mapping Program forms the technical basis for the administration of the NFIP locally and nationally. Therefore, FEMA and its Mapping Partners must adhere to the rigorous standards documented herein, both in performing the initial flood hazard analyses for a community or flooding source within a community and preparing the initial Flood Hazard Map, report, and other supporting products, and in performing a revised analysis of flood hazards and preparing a revised Flood Hazard Map and related products.

INT.4 Document Control and Maintenance Plan [April 2003]

These Guidelines are a “living” document that will be updated whenever FEMA determines that changes to the product and processing requirements documented herein are appropriate. Each October, FEMA will post a new version of these Guidelines on the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/fhm/gs_main.shtm as a collection of .pdf files. Additional information on the update process is provided below.

FEMA Regional and Headquarters Office staff will notify Mapping Partners when changes are made. Such changes may be frequent as FEMA proceeds with implementation of the Map Modernization Program. Therefore, FEMA encourages all Mapping Partners to remain familiar with, and cognizant of, FEMA’s progress in implementing the Map Modernization Program. Details on FEMA’s implementation activities may be found on the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/fhm/mm_main.shtm.

To ensure Mapping Partners are provided with a controlled and current version of these Guidelines for mapping activities, the following document control procedures have been implemented:

- A header on each page identifies the document (i.e., *Guidelines and Specifications for Flood Hazard Mapping Partners*) and the version date (e.g., April 2003). The header will always show the annual revision date as well as any subsequent revisions made to specific components (e.g., Volume 1, Appendix A).
- A footer on each page provides the page number and major section number (e.g., 1.1, 1.2).
- A date (month and year) that reflects the last time the section or subsection was revised appears at the beginning of each **numbered** section and subsection.

Mapping Partners also will be able to keep up to date on changes to these Guidelines through a Web site with the following features:

- An “Overview Paragraph,” which explains the functionality of the site and which provides the yearly update schedule;
- A “Diary of Revisions,” which provides the date implemented, a brief summary, and links to the new and superseded section or subsection for significant revisions made to these Guidelines since they were last revised; and
- An “Archive,” which contains previous versions of these Guidelines.

For the convenience of users of these Guidelines, a Summary of Changes also appears at the beginning of each volume or appendix. The Summary of Changes documents all significant changes made to the particular volume or appendix since these Guidelines were last issued or revised. For both the Diary of Revisions on the Web site and the Summaries of Changes in the volumes and appendices, a “significant” change or revision is defined as a change that may have

an impact on the level of effort or scope of work for a Mapping Partner or may substantially enhance Mapping Partners' understanding of FEMA requirements.

Because these Guidelines are a living document, new technologies and methodologies deemed applicable to Flood Map Projects undertaken by or for FEMA can be included in future updates. Therefore, FEMA encourages Mapping Partners to submit ideas for improving these Guidelines in writing.

These written comments may be submitted electronically by sending an e-mail message to FEMACG&S@floodmaps.net. Alternatively, they may be sent to the following address or transmitted by facsimile to the number provided:

Federal Emergency Management Agency
Emergency Preparedness and Response Directorate
Mitigation Division
500 C Street, SW
Washington, DC 20472
Facsimile: 202-646-4596
Attention: Allyson Lichtenfels, FEMA G&S Coordinator

INT.5 Overview of Flood Hazard Mapping Program

[February 2002]

For decades, the national response to flood disasters was generally limited to constructing flood-control works, such as dams, levees, and seawalls, and to providing disaster relief to flood victims. This approach did not reduce all monetary flood losses, nor did it discourage unwise development in the floodplain. To compound the problem, the public could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

Thus, it was in the face of mounting flood losses and escalating costs to the general taxpayer for disaster relief that the U.S. Congress created the NFIP with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973, the National Flood Insurance Reform Act of 1994, and other legislative measures, with the intent being to reduce future flood damage and provide an insurance mechanism that allows a premium to be paid for protection by those most in need of the protection.

The NFIP enables property owners in communities that choose to participate in the NFIP to insure structures against flood losses. The 1973 Act's mandatory flood insurance purchase requirements, which were expanded and strengthened in the 1994 Act, protect the financial interests of the lender, the borrower, and the taxpayer. Insurance coverage reduces reliance on Federal disaster assistance and also reduces the number of income tax write-offs for uninsured loans.

By employing sound floodplain management practices, officials and residents of a participating community can minimize the extent of the area requiring the mandatory purchase of flood insurance and protect homes and businesses from much of the devastating financial losses resulting from future flood disasters. More careful local management of floodplain development results in construction practices that can reduce flood losses and reduce the high costs associated with flood disasters.

To meet the community participation and flood hazard assessment objectives of the NFIP, the U.S. Congress assigned the following responsibilities to the Secretary of the U.S. Department of Housing and Urban Development:

...(1) identify and publish information with respect to all flood plain areas, including coastal areas located in the United States, which have special flood hazards, within five years following the date of the enactment of this Act, and (2) establish flood-risk zones in all such areas, and make estimates with respect to the rates of probable flood-caused loss for the various flood-risk zones for each of these areas, within fifteen years following each date.

Those responsibilities are now assigned to the Director of FEMA. For more than two decades as the administrator of the NFIP, FEMA has been engaged in a massive and unprecedented effort to

identify and assess flood hazards and present flood hazard information on community-based mapping. The results to date have been impressive. FEMA has produced over 90,000 Flood Hazard Map panels for approximately 19,000 communities representing approximately 150,000 square miles of floodplain. The net effect of this work is that it has protected citizens' lives, properties, and personal finances by providing an insurance mechanism for those at risk and flood hazard data to minimize the flood risk for new and existing development.

The Flood Hazard Maps are referred to for each of the 15 million mortgage transactions each year and every time a community issues a building permit. Although originally developed to support the flood insurance and floodplain management activities associated with the NFIP, the Flood Hazard Maps are currently used by no fewer than nine distinct constituencies for a variety of applications, including disaster preparedness, response, and recovery; risk assessment; and diverse mitigation activities.

The Flood Hazard Mapping Program continues to be funded almost exclusively by flood insurance policyholders. The Flood Hazard Maps are used daily by the following:

- **State and local floodplain managers, planners, and other officials** to establish and enforce minimum land-use and construction ordinances that comply with minimum NFIP standards;
- **Engineers** to consider the flood hazard when designing flood mitigation projects, such as structure elevations and relocations, buyouts, and culvert replacements;
- **Insurance companies and agents** to determine actuarial rates for flood insurance policies;
- **Lenders** to determine the flood hazard status of mortgaged properties at loan origination and throughout the life of the mortgages;
- **Real estate professionals and property owners** to determine the flood hazard status of properties;
- **Flood map determination firms** to specify the location of properties relative to the flood hazard area as well as provide other interpretive services for lenders;
- **Land development industry** to aid in designing developments that will be safe from flood hazards;
- **Surveyors** to prepare elevation certificates for structures; to prepare applications for Letters of Map Change, or "LOMCs;" and to collect the field data on which flood hazard studies are based; and
- **Federal, State, and local disaster and emergency response officials** to prepare for flooding disasters and issue warnings to those in danger of flooding and, after a flood has

occurred, to implement emergency response activities and to aid in the rebuild and reconstruction process.

As the uses and applications have grown over the years, the Flood Hazard Maps have evolved in response to user needs and improved technologies; however, production of new and revised maps has always taken place within real-world fiscal constraints. Newer digital mapping techniques are often more cost effective, in both the short- and long-term, than the old manual techniques.

However, FEMA's conversion of over 90,000 existing map panels to a digital format has been, by design, deliberate and methodical. Because of funding constraints, the conversion generally has occurred only when new or updated flood hazard information has required an update to a Flood Hazard Map for a community or in support of disaster response activities.

As FEMA joins the new Department of Homeland Security, the Emergency Preparedness and Response Directorate retains the responsibility to modernize and update the nation's flood maps. For Fiscal Year 2003, \$150 million was appropriated for Flood Map Modernization. This boost in funding will enable FEMA to begin to convert the current Flood Hazard Map panel inventory from paper to digital format.

As mapping technologies, applications, and uses for the Flood Hazard Maps evolve, and the NFIP map users become increasingly sophisticated, the Flood Hazard Maps, as well as associated NFIP products, must also continue to evolve. Accordingly, these Guidelines will continue to evolve to reflect current practices and technologies.

INT.6 Overview of Flood Hazard Mapping Products

[February 2002]

The NFIP objectives of flood hazard assessment and community participation have been achieved in two phases. The initial phase of community participation in the NFIP is referred to as the Emergency Phase; the Emergency Phase also may be referred to as the Emergency Program in some FEMA documents. The second phase of community participation is referred to as the Regular Phase; the Regular Phase also may be referred to as the Regular Program in some FEMA documents.

Information on the products that are produced and distributed by FEMA, its contractors, and other Mapping Partners during the Emergency and Regular Phases of the NFIP is provided in Subsections INT.6.1 and INT.6.2, respectively.

INT.6.1 Mapping Products Generated During Emergency Phase

[February 2002]

The Emergency Phase was designed to provide participating communities with a limited amount of insurance at federally subsidized rates until detailed evaluations of flood hazards in these communities could be performed. During the Emergency Phase, a community usually is provided with a Flood Hazard Boundary Map, or “FHBM.” The FHBM presents an approximate delineation of the Special Flood Hazard Areas, or “SFHAs,” in a community. The SFHAs are the areas that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent-annual-chance flood is also referred to as the “base flood” or “100-year flood.”

If a community chooses to participate in the Emergency Phase of the NFIP, the community must adopt the FHBM and require permits for construction or other development in the SFHAs as shown on the FHBM.

INT.6.2 Mapping Products Generated During Regular Phase

[February 2002]

During the second phase of community participation in the NFIP—the Regular Phase—FEMA imposes more comprehensive floodplain management requirements on participating communities in exchange for higher amounts of insurance. Also, insurance for new and substantially improved structures is rated on an actuarial, or actual risk, basis. The insurance is based on flood insurance risk zones and elevations as determined by a detailed assessment of flood hazards and risk for the community.

The results of the initial detailed assessment, termed a Flood Insurance Study, or “FIS,” are presented on a Flood Insurance Rate Map, or “FIRM,” and, for some communities, on a Flood Boundary and Floodway Map, or “FBFM.” The results also are presented in a collateral report, referred to as an “FIS report,” which provides supporting documentation for information presented on the FIRM and FBFM.

During the first decade of the NFIP, the FIRM and FBFM were prepared using traditional manual cartographic techniques. However, as the technology developed, FEMA has gradually transitioned to a digital environment. The mapping product that is produced using digital production techniques is referred to as a Digital Flood Insurance Rate Map, or “DFIRM.” The data associated with the DFIRM are maintained in a Geographic Information System, or “GIS,” or spatial database, which is referred to as the DFIRM Database.

In addition to the DFIRM products, FEMA is also creating Raster FIRMs. These Raster FIRMs are either created by scanning the manually produced FIRMs or as a by-product of the creation of DFIRMs.

Once the flood hazard data are generated, they are subject to various dynamic factors that affect their accuracy and, thus, their value as a tool for assessing flood risks for insurance and floodplain management purposes. These factors are as follows:

- Changes in development trends;
- Changes in hydrologic conditions;
- Changes in topographic conditions;
- Changes in flood hazard and risk assessment technologies and available data; and
- Discoveries of errors in existing analyses.

Therefore, since the early years of the NFIP, FEMA has performed restudies of hazards and coordinated with communities to revise or amend maps, reports, and other products in response to the dynamic factors listed above. Depending on the extent and impact of the revised flood hazard information, FEMA has physically revised and reissued the mapping products or has issued an alternative product, referred to as a Letter of Map Change, or “LOMC.”

The LOMC has the same effect as a physical map update in that it documents a change to the effective FIRM, FBFM, and/or FIS report. However, because these products are not physically revised and republished, LOMCs generally take less time to process and are significantly less expensive for FEMA to complete.

Additional information on the mapping products discussed above is presented in Subsections INT.6.2.1 through INT.6.2.6.

INT.6.2.1 Flood Insurance Rate Map

[February 2002]

The FIRM is the insurance and floodplain management map produced by FEMA that identifies, based on detailed or approximate analyses, the areas subject to flooding during a 1-percent-annual-chance flood event in a community. Flood insurance risk zones, which are used to compute actuarial flood insurance rates, also are shown. In areas studied by detailed analyses, the FIRM shows Base Flood Elevations, or “BFEs,” to reflect the elevations of the 1-percent-annual-chance flood. For many communities, when detailed analyses are performed, the FIRM also may show areas inundated by 0.2-percent-annual-chance, or “500-year,” flood and regulatory floodway areas. Specific information on how the detailed analyses are to be performed, how floodplain and regulatory floodway boundaries are to be delineated, and how the BFEs and regulatory floodway are to be computed is provided in Volume 1 of these Guidelines.

INT.6.2.2 Flood Boundary and Floodway Map

[February 2002]

The FBFM is the floodplain management map issued by FEMA that depicts, based on detailed flood hazard analyses, the boundaries of the 1-percent-annual-chance (100-year) and the 0.2-percent-annual-chance (500-year) floodplains and, when appropriate, the regulatory floodway. The FBFM does not show flood insurance risk zones or BFEs. Specific information on how the detailed flood hazard analyses are to be performed, how floodplain and regulatory floodway boundaries are to be delineated, and how the regulatory floodway is to be computed is provided in Volume 1 of these Guidelines. (Note: Since the mid-1980s, FEMA has been incorporating information related to the regulatory floodway into the FIRM; however, numerous communities still have separately published FBFMs.)

INT.6.2.3 Flood Insurance Study Report

[February 2002]

The FIS report is a document, prepared and issued by FEMA, that documents the results of the detailed flood hazard assessment performed for a community. The primary components of the FIS report are text, data tables, photographs, and Flood Profiles. Specific information on the contents of the FIS report and how it is to be produced is provided in Appendix J of these Guidelines.

INT.6.2.4 Digital Flood Insurance Rate Map

[February 2002]

The DFIRM is a FIRM containing the information described in Subsection INT.6.2.1, prepared as a digital product. Creation of the DFIRM product may involve converting the existing manually produced FIRM to digital format. DFIRM products also may be created from new digital data sources using a GIS environment. The DFIRM product allows for the creation of interactive, multi-hazard digital maps. Linkages are built into an associated database to allow users options to access the engineering backup material used to develop the DFIRM, such as hydrologic and hydraulic models, Flood Profiles, data tables, Digital Elevation Models, and

structure-specific data, such as digital elevation certificates and digital photographs of bridges and culverts.

INT.6.2.5 Digital Flood Insurance Rate Map Spatial Database [February 2002]

The objective of the DFIRM spatial database is to facilitate the collection, storage, processing, and distribution of data developed by FEMA. The DFIRM spatial database enables Mapping Partners to share the data necessary for the DFIRM production and conversion process. In addition, the database enables rapid map updates/revisions in the future. Where possible, all mapping and engineering data elements are linked to physical geographic features and georeferenced. The use of a GIS as a component of the DFIRM spatial database provides the ability to georeference and overlay the mapping and engineering data. This allows the database to support a wide variety of existing and visionary FEMA engineering and mapping products.

INT.6.2.6 Raster Flood Maps [February 2002]

The creation of raster FIRMs and FBFMs will allow FEMA and its map users to access the flood hazard information shown on the FIRM from electronic media, such as CD-ROMs, or via the Internet instead of printed and folded hardcopy (paper) maps. The raster FIRMs and FBFMs present the identical information shown on the printed maps in a more convenient format for computer users.

INT.6.2.7 Letters of Map Change [February 2002]

A LOMC is a letter, prepared and issued by FEMA that officially amends or revises an effective FHBM, FIRM, FBFM, FIS report, or DFIRM. LOMCs are issued in three forms: Letter of Map Revision Based on Fill, or “LOMR-F”; Letter of Map Revision based on conditions other than fill, or “LOMR”; and Letter of Map Amendment, or “LOMA.”

A LOMR-F is an official revision of the effective NFIP map for a community. The LOMR-F provides FEMA’s determination as to whether a property (i.e., legally defined parcel of land or structure) has been elevated on fill above the BFE and is therefore outside the SFHA.

A LOMR also is an official revision, by letter, of an effective NFIP map. The LOMR product is issued by FEMA to change flood elevations, floodplain and regulatory floodway boundaries, and planimetric features.

A LOMA is an official amendment of the effective NFIP map for a community. The LOMA provides FEMA’s determination as to whether a property that is on natural ground has been inadvertently included in the SFHA shown on the map. The LOMA establishes the property’s location in relation to the SFHA.

Additional information on LOMC processes and related products is provided in Subsection INT.7.2 and Volume 2 of these Guidelines.

INT.6.2.8 Revalidation Letters

[February 2002]

To assist communities in maintaining the FIRM, FEMA developed a process for revalidating LOMCs automatically when a revised FIRM becomes effective, thereby superseding the LOMCs. The result of this process is a revalidation letter, termed a “LOMC-VALID” letter. FEMA generally issues the LOMC-VALID letter approximately 2 weeks before the effective date of the revised FIRM, and the LOMC-VALID letter becomes effective 1 day after the effective date of the revised FIRM. The LOMC-VALID letter provides a list of all LOMCs on the revised FIRM panels that are revalidated, meaning that those LOMCs are still in effect for NFIP purposes.

INT.6.2.9 Letters of Determination Review

[February 2002]

As mandated by the National Flood Insurance Reform Act of 1994, FEMA developed a Standard Flood Hazard Determination Form that is to be used by all regulated lenders and Federal agency lenders that make flood hazard determinations for improved property used to secure loans. When a borrower disagrees with the information in the Standard Flood Hazard Determination form issued by the borrower and the borrower and lender cannot reach an agreement, the borrower and lender may request a determination from FEMA. The FEMA response to this type of request is a Letter of Determination Review, or “LODR.”

If sufficient information is provided, the written response from FEMA will indicate whether FEMA concurs or disagrees with the lender’s determination and whether the subject building is in the SFHA shown on the effective NFIP map. If sufficient information is not provided, the submitted information will be returned with a written response detailing the additional information FEMA would need to make a determination.

INT.6.2.10 Special Conversion Products

[February 2002]

The conversion of a community to the Regular Phase of the NFIP is usually accomplished through the publication of a FIRM for the community. However, for some newly identified communities and communities that are participating in the Emergency Phase of the NFIP, FEMA may take an alternative approach and use specially designed “Special Conversion” procedures.

Under these Special Conversion procedures, FEMA may convert a community to the Regular Phase of the NFIP without performing a detailed flood hazard analysis and preparing a FIRM with detailed flood risk zones. Under these procedures, a community is converted, based on the recommendation of the FEMA Regional Office, through either non-floodprone or minimally floodprone conversion procedures.

The products for non-floodprone and minimally floodprone communities are discussed below. An explanation of the terms “non-floodprone” and “minimally floodprone” and additional information on Special Conversion procedures is provided in Subsection INT.7.1.4 and in Volume 1 of these Guidelines.

Conversion Products for Non-Floodprone Communities

Once a community has been approved for a non-floodprone conversion, FEMA sends the community a letter to effect the conversion. The content of the letter for a particular community will vary, depending on the community's status in the NFIP and the existence of an FHBM.

Conversion Products for Minimally Floodprone Communities

If no changes are required within the SFHA shown on the effective FHBM, FEMA converts the community to the Regular Phase of the NFIP with a letter only. The letter informs the community that the FHBM is now a FIRM.

If the SFHA shown on the existing FHBM for a community must be revised, FEMA converts the community with a FIRM that is an updated version of the FHBM. Depending on the flooding situation in the community, FEMA prepares and prints one of the following:

- A FIRM that shows all SFHAs as Zone A;
- A FIRM Index that notes that all areas in the community are Zone D (used in cases where the FIRM is the community's initial map and all areas are considered remote and uninhabited); or
- A FIRM (one or more panels printed) that shows Zones A and X (unshaded) for the community's most populated areas and notes on the map Index that all unprinted panels are Zone D.

FEMA transmits Preliminary copies of the required map products to the community along with a transmittal letter that documents the floodprone status of the community.

INT.6.2.11 Other Flood Hazard Mapping Products

[February 2002]

FEMA issues a variety of other products related to the creation and distribution of the products discussed in Subsections INT.6.1, INT.6.2, and INT.6.3 (e.g., Summaries of Map Actions, BFE notices, appeal resolution letters). These products are discussed in detail in Volumes 1 and 2 and in the appendices in these Guidelines. In addition, FEMA and its Mapping Partners produce and distribute a variety of products to support the administration of the NFIP in general and the Flood Hazard Mapping Program in particular. These products, and the processes followed in preparing and distributing them, are discussed in Volume 3 of these Guidelines.

INT.7 Overview of Flood Hazard Mapping Processes

INT.7.1 FEMA-Contracted Flood Map Projects and Update Activities

[February 2002]

To fulfill its mandate to identify floodprone areas nationwide, FEMA has an ongoing program to (1) develop new FIRMs for floodprone communities that do not have them and (2) to produce updated FIRMs for communities with existing FIRMs. Detailed information on the processes, guidelines, and specifications by which FEMA develops and updates FIRMs are provided in Volume 1 of these Guidelines.

For the purposes of these Guidelines, all activities related to the flood hazard analyses performed for new or revised FIRMs are referred to as “Flood Map Projects.” However, these activities have until recently been categorized as one of the following:

- Flood Insurance Study;
- Flood Insurance Restudy;
- Limited Map Maintenance Program Revision;
- Existing Data Study;
- Existing Data Restudy;
- Special Conversion;
- Coastal Barrier Resources System Revision; or
- Notice-to-User Revision.

A more detailed description of each category of activities, as well as the revalidation process, is provided in Subsections INT.7.1.1 through INT.7.1.7.

INT.7.1.1 Flood Insurance Studies and Restudies

[February 2002]

A Flood Insurance Study, or “FIS,” is the initial study of flood hazards performed for a community that does not have an effective FIRM. An FIS also may be referred to as a “Type 15 FIS” or a “Type 15 study.”

A Revised Flood Insurance Study, or “RFIS,” is a revised study of flood hazards performed for a community that already has an effective FIRM (and, in some cases, FBFM). An RFIS also may be referred to as a “Type 19 RFIS” or a “Type 19 restudy.”

FISs and RFISs have traditionally been performed by FEMA Study Contractors. However, these types of Flood Map Projects also may be performed by communities, regional agencies, and States that are participating in the CTP Program.

INT.7.1.2 Limited Map Maintenance Program Project Revisions [February 2002]

A Limited Map Maintenance Program project revision, or “LMMP,” is a limited-scope restudy of flood hazards that generally involves a single community and one watercourse. The data submitted to FEMA for an LMMP are similar in format and level of detail to those submitted for an RFIS.

INT.7.1.3 Existing Data Studies and Restudies [February 2002]

FEMA also may prepare an Existing Data Study, or “XDS,” for a community that does not have a FIRM using previously published flood hazard information. This flood hazard information comes from one of the following sources:

1. Reports prepared by Federal agencies for purposes other than the NFIP, such as Flood Hazard Analyses Reports and Floodplain Information reports;
2. Other engineering reports prepared by Federal, State, or local agencies; or
3. FIS reports, FIRMs, and FBFMs issued by FEMA for adjacent communities (especially previously unincorporated areas of a county).

If FEMA uses previously published information to prepare an initial or revised FIRM and FIS report for a community that is already participating in the Regular Phase of the NFIP without a FIRM, the product produced is referred to as an Existing Data Restudy, or “RXDS.”

INT.7.1.4 Special Conversions [February 2002]

As mentioned earlier in this Introduction, FEMA may convert a community to the Regular Phase of the NFIP without preparing a FIRM with detailed flood risk zones. The exact process that is followed depends on whether FEMA determines the community is “non-floodprone” or “minimally floodprone.”

Non-floodprone communities are those communities that are determined by FEMA to not be subject to inundation by the 1-percent-annual-chance flood. The FEMA guidelines employed for determining whether a community is designated as non-floodprone are that all of its SFHAs are less than 200 feet wide and all contributing drainage areas are less than 1 square mile, or that physiographic features that exist in the community preclude potential development.

Minimally floodprone communities are those communities subject to inundation by the 1-percent-annual-chance flood, but for which existing conditions indicate that the area is unlikely

to be developed in the foreseeable future. The criteria used by FEMA to evaluate a community's development potential are as follows:

- Floodplains are publicly owned and designed for open space or preservation.
- Zoning laws, sanitary codes, subdivision regulations, shore land regulations, or community regulations effectively prohibit floodplain development.
- Surrounding land use or topography effectively limits the development potential.
- Population is decreasing or stable, and there is no foreseeable pressure for floodplain development.
- Floodplains are remote and uninhabited, and future development is unlikely.

Other indicators may be used in addition to these criteria to assess the development potential. One important indicator is the size of the undeveloped floodplain relative to the size of the entire community. The larger the proportion, the more the floodplain is likely to be subject to pressure for development.

INT.7.1.5 Coastal Barrier Resource System Revisions

[February 2002]

In cooperation with the U.S. Department of the Interior, FEMA transfers Coastal Barrier Resources System, or "CBRS" boundaries to FIRMs using congressionally adopted source maps. FIRMs clearly depict the unique CBRS areas and their effective dates with special map notes and symbology. An important distinction to make between CBRS revisions and other types of map revisions is the community review component. Although FEMA shows CBRS areas on FIRMs, the U.S. Congress is the only entity that may authorize a revision to CBRS boundaries; therefore, the U.S. Fish and Wildlife Service and/or the U.S. Congress must address any requests for revisions to CBRS boundaries shown on FIRMs.

The revised CBRS boundaries are not a component of flood hazard analyses, and are not determined by FEMA. Additional information on CBRS revisions is provided in Volume 2, Section 2.2 of these Guidelines.

INT.7.1.6 Notice-To-User Revisions

[February 2002]

The intent of a "Notice-To-User" revision is to quickly and inexpensively correct a non-technical problem with a published FIS report, FIRM, or FBFM. These types of revisions are intended solely to correct a noted defect with the product and cannot be used to establish new or revised flood hazard information. The corrected components are sent to all individuals that previously received a copy of the product that contained the error or omission. A Notice-To-User letter signed by the FEMA PO is sent with the corrected FIS report, FIRM, and/or FBFM to provide a brief explanation of the revision. Additional information on Notice-To-User Revisions is provided in Volume 2, Section 2.3 of these Guidelines.

INT.7.1.7 Revalidations

[April 2003]

When a revised FIRM panel becomes effective, all previous LOMCs issued for that panel are superseded. Therefore, each time a FIRM panel is physically revised and republished, FEMA updates the panel to include the changes in flood hazard information resulting from previously issued map update actions, including LOMCs. Frequently, the results of a LOMC cannot be shown on a revised FIRM panel due to the limited size of the change contained in the LOMC or because the change is structure-specific.

The changes made to the effective FIRM via the LOMC process become effective without the affected panel(s) being physically revised and republished. Therefore, FEMA maintains records of these modifications so they may be incorporated into the next physical update of the affected FIRM panel(s), if the changes made by the LOMCs are of sufficient size to be shown at the map scale. To assist communities in maintaining the FIRM, FEMA developed a process for revalidating LOMCs automatically when a revised FIRM becomes effective. The result of this process is the issuance of a revalidation letter, termed a “LOMC-VALID letter.”

The LOMC-VALID letter is considered legally binding, in the same manner as the original LOMC, provided a copy of the original LOMC determination letter or document accompanies it. If required by the requester, FEMA forwards a copy of the original LOMC determination letter or document with the LOMC-VALID letter. FEMA does not assess a fee for such requests.

Detailed information on processing procedures and requirements for revalidation letters is provided in Volume 2, Section 2.5 of these Guidelines.

INT.7.2 Community and Property Owner-Initiated Map Revisions

[February 2002]

Requests for map revisions may be submitted to FEMA by community officials or by individuals through their community officials in accordance with Part 65 of the NFIP regulations. These map revision requests generally involve changes to one or more of the following: (1) flood elevations, (2) flood risk zones, (3) floodplain boundaries, (4) regulatory floodway boundaries, and (5) corporate limits. These changes usually result from one or more of the following:

- Natural or manmade changes in the watershed or floodplain that affect flood hazards;
- Availability of new or more detailed topographic or flood information;
- Community annexations of floodprone areas; or
- Errors or discrepancies uncovered in the effective FIS report or map(s).

As discussed earlier in this Introduction, in response to such requests, FEMA may physically revise and reissue the FIS report and map(s). This action is referred to as a “Physical Map Revision,” or “PMR.”

FEMA also may revise the FIS report and maps by issuing a letter documenting the changes to the FIS report and/or map(s). This action is referred to as either a LOMR-F if the change is based solely on the placement of earthen fill and BFEs are not modified, or a LOMR if the change is based on conditions other than the placement of earthen fill. Additional information on PMRs, LOMRs, and LOMR-Fs is provided in Subsections INT.7.2.1 and INT.7.2.2.

INT.7.2.1 Physical Map Revisions

[April 2003]

FEMA generally will initiate a PMR when:

- Changes resulting from the requested revision are extensive, affecting significant portions of a FIRM panel or multiple FIRM panels;
- Revision will add significant SFHAs to the effective FIRM; or
- Revision will result in an increase in the BFEs and/or regulatory floodway.

FEMA also may prepare a revised FIS report and/or FBFM, depending on the nature of the revision.

Requests for PMRs must be routed through the community Chief Executive Officer (CEO), or an official designated by the CEO, and sufficient supporting data and documentation must be submitted to satisfy the criteria described in Part 65 of the NFIP regulations. Detailed information on PMRs is provided in Volume 2, Section 2.1 of these Guidelines.

INT.7.2.2 Letters of Map Revision

[February 2002]

The FIRM can be revised by a LOMR-F when it is determined by FEMA that a legally defined parcel of land or structure has been elevated above the BFE based on the placement of earthen fill after the date of the first NFIP map. The LOMR-F request must be routed through the community CEO, or an official designated by the CEO, and sufficient supporting data and documentation must be submitted to satisfy the criteria described in Section 65.5 of the NFIP regulations. FEMA's issuance of a LOMR-F may revise the effective FHBM or FIRM by removing the parcel of land or structure from the SFHA; however, LOMR-Fs should not be confused with LOMRs that make changes in BFEs, floodplain and floodway boundary delineations, and coastal high hazard areas.

Requests for LOMR-Fs may involve one or more properties (lots) or structures. Final determinations based on as-built data may be made for undeveloped lots totally filled above the BFE, portions of lots defined by metes and bounds and filled above the BFE, or for existing structure(s) on ground elevated by fill above the BFE.

Detailed information on processing procedures and requirements for LOMR-Fs is provided in Volume 2, Subsection 2.4.4 of these Guidelines.

FEMA may issue a LOMR to revise SFHAs, BFEs, or regulatory floodways on an effective FIRM, FBFM, and/or FIS report when the extent of the changes resulting from the requested revision are limited or when the request must be addressed quickly. However, FEMA typically does not issue a LOMR to add SFHAs to an effective FIRM and FBFM or to increase BFEs. If the width of an SFHA increases, and the increase is contained entirely on the requester's property, FEMA may issue a LOMR.

FEMA prepares the LOMR using a standard format and provides a general description of the changes resulting from the requested revision. For most LOMRs, FEMA prepares and includes annotated copies of the affected Flood Profile, FIRM, and FBFM panels; Summary of Discharges Table; and Floodway Data Table, as appropriate. Although a revision accomplished by LOMR usually becomes effective on the date of the LOMR, the effective date may vary.

Detailed information on the processing procedures for LOMRs is provided in Volume 2, Subsection 2.2.1 of these Guidelines.

INT.7.3 Conditional Map Revisions

[February 2002]

Conditional Map Revision requests are those based on proposed alterations to the floodplain conditions within a community.

A requester may choose to submit documentation that satisfies the criteria of Section 65.8 of the NFIP regulations and request that FEMA review and comment on the effect that a proposed project involving the placement of earthen fill within the SFHA will have on the SFHA designation for one or more legally defined parcels of land or one or more proposed structures. Conditional determinations also provide FEMA's comments as to whether the proposed project meets the minimum NFIP floodplain management criteria. Those FEMA reviews usually result in the issuance of a letter or determination document called a Conditional Letter of Map Revision Based on Fill, or "CLOMR-F." Detailed information on processing procedures and requirements for CLOMR-Fs is provided in Volume 2, Subsection 2.4.3 of these Guidelines.

A community or individual may request that FEMA review and comment on the effect of a proposed project on the flood hazards depicted on the effective FIRM and/or FBFM for a community. In these cases, FEMA reviews the proposed project based on proposed construction drawings instead of as-built plans. These reviews usually result in the issuance of a letter or determination document called a Conditional Letter of Map Revision, or "CLOMR." The CLOMR describes the effect of the project, if constructed as proposed, on the effective FIRM and/or FBFM. A CLOMR often contains detailed information on conditions that must be met by a requester before FEMA will issue a final determination regarding revising the FIS report, FIRM, and/or FBFM. Detailed information on processing procedures and requirements for CLOMRs is provided in Volume 2, Subsection 2.4.5 of these Guidelines.

INT.7.4 Map Amendments

[February 2002]

Under the provisions of Part 70 of the NFIP regulations, a requester who believes that his or her property has been inadvertently included in an SFHA is allowed to substantiate this claim by requesting a LOMA. As mentioned earlier in this Introduction, a LOMA is an official determination by FEMA that a property has been inadvertently included in an SFHA as shown on an effective FHBM or FIRM and is not subject to inundation by the 1-percent-annual-chance flood. Generally, the property is located on natural high ground at or above the BFE or on fill placed prior to the effective date of the first NFIP map designating the property as within an SFHA. Limitations of map scale and development of topographic data more accurately reflecting the existing ground elevations at the time the maps were prepared are the two most common bases for LOMA requests.

The result of such a request, if warranted, is an amendment to the currently effective FHBM or FIRM. Requests for such determinations generally are submitted by the owners of the affected property or others having an insurable interest in properties that may have been included in the SFHA. LOMAs eliminate the Federal requirement for the purchase of flood insurance. It remains the lending institution's prerogative, however, to require or waive the insurance purchase requirement.

LOMA requests may involve one or more properties (lots) and one or more structures. Final determinations, based on existing conditions, may be made for undeveloped lots or for existing structures.

Detailed information on processing procedures and requirements for LOMAs is provided in Volume 2, Subsection 2.4.2 of these Guidelines.

INT.7.5 Conditional Map Amendments

[February 2002]

Under Part 70 of the NFIP regulations, a requester who believes his or her structure, when constructed on natural ground at or above the BFE, will be outside the SFHA, may request a conditional determination from FEMA. FEMA's response is usually a Conditional Letter of Map Amendment, or "CLOMA." CLOMAs provide FEMA's comment on whether the structure, if built as proposed, would be in the SFHA. CLOMAs may not be issued for unimproved or undeveloped property. Detailed information on processing procedures and requirements for CLOMAs is provided in Volume 2, Subsection 2.4.1 of these Guidelines.

INT.7.6 Annexation Requests

[February 2002]

FEMA receives a considerable number of requests from communities to have their NFIP maps updated to reflect recent annexations or de-annexations. To accommodate these requests, FEMA developed a standard procedure for processing these requests. Using this procedure, processing decisions are made based on the following factors: (1) status of map for annexing community, (2) existence of flood hazard information for annexed area, (3) source of flood hazard information, and (4) effect of annexation on community participation in the NFIP.

Depending on the decision made, FEMA will take one of the following actions:

- Send a letter to the annexing community indicating the revision will not be made at this time because the flood hazard information has not changed.
- Issue a LOMR or multiple LOMRs as appropriate to revise the affected map panel(s) for both the annexing and de-annexing communities.
- Physically update and re-issue affected FIRM panel(s) for both the annexing and de-annexing communities.
- Create new FIRMs for communities that do not have FIRMs when necessary to meet NFIP regulations.
- Send a memorandum to the FEMA RO staff requesting additional guidance and coordination with the community (when the annexed area is covered by an effective or rescinded FHBM or by a rescinded FIRM).

Detailed information on processing procedures and requirements for annexation requests is provided in Volume 2, Section 2.6 of these Guidelines.

INT.7.7 Letters of Determination Review

[February 2002]

When a borrower disagrees with the Standard Flood Hazard Determination made by the lender and the borrower and lender cannot reach an agreement, the borrower and lender may request a determination from FEMA. The FEMA response to such requests is a LODR.

If sufficient information is provided, the written response from FEMA will indicate FEMA's concurrence or disagreement with the lender's determination and whether the subject building is in the SFHA shown on the effective NFIP map. If sufficient information is not provided, FEMA will return the submitted information with a written response indicating the additional information to be submitted.

Detailed information on processing procedures and requirements for LODR requests is provided in Volume 3, Section 3.10 of these Guidelines.

INT.8 Overview of Mapping Formats

[February 2002]

FEMA uses two basic formats in preparing FHBMs, FIRMs, and FBFMs—Flat Map and Z-Fold Map. Although they are discussed separately below, the Standard, Map Initiatives, and Countywide Formats are subsets of the Flat Map and Z-Fold Map Formats. Graphic representations of Flood Hazard Maps prepared in these formats are provided in Appendix K of these Guidelines.

INT.8.1 Flat Map Format

[February 2002]

For the Flat Map Format, the panels are produced as 11” x 17” pages that are formatted and printed in a booklet form. If more than one panel is required to cover a community, FEMA prepares a cover sheet that includes an index and legend. FEMA used the Flat Map Format primarily to prepare FHBMs; however, FEMA also prepared some FIRMs in this format. FEMA has not, and will not, prepare FBFMs or DFIRMs in this format. FEMA has, for the most part, discontinued the Flat Map Format for new Flood Hazard Maps and plans to convert the remaining inventory to Z-Fold Format on a community-by-community basis.

INT.8.2 Z-Fold Map Format

[February 2002]

For the Z-Fold Map Format, FEMA produces one or more map panels in a folded format similar to that used for road maps. FEMA shows a Legend on each printed panel. If more than one panel is required to cover a community, FEMA prepares an index, either in Z-Fold Format or as an accompanying 8.5” x 11” document. (See Appendix K of these Guidelines for further details.) FEMA has historically used the Z-Fold Map format to produce many FHBMs; most FIRMs; all FBFMs; and, most recently, all DFIRMs.

INT.8.3 Standard Format

[February 2002]

Until 1985, FEMA produced and published separate FIRMs and FBFMs. This is referred to as the Standard Format for FEMA maps. Generally speaking, FEMA only produced separate FBFMs if (1) regulatory floodways were computed, so they had to be shown on the map, or (2) if separate FBFMs were required by State regulations even if FEMA did not compute or delineate a regulatory floodway.

INT.8.4 Map Initiatives Format

[February 2002]

Starting in 1986, FEMA began preparing FIRMs in its “Map Initiatives Format.” For FIRMs prepared in the Map Initiatives Format, FEMA combined all essential information previously shown on the separately published FIRM and FBFM into a FIRM. At this same time, FEMA instituted some additional format changes to make the FIRM more user-friendly and useable. These changes included simplifying the flood insurance rate zone designations for SFHAs

developed based on detailed flood hazard assessments and providing a new cross-hatching feature to identify regulatory floodway areas.

INT.8.5 Countywide Format

[February 2002]

At about the same time that FEMA instituted the Map Initiatives Format, FEMA also instituted its “Countywide Format” to enable seamless flood hazard coverage at the county level. For FIRMs prepared in the Countywide Format, FEMA compiles the effective flood hazard information for all jurisdictions within the subject county (both unincorporated and incorporated areas) and produces one FIRM and one FIS report. For FIRMs prepared in Countywide Format, FEMA included all essential information that previously appeared on the effective FIRMs and FBFMs for the individual communities, unless that information had been superseded by a restudy or map revision.

INT.9 Overview of Mapping Partners

[February 2002]

To provide a sound basis for floodplain management and insurance rating, the Flood Hazard Maps must present flood hazard information that is correct and up to date. Maintaining correct and up-to-date flood hazard information requires the combined contributions of many Mapping Partners.

The following are the primary Mapping Partners involved in the development and maintenance of the Flood Hazard Maps and other flood hazard and risk information used for NFIP purposes:

- FEMA Regional Office staff;
- FEMA Headquarters Office staff;
- Community officials;
- Regional agency officials;
- State agency officials;
- Communities, regional agencies, and State agencies participating in the CTP initiative;
- Other Federal agencies;
- FEMA Contractors;
- Contractors for communities, regional agencies, and State agencies; and
- Community residents and property owners.

Brief descriptions of each of the primary groups of Mapping Partners as well as other constituent groups that have an interest in the accuracy of the flood hazard information are provided in Subsections INT.9.1 through INT.9.9.

INT.9.1 FEMA Regional Offices

[February 2002]

FEMA has offices in each of 10 Regions. The locations of these offices and the States, Commonwealths, and Territories that they cover are presented below.

- **Region I**, located in Boston, oversees flood hazard mapping and floodplain management activities in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

- **Region II**, located in New York City, oversees flood hazard mapping and floodplain management activities in New Jersey, New York, Puerto Rico, and the U.S. Virgin Islands.
- **Region III**, located in Philadelphia, oversees flood hazard mapping and floodplain management activities in Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia.
- **Region IV**, located in Atlanta, oversees flood hazard mapping and floodplain management activities in Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee.
- **Region V**, located in Chicago, oversees flood hazard mapping and floodplain management activities in Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin.
- **Region VI**, located in Denton, Texas, oversees flood hazard mapping and floodplain management activities in Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.
- **Region VII**, located in Kansas City, oversees flood hazard mapping and floodplain management activities in Iowa, Kansas, Missouri, and Nebraska.
- **Region VIII**, located in Denver, oversees flood hazard mapping and floodplain management activities in Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming.
- **Region IX**, located in Oakland, oversees flood hazard mapping and floodplain management activities in Arizona, California, Hawaii, Nevada, Guam, American Samoa, and the Northern Mariana Islands.
- **Region X**, located in Bothell, Washington, oversees flood hazard mapping and floodplain management activities in Alaska, Idaho, Oregon, and Washington.

INT.9.2 FEMA Headquarters Office

[February 2002]

The FEMA Headquarters Office is located in Washington, DC. The FEMA Headquarters Office is the office within the Emergency Preparedness and Response Directorate of the Department of Homeland Security that oversees flood insurance, flood hazard mapping, and floodplain management activities nationwide.

INT.9.3 Community Officials

[February 2002]

Many community officials have active roles in the process of creating and maintaining Flood Hazard Maps, implementing floodplain management ordinances, and ensuring wise floodplain development. The community officials who work most closely with FEMA and other Mapping Partners are the CEOs, floodplain managers, and community planners.

INT.9.4 Regional Agency Officials

[February 2002]

The regional agencies that have active roles in the process of creating and maintaining Flood Hazard Maps, implementing floodplain management ordinances, and ensuring wise floodplain development are watershed management districts, flood control districts, regional planning councils, councils of governments, and regional offices of State agencies.

INT.9.5 State, Commonwealth, and Territory Officials

[February 2002]

Many State, Commonwealth, and Territory agencies are actively involved in creating and maintaining Flood Hazard Maps, implementing floodplain management ordinances, and ensuring wise floodplain development. The most active agency in each is referred to as the “State NFIP Coordinator,” or “State Coordinating Agency” for that state, commonwealth, or territory. The State NFIP Coordinators in each FEMA Region are listed below.

Region I

Connecticut Department of Environmental Protection
Maine State Planning Office
Massachusetts Department of Flood Hazard Management Programs
New Hampshire Office of Emergency Management
Rhode Island Emergency Management Agency
Vermont Department of Environmental Conservation

Region II

New Jersey Department of Environmental Protection
New York State Department of Environmental Conservation
Puerto Rico Planning Board
U.S. Virgin Islands Department of Planning and Natural Resources

Region III

Delaware Department of Natural Resources
District of Columbia Environmental Health Administration
Maryland Emergency Management Agency
Pennsylvania Department of Community and Economic Development
Virginia Department of Conservation
West Virginia Office of Emergency Services

Region IV

Alabama Emergency Management Agency
Florida Division of Emergency Management
Georgia Department of Natural Resources
Kentucky Division of Water Resources
Mississippi Emergency Management Agency
North Carolina Division of Emergency Management
South Carolina Department of Natural Resources
Tennessee Department of Economic and Community Development

Region V

Illinois Department of Natural Resources
Indiana Department of Natural Resources
Michigan Department of Environmental Quality
Minnesota Department of Natural Resources
Ohio Department of Natural Resources
Wisconsin Department of Natural Resources

Region VI

Arkansas Soil and Water Conservation Commission
Louisiana Department of Transportation and Development
New Mexico Department of Public Safety
Oklahoma Water Resource Board
Texas Natural Resources and Conservation Commission

Region VII

Iowa Department of Natural Resources
Kansas Department of Agriculture, Division of Natural Resources
Missouri Emergency Management Agency
Nebraska Natural Resources Commission

Region VIII

Colorado Water Conservation Board
Montana Department of Natural Resources and Conservation
North Dakota State Water Commission
South Dakota Division of Emergency Management
Utah Division of Comprehensive Emergency Management
Wyoming Emergency Management Agency

Region IX

Arizona Department of Water Resources
California Department of Water Resources
Hawaii Department of Land and Natural Resources
Nevada Division of Water Planning
Guam Department of Public Works
American Samoa Economic Development Planning Office
Northern Mariana Islands Building Safety Division

Region X

Alaska Department of Community and Economic Development
Idaho Department of Water Resources
Oregon Department of Land Conservation and Development
Washington State Department of Ecology

INT.9.6 Participants in Cooperating Technical Partners Program **[February 2002]**

One of the key objectives of the FEMA Map Modernization Program is to increase local involvement in, and ownership of, the flood mapping process. To meet this objective, FEMA developed and implemented the Cooperating Technical Communities initiative, which is now the CTP Program. FEMA has identified the following beneficial reasons for partnering with State, local, and regional organizations to produce NFIP maps:

- The data used for local permitting and planning will also be the basis for the NFIP map, facilitating more efficient floodplain management.
- The CTP Program provides the opportunity to modify a national program to interject a tailored, local focus where unique conditions may exist that necessitate special approaches to flood hazard identification.
- The partnership mechanism provides the opportunity to pool resources and extend the productivity of limited public funds.

In support of the CTP Program, FEMA has committed to the following:

- To recognize the contributions made by FEMA's State, regional, and local community Partners by providing timely and accurate flood hazard information;
- To maximize the use of Partners' contributions as a means of leveraging limited public funds to the fullest extent possible while maintaining essential NFIP standards;
- To fully integrate contributing Partners into the flood hazard data development process, with the corresponding authorities and responsibilities;

- To provide training and technical assistance to Partners when appropriate; and
- To facilitate mentoring to increase capabilities of both existing and potential Partners.

The CTP Program allows communities as well as regional agencies and State, Commonwealth, and Territory agencies that have the interest and capability to become active partners in the FEMA Flood Hazard Mapping Program. FEMA and its Partners administer activities under the CTP Program through close and frequent coordination and through formal agreements.

More detailed information on these agreements and eligible mapping activities is provided in Volume 3, Section 3.18 of these Guidelines.

INT.9.7 Other Federal Agencies

[February 2002]

Five Federal agencies have been actively involved in the NFIP since its inception, and have worked closely with FEMA in performing flood hazard studies and preparing Flood Hazard Maps. These agencies are the U.S. Army Corps of Engineers, U.S. Geological Survey, Natural Resources Conservation Service (formerly U.S. Soil Conservation Service), U.S. Bureau of Reclamation, Tennessee Valley Authority. These agencies also often provide FEMA with copies of reports (e.g., Floodplain Information Reports, Flood Hazard Analyses Reports) and other information that was developed for purposes other than the NFIP for FEMA use in updating the Flood Hazard Maps for affected communities.

In accordance with Paragraph 65.10(e) of the NFIP regulations, a Federal agency with responsibility for levee design may certify that a levee has been adequately designed and constructed to provide protection from the 1-percent-annual-chance flood. Therefore, the U.S. Army Corps of Engineers and other Federal agencies may be involved in a flood hazard study/restudy or map revision even when they are not contracted with FEMA to perform the hydrologic and hydraulic analyses.

FEMA works closely with the National Geodetic Survey, which is the part of the National Oceanic and Atmospheric Administration that maintains a network of more than 750,000 precisely located monumented reference points nationwide. The National Geodetic Survey national reference network and Global Positioning System photogrammetry provide a universal set of coordinates across community, county, and State lines. FEMA requires such a foundation of accurate coordinates for the Flood Hazard Maps.

FEMA works closely with, and provides technical assistance to, the U.S. Fish and Wildlife Service to improve the mapping of CBRS areas. Specifically, FEMA assists the U.S. Fish and Wildlife Service in producing digital, vector mapping that is suitable for direct incorporation as a thematic layer in Digital FIRMs and potential posting on a Web site. As requested by the U.S. Congress, FEMA uses the mapping developed by the Service to present CBRS areas and related information of the Flood Hazard Maps for affected communities. Additional information on

CBRS revisions is presented in Subsection INT.7.1.5 and in Volume 2, Section 2.2 of these Guidelines.

FEMA has established a partnership with the U.S. Geological Survey through the National Digital Orthophoto Partnership Program. Through this Program, the U.S. Geological Survey will produce Digital Orthophoto Quadrangle Maps, or “DOQs,” for those communities where no community base map that meets FEMA base map specifications exists. FEMA will then use the information to update the Flood Hazard Maps.

FEMA is an active participant in the National Digital Elevation Program, which was established to promote the exchange of digital elevation data and technology among government, private-sector, and academic communities and establish standards and guidance that will benefit all agencies and users.

FEMA also is working cooperatively with 16 other Federal agencies participating on the Federal Geographic Data Committee. The Committee is developing the National Spatial Data Infrastructure, which encompasses policies, standards, and procedures for organizations to cooperatively produce and share geographic data. The goals of this Infrastructure are to (1) reduce duplication of effort among agencies; (2) improve quality and reduce costs related to geographic information; (3) make geographic data more accessible to the public; (4) increase the benefits of using available data; and (5) establish key partnerships with States, counties, cities, tribal nations, academia, and the private sector to increase data availability.

Representatives of the U.S. Army Corps of Engineers, U.S. Geological Survey, and National Aeronautics and Space Administration participated in the development of guidelines and specifications for the use of airborne Light Detection and Ranging systems. That information now appears in Appendix A, Section A.8 of these Guidelines.

INT.9.8 FEMA Contractors

[February 2002]

The primary FEMA contractors that assist FEMA and the other Mapping Partners in creating and maintaining Flood Hazard Maps and implementing floodplain management ordinances and their traditional roles and responsibilities are summarized in Subsections INT.9.8.1 through INT.9.8.3.

INT.9.8.1 Study Contractors

[February 2002]

The Study Contractors are the private-sector architectural/engineering firms and Federal agencies that perform flood hazard studies and restudies under contract to, or through Interagency Agreement (Federal agencies) with, FEMA. The Federal agencies that have performed flood hazard studies and restudies for FEMA are the U.S. Army Corps of Engineers, U.S. Geological Survey, Natural Resources and Conservation Service, U.S. Bureau of Reclamation, and Tennessee Valley Authority.

INT.9.8.2 Flood Map Production Coordination Contractors [February 2002]

The Flood Map Production Coordination Contractors are the private-sector architectural/engineering firms that: (1) review and process flood hazard studies and restudies; (2) review and process revisions and amendments to NFIP maps and related products; (3) prepare Preliminary copies and final reproduction materials for Flood Hazard Maps, reports, and related products; (4) provide program development and implementation support to FEMA and other Mapping Partners; and (5) maintain Region-based archives of flood hazard data.

INT.9.8.3 Map Service Center Contractor [February 2002]

The Map Service Center Contractor is a private-sector firm that maintains the FEMA Flood Hazard Mapping inventory and related products, distributes printed copies of Flood Hazard Maps and related products, and provides customer service support to FEMA and other Mapping Partners.

INT.9.9 Contractors for Communities and Regional Agencies [February 2002]

To expand their resources or to complete a specific short- or long-term mapping-related project, communities and regional agencies may hire contractors to provide a variety of engineering and mapping services. These contractors may be private-sector firms or public-sector agencies (Federal, State, and regional) with specific experience, knowledge, or capability.

INT.9.10 Contractors for State/Commonwealth/Territory Agencies [February 2002]

To expand their resources or to complete a specific short- or long-term mapping-related project, State, Commonwealth, and Territory agencies may hire contractors to provide a variety of engineering and mapping services. These contractors may be private-sector firms or public-sector agencies (Federal, State, and regional) with specific experience, knowledge, or capability.

INT.9.11 Community Residents and Property Owners [February 2002]

Community residents and property owners play an active role in creating and maintaining Flood Hazard Maps by providing community officials, FEMA, and their contractors with historical and property-specific information during the preparation of a new or revised Flood Hazard Map; by providing property- or area-specific technical support data to community officials and FEMA for use in revising or amending Flood Hazard Maps; and by notifying community officials and FEMA of potential violations of local floodplain management and development ordinances.

INT.9.12 Other Program Constituents

[February 2002]

Other Program constituents that may play lesser, but nonetheless important roles in the process of creating and maintaining Flood Hazard Maps, implementing floodplain management ordinances, and ensuring wise floodplain development and management are the following:

- U.S. Congress;
- Insurance companies and agents;
- Lenders;
- Real estate professionals;
- Flood map determination firms;
- Land development industry;
- Surveyors; and
- Federal, State, and local disaster and emergency response officials.

Several organizations that represent state and local officials, the nation's realtors, homebuilders, and surveyors, and those with a stake in floodplain management, development review, disaster mitigation, emergency response, land-use planning, and environmental protection, have formed a coalition. The coalition was formed to support the FEMA Map Modernization Program and take an active part in assuring that the Flood Hazard Maps are accurate. The following organizations are members of this coalition:

- American Congress of Surveying and Mapping;
- American Planning Association;
- American Public Works Association;
- American Society of Civil Engineers;
- Association of State Floodplain Managers;
- Association of State Wetland Managers;
- Coastal States Organization;
- National Association of Counties;
- National Association of Development Organizations;

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- National Association of Flood and Stormwater Management Agencies;
- National Association of Home Builders;
- National Association of Realtors,
- National Emergency Management Association;
- National League of Cities;
- National Flood Determination Association; and
- National Lenders Insurance Council.

The National Wildlife Federation and the Western Governors Association also have publicly supported the FEMA Map Modernization Program.

INT.10 Guidelines for Mapping Partners in Perspective **[February 2002]**

Since its inception, the Federal Government has had primary responsibility for administering the NFIP in general, with a special emphasis on the identification and mapping of the nation's floodplains. The Federal Government undertook the identification and mapping activities to create a broad-based awareness of flood hazards and to provide the data necessary for community floodplain management programs and to actuarially rate flood insurance.

In the enabling legislation that created and amended the NFIP, FEMA has been authorized to consult with, receive information from, and enter into agreements or other arrangements with the head of any State, regional, or local agency in order to identify these floodplain areas. Therefore, FEMA has encouraged strong Federal, State, regional, and local partnerships for the purposes of reducing flood losses and disaster assistance.

Over the years, FEMA has established and implemented initiatives to build on Federal, State, regional, and local partnerships and, where appropriate, formalize the partnerships. Through these initiatives—including the recent CTP Program—FEMA and its State, regional, and local partners have formalized improved cooperation in the flood hazard identification and mapping processes. Many communities and the agencies that serve them have developed considerable technical capabilities and resources that provide the opportunity to improve and expand the collection, development, and evaluation of flood hazard data.

Recognizing that the contributions of FEMA and all of its Mapping Partners may evolve over the next several years, these Guidelines have not emphasized the traditional roles of the various Mapping Partners. Instead, these Guidelines specify the requirements that the Mapping Partner performing a specific task must meet to ensure consistent and accurate flood hazard information is provided to U.S. citizens nationwide.