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Technical Assistance

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FLOOD HAZARD MITIGATION REPORT

FOR

CHESTERFIELD COUNTY

Prepared by the
Richmond Regional Planning District Commission

November, 1993

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1993

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Coastal Resources Management Program pursuant to
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APPENDIX A Virginia Flood Prevention and Protection Assistance Fund Regulations

I. INTRODUCTION

Flooding is a natural event. Flood damages result when structures are erroneously placed in a floodplain, or when structures knowingly placed there are not designed to withstand the force of flood water. The mitigation of flood damages occurs when no new hazards are created, and when existing floodplain hazards are eliminated.

Flood hazard mitigation is defined as a management strategy that reduces flood damage. It is important to understand in this definition, that the flood is not the hazard; the hazard consists of the structures, property, and human life that reside within the reach of flood waters. Without them, hazards do not exist; or are at least limited to a natural environment that has largely adapted itself for life within floodplains.

Historically the United States mitigation policy was based on the construction of flood control structures. These structures have provided significant protection. However, this protection was not without a price tag. The cost of flood control is high, a single dam or flood wall can easily exceed $50 million.

There are other costs as well. Some projects have altered significantly the natural river environment. Some projects protect one area by passing the flooding problem onto adjacent or downstream floodplain areas. And finally, flood control structures have encouraged development in flood prone areas so as to compound the disaster when a catastrophic flood occurs that exceeds the capacity of the flood control system. This summer's catastrophic flooding in the American Mid-west is an outstanding, albeit tragic example of this. Because of these factors, the Corps of Engineers has modified its policies, and flood control structures in the future will be fewer in number and much more carefully placed.

Over the past 30 years flood control experts have come to recognize that other flood hazard mitigation approaches were necessary; that a combination of strategies must be employed to reduce flood damages. These concepts and ideas are slowly being adopted into national flood protection policies as the general population begins to accept the need to try new approaches. These mitigation opportunities can be grouped into two broad categories.

1. Hazard creation minimization:

   - discouraging the development of flood prone areas;
   - minimizing the size of floodplain encroachments;
   - constructing in a manner to minimize flood damages; and,

- implementing watershed changes that will not aggravate flooding.

2. Hazard reduction and elimination:

   - flood proofing individual structures;
   - elevating or relocating flood-prone structures;
   - modifying local drainage systems;
   - constructing flood modification structures; and,
   - the purchase of flood insurance.

As a package these strategies will effect reduced flood damages. Broad implementation of these strategies is not currently feasible due to financial limitations. However, the Federal Emergency Management Administration (FEMA) and the insurance industry recognize that mitigation is necessary to control escalating disaster recovery costs, and consequently are developing improved mitigation concepts for implementation. Using these techniques communities and citizens should no longer be victimized by floods, and through proper planning and budgeting flood damages can be eliminated.

II. PURPOSE

The purpose of this study is twofold: to characterize flood hazards within Chesterfield County and identify strategies to address flood hazards; and, to assess the usability of the Department of Conservation and Recreation's (DCR) flood hazard assessment protocol. The project study area is shown on Map 1.

DCR's Bureau of Rivers and Shorelines (BRS) developed a draft flood hazard mitigation protocol that the Bureau utilized to assess flood hazards in the Rappahanock-Rapidan Planning District (PDC 9). The results of this assessment are contained in a draft report, "Flood Hazard Mitigation Report, Planning District Commission 9", 2/1/93. The introduction of the draft report describes the impetus behind this work.

> "In The Floodplain Management Plan for the Commonwealth of Virginia published in May of 1991, one of the major strategies was to begin flood hazard mitigation planning. The development of regional flood hazard reduction plans will lead to the elimination of many flood hazards. The implementation of such plans will require the evaluation of a region's flood damage history and potential; the development of strategies that over time will reduce or eliminate the hazard; and the implementation of policies that do not put more property at risk or make the problem worse. It is the Department's intent to pursue these planning activities with willing planning district commissions and the localities within their boundaries."[1]

A completed flood hazard mitigation study may be useful to a locality applying for federal or state funding for flood hazard mitigation projects. The Commonwealth of Virginia has developed a program administered by the Virginia Division of Soil and Water Conservation (DSWC) called the Virginia Flood Prevention and Protection Assistance Fund[2] (Appendix A). This program is designed to provide grants and loans to localities for use in meeting matching requirements of federal programs that provide funds for flood prevention and protection studies, projects, and activities. A completed flood hazard mitigation study can be submitted with the grant application as proof a locality has a thorough understanding of local flood hazard problems and a commitment to addressing them. This will increase a localities prospect of receiving approval of it's funding request.

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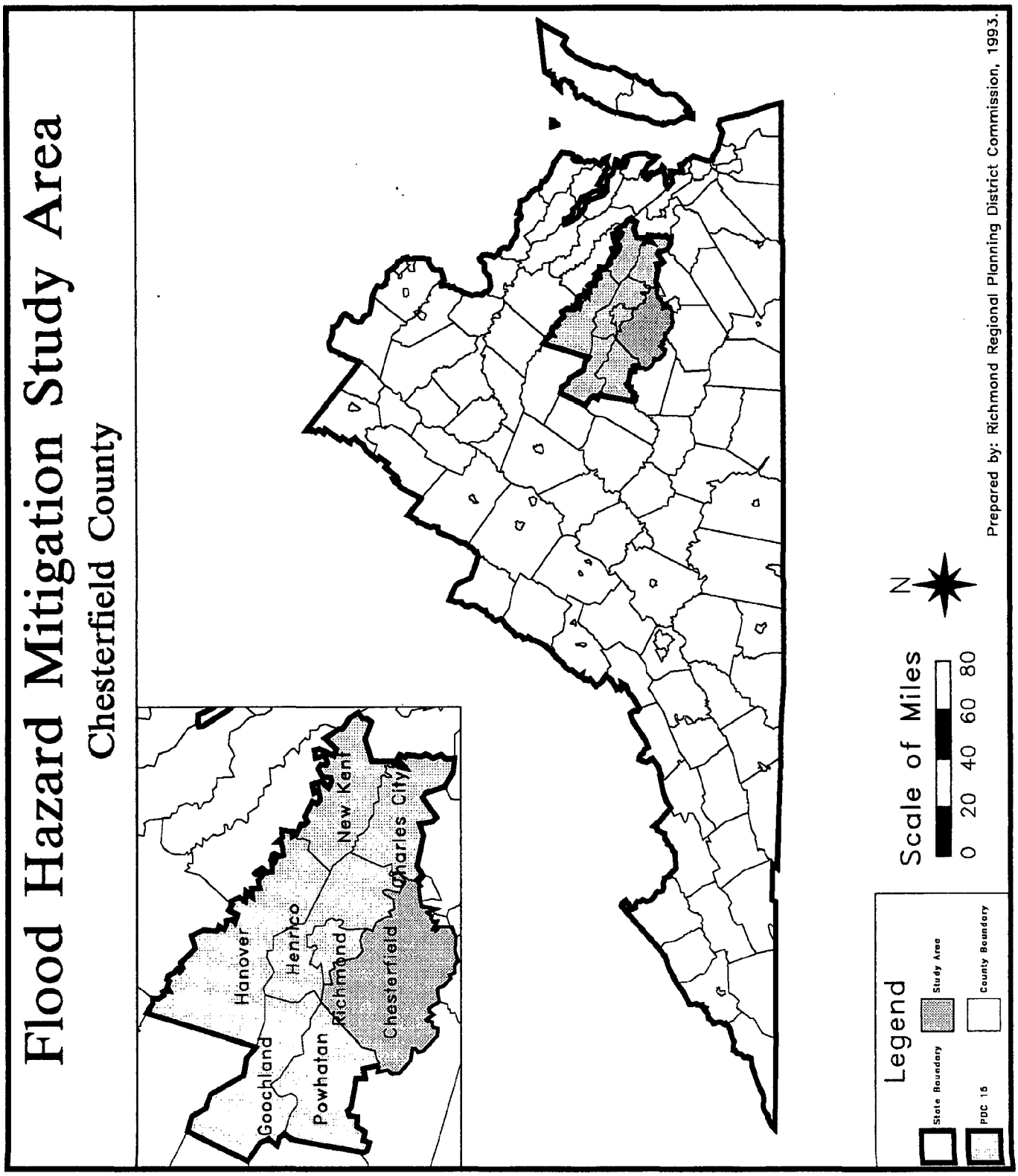
[1]Flood Hazard Mitigation Report Planning District Commission 9, Department of Conservation and Recreation, Bureau of Flood Protection (now Bureau of Rivers and Shorelines), Draft, 2/1/93, p. i.

[2]This program became affective May 9, 1990, but of this writing, state budget limitations have prevented it's funding.

MAP 1


Flood Hazard Mitigation Study Area
Chesterfield County
Hanover
Henrico
New Kent
Charles City
Richmond
Chesterfield
Goochland
Powhatan
Legend
State Boundary
Study Area
PDC 15
County Boundary
Scale of Miles
0 20 40 60 80
N
Prepared by: Richmond Regional Planning District Commission, 1993.

The Richmond Regional Planning District Commission staff is the first PDC staff to use and test DCR's floodplain hazard mitigation process on a locality. The RRPDC's participation in this project will provide feedback the DCR staff can use to evaluate and modify the procedure and improve its usefulness for PDC's that choose to perform flood hazard mitigation assessments in their regions. In turn, Chesterfield County will receive a completed flood hazard assessment that the County's staff can use to assess it's floodplain management program.

III. PROCEDURE

WATERSHED APPROACH

DCR staff developed and performed the first flood hazard mitigation assessment for PDC 9, a PDC composed of rural localities. In contrast, Chesterfield County has significant areas of rapidly developing and developed urban expanses. Uncertain of the possibility of completing the entire County within the twelve month grant period, RRPDC staff, with the concurrence Chesterfield and DCR personnel, chose a watershed by watershed approach. Map 2 shows County watersheds. The study team agreed to complete as many watersheds as time allowed. Watersheds were identified and prioritized, and RRPDC staff, under the guidance of DCR staff, completed a field assessment of each watershed in order of priority.

Watersheds were prioritized based on three criteria: population; the number of flood insurance claims filed; and the number of repetitive losses experienced. Information on filed claims, and repetitive losses was obtained from the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP). FEMA data reflects the period from January 1978 to May 1993.

Table 1 displays the priority watershed criteria. The claims filed column represents properties for which a claim has been filed one or more times. The repetitive loses column shows the total number of properties in each watershed that have filed more than one approved claim. For example, 10 properties in the James River watershed have filed flood loss related claims, and seven of those ten properties have experienced more than one lose that has been approved for payment.

Watersheds with higher populations, filed claims, and repetitive loses received higher priority. Table 2 displays the priority rankings of Chesterfield's watersheds. Field work was performed for each watershed in order of priority.

AVAILABLE DATA

In addition to FEMA NFIP data cited above, other sources of information that were useful in performing the flood hazard field assessments included: FEMA's "Flood Insurance Study for Chesterfield County, Virginia"; and, the US Army Corps of Engineer's "Flood Plain Information" studies developed for the Appomattox River, Falling Creek, Johnson Creek and Tributary, Kingsland Creek, Pocoshock and Pocosham Creeks (tributaries to Falling Creek), Proctors Creek, and Swift Creek.

MAP 2

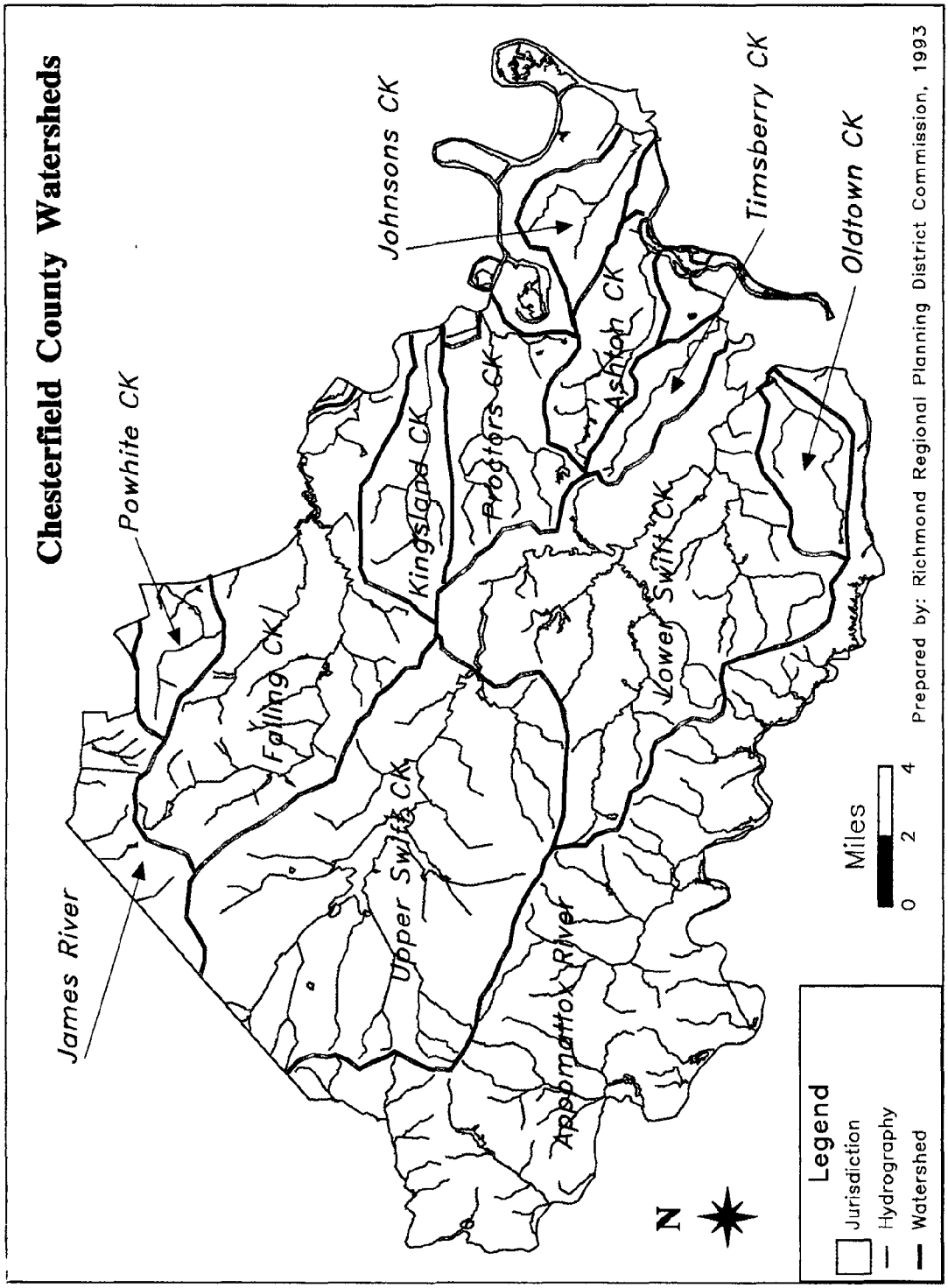

Chesterfield County Watersheds
Powhite CK
James River
Falling CK
Kingsland CK
Upper Swift CK
Proctors CK
Johnsons CK
Ashton CK
Lower Swift CK
Appomattox River
Timsberry CK
Oldtown CK
N
Miles
0
2
4
Legend
Jurisdiction
Hydrography
Watershed
Prepared by: Richmond Regional Planning District Commission, 1993

TABLE 1 CHESTERFIELD COUNTY PRIORITY WATERSHED CRITERIA			
Watershed	Population	Claims Filed	Repetitive Loses
Appomattox River	9,800	0	0
Ashton Creek	9,000	0	0
Falling Creek	98,000	4	2
James River	7,000	10	7
Johnson Creek	3,400	0	0
Kingsland Creek	19,900	1	0
Oldtown Creek	3,000	1	0
Powhite Creek	16,600	1	0
Proctors Creek	16,000	3	0
Swift Creek (Upper)	9,300	2	0
Swift Creek (Lower)	10,500	6	2
Timsberry Creek	6,600	0	0

The "Flood Insurance Study for Chesterfield County, Virginia" (FIS), contains hydrologic and hydraulic analyses for selected streams in the County. These analyses are used to delineated flood insurance zones and base flood elevations on a series of maps, "Flood Insurance Rate Maps" (FIRM), that comprise the County. FIRMs are used for insurance purposes to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program. Flood profiles contained within the FIS were used in the field to assist in identifying structures within floodplains.

TABLE 2 CHESTERFIELD COUNTY PRIORITY WATERSHEDS			
Priority Rank	Watershed	Priority Rank	Watershed
1	Falling Creek	7	Swift Creek (Upper)
2	Swift Creek (Lower)	8	Oldtown Creek
3	James River	9	Johnson Creek
4	Proctors Creek	10	Ashton Creek
5	Kingsland Creek	11	Timsberry Creek
6	Powhite Creek	12	Appomattox River

"Flood Plain Information" studies were developed to aid County officials in making floodplain land use planning and management decisions. The studies identify areas subject to possible future floods through maps, photographs, flood profiles and cross sections. This information, like the FIS's, is a valuable field resource.

FIELD SURVEYS

Field surveys were performed over four days during the months of June and July, 1993. The survey team assessed properties where flood insurance claims had been filed, and where repetitive losses had occurred. Also, structures shown to be in the floodplain from maps contained in "Flood Plain Information" reports were assessed. At each site, the survey team noted any flood proofing measures observed and appropriate measures that could be employed. This information is generalized in the assessment section below.

IV. CHESTERFIELD COUNTY ASSESSMENT

COMMUNITY DESCRIPTION

History[3] Chesterfield County was formed from Henrico County in 1749 and probably received its name from Lord Chesterfield, the Fourth Earl of Stanhope. Prior to English settlement, the area was inhabited by native American Indians of the Appomattox and Monacan tribes. The Appomattox and Monacan Indians were part of the Powhatan confederacy that dominated the region when English settlers arrived at the beginning of the 17th Century. Colonial settlements were established initially along the James River most notably at Bermuda Hundred, Farrar's Island, and at the mouth of Falling Creek where the first iron works in America was established. Later, around 1700, French Huguenots settled along the James River in the area of the present day Powhatan County line.

The first commercial coal mines in America were constructed at the headwaters of Falling Creek near Midlothian, and the first rail line in Virginia (drawn by mules) was built to transport the coal to Manchester on the James River. Some of the first cotton mills in the South were established along the Appomattox River around the villages of Ettrick and Maotoaca.

Military engagements erupted in Chesterfield during both the Revolutionary and Civil Wars. Virginia Governor Thomas Jefferson set up a training center for military recruits during the Revolutionary War at Chesterfield Courthouse. Fighting occurred between British troops and the local militia at the Courthouse and around the coal fields of Midlothian. In 1862, during the Civil War, Confederate troops were successful in preventing the U.S. Navy from reaching Richmond when they were repulsed by fierce shelling from a Confederate battery at Fort Darling on Drewry's Bluff. Later near the end of the war, Federal troops were successful in destroying County rail lines that provided coal to Richmond. Petersburg fell under General U.S. Grant's siege, and shortly thereafter on April 9, 1865 the war ended at Appomattox.

Since the Civil War, Chesterfield County has continued as an intregal part of the region's economic and cultural makeup. Large industries such as DuPont, Philip Morris, ICI America, Reynolds Metals, and others, have significant manufacturing facilities here. Today, agriculture and forestry activities occur primarily in the more rural southern and western portions of the County. The County has absorbed a large percentage of the Richmond Region's growth in population. According to the 1990 U.S. Census, the County's population was 209,274. Urbanization has spread from the City of Richmond into the northern and eastern half of the County, and continues to grow at a rapid pace.

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[3]Information from, The Messenger of the Chesterfield Historical Society of Virginia, No. 1, February, 1982.

Physiography[4] Chesterfield County is located in south-central Virginia, partially in the Piedmont province and partially in the Coastal Plain province. These provinces are defined by an escarpment known as the "fall line," which crosses the County in a north-south direction. Elevations in the County range from 0 feet in the east to 350 feet in the west. Chesterfield county is bordered by the City of Richmond and Henrico County to the northeast; Powhatan County to the northwest; Amelia County to the southwest; Dinwiddie County to the south; the City of Colonial Heights and Prince George County to the southeast; and Charles City County to the east. The total land area of the County is 446 square miles.

The James River forms the northern and eastern boundaries of the County. The river is tidal along the eastern portion of the County and riverine where it forms the northern boundary. The Appomattox River, which is a major tributary of the James River, forms the southern boundary of the County. At its confluence with the James River, the Appomattox River is tidal. It becomes riverine as it progresses up the "fall line" on its westward extension. The remaining streams in the County generally flow from west to east and empty into the James or Appomattox Rivers.

Climate[5] Chesterfield County has warm summers, relatively mild winters, and normally adequate rainfall. The County is located well inland from the Atlantic Ocean, which has only a very small moderating effect on the climate. Although the area is near the mean path of winter storms, the Appalachian Mountains to the west tend to lessen their intensity.

Mean annual temperatures vary slightly from year to year and are mostly 55° to 60° F. Maximum temperatures of 90° or higher occur on an average of about 48 days per year, and 100° or more only about every 3 years on the average. Minimum temperatures are 32° or lower about 80 to 100 days per year and occur on a few more days in the rural parts of the County than near the urban areas. A few hard freezes occur in winter, but temperatures of 0° or below are very rare.

Precipitation averages approximately forty-four inches per year, but can be quite variable over both long and short periods in the area. Although rainfall is generally greatest in July and August, it is often insufficient during these months because this is the time when vegetation demands for moisture are greatest and evaporation is highest. Thundershowers occur on an average of

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[4]Information from Flood Insurance Study Chesterfield County, Virginia, Federal Emergency Management Agency, September 3, 1992.

[5]Information from, Soil Survey of Chesterfield County, Virginia, U.S. Department of Agriculture Soil Conservation Service, In cooperation with VPI & SU, July 1978.

about 37 days per year mainly in summer. Some are heavy and result in considerable runoff. Hurricanes pass inland every few years near the area and usually cause extremely heavy rains.

PRINCIPAL FLOOD PROBLEMS[6]

The history of flooding in Chesterfield County indicates that flooding can occur in any season of the year. Major flooding along the James River and the Appomattox River is produced by large storm systems occurring over their drainage areas. The smaller streams in the County are subject to flooding from smaller, more localized storm systems, as well as from the larger storms.

Falling Creek, Kingsland Creek, Proctors Creek, Johnson Creek, Ashton Creek, Swift Creek, and Oldtown Creek are tidal at their respective confluences with either the James or the Appomattox River. The effects of tidal flooding are insignificant, however, when compared to riverine flooding in Chesterfield County.

Three of the five largest floods on the Appomattox River in Chesterfield County occurred between October 1971 and October 1972. Excluding the historical events of 1667 and 1771, the largest flood on the James River occurred as a result of Hurricane Agnes in 1972. Table 3 shows discharges and recurrence intervals of past floods on the Appomattox River near Chesterfield County, as recorded at the Matoaca gage, and compares them with selected recurrence interval discharges for the ten, fifty, onehundred, and fivehundred year statistical floods.

Table 4 shows discharges and recurrence intervals of past floods on the James River near Chesterfield County, as recorded at the Westham gage, and compares them with selected recurrence interval discharges for the ten, fifty, onehundred, and fivehundred year statistical floods.

The amount and extent of damage caused by any flood depends, in general, upon the size of the area flooded, the height of flooding, the velocity of flow, the rate of rise, and the duration of flooding. The rate of rise and duration of flooding depend largely on the time required for floodwaters to concentrate at a particular point and on the duration and intensity of flood-producing rainfall. Stream velocities during floods depend largely on the size and shape of the stream cross sections, roughness conditions of the stream bed, and the streambed slope. During all major floods, high velocity flood flows and hazardous conditions would exist in the main channel and in some portions of the floodplain.

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[6]Information from, Flood Insurance Study Chesterfield County Virginia, Federal Emergency Management Agency, September 3, 1992.

TABLE 3 APPOMATTOX RIVER IN CHESTERFIELD COUNTY FLOOD DISCHARGE AND RECURRENCE INTERVALS		
Flood	Discharge (cfs)	Recurrence Interval (Years)
500-year	76,000	500
October 1972	40,800	110
100-year	40,000	100
50-year	30,000	50
August 1940	28,000	40
June 1972	22,800	25
October 1971	21,100	20
April 1937	18,800	15
10-year	16,100	10

Damage from past floods along the Appomattox River through Chesterfield County and the upper portion of the James River along the northern border was minor because of the topography and physical characteristics of the floodplain. The eastern portion of the James River and the extreme lower portion of the Appomattox River have floodplains ranging up to several thousand feet in width. These areas are sparsely developed at the present time, with quarrying operations prevailing; however, the areas are coming under pressure for development, particularly industrial and commercial. The remaining streams in the County cause minor damage primarily to residential structures.

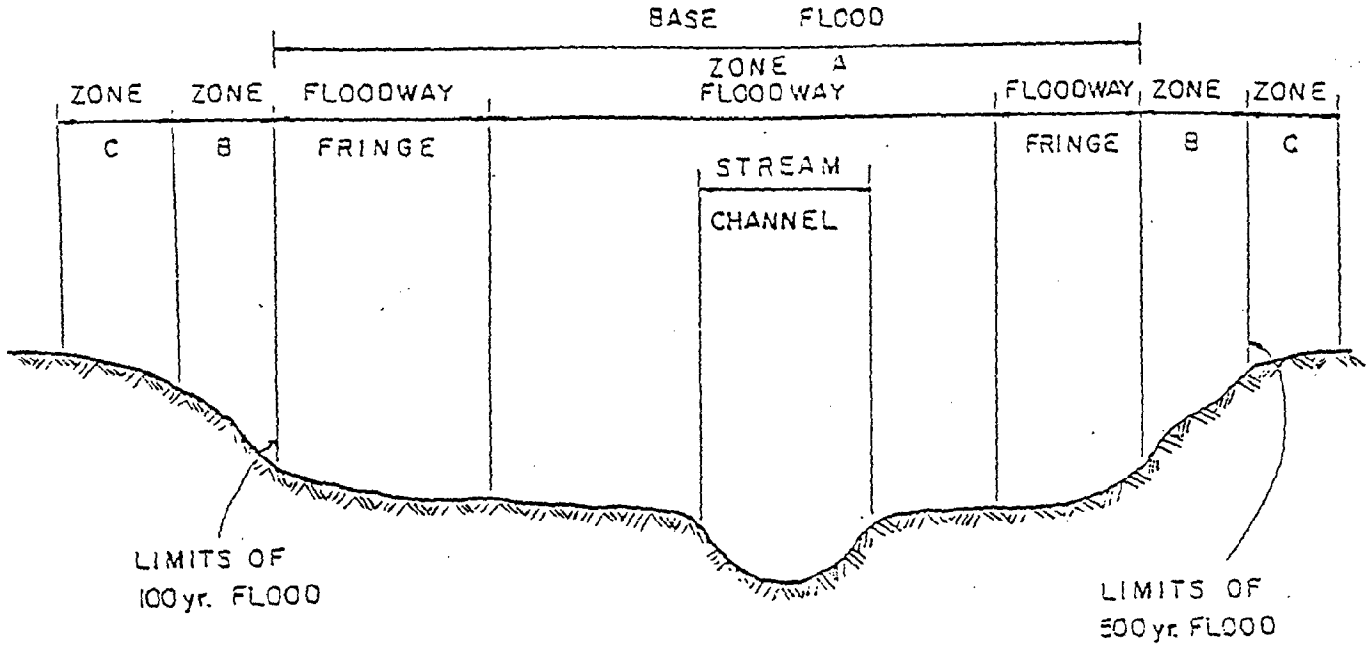
LOCAL FLOODPLAIN MANAGEMENT

Floodplain management in Chesterfield County is accomplished primarily through the County's "Flood Plain Management Ordinance". Chesterfield County adopted the ordinance on February 23, 1983; the ordinance has been revised twice, most recently on April 12, 1989 due to changes in the NFIP law. The program utilizes the flood boundary delineations contained in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) and applies restrictions and performance requirements within floodplain zones. Figures 1 and 2 show the flood boundary delineations and accompanying zones.

TABLE 4 JAMES RIVER IN CHESTERFIELD COUNTY FLOOD DISCHARGE AND RECURRENCE INTERVALS		
Flood	Discharge (cfs)	Recurrence Interval (Years)
500-year	493,000	500
May 1771	375,000	210
August 1667	350,000	160
June 1972	313,000	110
100-year	310,000	100
50-year	241,000	50
August 1969	222,000	40
March 1936	175,000	20
October 1971	158,000	14
August 1940	151,000	13
September 1944	150,000	13
April 1937	148,000	12
March 1979	140,000	10
10-year	138,000	10

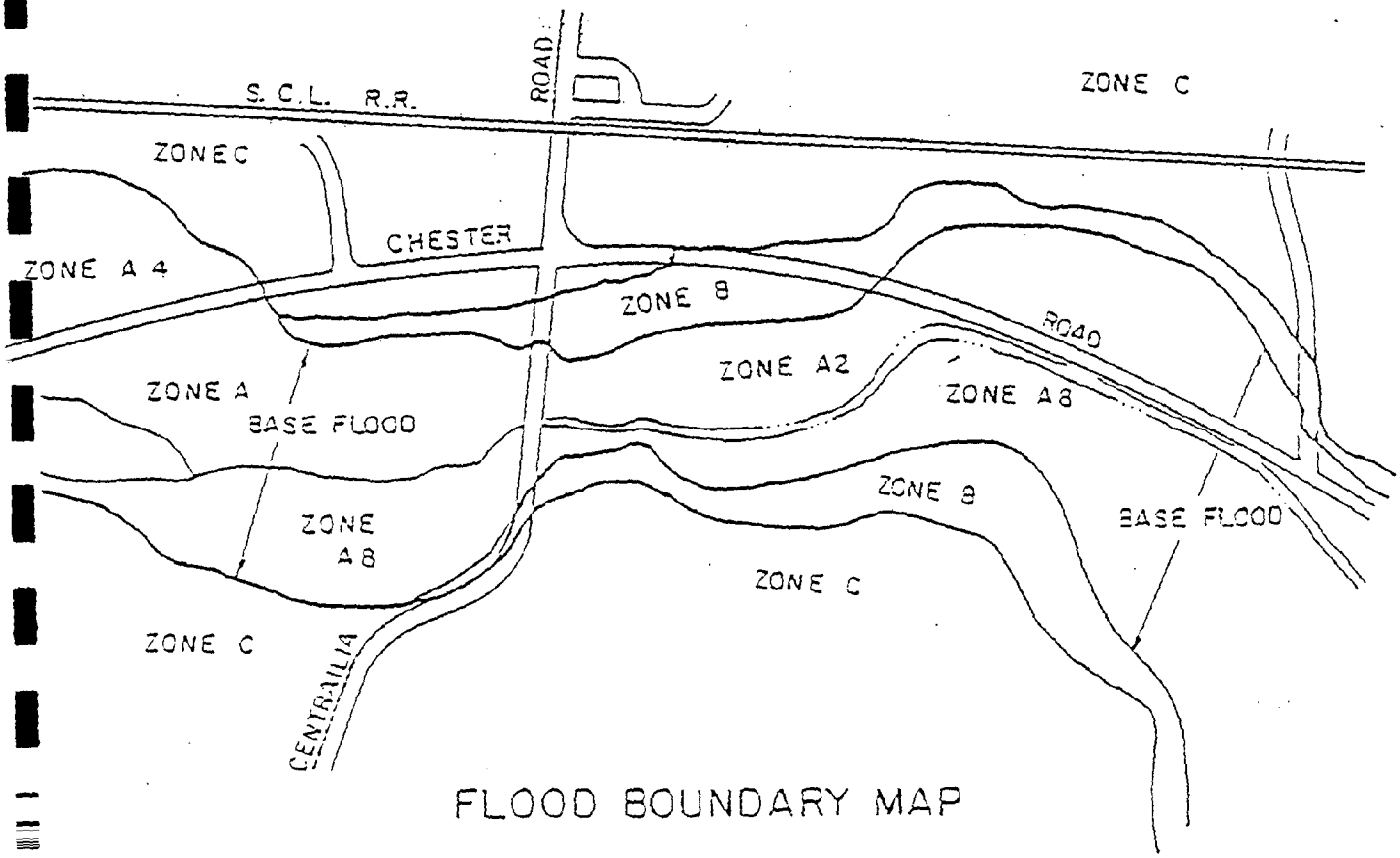
In general, the County ordinance includes the following restrictions and requirements:

- no new residential structures may be built within the limits of the 100 year flood (i.e., base flood or A zone);
- new residential structures and improvements built within B and C zones must be twelve inches above the nearest A zone base flood elevation, and twenty feet away horizontally from the nearest A zone base flood boundary;
- no new nonresidential structures may be built within the floodway;
- new nonresidential structures and improvements built within the floodway fringe of A zone must be twelve inches above A zone base flood elevation, or be watertight up to twelve inches above the base flood elevation;



FLOOD PLAIN SCHEMATIC

FIGURE 1



FLOOD BOUNDARY MAP

FIGURE 2

- new nonresidential structures and improvements built within B and C zones must be twelve inches or more above the A zone base flood elevation, or be watertight up to twelve inches above the base flood elevation;
- flood proofing applied to structures must be certified by a registered professional engineer;
- new mobile and manufactured homes are prohibited from A zones;
- existing mobile and manufactured home parks and subdivisions located within A zones must file an evacuation plan with the County;
- existing mobile and manufactured homes within special flood hazard areas must be anchored;
- new mobile and manufactured homes within B and C zones must be elevated twelve inches above the nearest A zone base flood elevation and set back twenty feet horizontally from the nearest A zone base flood boundary;
- subdivision and new development proposals shall include base flood elevation data;
- new access driveways and improvements to access driveways shall be elevated to the base flood elevation;
- no fill shall be placed in floodplains without a County approved subdivision or site plan.

Certain uses and activities are permitted in floodplains subject to review and approval by the County. Generally these uses and activities are related to agriculture, recreation, utilities, material extraction, or are water dependent in nature.

There are approximately 250 flood insurance policies issued for structures in the County[7]. Although data are unavailable, County officials indicate that there are far more policies issued than there are structures within floodplains in the County. Many policies have been issued for properties that may be partially located in a floodplain, but where structures on the property are located well above the base flood elevation. It is believed that many mortgage lenders are requiring flood insurance for structures on these properties to protect the mortgagee, despite the fact that the structures are above the 100 year base flood elevation. When asked, the County has attempted to assist property owners in their efforts to convince lenders that no flood hazard exists, and that

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[7]From NFIP Community Visit Report, Chesterfield County, VA, by William Lesser, August 17, 1992.

flood insurance is unnecessary. To date, lenders have been unwilling to drop insurance requirements for these properties.

A process exists called the Letter of Map Amendment (LOMA) that allows for amendments to FEMA map boundaries when detailed information is available that shows map boundaries incorrectly place a structure or property within a flood zone. This is an option land owners may pursue through Chesterfield County and DCR.

FIELD SURVEYS

The survey team composed of RRPDC and DCR personnel visited a total of thirty-six structures in the County that had been identified from single and repetitive loss reports, and "Flood Information Studies" for various drainage areas. Based on these visits, several observations were made:

1. all structures observed appeared to have been constructed prior to the County's adoption of it's floodplain management program in 1983;

2. future flood damages for most structures could be mitigated using one or a combination of flood proofing techniques;

3. some sites were observed where the dwelling unit is evidently above the base flood elevation and only outbuildings and personal property located below the base flood elevation (100 year flood) had received past flood damage; and,

4. the approximately 250 flood insurance policies issued in the County does not appear warranted base on field observations.

CONCLUSIONS

Chesterfield County has a strong floodplain management program, the strength of which is reflected both in the requirements of its ordinance, and in the limited number of flood hazard structures observed on the ground.

The County's ordinance exceeds the minimum requirements as set forth in the Federal Emergency Management Agency's National Flood Insurance Program Regulations. Examples of important provisions that exceed the federal minimum requirements are:

1. the prohibition of residential structures in floodplains;

2. the twenty foot setback away from the nearest floodplain boundary and the lower floor height requirement of twelve inches above BFE;

3. the filing of an evacuation plan by owners of mobile and manufactured home parks and subdivisions located within floodplains;

4. the prohibition on placing new mobile or manufactured homes in flood plains;

5. for substantial improvements to homes in flood plains require a lower floor at least twelve inches above base flood elevation.[8]

Structures that have experienced flood damage are those that were constructed prior to the County's participation in the National Flood Insurance Program beginning March of 1983. Conscientious enforcement of the County's floodplain management program will continue to ensure additional flood hazards are not created. Once assistance programs such as the Virginia Flood Prevention and Protection Assistance Fund are underwritten, the County may find it worthwhile to seek outside funding to mitigate existing flood hazards.

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[8]Sec. 21.1-40(a) of the Chesterfield County Flood Plain Management ordinance defines substantial improvement as, "The modification, alteration, repair, reconstruction or improvement of any kind to a structure requiring a building permit and/or use regardless of its location in a flood plain district to an extent or amount of more than fifty (50) percent of its value, in accordance with the County Assessor's records, shall constitute a substantial improvement."

V. FLOODPLAIN MANAGEMENT OPTIONS

There are a number of options to address existing flood hazards. These options include, floodplain management alternatives, options to protect structures, emergency services, and flood control.

FLOODPLAIN MANAGEMENT

The County already has a strong floodplain management ordinance that will serve to control inappropriate development in floodplains. Existing hazards and future development can be addressed through other management options including:

- acquiring open spaces and easements in floodplains;
- implementation of stormwater management strategies and erosion and sediment controls that do not exacerbate flood flows; and,
- stream maintenance practices that retain their natural ability to absorb floodwater flows.

PROPERTY PROTECTION

Existing structures can benefit from a number of techniques designed to mitigate flood damage through physical changes to the structure. Some techniques to consider include:

- raising the structure to some level (at least 12 inches in accordance with current County code) above the base flood elevation;
- relocating the structure out of the floodplain (at least 20 feet horizontally from BFE boundary as per County code);
- construction of free-standing barriers around the structure;
- dry flood-proofing such as the installation of impermeable membranes and coatings on exterior walls and one-way checkvalves on sewer lines; and,
- wet flood-proofing such as raising utility equipment including furnaces, hot water heaters, and electric service entrances above the base flood elevation.

Another non-physical technique is the purchase of flood insurance. Flood insurance provides assistance in paying for all or part of the costs of repairing the flood damaged structure. Although flood insurance is not the most desirable alternative since it does not mitigate flood damage, it does relieve the policy holder of the financial burden of making repairs to the damaged structure.

EMERGENCY SERVICES

Emergency service options help ensure a locality is prepared for a flood event, and includes:

- flood preparedness planning;
- flood warning and response plans;
- sandbagging;
- evacuation and rescue; and,
- public health and safety maintenance facilities.

FLOOD CONTROL

Flood control options generally involve large scale construction projects some of which are falling under ever increasing scrutiny as to their cost effectiveness. Flood control options available are:

- levees and floodwalls;
- reservoirs and detention ponds;
- river and stream channel improvements;
- control gates and backup valves; and,
- runoff controls such as terracing.

The floodplain management techniques listed above are described in detail in the Department of Conservation and Recreation's "Floodplain Management Plan", 1990, and a recent publication, "Flood Proofing Options for Virginia Homeowners", U.S. Army Corps of Engineers and Virginia Department of Conservation and Recreation, 1993.

VI. ASSESSMENT OF DRAFT METHODOLOGY

Flood hazard mitigation planning on a regional level is a strategy recommended in the Department of Conservation and Recreation's "The Floodplain Management Plan for the Commonwealth of Virginia", 1990. DCR's first flood hazard mitigation plan performed for the Rappahannock-Rapidan Planning District Commission (PDC 9), was still in draft form when RRPDC staff, under the guidance of staff from the State Division of Rivers and Shorelines, began the flood hazard assessment for Chesterfield County. As such, a final methodology had not formally been developed by DCR staff for RRPDC staff to utilize. The following comments are intended to provide DCR with feedback that it may utilize in the development of the program and final methodology.

- The final program and methodology should be developed with the knowledge that Virginia's twenty-one PDCs have widely varying levels of personnel and expertise.

- PDCs will require technical support (many times significant support) from DCR to perform flood hazard mitigation planning.

- PDC staffs will benefit from some level of background education pertaining to floodplain functions and values, federal and state acts and regulations, floodplain management, and flood hazard mitigation strategies.

- A flood hazard mitigation report outline containing generic background text would reduce project completion time and develop consistency among reports.

- PDC staffs would benefit from a list of information sources and reference materials for information useful in writing the study report.

- PDC staffs will require significant field support from DCR to perform field surveys.

- Development of a field survey sheet listing various parameters to look for and to record observations on site visits would be a valuable tool.

- Funding sources should be identified and developed to underwrite future flood hazard mitigation projects.

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APPENDIX A

VIRGINIA FLOOD PREVENTION AND PROTECTION ASSISTANCE FUND REGULATIONS

VIRGINIA SOIL AND WATER CONSERVATION BOARD

VR 625-03-00. Flood Prevention and Protection Assistance Fund

Statutory Authority: § 10.1-603.18 of the Code of Virginia

Effective Date: May 9, 1990

PART I

GENERAL INFORMATION

§ 1.1. Definitions

The following words and terms, when used in these regulations, shall have the following meaning, unless the context clearly indicates otherwise:

"Board" means the Virginia Soil and Water Conservation Board.

"Department" means the Department of Conservation and Recreation.

"Director" means the Director of the Department of Conservation and Recreation or his designee.

"Flood prevention or protection" means the construction of dams, levees, flood walls, channel improvements or diversions, local flood proofing, evacuation of flood-prone areas or land use controls which reduce or mitigate damage from flooding.

"Flood prevention or protection studies" means hydraulic and hydrologic studies of flood plains with historic and predicted floods, the assessment of flood risk and the development of strategies to prevent or mitigate damage from flooding.

"Fund" or "revolving fund" means the Flood Prevention and Protection Assistance Fund, established pursuant to Article 1.2 (§10.1-603.16 et seq.) of Chapter 6 of Title 10.1 of the Code of Virginia.

"Local public body" means any city, county, town, water authority, service authority or special taxing district.

"Study, project, or activity" means those flood prevention or protection measures carried out by the sponsoring local public body that require the provision of nonfederal funds to support the federal effort.

§ 1.2. Authority

A. Section 10.1-603.19 of the Code of Virginia authorizes the board to make loans and grants from the fund to any local public body for the purpose of assisting local sponsors in providing required matching funds for flood prevention or protection, or for flood prevention or protection studies, conducted by agencies of the federal government.

B. Section 10.1-603.18 of the Code of Virginia authorizes the board to promulgate regulations for the administration of the fund.

§ 1.3. Purpose

The purpose of these regulations is to ensure the proper administration of the fund through the establishment of policies, criteria, conditions, and procedures for awarding loans and grants from the fund to local public bodies.

PART II

ELIGIBLE STUDIES, PROJECTS, AND ACTIVITIES

§ 2.1. Introduction

Loan and grants from the fund shall be made for the purpose of assisting local public bodies in providing required matching funds for undertakings conducted by agencies of the federal government. These undertakings may be either flood prevention or protection studies or flood prevention or protection projects and activities.

§ 2.2. Eligible flood prevention or protection studies

Flood prevention or protection studies that are eligible for loans and grants from the fund are those that are carried out by federal agencies to provide information on historic or predicted flood events; to otherwise assist in the assessment of flood risks; or to provide information, support and assistance in the development of strategies and plans to prevent or mitigate damage from flooding, including protection of the environment. Eligible flood prevention or protection studies include, but are not limited to, the following:

1. U.S. Army Corps of Engineers water resource development studies specifically authorized by Congress and those studies conducted under the Continuing Authorities program, including, but not limited to, § 205, Flood Control Act of 1948, as amended (Small Flood Control Projects); § 208,

Flood Control Act of 1954, as amended (Snagging and Clearing of stream channels); § 206 of the Flood Control Act of 1960 (Floodplain Management Services) for provision of floodplain information studies and reports, including restudies; and § 22 of the Water Resources Development Act of 1974 (Technical Assistance to States).

2. U.S. Soil Conservation Service water resources development studies under the small watershed protection program Watershed Protection and Flood Prevention Act of 1954 (Pub. L. 83-566) and Flood Control Act of 1944 (Pub. L. 78-534)); the River Basin Program (Flood Control Act of 1944 (Pub. L. 78-534)), including floodplain management studies; and the Resource Conservation and Development Program (Pub. L. 88-703, § 102 of the Flood and Agriculture Act of 1962).

3. Federal Emergency Management Agency flood insurance studies and restudies and studies required to design and develop disaster preparedness and response programs.

4. Tennessee Valley Authority assisted local flood damage reduction and floodplain protection studies including the provision of floodplain information.

5. National Weather Service studies of the feasibility of installing local flood observation and warning systems.

6. U.S. Geological Survey stream flow information on water gage heights, discharge runoff, historic flood peaks, flood travel times and other information needed for planning.

7. U.S. Department of the Interior, Fish and Wildlife Service environmental studies and impact assessments under the Fish and Wildlife Coordination Act, National Environmental Policy Act, and the Clean Water Act (§ 404.).

8. U.S. Department of the Interior, National Park Service assistance to local public bodies in carrying out river corridor assessments and in developing plans to protect greenway values through its State and Local Rivers Conservation Assistance Program.

9. U.S. Environmental Protection Agency technical assistance, through its wetlands program, to local public bodies for maintaining or restoring the natural and beneficial values of floodplains.

§ 2.3. Eligible flood prevention or protection projects and activities

Flood prevention or protection projects and activities that are eligible for loans and grants from the fund are those that are carried out by or with assistance from federal agencies to reduce or mitigate damage from flooding, such as the construction of dams, levees and floodwalls; channel modifications; flow diversions; flood proofing or retrofitting of structures; flood warning and response systems; floodplain evacuation and relocation; redevelopment, acquisition and open space use; information and education programs; post-flood mitigation; or development and adoption of land use controls.

Eligible flood prevention or protection projects and activities include, but are not limited to, the following:

1. U.S. Army Corps of Engineers water resources development projects and activities carried out under the legislation cited under subdivision 1 of § 2.2 above.

2. U.S. Soil Conservation Service water resource development projects and activities carried out under the programs cited under subdivision 2 of § 2.2 above.

3. Federal Emergency Management Agency disaster preparedness assistance program, under § 201, Pub. L. 93-288, as amended, to assist communities in the preparation of disaster preparedness programs; acquisition of flood damaged properties under § 1362 of the National Flood Insurance Act of 1968 (Pub. L. 90-448); and other post-flood hazard mitigation measures under § 404, Pub. L. 100-707.

4. Tennessee Valley Authority assisted local flood damage reduction and floodplain protection projects.

5. National Weather Service local flood warning systems including the Integrated Flood Observing and Warning System (IFLOWS).

6. U.S. Department of the Interior, Fish and Wildlife Service consultation and recommendations for environmental protection and mitigation measures resulting from a proposed project or activity.

7. U.S. Department of the Interior, National Park Service assistance in carrying out plans to protect river corridor greenways through its State and Local Rivers Conservation Assistance Program.

8. U.S. Environmental Protection Agency activities to maintain floodplain natural resources and to restore degraded resources.

§ 2.4. Ineligible activities

Activities that are not eligible for loans and grants from the fund are:

1. Operation and maintenance of flood prevention or protection projects, whether partially funded under the fund or previously installed or completed by the local public body, with or without assistance from a federal agency;

2. Direct or indirect support of local personnel or any other operating expenses of the local public body; and

3. Studies, projects or activities whose primary purpose is not flood prevention or protection (e.g., erosion control).

PART III

LIMITATIONS AND CONDITIONS FOR LOANS AND GRANTS

§ 3.1. Conditions and limitations for loans

A. Loans from the fund shall be the primary means for providing assistance to local public bodies under these regulations in order to keep the fund viable.

B. No loan shall exceed 50% of the nonfederal share required by a federal agency to be provided by the local sponsor. The composition of local funds approved by the federal agency for the required nonfederal share shall also be approved by the board as the local share of the project.

C. At least 75% of all appropriations from the General Assembly to the fund shall be available for loans unless otherwise specified in an appropriation.

D. No loan from the fund shall be for a period in excess of 20 years.

E. Each loan shall bear interest at the rate of 3.0% annually.

F. The total outstanding loans to a local public body shall not exceed 25% of the total amount of all appropriations from the General Assembly to the fund, unless otherwise specified in an appropriation.

G. Previous obligations incurred by a local public body underwritten agreements and assurances to provide its share of nonfederal funds, which have not been fulfilled or already obligated in the local budget, are eligible loan items.

H. A lien shall be created against any real or personal property acquired with the proceeds of a loan from the fund.

I. Any real property interest acquired with a loan from the fund shall be dedicated to public open space and recreation or other compatible uses to prevent reuse incompatible with the flood hazard. The local public body shall either retain ownership of such property interest, or retain a perpetual floodplain conservation easement which limits the use of such property to flood compatible uses.

§ 3.2. Conditions and limitations for grants

A. Grants from the fund may be made under special circumstances to provide assistance to local public bodies. The board may authorize a grant after examining the fiscal capability of the applicant, including consideration of past studies, projects and activities that have been terminated because of the inability to provide the local share of nonfederal funds.

B. No grant shall exceed 50% of the nonfederal share required by a federal agency to be provided by the local sponsor. The composition of local funds approved by the federal agency for the required nonfederal share shall also be approved by the board as being eligible to satisfy the funds to be provided by the local sponsor.

C. Not more than 25% of all appropriations from the General Assembly to the fund shall be available for grants unless otherwise specified in an appropriation.

D. The total of all grants to a local public body shall not exceed 25% of the total amount available for grants in the fund, unless otherwise specified in an appropriation.

E. Any real property interest acquired with a grant from the fund shall be dedicated to public open space and recreation or other compatible uses to prevent reuse incompatible with the flood hazard. The local public body shall either retain ownership of such property interest, or retain a perpetual floodplain conservation easement which limits the use of such property to flood compatible uses.

§ 3.3. Conditions applicable to all loans and grants

A. No loan or grant may be authorized under these regulations unless the following conditions exist:

1. An application meeting the requirements of Part IV of these regulations has been submitted to the board.

2. The purpose for which the loan or grant in sought is one that is described in these regulations.

3. The local public body agrees, and furnishes assurance, as the board may require, that it will satisfactorily maintain any structure financed, in whole or in part, through the loans or grants provided under these regulations.

4. If a purpose of the requested loan or grant is to acquire real property, the board shall, prior to acting on the request, require satisfactory evidence that the local public body will acquire the real property if the loan or grant is made.

B. In addition to the foregoing conditions the board may require of a local public body such covenants and conditions as the board deems necessary or expedient to further the purpose of the loan or grant. These additional covenants and conditions need not be identical among local public bodies, and may include, without limitation, any or all of the following, as the board deems appropriate:

1. The creation and maintenance of special funds for the repayment of principal and interest on loans, or for other purposes.

2. The granting and recording of liens on, or security interests in, real and personal property to secure repayment of principal and interest on loans.

3. The use of designated depositories for funds pending their expenditure.

4. The establishment of schedules for the disbursement of funds and the completion of projects.

5. The collection of rents, fees and charges from projects.

6. The procurement of insurance.

C. The board may, as it deems appropriate, consent to and approve any modifications in the terms of any loan or grant to any local public body.

PART IV

APPLICATIONS FOR LOANS AND GRANTS

§ 4.1. Local public bodies eligible to apply

Any city, county, town, water authority, service authority or taxing district serving as a local sponsor and required to provide matching funds for flood prevention or protection studies, projects and other activities conducted by agencies of the federal government may apply for a loan or grant from the fund.

§ 4.2. Required conditions before making application

Prior to applying to the board the local public body shall:

1. Be participating in the National Flood Insurance Program, so that its residents shall have the opportunity to purchase flood insurance for future flood losses. And have adopted and be administering land-use regulations that, at a minimum, are compatible with the requirements of the National flood Insurance Program, or be located in a political subdivision meeting the above conditions;

2. Have entered into any necessary written agreement with the federal agency endorsing the study, project or activity, including provisions for cost sharing; or have adopted a resolution of intent to enter into such agreements; and

3. Have formally adopted a resolution requesting assistance from the fund and have satisfactory assurances of local support, funding, property acquisition and use, and project maintenance and management.

§ 4.3. Contents of applications

A. Each application shall specify whether a loan or grant is being requested, the amount requested, how it will be used, and whether a loan will be considered in lieu of a grant.

B. The application shall further describe in detail:

   1. The area to be studied or protected including the population and value of the property to be protected or affected;

   2. Historic flooding data and hydrologic and hydraulic studies projecting flood frequency and extent of flooding of future flood events;

   3. The proposed study, project or activity to be funded;

4. The planning process involved, including alternative flood prevention and protection measures which were considered and evaluated;

5. Locally significant natural and beneficial floodplain resources and values that will be maintained, enhanced or restored by the proposed activity;

6. The estimated benefit-cost ratio of the project or activity;

7. An assessment of the applicant's ability to provide its share of the cost of the federal flood control study, project or activity, along with its ability to repay a loan from the fund, or in a grant request, sufficient information about the applicant's fiscal capability to enable the board to determine the need for a grant instead of a loan; and

8. Administration of local floodplain management regulations including a copy of the most recent Community Assistance Visit report prepared by or for the Federal Emergency Management Agency, if available.

C. The application shall provide information on the nonfederal funding schedule in sufficient detail for the board to determine the amounts and dates when approved funds would be applied.

D. The application shall include a formally adopted resolution by the local public body requesting assistance from the fund and providing necessary assurances of local support, funding, property acquisition and use, and maintenance and management.

E. The applicant shall attach to the application:

1. Copies of written agreements or an adopted resolution of intent to enter into an agreement with the assisting federal agency.

2. Copies of federal, state and local permits required to implement the proposed study, project or activity that have been issued, or a list of permits that were applied for prior to submittal of the application.

F. Assistance in preparing the application is available from the director upon request.

§ 4.4. Application procedures

A. The board will consider applications for loans or grants on a semiannual basis, in September and March of each year. Applications shall be submitted to the board at least 60 days prior to the date when the application will be considered. The applicant shall be notified whether the application is complete within 30 days after it is received. The applicant shall be given not less than 15 days' written notice prior to consideration of the application by the board. The applicant shall have an opportunity to discuss the application during the board meeting.

B. Upon receipt of notice by the board the applicant may submit a written request to delay consideration until a future meeting if more time is needed to prepare to meet with the board or if the situation has changed since the application was submitted.

§ 4.5. Review and action by the board

A. The board will consider applications using the following criteria:

1. Whether a loan or grant is requested. Loans will be given priority over grants.

2. The applicant's ability to pay for the nonfederal share.

3. The amount of local contributions in relation to requested state funding. Priorities will be given to larger local cash contributions as an indicator of local burden.

4. The level of multijurisdictional involvement in the study, project or activity in terms of joint support, commitments and funding, including joint applications to the board for funding.

5. The extent of prior local effort to deal with the problems addressed in the application and with other flood related problems, as evidenced by other measures which the applicant has implemented (e.g., flood warning system, redevelopment, acquisition, public policies, stormwater management).

6. Whether the proposed study or project provide for permanent solutions to existing flood related problems and minimize the need for additional measures or excessive operation, maintenance and repair.

7. Whether the proposal is designed to prevent a flood related problem rather than solving an existing problem.

8. The anticipated achievement of multiple objectives and benefits such as recreational opportunities, open-space preservation, ecological enhancement, water quality improvements, increased water supply, and other environmental and conservation factors and needs.

9. The number of innovative solutions to local problems that can be transferred and utilized elsewhere in the Commonwealth.

10. The number of past studies, projects and activities that have been terminated solely because of the inability of the applicant to provide the required nonfederal share.

11. The level of commitment to the administration of local floodplain regulations as evidenced by the dates that regulations were initially adopted, as well as by the funding, staffing, administration and enforcement of such regulations.

12. The implementation of other state policies and regulations for flood prevention and protection; for environmental protection; and for control of stormwater runoff affecting the waters, floodplains, wetlands and watersheds of the Commonwealth.

13. The flood history of the area to be studied or protected including the extent of the area; the flood-prone population; the value of flood-risk property to be affected or protected; the magnitude and frequency of past flood events; the resultant flood damages and environmental losses; and the threat to public health, safety, and welfare.

14. The estimated benefit-cost ratio and cost effectiveness, including overall benefits in excess of costs. Priority will be given to those studies, projects, and activities having higher ratios, and substantial indirect costs and direct damages prevented.

15. The total amount of the requested loan or grant. Priority will be given to less capital intensive uses of the fund.

16. The future need for a loan or grant to expand the project to include additional areas. Priority will be given to projects that provide a permanent solution to the problem such as floodplain evacuation and relocation.

17. The likelihood for the provision of the federal share of the costs for the study, project, or activity, including whether federal assistance has already been requested.

18. The expected life or duration of the study, project or activity.

19. The overall benefit to the Commonwealth resulting from the study, project or activity.

20. The percentage of required nonfederal contributions. Priority will be given to studies, projects or activities having a higher percentage of federal contributions.

B. Upon receipt of completed applications and consideration of the above criteria the board shall establish a state priority list semiannually for the use of the fund. Loans and grants shall be commingled on the priority list.

C. The board may authorize payments from the fund and may establish a schedule of payments in accordance with this priority list to help local public bodies meet their share of the nonfederal contributions.

D. All authorizations by the board are subject to the following limitations: (i) the availability of money in the fund; (ii) the percentage of funds that may be allocated for grants; (iii) the amount that may be approved for a particular applicant; and (iv) the total amounts approved for the semiannual period.

§ 4.6 Written agreements required for loan or grant recipients

Prior to receiving any funds from an approved loan or grant, the local public body shall enter into a written agreement with the board containing such covenants and conditions as the board may require.

§ 4.7. Availability of applications

A record of each application for a loan or grant and the action taken by the board shall be available for public inspection at the office of the director and shall be presented to the Governor and members of the legislature prior to budgetary sessions of the General Assembly.

VIRGINIA SOIL AND WATER CONSERVATION BOARD
APPLICATION FOR THE FLOOD PREVENTION AND
PROTECTION ASSISTANCE FUND[1]

Please complete the following application. If requested information is not available or applicable, please indicate this on the form.

The applicant should review §2.4 of the Flood Prevention and Protection Fund Regulation for compliance. In accordance with §4.2 of the regulation, prior to application, the local entity making application must have satisfied the following criteria. Please provide evidence of compliance in section II of the application:

1. Participating in the National Flood Insurance Program.
2. Has entered into formal agreements with sponsoring federal agency.
3. Adopted a resolution formally requesting assistance from the fund and have satisfactory assurance of local support, funding, property acquisition and use, and project maintenance and management.

Attach additional pages or obtain computer based form if needed.

Return completed application to:

Virginia Soil and Water Conservation Board
203 Governor Street, Suite 206
Richmond, VA 23219-2094

ATTN: Bureau of Flood Protection

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[1]January 1991 - Please print application using dark ink or type. This form has been prepared using standard word processing software. If applicant supplies the Bureau with a diskette, an electronic copy of the form will be copied for the applicant's use.

I. Application Summary

1. Project Title _____
   Local Sponsoring Agency _____
   _____
   Mailing Address _____
   _____
   _____

   Authorized Representative _____

   Telephone Number _____
   Chief Executive Officer _____
   Title _____
   Telephone Number _____

2. Date of Application _____

3. Amount of funding requested _____
   Please check one of the following and fill blank if appropriate:
   _____ Loan for _____ years; or
   _____ Grant; or
   _____ Combination Grant/Loan for _____ years

4. Sponsoring Federal Agency _____
   Agency Representative _____
   Mailing Address _____
   _____
   _____
   Telephone Number _____

5. Commonwealth Participation (please list all agencies, agency representative, and whether their participation has been a commitment of funds, technical and administrative assistance, or advisory) _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

6. Other Local Sponsors _____
   _____
   _____

7. Description of flooding problem to be corrected/studied

_____
_____
_____
_____
_____

8. Description of project or study products expected

_____
_____
_____
_____
_____

9.

Total Project Cost	$_____	100%
Federal Commitment	$_____	___%
Applicants Commitment	$_____	___%
Other Local Commitment	$_____	___%
Commonwealth Commitment (non grant-loan fund)	$_____	___%
Grant-Loan Request	$_____	___%

II. SUPPORTING DOCUMENTATION

1. Please attach evidence that §4.2 of the regulation is satisfied.

2. Project/Study Background

   a. Project Area (current and proposed populations, value of property at risk, critical features such as hospitals or schools).

   _____
   _____
   _____
   _____
   _____
   _____
   _____

   b. Historic flooding data (specific events, dollar damages, lives lost, impact on homes and commerce).

   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

c. Planning process used to determine project need. Include analysis of alternatives if appropriate.

d. Enhancement or degradation of activity on the natural and beneficial values within the floodplain.

e. Estimated benefit to cost ratio if available.

f. Description of resources applicant will use to meet project obligation, including ability to repay loan.

g. Status of National Flood Insurance Program in locality, include copy of most recent Community Assessment Visit report form if available.

3. Attach non-federal funding schedule.

III. Other Supporting Documentation

1. Localities floodplain management programs. Provide a description of the floodplain management program especially where activities exceed NFIP minimum criteria.

2. Localities flood control program. Provide history of other flood control projects or studies impacting the locality and the level of local participation.

3. Please attach copies of supporting studies.

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