Virginia Community Flood Preparedness Fund Grant Application

2-Dimensional Stormwater Management Model for Meadow Creek and Rivanna River Watersheds

Rivanna River Flooding, May 2018

CITY OF CHARLOTTESVILLE
Department of Public Works
305 4th Street NW • Charlottesville, Virginia 22903
Telephone 434-970-3631

Grant Application Information

This Virginia Community Flood Preparedness Fund (CFPF) grant application is being submitted by the City of Charlottesville, Virginia. Completed copies of the CFPF grant application form (Attachment A) and Study Scoring Sheet (Attachment B) are provided.

The completion of this project will, in conjunction with the City's Round 1 grant award, result in a series of stormwater management models covering the entirety of the City's jurisdictional limits. These models will meet the criteria for studies, as outlined in the 2022 grant manual, including:

- Hydrologic or hydraulic studies of floodplains to clarify or update FEMA Flood Insurance Rate Maps. (Schenks Branch Tributary, Meadow Creek).

- Studies and Data Collection of Statewide or Regional Significance:

    - Updating precipitation data and IDF information

    - Other proposals that will significantly improve protection from flooding on a statewide and regional basis. (informs future conveyance needs to mitigate damage from nuisance flooding)

- Revisions to existing comprehensive and hazard plans, based on the 2008 SWWM model.

- Other relevant flood prevention and protection project or study (the impacts of climate influenced storm events on pluvial flooding in urban environments).

Overview

The City of Charlottesville, Virginia's corporate limits of 10.2 square miles and population of just under 46,786 people are located within the 750 square mile Rivanna River watershed, one of the largest watersheds in Virginia and a major tributary to the Chesapeake Bay.

As stewards of the watershed, the City of Charlottesville manages many components of a stormwater infrastructure system, both natural and built, including the following:

- 35 miles of open waterways
- 130 miles of storm drain
- 8,250 stormwater structures (inlets, manholes, junction boxes, etc.)
- 460 outfalls
- 294 BMPs
- 445 acres of Zone AE floodplain

In 2008, the City of Charlottesville, in partnership with the Army Corp of Engineers (USACE), hired URS to develop a comprehensive stormwater model representing the majority of the City's stormwater management inventory. This model was designed to do the following:

1. Produce an updated technical basis for the City's stormwater management program that could be used to make good management decisions,
2. Create computer models that could be modified in the future as additional field data was collected and future developments were considered, and
3. Identify major flooding points within the City's stormwater and drainage systems for both existing and future land cover conditions.

The existing model represents the input data and best methodology available in 2008. The purpose of this grant application is to update a portion of the existing SWMM model for use as initially intended, as well as expanding the model beyond its originally identified applications. Uses will include analyses of storm sewer capacity issues, identification of special flood hazard zones for major tributaries, identification of problem areas, development and prioritization of solutions, and support for public outreach and education.

Area of Interest

The grant application will focus on the portion of the Meadow Creek and Rivanna River watersheds within City limits, approximately 6.5 square miles and 63% of the City's geographical area.

Because of the increased complexity of the updated model, each watershed will be evaluated in separate models, including the Moores Creek watershed model currently under development.

SWMM Inventory

PCSWMM Version 5.0.11 was originally used by URS in 2008. The model delineated approximately 360 subbasins in order to distribute point sources for inflow throughout the entire area. The entire SWMM model has over 750 nodes and over 800 links, making it an extremely large and complex model for this locality.

The focus of model updates will include the following general categories:

Increased Functionality

The existing model will be imported to the most current version of PCSWMM, running on an EPA SWMM 5.1.015 engine. This will enable the City to take advantage of increased functionality in the model, especially a combined 1D-2D approach to system analysis. The 1D model cannot identify flood at-risk areas due to a lack of infrastructure. Additionally, it cannot support an impact analysis of undersized or non-existent systems. Identifying areas of vulnerability, including roads, residences, and critical facilities, will be important when prioritizing improvement projects and can be accomplished with 2D modeling.

Future areas of vulnerability will be identified based on predictions of climate change- influenced storm events and records of recent storm data. The City will use NOAA Atlas 14 adjusted IDF curves and IDF curves developed specifically for the Chesapeake Bay watersheds. These precipitation events will be important for determine future stormwater conveyance and land use needs.

2D capabilities within the model will now allow the City to develop existing and potential future floodplain delineations for tributaries that are currently unmapped.

Updated Data

Since 2008, the City has been actively updating GIS layers for impervious cover, streams, and the storm drain network. This GIS layer will be compared against the network in the existing SWMM model to identify discrepancies and the model will be updated accordingly. Select areas of the watershed will be surveyed to validate or clarify the GIS data provided by the City.

The City implemented a stormwater utility fee in 2013 and has been implementing a vigorous storm drain rehabilitation program. The updated model will incorporate increased conveyance and alignment changes associated with work done under this program in the last 8 years. Updates from other projects, including private developments and transportation improvements, will also be incorporated into the new model.

Manageable Output

In this iteration of the model buildout, careful consideration will be given to how output data is organized and communicated. While the SWMM model will be run and managed by engineers within the City, the data should be useful to parties beyond experienced SWMM users. Nomenclature in the model should mirror that used by the City's utility inventory. GIS output should include not only location but useful information for future design and analysis of the system, including inverts, size, material, depth of cover, and percent capture for design storms.

Aggregated sub-basin delineations should match larger delineations for minor and major tributaries, allowing for an infrastructure inventory and flood assessment per receiving water body. This will be

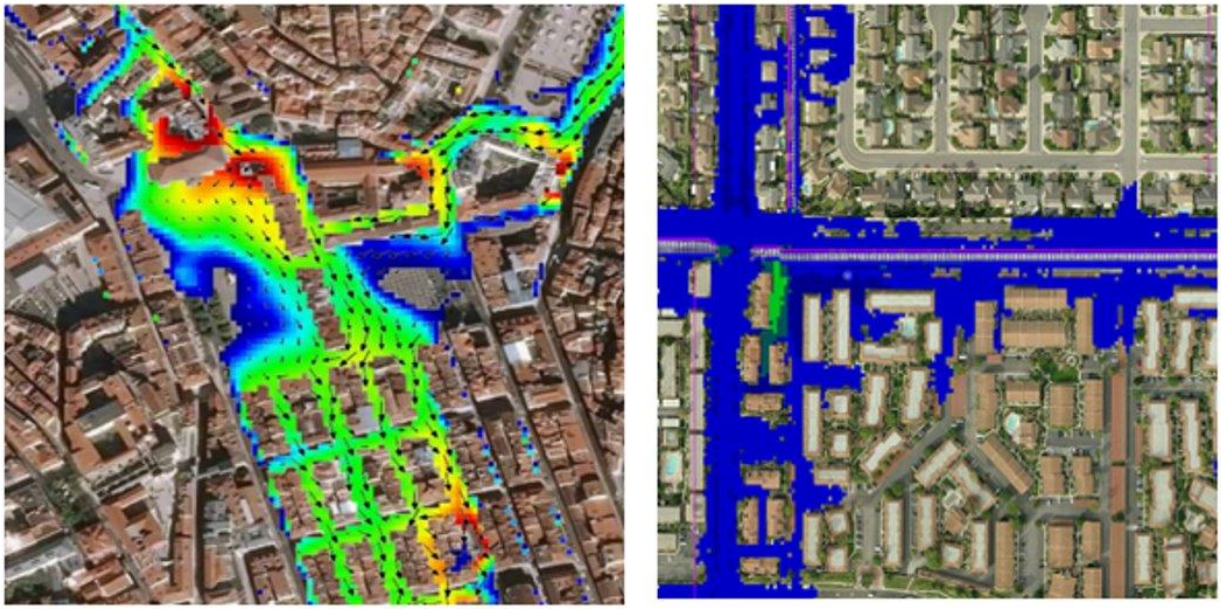
especially useful as the City considers simplifying its 38 named drainage areas to less than a dozen drainage areas associated with named tributaries.

Future Uses

Master Planning

The primary function of the SWMM model is to analyze the watershed by using configurations to quantify flooding associated with both existing and future watershed conditions. Potential drainage improvement projects can be geospatially mapped in relation to predicted future flooding, so City staff can make assessments about the value of individual projects. The advantage of this approach is that the entire drainage system can be evaluated on a consistent, system-wide basis.

Consistent and transparent methods of analysis when determining how and where to spend taxpayer money are essential for prioritizing improvements in an equitable manner. Although additional consideration factors, including other master plan objectives, location-specific funding opportunities, a history of underinvestment, etc., can also be incorporated into a system of project selection, the foundation of project prioritization should be the quantification of potential impacts from existing and future flooding events. An objective analysis using industry standard methodology applied over the entire City is a key element to achieving this goal.



2D Flood Modeling output

Images Courtesy of: Montalto, Franco, PE, PhD.(2021), "H&H Modeling 101" from Overwhelmed? Reevaluating Stormwater Modeling in Changing Climate webinar series, Power Point Presentation

Flood Mitigation Projects

The SWMM model can also be used to design improvement projects based on impact analyses and the subsequent development of a prioritization system. The benefit of having larger projects designed within a SWMM model is that the effects of the individual projects on the performance of the entire drainage system can be evaluated holistically, rather than in piecemeal fashion. This approach ensures that monies are well spent, and that each project is truly needed as part of an overall master drainage plan. The model should also be useful for obtaining starting hydraulic grade line elevations for design purposes on smaller development projects, and for designing stormwater management BMPs. Once a level of confidence is achieved for the model, it can be shared with consultants and private developers to support public/private partnerships to improve flood mitigation and water quality.

Allied Street Flooding, Meadow Creek Watershed, August 2008

BMP/Green Infrastructure Performance Assessments

Increased functionality in SWMM will allow for assessment of various green infrastructure techniques with continuous simulation modeling. Existing BMPs can be evaluated for performance over a range of storm events and retrofits can be designed within SWMM to protect treatment volumes from intense, destructive rainfalls.

The City will work collaboratively with a team from the University of Virginia to calibrate the Meadow Creek model to low-flow events so that it may be reliably used for the design of distributed, nature-based infrastructure.

Climate Resilient Stormwater Management

In order to incorporate climate change impacts into stormwater management design standards, a wide range of potential extreme rainfall events must be analyzed. The suite of rainfall events will be derived from multiple methodologies to determine future IDF (intensity-duration-frequency) curve values that best fit Charlottesville's location and geography. These rainfall events will be routed through SWMM to determine confidence intervals around the predictive performance of stormwater management infrastructure. Based on the SWMM results, both storm drain conveyance goals and maintenance routines may be updated to reflect future needs.

Backwater effects from climate change – influenced floodplains can also be modeled in SWMM to determine impacts on stormwater infrastructure performance.

Community Engagement

Using the outputs of these models, comprehensive stormwater management plans can be developed and communicated to the public per City "watershed" to promote a sense of ownership among residents. The stormwater management models can provide visual displays that will be the building blocks for a data driven community outreach plan.

Future Maintenance

Moving forward, the updated PCSWMM models will be an active tool in the City's stormwater management practices. As such, the models will be continuously updated by existing in-house staff. The City's Water Resource Protection (WRP) Administrator is a professional engineer with almost two decades of hydrologic and hydraulic modeling experience. As more data, better methodologies, and updated SWMM versions become available, the Administrator will revise the City's working model. As the confidence in the SWMM model's accuracy increases, the Administrator will also be responsible for sharing model results with other design professionals in the community so that everyone works from a shared point of knowledge.

As-built plans, for both private development and public improvement projects, will be submitted to the City's Stormwater Technician and WRP Administrator so that storm drain infrastructure and BMPs can be added to both the GIS inventory and SWMM model. Additionally, this team will take on the responsibility of utility mapping beyond the scope of survey included in this grant application to identify discrepancies and provide accurate data in areas of the City's storm drain inventory that are less susceptible to flooding.

The grant application also includes SWMM training for up to four professional engineers or engineers in training in the City of Charlottesville to provide overlap in technical skill sets and distributed responsibility of model use and management.

Stakeholders

Model Update

A consulting firm with significant hydrologic and 2D hydraulic modeling experience will be hired with funds from the grant to update the model, incorporate new data, expand analyses to include minor tributaries and select portions of the storm drain network, and introduce future climate change adjustments. It will be important to select a firm with the man-hour capacity to complete the update in a timely manner, so that the model results can be used as soon as possible for master planning.

A technical advisor from the University of Virginia's Department of Engineering Systems and Environment, Dr. Teresa Culver, will be involved to review model extensions, to provide insight into the Meadow Creek system, and to facilitate integration of data collected through the University. Dr. Culver recently received the Margaret S. Petersen Award from the American Society of Civil Engineers for her leadership and contributions to the field of water resource engineering. She and her students have been studying Meadow Creek and its watershed for over a decade. Her work includes modeling to support multi-objective water resource management, including flood reduction.

The WRP Administrator, Andrea Henry, PE will serve as the project manager and City's technical advisor for the model update. The WRP Administrator, along with staff in the Public Works – Engineering Division will provide active, hands-on leadership throughout the 36-month process and manage and direct the selected consultants. The WRP Stormwater Tech will be tasked with data collection, including gathering as-builts, conducting field investigations, and providing pertinent GIS layers.

Future Use

The SWMM model will be used internally for master planning, identification of under-capacity systems, and project design. Public Works Engineering staff will be offered opportunities for training to become proficient in SWMM modeling techniques.

The model will be maintained by the WRP Administrator and used to build a master plan, to be incorporated into the City's resilience plan, and develop annual budgets. The WRP Administrator will communicate the results of modeling efforts and how they will be used in project prioritization efforts to the City's Water Resource Protection Program (WRPP) Advisory Committee. This committee is made up of City residents with a variety of professional experiences that ensure the stormwater utility fee is managed appropriately.

The 1D portion of the model will be available to design professionals in the community and the City will undertake outreach efforts to encourage its use when conducting drainage analyses for site development.

Implementation Plan

Once grant funding is awarded, select stakeholders for the model buildout will meet to develop a detailed scope of work and identify areas that need additional survey data. A request for proposal will be advertised no later than two months after the award agreement is executed.

Efforts to upgrade model methodology and inputs, collect survey data (including select utilities, roadways, and open channels), and conduct field investigations for problematic areas in the terrain data will happen concurrently to build out a draft model within a year of the RFP selection. Once the draft model is finalized and a level of confidence is achieved using standard design storms, stakeholders will conduct a detailed review and identify where additional survey data will be necessary to quantify impacts of flooding. A portion of the funding allocated to survey efforts will be reserved for the final model update.

As the model is upgraded, the technical advisor and stakeholders will determine the appropriate suite of climate-informed storm events to include in an analysis of future flood vulnerability and best methods for communicating the results of climate-informed stormwater management analysis.

The City's stormwater management models will be used to communicate the potential effects of climate-influenced storm events on existing infrastructure and may support future regional floodplain studies.

Performance Metrics

Once the model is finalized, it will be used in conjunction with visual assessments of stream degradation to identify and prioritize projects, funded in part with the City's stormwater utility fee, in the following categories: flood mitigation, outfall protection, and BMP development. The model will also be used to develop scopes of work for each project identified in these categories that provides a comprehensive solution to overall stormwater management in the City. For example, an outfall protection project should be designed based on future predicted storm events and necessary conveyance upgrades to the outfall. Flood mitigation projects should evaluate the cost effectiveness and co-benefits of volume reduction techniques such as distributed green infrastructure. These are all design scenarios that can be built and analyzed within SWMM.

Immediate success metrics will include the development of a master plan with a prioritized project list that includes a comprehensive review of vulnerabilities to flooding throughout the City's watersheds and a transparent pathway to equity-based funding strategies. Maps will be developed for each drainage area contributing to minor and major tributaries, conveying flood vulnerability assessments for both design storms and climate change – informed storm events.

A scope and budget for annual maintenance of grey infrastructure will be developed using the SWMM model as the basis for selection. Model results will be compared against recently identified (within the last 5-years) drainage issues to determine areas prone to flooding as a result of infrastructure clogging.

Budget

The total budget for this grant application is **$550,000**, broken down into the following general categories:

- $255,000: 1D model methodology updates, 2D mesh and model development, incorporation of stormwater infrastructure information from as-built drawings and prior field investigations conducted by the City of Charlottesville and survey and utility mapping conducted during this study. Technical methodology report included.
- $190,000: Survey and utility mapping in select areas.
- $20,000: Incorporation/calibration of flow gauge data in Meadow Creek
- $60,000: Model analyses, technical report, and maps for climate-influenced storm events.
- $15,000: Visual displays and power point for community outreach
- $5,000: PCSWMM license for 4 users within the City of Charlottesville for 1 year.
- $5,000: PCSWMM training for 4 City of Charlottesville staff.

This project falls under the funding category of a flood prevention and protection study. As such, the City of Charlottesville is requesting funding in the amount of $275,000, a cost participation percentage of 50%. These funds will come from money dedicated to the Water Resources Protection Program and are confirmed in the accompanying letter from the Deputy City Manager.

Category	City of Charlottesville - direct expense	CFPF grant reimbursement	Total:
Salary	$0.00	$0.00	$0.00
Fringe Benefits	$0.00	$0.00	$0.00
Travel	$0.00	$0.00	$0.00
Supplies (PCSWMM)	$5,000.00	$0.00	$6,000.00
Other (Staff Training)	$5,000.00	$0.00	$5,000.00
Contractual	$265,000.00	$275,000.00	$285,000.00
TOTAL:	$275,000.00	$275,000.00	**$550,000.00**

Attachments

Attachment A: Application Form for Grant Requests

Attachment B: Scoring Criteria for Studies

Attachment C: Checklist for All Categories

Attachment D: City of Charlottesville Local Waterways Map

Attachment E: Meadow Creek and Rivanna River Watershed Location Map

Attachment F: Charlottesville Social Vulnerability Index Location Map

Attachment G: City of Charlottesville Floodplain Ordinance

Attachment H: Thomas Jefferson Planning District Regional Natural Hazard Mitigation Plan (2018)

Attachment I: City of Charlottesville Comprehensive Plan (2021)

Attachment J: Authorization to Request Funding, Charlottesville City Manager

Attachment K: FIRM Panels

Attachment A

Application Form for Grant Requests

Appendix A: Application Form for Grant Requests for All Categories

Virginia Department of Conservation and Recreation
Virginia Community Flood Preparedness Fund Grant Program

Name of Local Government:

City of Charlottesville

Category of Grant Being Applied for (check one):

____Capacity Building/Planning

_____Project

___X_Study

NFIP/DCR Community Identification Number (CID)___510033_____

If a state or federally recognized Indian tribe, Name of tribe_____

Name of Authorized Official: __Tony Edwards, CFM Tony Edwards

Signature of Authorized Official: _____

Mailing Address (1): ___Department of Public Works_____

Mailing Address (2): ___305 4th Street NW_____

City: __Charlottesville_____ State: __VA_____ Zip: __22903_____

Telephone Number: (_434_) _970-3992_____ Cell Phone Number: (434_) ___981-9293_____

Email Address: ____edwards@charlottesville.gov_____

Contact Person (If different from authorized official): _Andrea Henry, PE_____

Mailing Address (1): ____Public Works Department_____

Mailing Address (2): _____305 4th Street NW _____

City: __Charlottesville_____ State: __VA_____ Zip: _22903_____

Telephone Number: (_434) _970-3529_____ Cell Phone Number: (512) _923-2756_____

Email Address: ___henrya@charlottesville.gov_____

Is the proposal in this application intended to benefit a low-income geographic area as defined in the Part 1 Definitions? Yes ____ No _X___

Categories (select applicable project):

Project Grants (Check All that Apply)

Acquisition of property (or interests therein) and/or structures for purposes of allowing floodwater inundation, strategic retreat of existing land uses from areas vulnerable to flooding; the conservation or enhancement of natural flood resilience resources; or acquisition of structures, provided the acquired property will be protected in perpetuity from further development.

Wetland restoration.
Floodplain restoration.
Construction of swales and settling ponds.
Living shorelines and vegetated buffers.
Structural floodwalls, levees, berms, flood gates, structural conveyances.
Storm water system upgrades.
Medium and large scale Low Impact Development (LID) in urban areas.
Permanent conservation of undeveloped lands identified as having flood resilience value by *ConserveVirginia* Floodplain and Flooding Resilience layer or a similar data driven analytic tool.
Dam restoration or removal.
Stream bank restoration or stabilization.
Restoration of floodplains to natural and beneficial function.
Developing flood warning and response systems, which may include gauge installation, to notify residents of potential emergency flooding events.

Study Grants (Check All that Apply)

Studies to aid in updating floodplain ordinances to maintain compliance with the NFIP or to incorporate higher standards that may reduce the risk of flood damage. This must include establishing processes for implementing the ordinance, including but not limited to, permitting, record retention, violations, and variances. This may include revising a floodplain ordinance when the community is getting new Flood Insurance Rate Maps (FIRMs), updating a floodplain ordinance to include floodplain setbacks or freeboard, or correcting issues identified in a Corrective Action Plan.

Revising other land use ordinances to incorporate flood protection and mitigation goals, standards and practices.

Conducting hydrologic and hydraulic studies of floodplains. Applicants who create new maps must apply for a Letter of Map Revision or a Physical Map Revision through the Federal Emergency Management Agency (FEMA). For example, a local government might conduct a hydrologic and hydraulic study for an area that had not been studied because the watershed is less than one square mile. Modeling the floodplain in an area that has numerous letters of map change that suggest the current map might not be fully accurate or doing a detailed flood study for an A Zone is another example.

✓ Studies and Data Collection of Statewide and Regional Significance.

✓ Revisions to existing resilience plans and modifications to existing comprehensive and hazard.

✓ Other relevant flood prevention and protection project or study.

Capacity Building and Planning Grants

Floodplain Staff Capacity.

Resilience Plan Development

Revisions to existing resilience plans and modifications to existing comprehensive and hazard mitigation plans.
Resource assessments, planning, strategies and development.

- Policy management and/or development.
- Stakeholder engagement and strategies.

Location of Project (Include Maps): see Appendix F

NFIP Community Identification Number (CID#):(See appendix F 510033

Is Project Located in an NFIP Participating Community? ☑ Yes ☐ No

Is Project Located in a Special Flood Hazard Area? ☑ Yes ☐ No

Flood Zone(s) (If Applicable): A/AE/X

Flood Insurance Rate Map Number(s) (If Applicable): 51003-C0267D/C0278D/C0279D/C0280D/C0287D/C0288D/C0289D

Total Cost of Project: $550,000

Total Amount Requested $275,000

Attachment B

Scoring Criteria for Studies

Appendix B: Scoring Criteria for Studies

Virginia Department of Conservation and Recreation
Virginia Community Flood Preparedness Fund Grant Program

Applicant Name:	City of Charlottesville	
Eligibility Information		
Criterion	**Description**	**Check One**
1. Is the applicant a local government (including counties, cities, towns, municipal corporations, authorities, districts, commissions, or political subdivisions created by the General Assembly or pursuant to the Constitution or laws of the Commonwealth, or any combination of these)?		
Yes	Eligible for consideration	X
No	Not eligible for consideration	
2. Does the local government have an approved resilience plan and has provided a copy or link to the plan with this application?		
Yes	Eligible for consideration under all categories	
No	Eligible for consideration for studies, capacity building, and planning only	X
3. If the applicant is <u>not a town, city, or county</u>, are letters of support from all affected local governments included in this application?		
Yes	Eligible for consideration	
No	Not eligible for consideration	
4. Has this or any portion of this project been included in any application or program previously funded by the Department?		
Yes	Not eligible for consideration	
No	Eligible for consideration	X
5. Has the applicant provided evidence of an ability to provide the required matching funds?		
Yes	Eligible for consideration	X
No	Not eligible for consideration	
N/A	Match not required	

Studies Eligible for Consideration		Yes / No
Applicant Name:	City of Charlottesville (510033)	
Scoring Information		
Criterion	**Point Value**	**Points Awarded**
6. Eligible Studies (Select all that apply)		
Revising floodplain ordinances to maintain compliance with the NFIP or to incorporate higher standards that may reduce the risk of flood damage. This must include establishing processes for implementing the ordinance, including but not limited to, permitting, record retention, violations, and variances. This may include revising a floodplain ordinance when the community is getting new Flood Insurance Rate Maps (FIRMs), updating a floodplain ordinance to include floodplain setbacks or freeboard, or correcting issues identified in a Corrective Action Plan.	30	
Creating tools or applications to identify, aggregate, or display information on flood risk or creating a crowd-sourced mapping platform that gathers data points about real-time flooding. This could include a locally or regionally based web-based mapping product that allows local residents to better understand their flood risk.	15	15
Conducting hydrologic and hydraulic studies of floodplains. Applicants who create new maps must apply for a Letter of Map Revision or a Physical Map Revision through the Federal Emergency Management Agency (FEMA).	35	
Studies and Data Collection of Statewide and Regional Significance. Funding of studies of statewide and regional significance and proposals will be considered for the following types of studies:		
Updating precipitation data and IDF information (rain intensity, duration, frequency estimates) including such data at a sub-state or regional scale on a periodic basis.	45	45
Regional relative sea level rise projections for use in determining future impacts.	45	
Vulnerability analysis either statewide or regionally to state transportation, water supply, water treatment, impounding structures, or other significant and vital infrastructure from flooding.	45	45
Flash flood studies and modeling in riverine regions of the state.	45	
Statewide or regional stream gauge monitoring to include expansion of existing gauge networks.	45	

	New or updated delineations of areas of recurrent flooding, stormwater flooding, and storm surge vulnerability in coastal areas that include projections for future conditions based on sea level rise, more intense rainfall events, or other relevant flood risk factors.	45	
	Regional flood studies in riverine communities that may include watershed-scale evaluation, updated estimates of rainfall intensity, or other information.	50	50
	Regional hydrologic and hydraulic studies of floodplains.	45	
	Studies of potential land use strategies that could be implemented by a local government to reduce or mitigate damage from coastal or riverine flooding.	40	
	Other proposals that will significantly improve protection from flooding on a statewide or regional basis	35	35
7. Is the study area socially vulnerable? (Based on ADAPT VA's Social Vulnerability Index Score.)			
Very High Social Vulnerability (More than 1.5)		15	
High Social Vulnerability (1.0 to 1.5)		12	
Moderate Social Vulnerability (0.0 to 1.0)		8	
Low Social Vulnerability (-1.0 to 0.0)		0	
Very Low Social Vulnerability (Less than -1.0)		0	
8. Is the proposed study part of an effort to join or remedy the community's probation or suspension from the NFIP?			
Yes		10	
No		0	
9. Is the proposed study in a low-income geographic area as defined in this manual?			
Yes		10	
No		0	
10. Projects eligible for funding may also reduce nutrient and sediment pollution to local waters and the Chesapeake Bay and assist the Commonwealth in achieving local and/or Chesapeake Bay TMDLs. Does the proposed project include implementation of one or more best management practices with a nitrogen, phosphorus, or sediment reduction efficiency established by the Virginia Department of Environmental Quality or the Chesapeake Bay Program Partnership in support of the Chesapeake Bay TMDL Phase III Watershed Implementation Plan?			
Yes		5	
No		0	
Total Points			190

Attachment C

Checklist for All Categories

Appendix D: Checklist All Categories

Virginia Department of Conservation and Recreation

Community Flood Preparedness Fund Grant Program

Scope of Work Narrative	
Supporting Documentation	**Included**
Detailed map of the project area(s) (Projects/Studies)	☑ Yes ☐ No ☐ N/A
FIRMette of the project area(s) (Projects/Studies)	☑ Yes ☐ No ☐ N/A
Historic flood damage data and/or images (Projects/Studies)	☑ Yes ☐ No ☐ N/A
A link to or a copy of the current floodplain ordinance	☑ Yes ☐ No ☐ N/A
Non-Fund financed maintenance and management plan for project extending a minimum of 5 years from project close	☐ Yes ☐ No ☑ N/A
A link to or a copy of the current hazard mitigation plan	☑ Yes ☐ No ☐ N/A
A link to or a copy of the current comprehensive plan	☑ Yes ☐ No ☐ N/A
Social vulnerability index score(s) for the project area from ADAPT VA's Virginia Vulnerability Viewer	☑ Yes ☐ No ☐ N/A
If applicant is not a town, city, or county, letters of support from affected communities	☐ Yes ☐ No ☑ N/A
Completed Scoring Criteria Sheet in Appendix B, C, or D	☑ Yes ☐ No ☐ N/A
Budget Narrative	
Supporting Documentation	**Included**
Authorization to request funding from the Fund from governing body or chief executive of the local government	☑ Yes ☐ No ☐ N/A
Signed pledge agreement from each contributing organization	☐ Yes ☐ No ☑ N/A

Attachment D

City of Charlottesville Local Waterways Map

CITY OF CHARLOTTESVILLE
LOCAL WATERWAYS

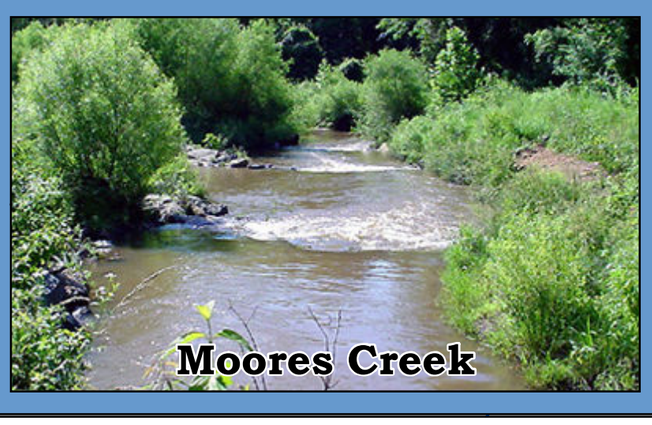
Meadow Creek
Meadowbrook Creek
Schenks Branch
St. Charles Creek
Meadow Creek
Rivanna River
Rock Creek
Lodge Creek
Pollocks Branch
Quarry Creek
Moores Creek
Fry's Spring

N

0 0.25 0.5 0.75 1 Miles

Prepared by City of Charlottesville
Department of Public Works,
Environmental Sustainability Division
Map created by Dan Frisbee, January 2011

Note: The map elements depicted are graphic representations and are not to be construed or used as a legal description. This map is for display purposes only.

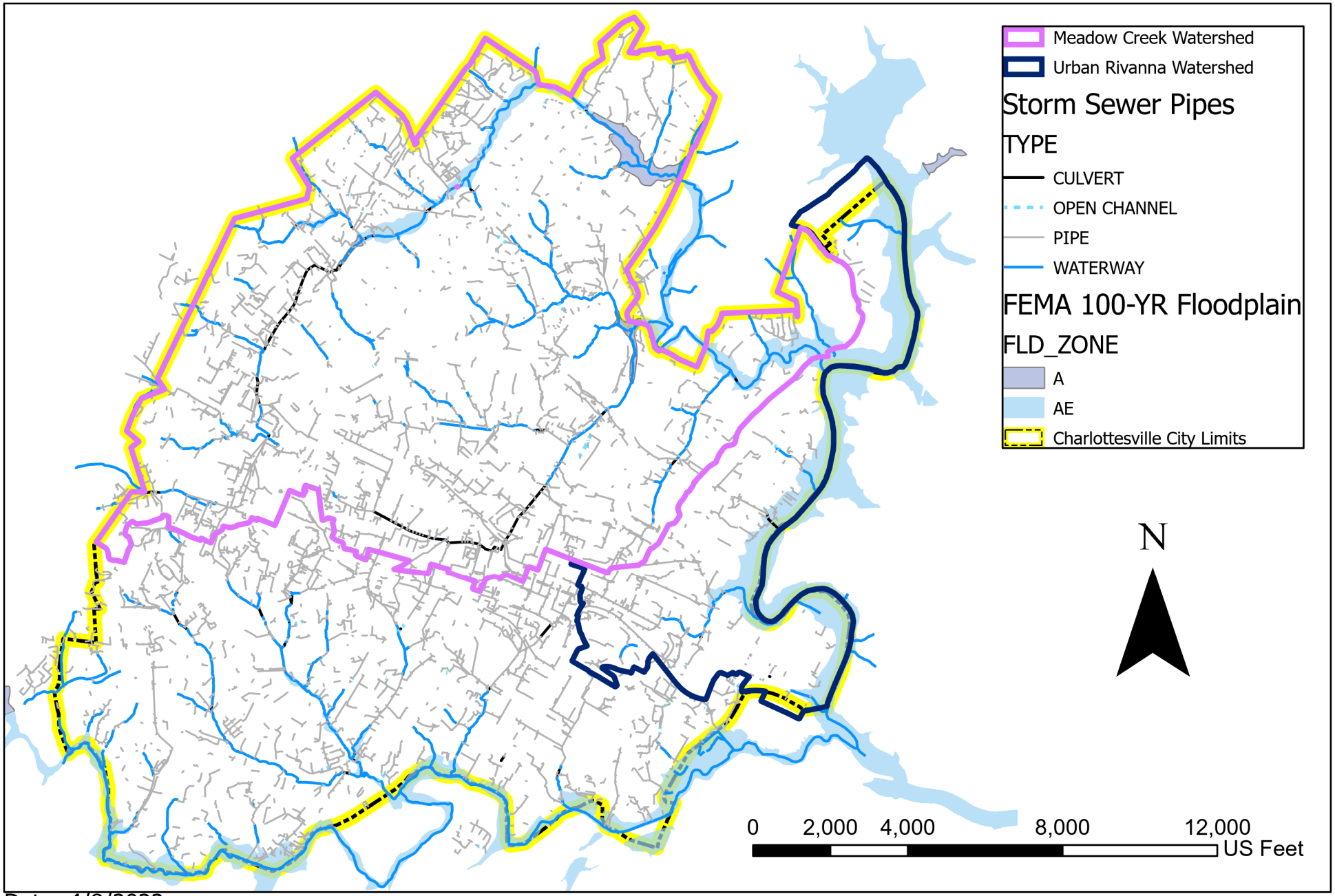


Legend

- Waterways
- City Limits
- Roads
- Parks
- Railroads
- Waterways in Pipes
- Drains to Moores Creek
- Drains to Meadow Creek
- Drains to Rivanna River
- Drains to Schenks Branch
- Drains to Lodge Creek
- Drains to Rock Creek
- Drains to Pollocks Branch

Attachment E

Meadow Creek and Rivanna River Watershed Location Map

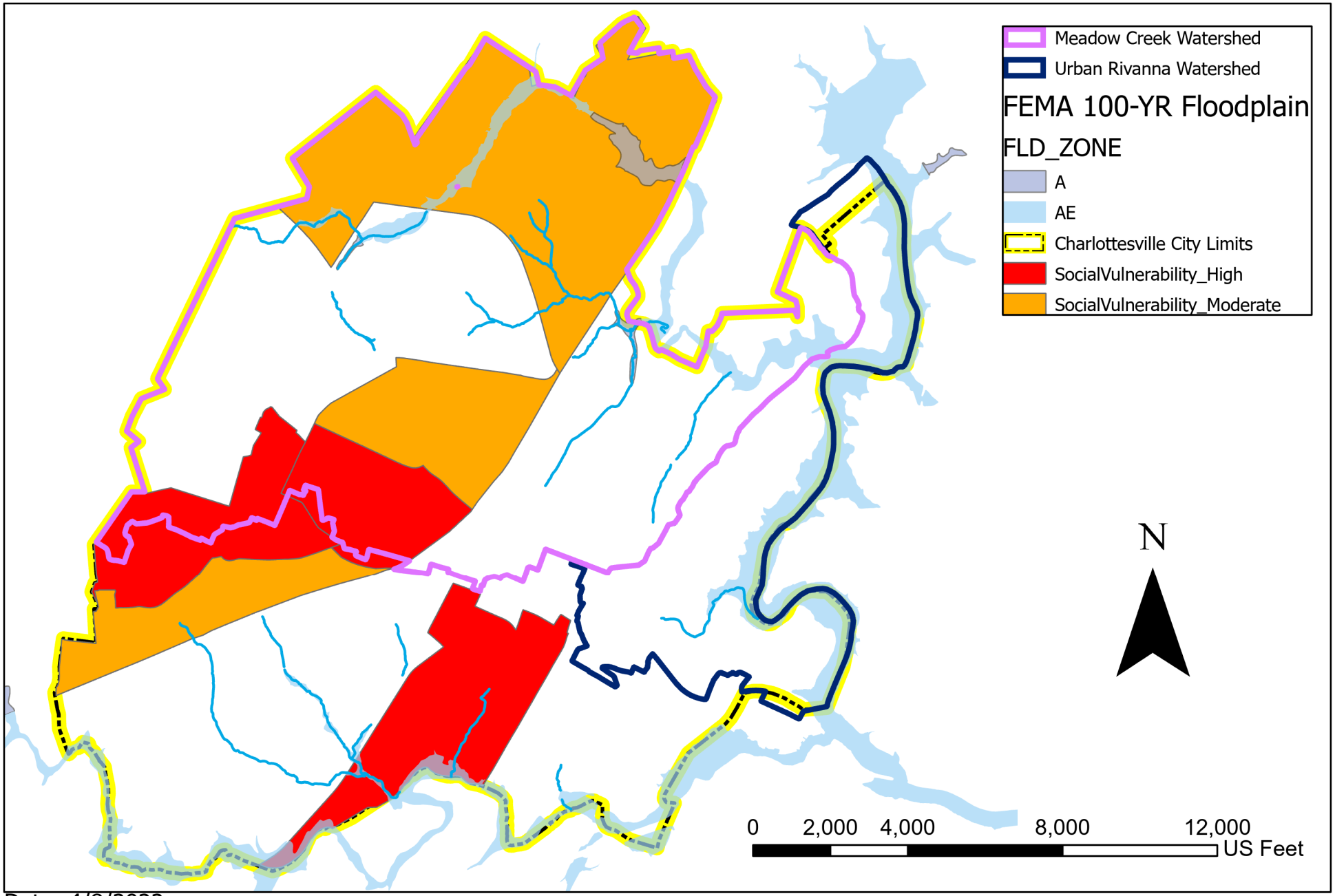


Date: 4/8/2022

Meadow Creek and Rivanna River Watershed in Charlottesville City Limits

Attachment F

Charlottesville Social Vulnerability Index Location Map



Date: 4/8/2022

Charlottesville Social Vulnerability Index

Attachment G

City of Charlottesville Floodplain Ordinance

https://www.charlottesville.gov/DocumentCenter/View/1380/City-Ordinance-34-240-PDF

Attachment H

Thomas Jefferson Planning District Regional Natural Hazard Mitigation Plan (2018)

https://tjpdc.org/wp-content/uploads/pdf/Environment/Hazard-Mitigation/Hazard-Mitigation-Plan-2018.pdf

Attachment I

City of Charlottesville Comprehensive Plan (2021)

https://www.charlottesville.gov/DocumentCenter/View/7073/Comprehensive-Plan-Document---2021-1115-Final?bidId=

Attachment J

Authorization to Request Funding, Charlottesville City Manager

CITY OF CHARLOTTESVILLE
"A World Class City"

Office of The City Manager

Post Office Box 911
Charlottesville, Virginia 22902
Telephone 434-970-3101
Fax 434-970-3890
www.charlottesville.gov

April 8, 2022

Virginia Department of Conservation and Recreation
Attention: Virginia Community Flood Preparedness Fund
Division of Dam Safety and Floodplain Management
600 East Main Street, 24th Floor
Richmond, Virginia 23219

To Whom it May Concern,

The City of Charlottesville is excited for the opportunity to submit this application for the third round of the Community Flood Preparedness Fund grant awards. We have been strong proponents of the Commonwealth of Virginia joining the Regional Greenhouse Gas Initiative and are pleased that funds are now being made available to support our efforts to mitigate and protect against flooding in neighborhoods across our entire community.

The enclosed grant application will assist the City with the development of stormwater management models for the Meadow Creek and Rivanna River watersheds within City limits. This application is the 2nd in a series, the first being our Round 1 CFPF grant award for a model of the Moore's Creek watershed. Combined, these grants will produce models covering Charlottesville's entire jurisdictional limits so that we may identify drainage problems across the City using the same methods of evaluation. The total estimated project budget is $550,000. Per the grant application process, I hereby confirm that the City has identified the necessary resources for the required 50% match of $275,000, which will be composed of cash allocated to our Water Resources Protection Program. Upon Notice of Award of the grant, a resolution will be presented to City Council of Charlottesville for appropriation of the grant funds and the identified matching funds.

We look forward to the VA Department of Conservation and Recreation's support in developing the tools necessary to protect our community in a strategic, equitable, and proactive manner.

Sincerely,

Samuel Sanders, Jr.
Deputy City Manager for Operations

Attachment K

FIRM Panel
51003C0267D/51003C0278D/51003C0279D/51003C0286D/51003C0287D/51003C0288D/51003C0289D

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 17. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East–West Highway
Silver Spring, Maryland 20910
(301) 713–3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Albemarle County Department of Planning & Community Development. This information was photogrammetrically compiled at a scale of 1:4,800 from aerial photography dated March 2000.

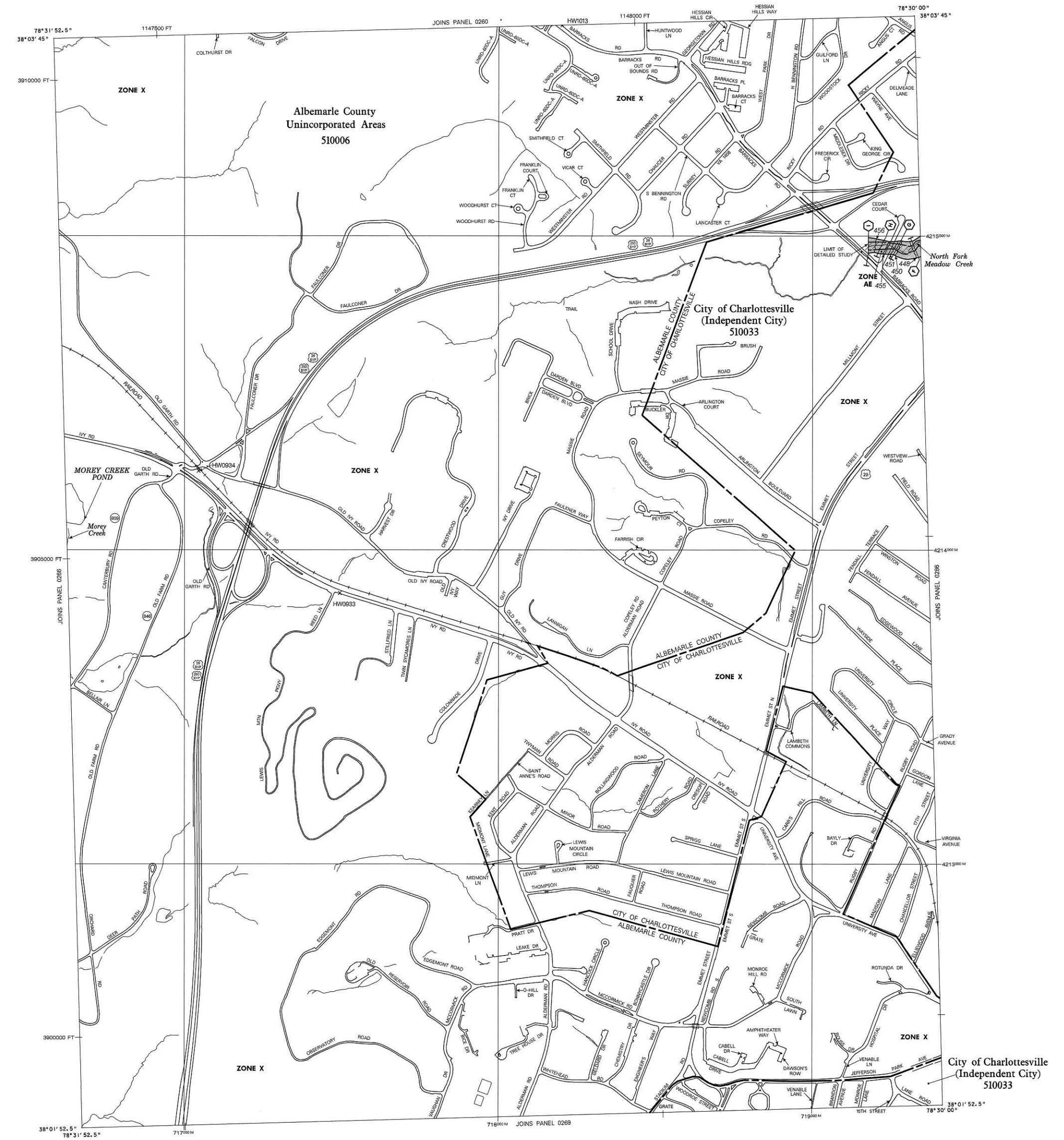
This map reflects more detailed and up–to–date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contain authoritative hydaulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de–annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1–800–358–9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1–800–358–9620 and their website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1–877–336–2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100–year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water–surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - 23	Transect line
97°07' 30", 32°22' 30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4276000 M	1000–meter Universal Transverse Mercator grid values, zone 17
600000 FT	5000–foot grid ticks: Virginia State Plane coordinate system, south zone (FIPSZONE 4502), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
February 4, 2005

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1–800–638–6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0267D

FIRM
FLOOD INSURANCE RATE MAP

ALBEMARLE COUNTY, VIRGINIA AND INCORPORATED AREAS AND THE INDEPENDENT CITY OF CHARLOTTESVILLE

PANEL 267 OF 575

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBEMARLE COUNTY	510006	0267	D
CHARLOTTESVILLE, CITY OF (INDEPENDENT CITY)	510033	0267	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
51003C0267D

EFFECTIVE DATE
FEBRUARY 4, 2005

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 17. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Albemarle County Department of Planning & Community Development. This information was photogrammetrically compiled at a scale of 1:4,800 from aerial photography dated March 2000.

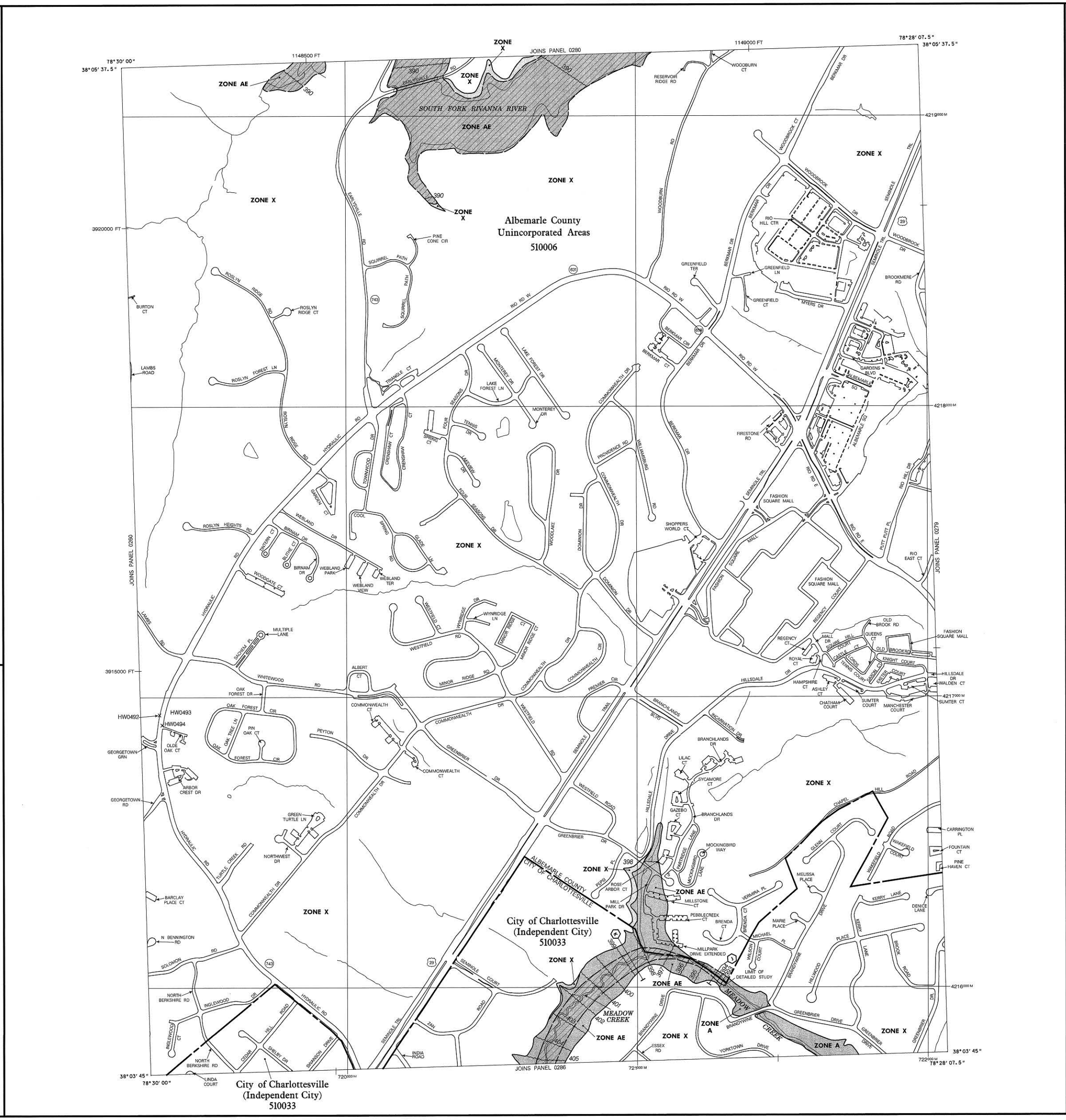
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contain authoritative hydaulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and their website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~513~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)——(A)	Cross section line
(23)- - -(23)	Transect line
97°07' 30", 32°22' 30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4276000 M	1000-meter Universal Transverse Mercator grid values, zone 17
600000 FT	5000-foot grid ticks: Virginia State Plane coordinate system, south zone (FIPSZONE 4502), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
February 4, 2005

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

N

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0278D

FIRM
FLOOD INSURANCE RATE MAP

ALBEMARLE COUNTY, VIRGINIA AND INCORPORATED AREAS AND THE INDEPENDENT CITY OF CHARLOTTESVILLE

PANEL 278 OF 575

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBEMARLE COUNTY	510006	0278	D
CHARLOTTESVILLE, CITY OF (INDEPENDENT CITY)	510033	0278	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
51003C0278D

EFFECTIVE DATE
FEBRUARY 4, 2005

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 17. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Albemarle County Department of Planning & Community Development. This information was photogrammetrically compiled at a scale of 1:4,800 from aerial photography dated March 2000.

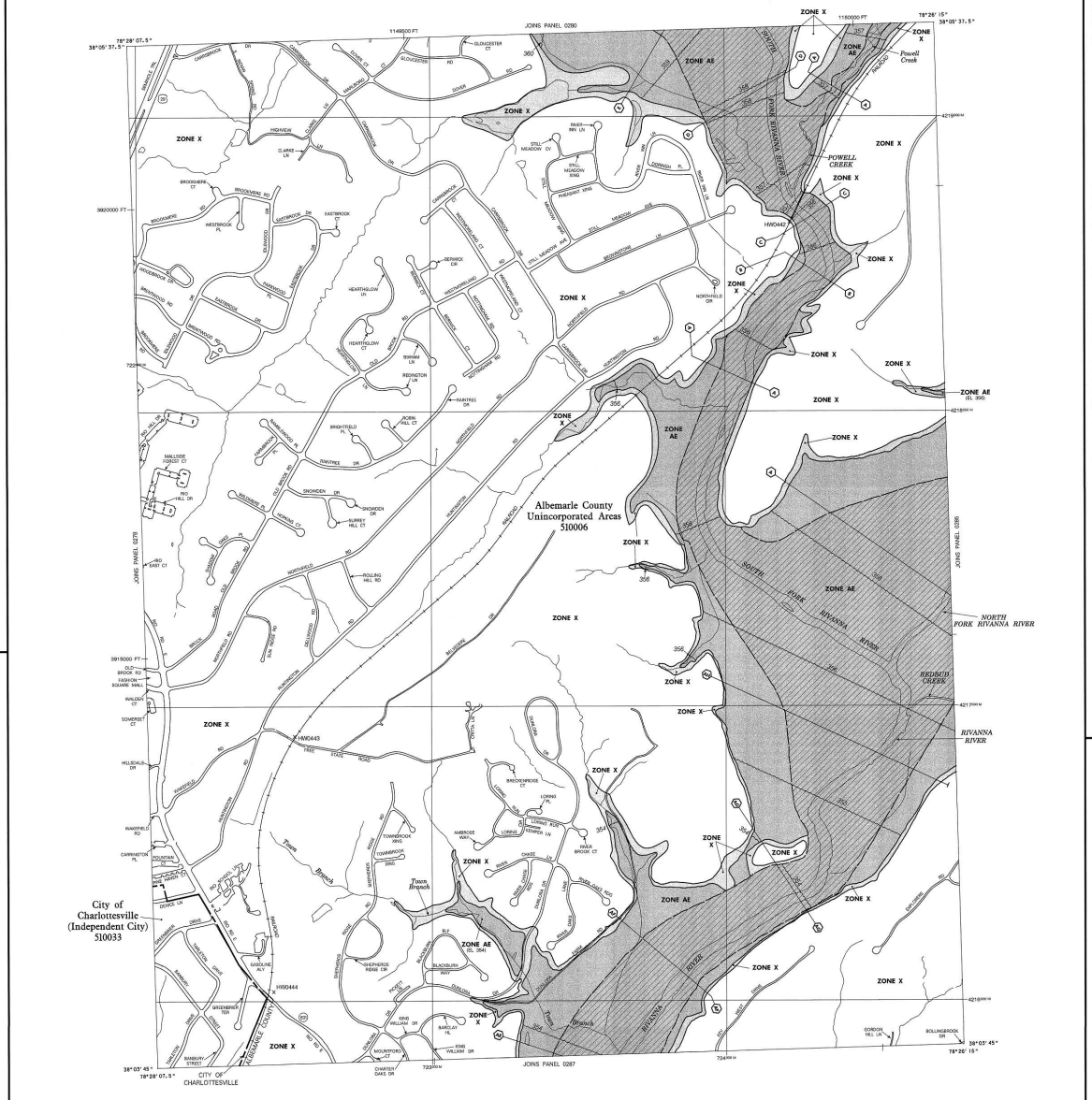
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contain authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with the FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and their website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream, plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A Cross section line

23 — 23 Transect line

97°07' 30", 32°22' 30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

4276000 M 1000-meter Universal Transverse Mercator grid values, zone 17

600000 FT 5000-foot grid ticks: Virginia State Plane coordinate system, south zone (FIPSZONE 4502), Lambert Conformal Conic projection

DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
February 4, 2005

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0279D

FIRM
FLOOD INSURANCE RATE MAP

ALBEMARLE COUNTY, VIRGINIA
AND INCORPORATED AREAS
AND THE INDEPENDENT CITY
OF CHARLOTTESVILLE

PANEL 279 OF 575

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBEMARLE COUNTY	510006	0279	D
CHARLOTTESVILLE, CITY OF (INDEPENDENT CITY)	510033	0279	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
51003C0279D

EFFECTIVE DATE
FEBRUARY 4, 2005

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 17. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Albemarle County Department of Planning & Community Development. This information was photogrammetrically compiled at a scale of 1:4,800 from aerial photography dated March 2000.

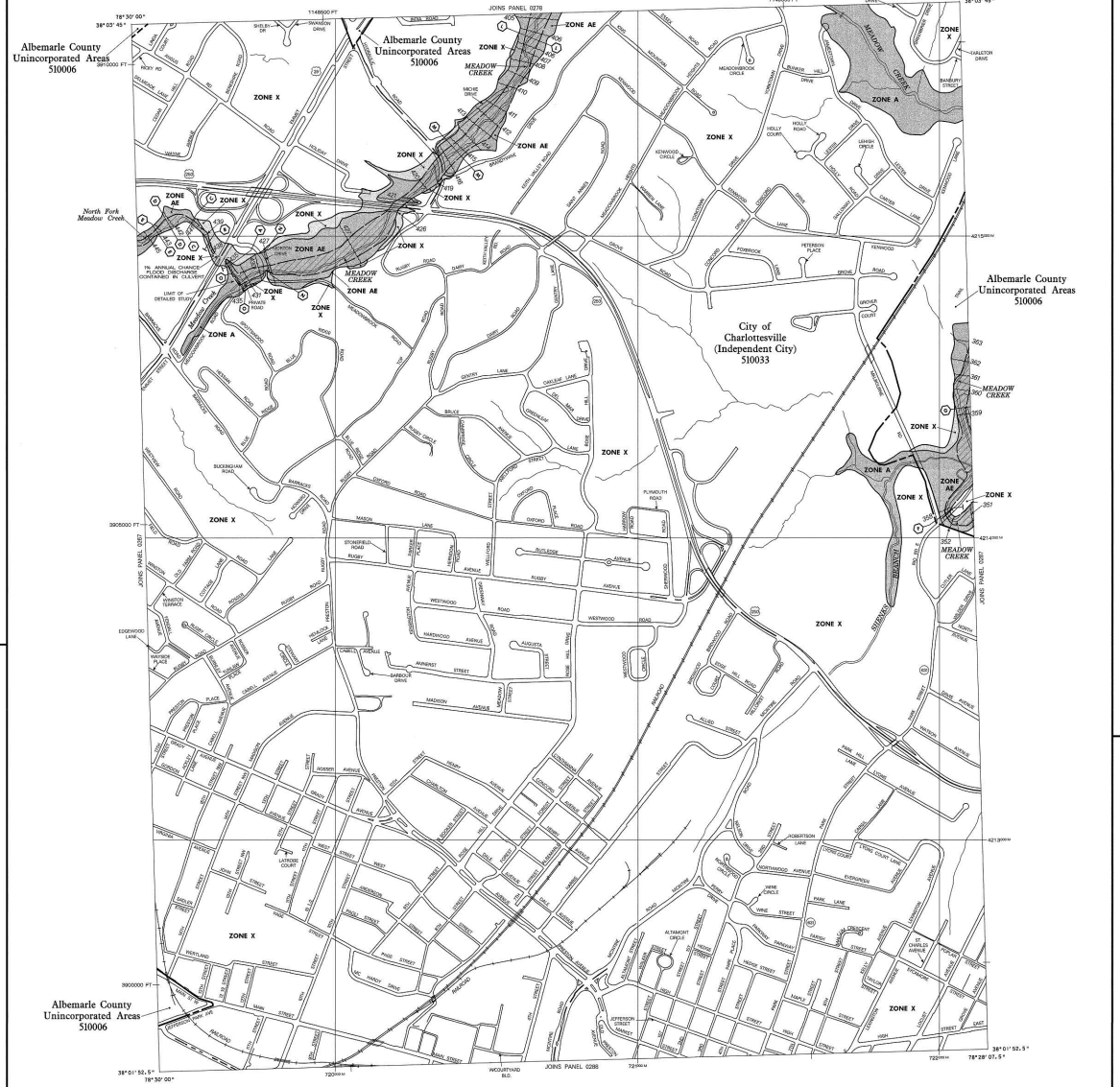
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contain authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and their website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, A1-A30, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL. 987') — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4276000 FT — 1000-meter Universal Transverse Mercator grid values, zone 17
- 600000 FT — 5000-foot grid ticks: Virginia State Plane coordinate system, south zone (FIPSZONE 4502), Lambert Conformal Conic projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 4, 2005

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0286D

FIRM
FLOOD INSURANCE RATE MAP

ALBEMARLE COUNTY, VIRGINIA
AND INCORPORATED AREAS
AND THE INDEPENDENT CITY
OF CHARLOTTESVILLE

PANEL 286 OF 575

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBEMARLE COUNTY	510006	0286	D
CHARLOTTESVILLE, CITY OF (INDEPENDENT CITY)	510033	0286	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
51003C0286D

EFFECTIVE DATE
FEBRUARY 4, 2005

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 17. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Albemarle County Department of Planning & Community Development. This information was photogrammetrically compiled at a scale of 1:4,800 from aerial photography dated March 2000.

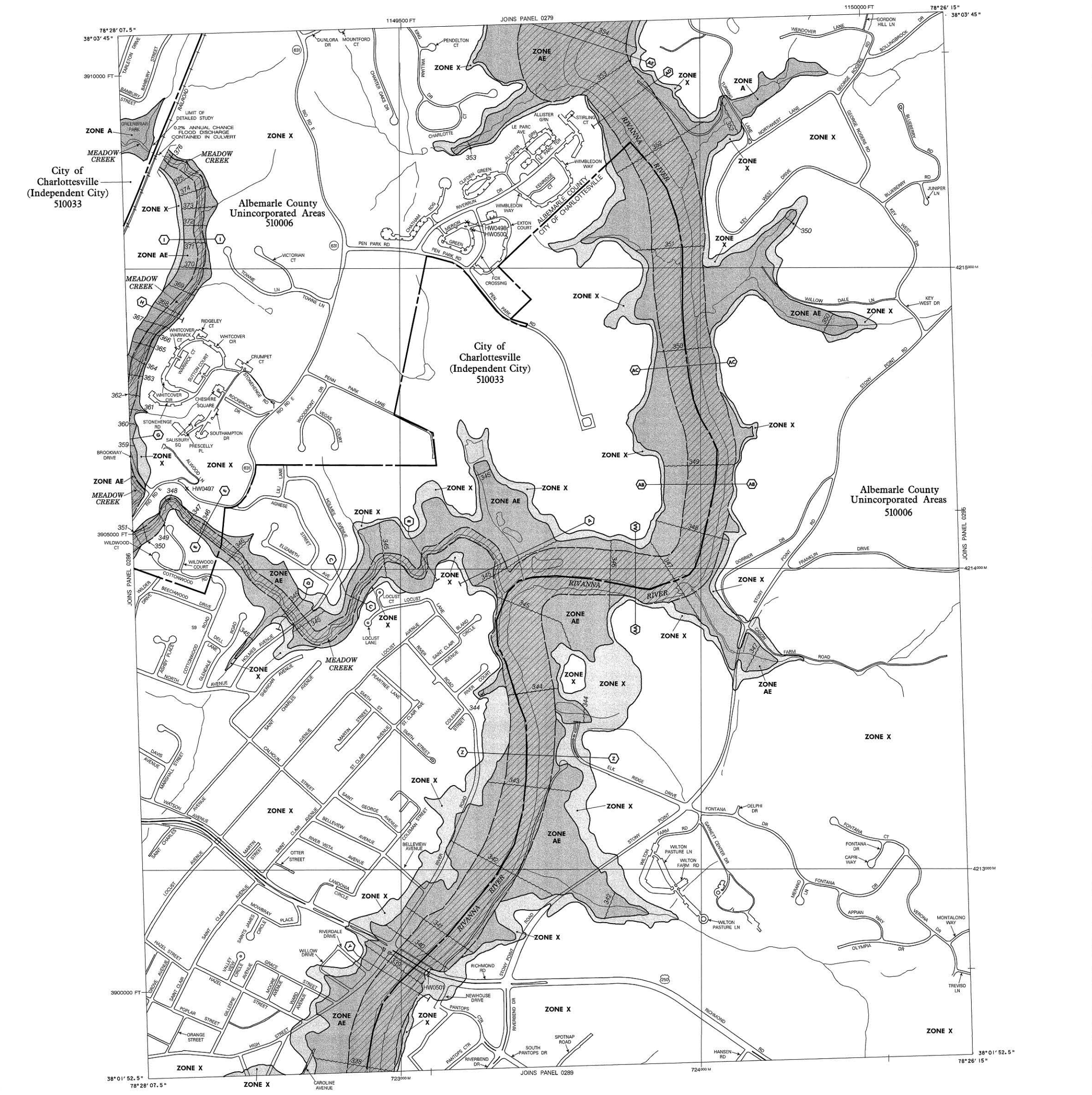
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contain authoritative hydaulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and their website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
~~513~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)——(A)	Cross section line
(23)- - -(23)	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4276000 M	1000-meter Universal Transverse Mercator grid values, zone 17
600000 FT	5000-foot grid ticks: Virginia State Plane coordinate system, south zone (FIPSZONE 4502), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
February 4, 2005

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0287D

FIRM
FLOOD INSURANCE RATE MAP

ALBEMARLE COUNTY, VIRGINIA AND INCORPORATED AREAS AND THE INDEPENDENT CITY OF CHARLOTTESVILLE

PANEL 287 OF 575

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBEMARLE COUNTY	510006	0287	D
CHARLOTTESVILLE, CITY OF (INDEPENDENT CITY)	510033	0287	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 51003C0287D

EFFECTIVE DATE FEBRUARY 4, 2005

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 17. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Albemarle County Department of Planning & Community Development. This information was photogrammatically compiled at a scale of 1:4,800 from aerial photography dated March 2000.

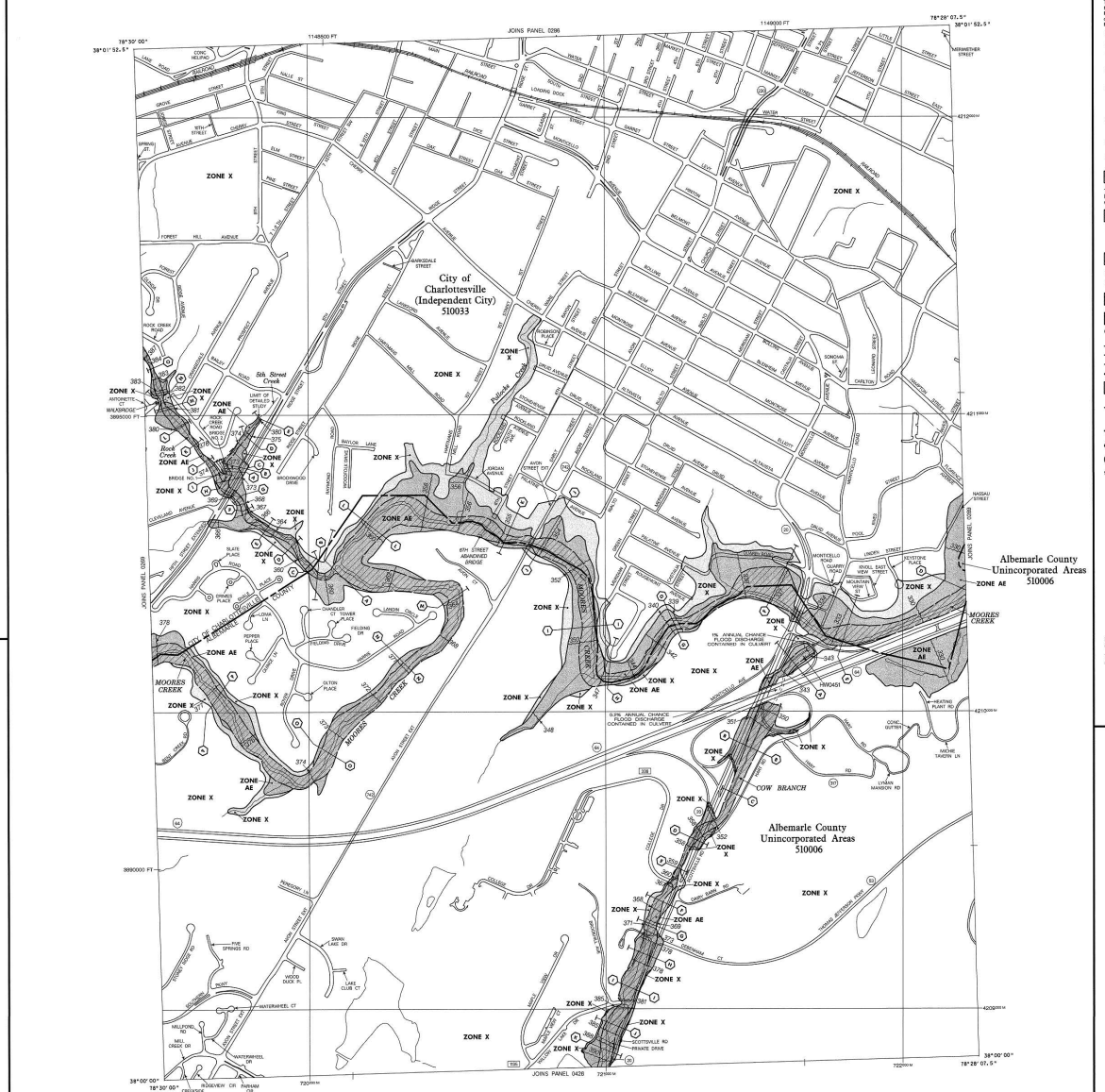
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contain authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and their website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A Cross section line

23 — 23 Transect line

97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

4278000 mN 1000-meter Universal Transverse Mercator grid values, zone 17

600000 FT 5000-foot grid ticks: Virginia State Plane coordinate system, south zone (FIPSZONE 4502), Lambert Conformal Conic projection

DX6510 X Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 4, 2005

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
125 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0288D

FIRM
FLOOD INSURANCE RATE MAP

ALBEMARLE COUNTY, VIRGINIA
AND INCORPORATED AREAS
AND THE INDEPENDENT CITY
OF CHARLOTTESVILLE

PANEL 288 OF 575

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBEMARLE COUNTY	510006	0296	D
CHARLOTTESVILLE, CITY OF (INDEPENDENT CITY)	510033	0288	D

Notes to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
51003C0288D

EFFECTIVE DATE
FEBRUARY 4, 2005

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 17. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contract the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Albemarle County Department of Planning & Community Development. This information was photogrammetrically compiled at a scale of 1:4,800 from aerial photography dated March 2000.

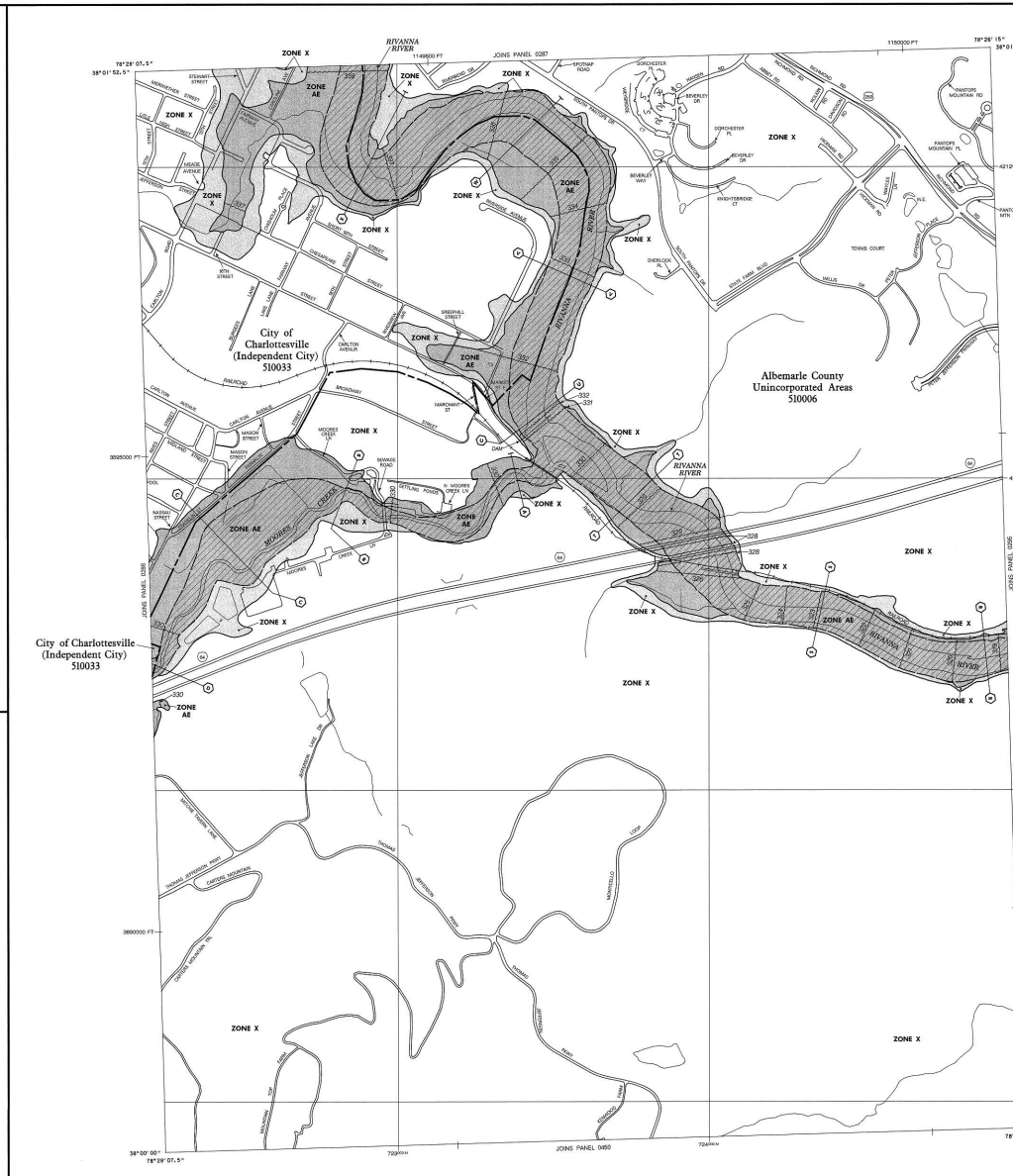
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contain authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and their website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, A1-A30, AH, AO, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A8 Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL. 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4276000 M — 1000-meter Universal Transverse Mercator grid values, zone 17
- 600000 FT — 5000-foot grid ticks: Virginia State Plane coordinate system, south zone (FIPSZONE 4502), Lambert Conformal Conic projection
- DX510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
February 4, 2005

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
500 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0289D

FIRM
FLOOD INSURANCE RATE MAP

ALBEMARLE COUNTY, VIRGINIA AND INCORPORATED AREAS AND THE INDEPENDENT CITY OF CHARLOTTESVILLE

PANEL 289 OF 575

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBEMARLE COUNTY	510030	0289	D
CHARLOTTESVILLE, CITY OF (INDEPENDENT CITY)	510033	0289	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
51003C0289D

EFFECTIVE DATE
FEBRUARY 4, 2005

Federal Emergency Management Agency

Commonwealth of Virginia

CFPF, rr <cfpf@dcr.virginia.gov>

CFPF Grant Application, City of Charlottesville 4.8.22

1 message

Henry, Andrea E <henrya@charlottesville.gov> Fri, Apr 8, 2022 at 1:13 PM
To: "CFPF, rr" <cfpf@dcr.virginia.gov>
Cc: "Edwards, Tony" <Edwardst@charlottesville.gov>

To Whom It May Concern,

The City of Charlottesville is thrilled to submit our third grant application for the Community Flood Preparedness Fund. This grant is the second in a series of two, aimed at developing a strategic approach to both identifying and prioritizing flood mitigation and protection projects. The City strives to plan projects in an equitable and comprehensive manner, relying on watershed-scale solutions when possible. Development of watershed-scale models is the cornerstone to these future efforts and we are committed to developing stormwater management and resilience plans that reflect the best science and methodology available.

Please let me know if you have any questions or concerns about the attached application.

Have a wonderful day!

Andrea Henry, PE

Water Resources Protection Administrator

Public Works Department

City of Charlottesville

(434) 970 - 3529

henrya@charlottesville.gov

CID510033_CityofCharlottesville_CFPF_Apr082021.pdf
12504K