

CHAPTER 18

FLOODPLAIN POLICY AND REGULATIONS



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FLOODPLAIN POLICY AND REGULATIONS

This chapter focuses on the documentation and regulations that pertain to the protection of floodplains. In the District of Columbia, floodplains occur along the Potomac River, the Anacostia River, Rock Creek, and some of their tributaries. In the planning and design of highway projects, the District of Columbia Department of Transportation (DDOT) must consider potential impacts on floodplains and take action to minimize those impacts in order to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains, which include habitat and water quality values.

If DDOT finds that the only practicable alternative requires siting in a floodplain, impacts must be minimized to the extent possible. A separate “Only Practicable Alternative Finding” statement must be placed in the final environmental document.

18.1 Summary of Key Legislation, Regulations, and Guidance

Federal Laws and Regulations

- Executive Order (EO) 11988, Floodplain Management, 1977
- United States Department of Transportation (USDOT) Order 5650.2, Floodplain Management and Protection, 1979
- 44 Code of Federal Regulations (CFR) 59–62, 64–68, 70–71, 75–77, National Flood Insurance Program (NFIP)

District of Columbia Laws and Regulations

- District of Columbia Municipal Regulations (DCMR) Title 20, Chapter 31, Flood Hazard Rule

Guidance Documents

- Federal Highway Administration (FHWA). 1987. Guidance for Preparing and Processing Environmental

and Section 4(f) Documents. Technical Advisory (TA) T6640.8A

18.2 Agency Roles

Federal and District of Columbia agencies share responsibilities for activities along streams or within floodplains. The following agencies may provide regulatory information or studies that can assist in the assessment of floodplain impacts.

- Federal Emergency Management Agency (FEMA) has primary responsibility for the protection of floodplains in accordance with EO 11988, Floodplain Management. Generally, FEMA regulates projects within the limits of the 100-year floodplain, as determined in the Flood Insurance Study issued by FEMA.
- United States Army Corps of Engineers (USACE) is responsible for dredging navigation channels. USACE may have additional flood data/studies for the Potomac and lower Anacostia Rivers to supplement FEMA studies.
- United States Coast Guard (USCG), Fifth District, Office of Bridge Administration has authority to regulate projects in or over navigable waterways that may impede navigation, under Section 9 of the Rivers and Harbors Act. While the impact to floodplains is not its primary focus, USCG may have hydraulic studies for any bridges that have been constructed or modified in the project area since the time of the FEMA Flood Insurance Study (FIS).

Local Agencies

- District of Columbia Department of the Environment (DDOE), Watershed Protection Division, Sediment and Storm Water Technical Services Branch. At the

local level, FEMA has delegated floodplain regulation to the Department of Consumer and Regulatory Affairs (DCRA), although the DDOE Watershed Protection Division's Sediment and Storm Water Technical Services Branch has primary responsibility for technical review of impacts to the floodplain. Thus, the Technical Services Branch reviews projects to ensure compliance with both the National Flood Insurance Program (NFIP) requirements and DCMR floodplain regulations.

18.3 General Methodology

18.3.1 Definitions

Base Flood: Flood event having a 1 percent chance of being equaled or exceeded in a given year (also known as the 100-year flood).

Base Flood Elevation (BFE): Water surface elevation of the base floodplain.

Flood Insurance Study (FIS): Published by FEMA in 1985 pursuant to the National Flood Insurance Act, the study includes hydrologic and hydraulic analysis to develop flood risk data for areas around larger streams in the District of Columbia area.

Floodplain: The area of land adjacent to a stream or river that would be covered by waters during a 100-year flood event.

Floodway: The regulatory floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood discharge can be conveyed without increasing the base flood elevation more than a specified amount.

Floodway Fringe: The area between the floodway and the 100-year floodplain boundaries. The floodway fringe encompasses the portion of the floodplain that could be

completely obstructed without increasing the water surface elevation of the 100-year flood by more than 1 foot at any point.

18.3.2 Existing Conditions/Affected Environment

Most basic floodplain impact assessments can be made from the published FEMA maps. These maps, whether on geographic information system (GIS) layers or hard copy, will show the 100-year and 500-year floodplain areas. Generally, the focus of the assessment should be on the 100-year floodplain.

Floodplain boundaries were determined by FEMA in an FIS for the District of Columbia in May 1985. This is the official study cited in the DCMR Flood Hazard Rules. The floodplains are shown on two types of maps published by FEMA: Flood Boundary and Floodway Map (FBFM) and Flood Insurance Rate Map (FIRM). The use of these maps is mandatory in determining whether a highway location alternative will encroach on the base floodplain. These maps are available through the online FEMA Flood Map Store. The District GIS also includes a floodplain layer that was developed from the FEMA maps.

Flood boundaries that have been mapped based on detailed analysis of the watershed are designated Zones A2 through A22. In areas where the floodplain has been determined by approximate methods, the floodplain is simply designated Zone A. The area between the 100-year flood and the 500-year flood is shown as Zone B. Zone C designates areas outside the 500-year floodplain.

The FIS takes into account structures (such as bridges) that existed at the time of the study. A comparison of recent and historical mapping or aerial photos (from around 1985) may be used to determine whether substantial modifications have been made since the time of the FIS that may have

had an effect on the floodplain boundaries or the base flood elevation. If there have been substantial modifications or additional structures installed in the project area that are not represented in the FIS, an inquiry should be made to the DDOE Technical Services Branch and FEMA for any updates to the flood data in the project area.

The Affected Environment section of the National Environmental Policy Act of 1969 (NEPA) document should describe the references used (such as FIS, FIRM, and additional data from FEMA), floodplain characteristics (size and location of floodplain in the project area), the waterways with which it is associated, whether any parcels in the floodplain were purchased with FEMA funds, and land uses in the floodplain.

A description of the land uses (or cover types) in floodplains is important in understanding the degree to which a potentially affected floodplain maintains natural and beneficial floodplain values. A statement should be included in the Affected Environment text stating that floodplains in their natural or relatively undisturbed state serve water resource values (natural moderation of floods, water quality maintenance, and groundwater recharge); living resource values (fish, wildlife and plant resources); cultural resource values (open space, recreation); and cultivated resource values (agriculture, aquaculture and forestry). A description of land uses in the floodplain allows a comparison between the functions a natural or relatively undisturbed floodplain can serve and the functions actually being served. This information will help define the level of a project's impact in the Environmental Consequences text.

18.3.3 Determination of Floodplain Impacts

The assessment of floodplain impacts is primarily a task of determining the area of the floodplain that would be affected, whether an increase in the BFE is expected between

postproject conditions and effective (preproject) conditions, and the effect on other natural benefits provided by the floodplain in the area.

The discussion of floodplain impacts should identify the acres of floodplain land uses (cover types) converted to transportation uses and the effects of those impacts on natural and beneficial floodplain values. Impacts to natural or relatively undisturbed floodplains would be expected to have a greater effect on water resource values, living resource values, cultural resource values, and cultivated resource values than impacts to a floodplain that was dominated by cropland or developed urban land.

FEMA regulations limit encroachments into the floodplain that would cause a rise in the BFE by more than 1 foot when no floodway is designated. Where there is a floodway, encroachments only into the flood fringe, by definition, should not cause a rise of greater than 1 foot. The regulations prohibit encroachments into floodways that cause any rise in the BFE.

Under the DCMR flood rules, it is specified that no encroachment, alteration or improvement of any kind shall be made to any watercourse that would reduce the flood-carrying capacity of the watercourse. There are no additional limitations to changes to the BFE than is specified in the FEMA rule.

Potential impacts to floodplains can be assessed when preliminary road designs (footprints) are available for the alternatives. By overlaying the design on the floodplain mapping, the area of the impacts to the 100-year floodplain can be determined. Impacts should be classified as transverse (that is, perpendicular to the stream, such as a bridge) or longitudinal (parallel to the stream). The environmental document should include exhibits that depict the

alternatives, the floodplains, and, where applicable, the regulatory floodways.

Longitudinal impacts are generally considered to have greater impact. The practicability of alternatives to any longitudinal encroachments must be discussed. The following items should be evaluated, commensurate with the significance of the risk or environmental impact, for all alternatives containing encroachments:

- The increased risks of flooding associated with implementation of the action
- The impacts on natural and beneficial floodplain values
- The support of probable incompatible floodplain development
- The measures to minimize floodplain impacts associated with the action
- The measures to restore and preserve the natural and beneficial floodplain values impacted by the action
- Permit conditions (if any)

If any alternative results in a floodplain encroachment or supports incompatible floodplain development having significant impacts, or requires a commitment to a particular structure size or type, the environmental document should include an evaluation and discussion of practicable alternatives to the structure or to the significant encroachment.

For each alternative encroaching on a designated floodway, engineering and environmental analyses should be undertaken commensurate with the level of encroachment, to identify impacts and to discuss the consistency of the action with the regulatory requirements. Hydraulic technical studies such as HEC-2 modeling and bridge scour

analysis may be useful if more detailed floodplain studies are considered necessary through agency coordination. Normally, hydraulic impact assessment requires a high level of engineering and it generally occurs after the NEPA process. A brief description of both studies is given below.

HEC-2 Modeling is a program from the USACE that was designed for its Water Surface Profiles Program. This model, and the subsequent version known as HEC-RAS, are the standard methods for FEMA floodplain and river channel evaluations during the preliminary design stage of project development. It is capable of modeling sideflow weirs, drop structures, and floodplain encroachments and can be used to evaluate floodway encroachments, identify flood hazard zones, manage floodplains, and design and evaluate channel improvements. HEC-2 modeling can be used to calculate the effect that an in-stream structure (such as bridge piers) would have on upstream water levels.

Bridge Scour Analysis. The format and content of a Bridge Scour Analysis are covered in the Guidelines for Preliminary Design of Bridges and Culverts Manual from the Office of Bridges and Structures. Appendix C of that manual describes methods to estimate scour for existing and proposed structures. Also in Appendix C are recommendations for reducing and preventing scour effects on existing and proposed bridges and worksheets for documenting the analysis.

Coordination with FEMA and the DDOE Technical Services Branch should be undertaken for each floodway encroachment. If a floodway revision is necessary, the Environmental Impact Statement (EIS) should include evidence from FEMA and the Technical Services Branch indicating that such revision would be acceptable.

Only Practicable Alternative Finding

If the project includes unavoidable impacts to floodplains, then an “Only Practicable Alternative Finding” will need to be specifically included in the NEPA document in accordance with EO 11988.

A proposed action that includes a significant encroachment will not be approved unless FHWA finds that the proposed significant encroachment is the only practicable alternative. This finding shall be included in the Final EIS or in the Finding of No Significant Impact (FONSI) document and shall be supported by the following information.

- The reasons why the proposed action must be located in the floodplain
- The alternatives considered and why they were not practicable
- A statement indicating whether the action conforms to FEMA and DCMR flood hazard rules

18.4 Post-NEPA Commitments

FEMA requirements apply to permitting and design of structures and utilities in the floodplain. A submittal to FEMA for proposed projects in Zone A areas is not required by FEMA regulations, but the DCMR flood hazard rules require a permit for any actions in the floodplain.

The application for building permit in the floodplain is submitted through the Department of Consumer and Regulatory Affairs (DCRA), although the Technical Services Branch has primary responsibility for technical review of impacts to the floodplain. The general requirements for approval as specified in DCMR are to ensure that all proposed actions do not reduce the flood carrying capacity and are adequately constructed and protected to prevent flood damage.

With the application, an elevation determination must be submitted based on an appropriate hydrologic and hydraulic analysis. For the floodplain administrator to issue a floodplain development permit, they must receive a no rise certification that the proposed work would not increase the BFE. At this time, the HEC-2 or similar model and Bridge Scour Analysis (if necessary) will be mandatory.

The details of the permit application are outlined in DCMR Title 20 Chapter 31.

18.5 Additional Information

- U.S. Coast Guard, Fifth District, Portsmouth, Virginia:
<http://www.uscg.mil/d5/>
- USACE, Baltimore District
10 South Howard Street
8th Floor
Baltimore, MD 21201
<http://www.nab.usace.army.mil/>
- DDOE
District Department of the Environment
Watershed Protection Division
Sediment and Storm Water Technical Services Branch
51 N Street, NE, 5th Floor
Washington, DC 20002
202-535-2240
http://ddoe.dc.gov/ddoe/cwp/view,a,1209,q,492320,ddoeNav_GID,1486,ddoeNav,31375/313771.asp
<http://ddoe.dc.gov/ddoe/cwp/view,a,1209,q,494833.asp>
- Department of Consumer and Regulatory Affairs (DCRA): *<http://dcra.dc.gov/DC/DCRA>*
- District Geographic Information System (GIS). *<http://dcatlas.dcgis.dc.gov/catalog/>*
- Federal Emergency Management Agency. 1985. Flood Insurance Study, District of Columbia, Washington, DC., November 15, 1985. Community Number 110001.
- The Flood Insurance Study, Floodway and Flood Boundary Maps, and Flood Insurance Rate Maps, are available on the web at the FEMA “Product Catalog”:
<http://msc.fema.gov/webapp/wcs/stores/servlet/StoreCatalogDisplay?storeId=10001&catalogId=10001&langId=-1&userType=G>