

Appendix 2-G

National Flood Insurance Program

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2.G.1 Introduction

The following appendix is intended to provide an overview of key requirements and provisions of the National Flood Insurance Program (NFIP). This appendix outlines general requirements for working in or near floodplains and discusses coordination needed with Federal Emergency Management Agency (FEMA) and local communities.

2.G.2 Flood Disaster Protection

The Flood Disaster Protection Act of 1973 (PL 93-234, 87 Stat. 975) denies federal financial assistance to flood-prone communities that do not qualify for flood insurance. Formula grants to states are excluded from the definition of financial assistance and the definition of construction in the Act does not include highway construction. Therefore, Federal-aid for highways is not affected by the Act. The Act does require communities to adopt certain land use controls to qualify for flood insurance. These land use requirements could impose restrictions on the construction of highways in mapped floodplains and floodways in communities enrolled in the NFIP. For a project in a floodway or floodplain in Michigan, no rise in water surface elevation is permitted as a result of the project, unless a damage assessment is completed.

2.G.3 Flood Insurance

The National Flood Insurance Act of 1968, as amended, (42 U.S.C. 4001-4127) requires that communities adopt adequate land use and control measures to qualify for insurance. Federal criteria promulgated to implement this provision contain the following requirements that can affect certain highways.

Participating cities and/or counties agree to regulate new development in the designated floodplain and floodway through regulations adopted in a local floodplain ordinance or State statute. The ordinance or State statute must require that development in the designated floodplain be consistent with the intent, standards, and criteria set by the NFIP. State laws and local ordinances may be more restrictive than NFIP standards.

In riverine situations, when the Administrator of the Federal Insurance Administration has identified the flood-prone area, the community must require that, until a floodway has been designated, no use, including landfill, be permitted within the floodplain area having special flood hazards for which base flood elevations have been provided, unless it is demonstrated that the cumulative effect of the proposed use, when combined with all other existing and reasonably anticipated uses of a similar nature, will not increase the water surface elevation of the 1% chance (100-year) flood more than 1 foot (0.3 m) at any point within the community. States and communities can adopt stricter regulations than the federal requirement: IN MICHIGAN THERE IS NO CUMULATIVE INCREASE ALLOWED UNLESS A DAMAGE ASSESSMENT IS COMPLETED BY A LICENSED PROFESSIONAL ENGINEER. Note, floodways are not determined in coastal floodplain situations unless there is a riverine confluence.

After the floodplain area having special flood hazards has been identified and the water surface elevation for the 100-year flood and floodway data have been provided, the community is required to designate a floodway that will convey the 1% chance (100-year) flood without increasing the water surface elevation of the flood more than 1 foot (0.3 m) at any point. MICHIGAN LIMITS THIS INCREASE TO 0.10 FEET (0.03 M) for the definition of a floodway versus floodplain. The community must also prohibit, within the designated floodway, fill, encroachments, and new construction and substantial improvements of existing structures which would result in ANY increase in flood heights within the community during the occurrence of the 100-year flood discharge.

The various models required during a hydraulic analysis for projects impacting the regulated floodplain are defined as follows:

- Duplicate effective model (DEM) - This is the current effective FEMA model with zero changes. To obtain the effective Flood Insurance Study (FIS) models, refer to FEMA's online [Mapping Information Platform](#).
- Corrected effective model (CEM) - This model includes corrections to any errors that occur in the DEM; adds any additional cross-sections to the DEM, or incorporates more detailed topographic information. The CEM must not reflect any man-made changes since the date of the first effective FEMA model. An error may be a technical error in the modeling procedures or any construction in the floodplain that occurred prior to the date of the effective model but was not included in the effective model. All differences between the models are required to be documented and explained.
- Existing conditions model - Most of the time, this model is the same as the CEM. However, this model could reflect any changes to the floodplain since the date of the effective study. Any changes between the existing conditions model and CEM are required to be documented and explained in detail.
- Proposed conditions – This model includes encroachments added to the existing conditions model to reflect the proposed project. If the proposed 100-year flood elevations are higher than the DEM for any reason, the applicant is required to obtain a conditional Letter of Map Revision (CLOMR) from FEMA prior to issuance of the State floodplain permit.
- Construction models – This model may be needed to evaluate the impacts of temporary floodway obstructions during the construction process, such as sheet piling. Sheet pile height and locations are required to be specified in the plans. Plans to remove sheet piling above certain flow rates can be used to offset potential increases; but details are required that provide information on who removes the sheet piles, which sheet piles will be removed, what type of equipment will be used, if equipment is onsite, time it takes to remove sheet piles, and flow rates when this will occur.

2.G.4 Local Community

The local community with land use jurisdiction, whether a city, county, or state, is responsible for enforcing NFIP regulations in that community if the community

participates in the NFIP. Consistency with NFIP standards is required for Federal-aid highway actions involving regulatory floodways adopted by the participating community. The community, by necessity, is required to submit proposals to the FEMA for amendments to NFIP ordinances and maps in that community, if necessary. The highway agency is required to work directly with the community and the community is required to coordinate with FEMA. Determination of the status of a community's participation in the NFIP and review of applicable NFIP regulatory products and community ordinances are essential first steps in conducting hydraulic studies and preparing environmental documents.

2.G.5 National Flood Insurance Program Maps

Where NFIP maps are available, their use is mandatory when determining whether a highway location alternative will include an encroachment on the base floodplain. Three types of NFIP maps are published:

- Flood Hazard Boundary Map (FHBM)
- Flood Boundary and Floodway Map (FBFM)
- Flood Insurance Rate Map (FIRM)

A FHBM is not based on a detailed hydraulic study and the floodplain boundaries shown are approximate. On a FBFM, flood hazard areas for streams with a designated floodway boundary are derived from a detailed hydraulic study and should provide reasonably accurate information, subject to the best data available when the study was published. A FBFM shows flood hazard areas studied by approximate methods for streams without a delineated floodway. FEMA does not publish new FHBMs and FBFMs, but they may be the regulatory maps for a community if no new flood hazard information has been published.

A FIRM usually is based on a Flood Insurance Study and includes flood elevations and other hazard information needed to better protect new construction from flood damage.

Communities may or may not have one or more of the maps published by FEMA. Information on community participation in the NFIP is provided in the "National Flood Insurance Program Community Status Book" which is published for each State and available on FEMA's website: www.fema.gov

2.G.6 Coordination with FEMA

MDOT coordinates with participating communities and FEMA in situations where administrative determinations are needed involving a regulatory floodway or where flood risks in NFIP communities are significantly impacted. Circumstances that typically require coordination with participating communities and FEMA include:

- When a proposed crossing encroaches on a regulatory floodway.
- When a proposed crossing encroaches on a floodplain where a detailed study has been performed, but where no floodway is designated, and the maximum 1-

foot (0.3 m) increase in the base flood elevation would be exceeded. Note, in Michigan, EGLE does not allow for ANY increase in the floodplain elevation as a result of a proposed crossing without a damage assessment certification.

- When a local community is planning to enter into the NFIP within a reasonable period and detailed floodplain studies are under way.
- When a local community is participating in the NFIP and the base flood elevation in the vicinity of insurable buildings is increased by more than 1 foot (0.3 m). Where insurable buildings are not affected, it is sufficient to notify FEMA of changes to base flood elevations as a result of highway construction. In Michigan, EGLE does not allow for ANY increase in the floodplain elevation as a result of a proposed crossing without a damage assessment certification.

The draft Environmental Impact Statement or Environmental Assessment (EIS/EA) indicates the NFIP status of affected communities, the encroachments anticipated, and the need for floodway or floodplain ordinance amendments. Coordination means furnishing to FEMA the draft EIS/EA and, upon selection of an alternative, furnishing to FEMA through the community, a preliminary site plan and water surface elevation information and technical data in support of a floodway revision request as required. If a determination by FEMA influences the selection of an alternative, a commitment from FEMA is required to be obtained prior to the final environmental impact statement (FEIS) or a finding of no significant impact (FONSI).

For projects that will be processed with a Categorical Exclusion (CE) in federal regulations, coordination may be carried out during design. However, the outcome of the coordination at this time could change the class of environmental processing.

2.G.7 Consistent with Floodways

In many situations, highways can be designed and constructed in a cost-effective manner such that their components are excluded from the designated floodway. This is the simplest way to ensure the project does not increase base flood elevations and complies with NFIP standards. This should be the initial alternative evaluated, because a floodway encroachment review is not required. If a project element encroaches on the floodway and is determined through hydraulic analysis to not increase the base flood elevations (such as piers in the floodway), the project is considered compliant with NFIP standards. Minor project elements within the floodway that are not known to cause an obstruction to flood flows, such as grading without fill, may be considered compliant with NFIP standards and may not warrant an engineering evaluation.

2.G.8 Revisions of Floodway

Where it is not cost-effective to design a highway crossing to avoid encroachment on an established floodway, a second alternative is to modify the floodway itself. Often, the community is willing to accept an alternative floodway configuration to accommodate a proposed crossing provided NFIP limitations on increases in the base flood elevation are not exceeded. In some cases, it is possible to enlarge the floodway or otherwise increase conveyance in the floodway above and below the

crossing to allow greater encroachment. Such planning is best accomplished when the floodway is first established. However, when the community is willing to amend an established floodway to support this option, the floodway may be revised.

The community is responsible for demonstrating that an alternative floodway configuration meets NFIP requirements. However, this responsibility may be borne by the agency proposing to construct the highway crossing. Floodway revisions are required to be based on the hydraulic model that was used to develop the currently effective floodway but updated to reflect existing encroachment conditions. This allows the determination of the increase in the base flood elevation that is caused by encroachments since the original floodway was established. Alternate floodway configurations may then be analyzed.

Base flood elevation increases are referenced to the profile obtained for existing conditions when the floodway was first established.

2.G.9 Data for Revisions

Data submitted to FEMA, through the community, in support of a floodway revision request should include:

- Current regulatory FIRM or FHBM, showing existing conditions, the proposed highway crossing, and revised floodway limits.
- Computer model/printouts (input, computation and output) for the current 100-year model and current 100-year floodway model.
- Computer model/printouts (input, computation and output) for the revised 100-year floodway model. Any fill or development that has occurred in the existing flood fringe area must be incorporated into the revised 100-year floodway model.
- Engineering certification required for work performed by private subcontractors.

The revised and current computer data required should extend far enough upstream and downstream of the floodway revision area to match the original floodway and profiles published in the FEMA FIS using sound hydraulic engineering practices. The upstream and downstream limits vary depending on the magnitude of the requested floodway revision and the stream's hydraulic characteristics.

If input data representing the original hydraulic model used to define the floodway are unavailable, a new hydraulic model is created to reflect the effective data. The new model is established using the original cross section topographic information, where possible, and the discharges contained in the Flood Insurance Study that established the original floodway. The new model is run confining the effective flow area to the currently established floodway and calibrated to reproduce the output data in the Floodway Data Table for the current floodway (i.e., the differences between existing and proposed conditions using the same computer model). Floodway revisions are based on the new model are evaluated using the procedures outlined in this section. Note, floodplain elevations for the revised model must tie-in to the effective model within 0.5 feet.

2.G.10 Allowable Floodway Encroachment

When it is demonstrably inappropriate to design a highway crossing to avoid encroachment on the floodway and where the floodway cannot be modified such that the structure could be excluded, FEMA will approve an alternate floodway with backwater in excess of the 1-foot (0.3 m) maximum only when the following conditions have been met. Note, EGLE may require these steps for all projects increasing the floodplain elevation by ANY amount:

- A location hydraulic study has been performed in accordance with Federal-Aid Highway Program Manual (FHPM) 6-7-3-2, FHWA, "Location and Hydraulic Design of Encroachments on Floodplains" (23 CFR 650, Subpart A) and FHWA finds the encroachment is the only practicable alternative.
- The constructing agency has made appropriate arrangements with affected property owners and the community to obtain flooding easements or otherwise compensate them for future flood losses due to the effects of backwater greater than 1 foot (0.3 m).
- The constructing agency has made appropriate arrangements to assure that the National Flood Insurance Program and Flood Insurance Fund will not incur any liability for additional future flood losses to existing structures which are insured under the program and grandfathered in under the risk status existing prior to the construction of the structure.
- Prior to initiating construction, the constructing agency provides FEMA with revised flood profiles, floodway and floodplain mapping, and background technical data necessary for FEMA to issue revised Flood Insurance Rate Maps and Flood Boundary and Floodway Maps for the affected area, upon completion of the structure.

2.G.10.1 Highway Encroachment on a Floodplain with a Detailed Study

In communities where a detailed flood insurance study has been performed but no regulatory floodway has been designated, design the highway crossing to allow no more than a 1-foot (0.3 m) increase in the base flood elevation based on technical data from the flood insurance study. IN MICHIGAN, THERE IS NO CUMULATIVE INCREASE ALLOWED UNLESS A DAMAGE ASSESSMENT IS COMPLETED BY A LICENSED PROFESSIONAL ENGINEER.

Technical data supporting the increased flood elevation is required to be submitted to the local community and through the local community to FEMA for their files.

2.G.10.2 Highway Encroachment on a Floodplain without a Detailed Study

In communities where detailed flood insurance studies have not been performed, the highway agency is required to generate its own technical data to determine the base floodplain elevation and design encroachments in accordance with FHPM 6-7-3-2. Base floodplain elevations are required to be furnished to the community and coordination carried out with FEMA as outlined previously where the increase in base flood

elevations in the vicinity of insurable buildings exceeds 1 foot (0.3 m). IN MICHIGAN, THERE IS NO CUMULATIVE INCREASE ALLOWED UNLESS A DAMAGE ASSESSMENT IS COMPLETED BY A LICENSED PROFESSIONAL ENGINEER.

2.G.10.3 Highway Encroachment on Unidentified Floodplains

Encroachments that are outside of NFIP-identified special flood hazard areas are required to be designed in accordance with FHPM 6-7-3-2 of the Federal Highway Administration.

2.G.11 Levee Systems

For purposes of the NFIP, FEMA will only recognize in its flood hazard and risk mapping effort those levee systems that meet, and continue to meet, minimum design operation and maintenance standards that are consistent with the level of protection sought through the comprehensive floodplain management criteria as outlined in the NFIP. The levee system is required to provide adequate protection from the base flood. Information supporting this is required to be supplied to FEMA by the community or other party seeking recognition of such a levee system when a flood risk study or restudy is conducted, when a map revision is sought based on a levee system, and upon request by the Administrator during the review of previously recognized structures. The FEMA review is for the sole purpose of establishing appropriate risk zone determinations for NFIP maps and does not constitute a determination by FEMA as to how a structure or system will perform in a flood event. To obtain more information on the requirements related to levee systems, refer to the "National Flood Insurance Program and Related Regulations," Federal Emergency Management Agency, Revised October 1, 1986, and amended June 30, 1987, ([44 CFR 65.10](#)).

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