

Risk MAP (Jefferson Co. Preliminary Flood Maps)

Risk **M**apping (Review New Flood Risk Maps)

Map Changes

- BFE's (e.g., 24' BFE change at Harpers Ferry)
- Floodplain Width (e.g., Shepherdstown)

SFHA Building Changes

- Mapped-in/Mapped Out Bldgs.
- LOMAs (SFHA bldgs. mapped out)

Risk Communications

- Outreach Letters for building changes in SFHA/Floodway

Future Map Discovery

- Map [Zone AE Upgrades](#) for Potomac / Shenandoah Rivers?

Risk **A**ssessment (Quantify Flood Risk)

Statewide Risk Assessment

(aggregate level or summary reports)

- *River/Stream Scale*
- *County Scale*
- *Unincorporated Area Scale*
- *Incorporated Area Scale*
 - *Shepherdstown*
 - *Harpers Ferry*

Building Level Risk Assessments

- *Unmitigated Structures*
- *Mitigated Structure*

Risk **P**lanning (Build Flood Resiliency)

Pre-Disaster Planning

- Preload WV Flood Tool Structures into FEMA's SDE Software
- Update Emergency Response & Hazard Mitigation Plans using risk assessments for major storm event

Higher Standards - Municipalities

- Apply for CRS status
- Adopt higher Freeboard value of 3 ft. in floodplain mgmt. ordinance

Verify Risk Layers on WV Flood Tool

- Building-level assessments
- Open space properties



WV Flood
Resiliency
Framework

Risk MAP: Reduce Loss of Life and Property

RiskMAP
Increasing Resilience Together

Map Changes

WV Flood Tool
Remember: When In Doubt, It's Not Out!

Public Expert **Risk MAP** Risk Reference Basemaps Address Harpers Ferry, WV

Flood Hazard Area: Location is **WITHIN** an updated FEMA 100-year flood hazard zone and floodway. The flood zone is preliminary and under review to become effective. Refer to FEMA's Flood Map Changes Viewer

Flood Zone: Preliminary Flood Zone (A)
Stream: Shenandoah River
Watershed (HUC8): Shenandoah (2070007)

FEMA's Flood Map: 54037C0175E NFHL
Map Effective Date: 12/18/2009
Contacts: Jefferson

Flood Height: About 302.5 ft (AFH) NAVD88
Water Depth: About 33.0 ft (Source: HEC-RAS)

HEC-RAS Model: Shenandoah2

Flood Profile: N/A

Community: **Town of Harpers Ferry**
Freeboard: 2 ft CRS Class: 10 CID: 540067

Location (lat, long): (39.322440, -77.730647) WGS84
Location (UTM 17N): (4357657, 781840) WGS84

External Viewers: [Icons]

Elevation: 269.4 ft (Source: FEMA 2012) NAVD88

Address: multiple addresses
Parcel: 19-05-0004-0025-0000 | Assessment

Flood Risk Information Related Resources

scale - 1: 77 734

Harpers Ferry: BFE change minus 24 ft.

WV Flood Tool
Remember: When In Doubt, It's Not Out!

Public Expert Risk MAP Flood Reference Basemaps Address Shepherdstown

Flood Hazard Area: Location is **WITHIN** an updated FEMA 100-year flood hazard zone and floodway. The flood zone is preliminary and under review to become effective. Refer to FEMA's Flood Map Changes Viewer

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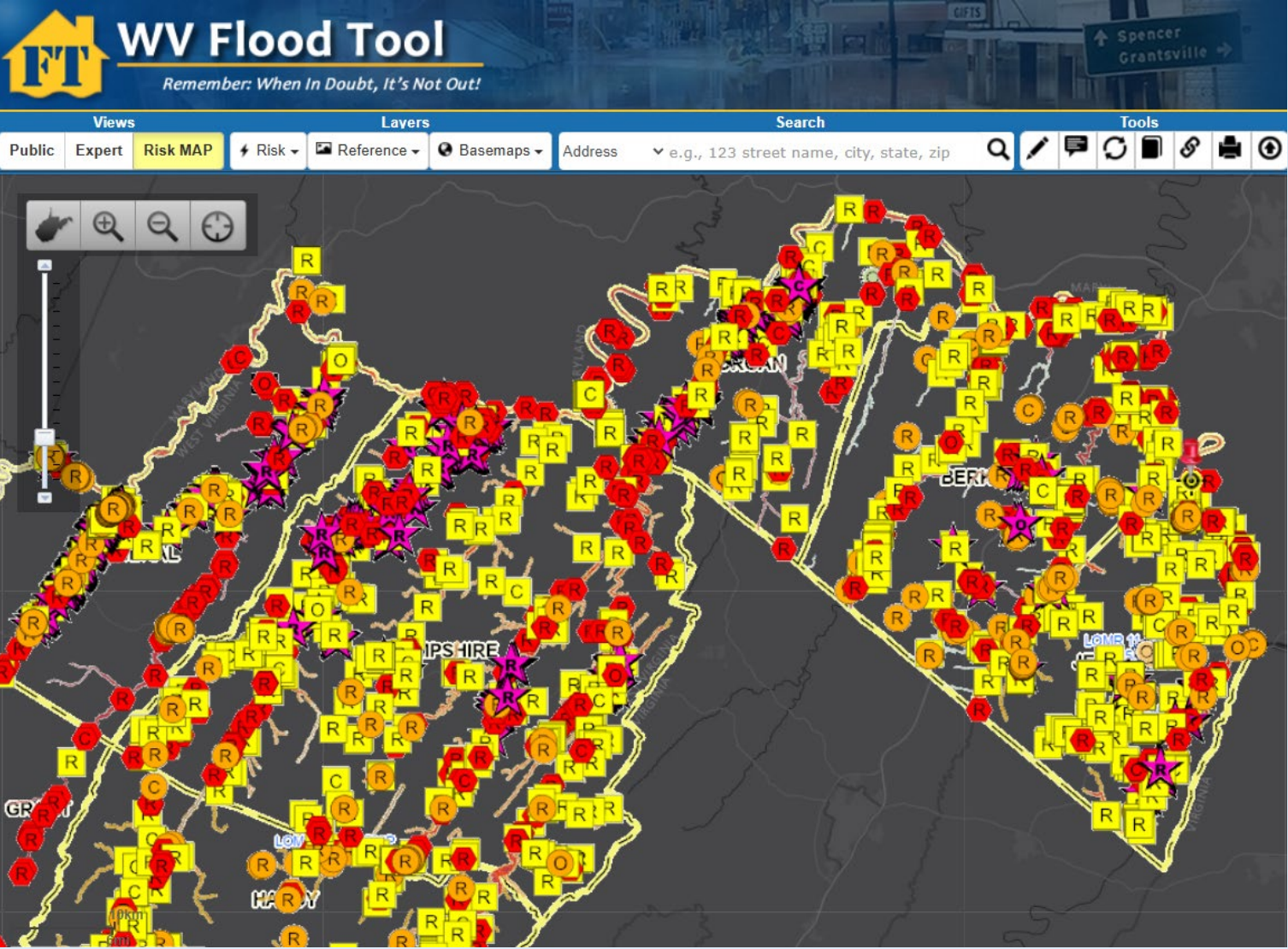
Address: multiple addresses
Parcel: 19-05-0004-0025-0000 | Assessment

Flood Risk Information Related Resources

scale - 1: 77 734

Shepherdstown: Floodplain Type/Width

Buildings Mapped-In / Out of Preliminary SFHA



Future Map Condition		Land Use Category	
Yellow Square	Mapped Out SFHA	(R)	Residential
Orange Circle	Mapped In SFHA	(C)	Commercial
Red Hexagon	Remains Same	(O)	Other
Purple Star	Floodway		

Difference between FEMA's 2009 and 2024 flood studies

SFHA Building Changes: Mapped-In/Out

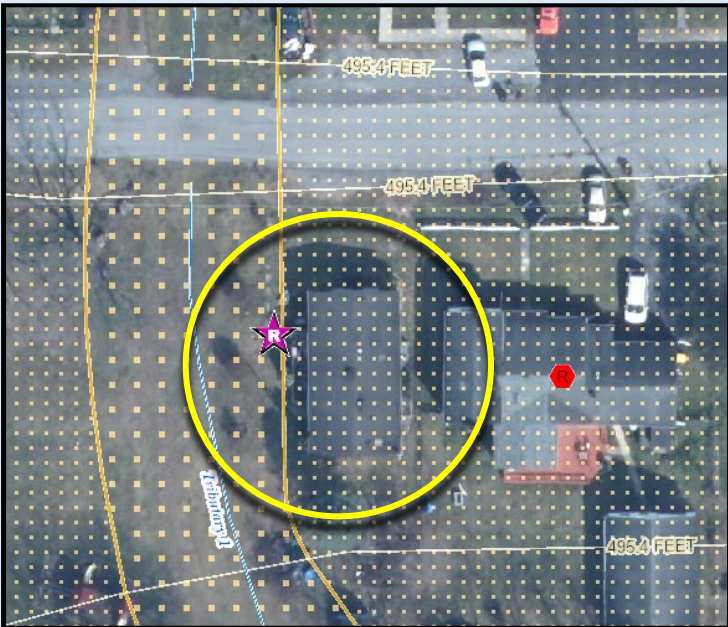
COMMUNITY IDENTIFICATION		Estimated structures in the Community	Estimated structures in the preliminary flood high hazard area	Estimated structures newly mapped in	Estimated structures newly mapped out
Community Name	Community Type				
Jefferson County*	Unincorporated	20,397	317	55	220
Bolivar	Incorporated	616	4	4	0
Charles Town	Incorporated	3,670	21	4	8
Harpers Ferry	Incorporated	276	31	30	0
Ranson	Incorporated	2,918	50	1	28
Shepherdstown	Incorporated	735	76	29	20
JEFFERSON	County	28,612	499	123	276

* Unincorporated Area

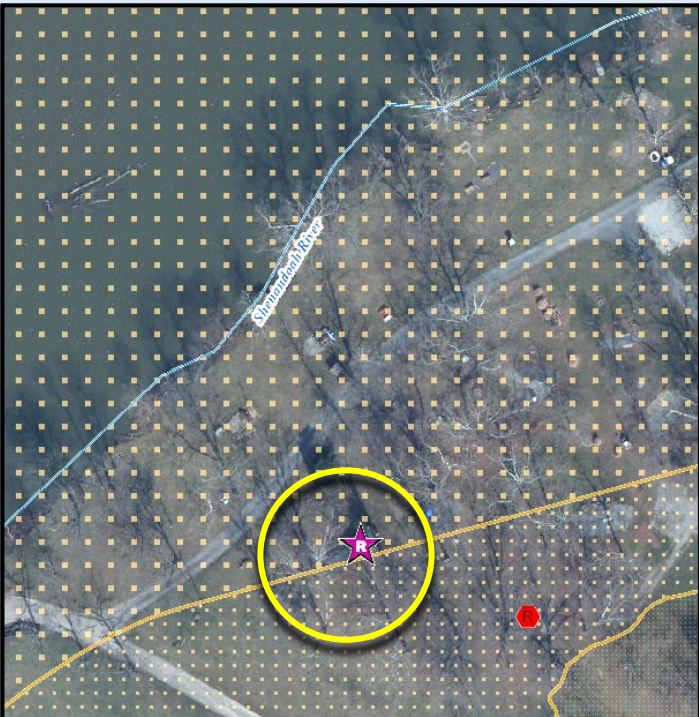
County Net Change in structures: - 153

County Net Change in floodway structures: - 14

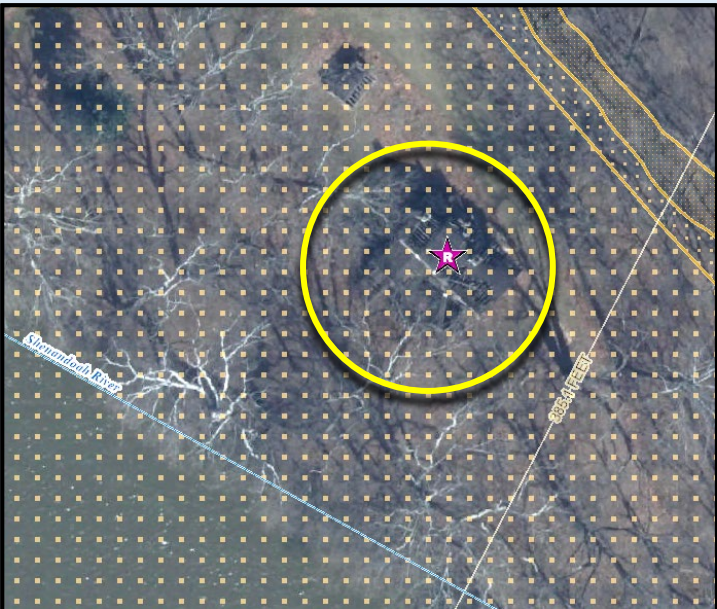
Buildings Mapped into Floodway



Double-wide Mobile Home in Ranson (FD: 2.2 ft)
 \$33K; Year Built: 1993 (Post-FIRM)
 (Building ID: [19-08-0006-0019-0001_407](#))






Single-wide Mobile Home in Jefferson County* (FD: 7.0 ft)
 \$25K; **Minus Rated: 3.5 ft**; Year Built: Unknown
 (Building ID: [19-02-0020-0031-0000_30](#))



Single Family Dwelling in Jefferson County* (FD: 14.0 ft)
 \$8K; **Minus Rated: 10.3 ft**; Year Built: 1979 (Pre-FIRM)
 (Building ID: [19-06-008F-0007-0000_457](#))

*Structures mapped from
 Floodplain Fringe into Floodway*

-  FLOOD FRINGE TO FLOODWAY-Res.
-  FLOOD FRINGE TO FLOODWAY-Com.
-  FLOOD FRINGE TO FLOODWAY-Other

Risk Communications: SFHA Map Change Letters

Incorporate 1% Floodplain Building Risk Assessment Inventory into **Mitigation** and **NFIP/CRS Management** Activities



FEMA Region 3 Toolkit for New Flood Studies

City of White Sulphur Springs

Date: 10/14/2021

Dear SMITH JOHN:

This letter is a test to show the use of mail merge and the data we can retrieve for it. I copied the first two paragraphs from the Local Officials Toolkit template and added the last two paragraphs for demonstration purposes.

A multi-year project to re-examine City of White Sulphur Springs's flood zones and develop detailed digital flood hazard maps has been completed. The new maps, also known as Flood Insurance Rate Maps (FIRMs), were just released for public view. The new maps reflect current flood risk based on the latest data and a more accurate understanding of our area's topography. As a result, you and other property owners throughout GREENBRIER COUNTY will have up-to-date, Internet-accessible information about flood risk to your property.

How will these changes affect you?

Based on the new maps, your property is being mapped into a higher risk flood zone, known as the Special Flood Hazard Area (SFHA). If you have a mortgage from a federally regulated lender and your property is in the SFHA, you are required by Federal law to carry flood insurance when these flood maps are put into effect. We recommend that you use this time to contact your insurance agent to get the most favorable rate and learn about options offered by the National Flood Insurance Program (NFIP) for properties being mapped into higher risk areas for the first time.

You can find your property on the WV Flood tool in one of two ways: first, you can go to the following link in a web browser: <https://mapwv.gov/flood/map/?wkid=102100&x=-8939196.678447664&y=4550352.316266677&l=13&v=2>. Or, you can go to <https://mapwv.gov/> map and enter your address, 177 PATTERSON ST, WHITE SULPHUR SPRINGS, WV, 24986, in the search bar.

Your property is within the Howard Creek flood zone and has a flood depth of 1.0 feet. Its FIRM status is Pre-FIRM.

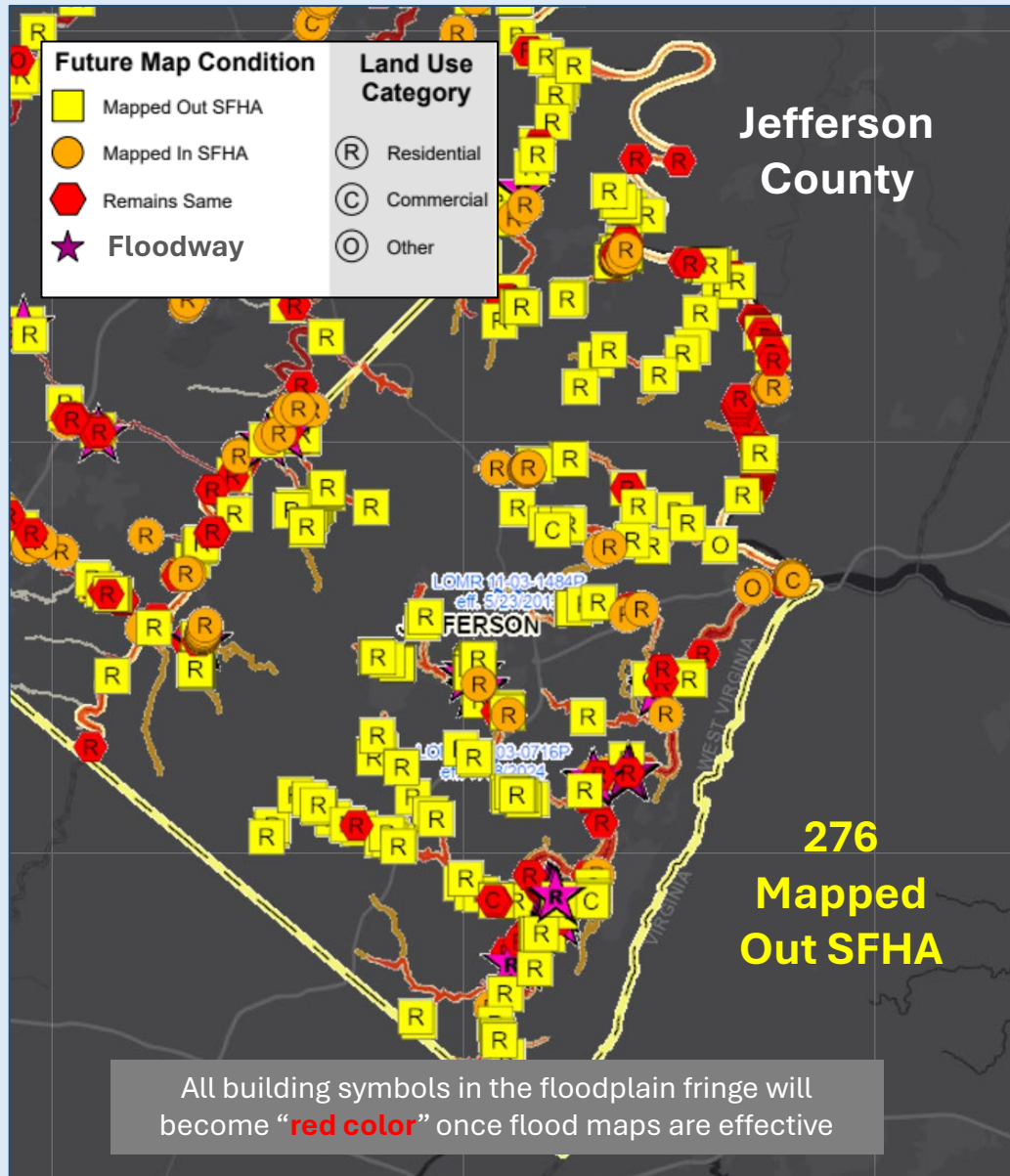
Mail Merge Template for SFHA Mapped-in Structures

Counties which recently sent outreach letters to homeowners:

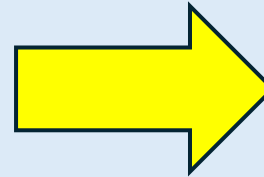
- Hardy County Risk MAP
- Kanawha County - Elk River PMR
- Greenbrier County Risk MAP

Jefferson County and Shepherdstown have 55 and 29 buildings, respectfully, mapped into the SFHA

SFHA Buildings Changes: LOMAs for Mapped Out



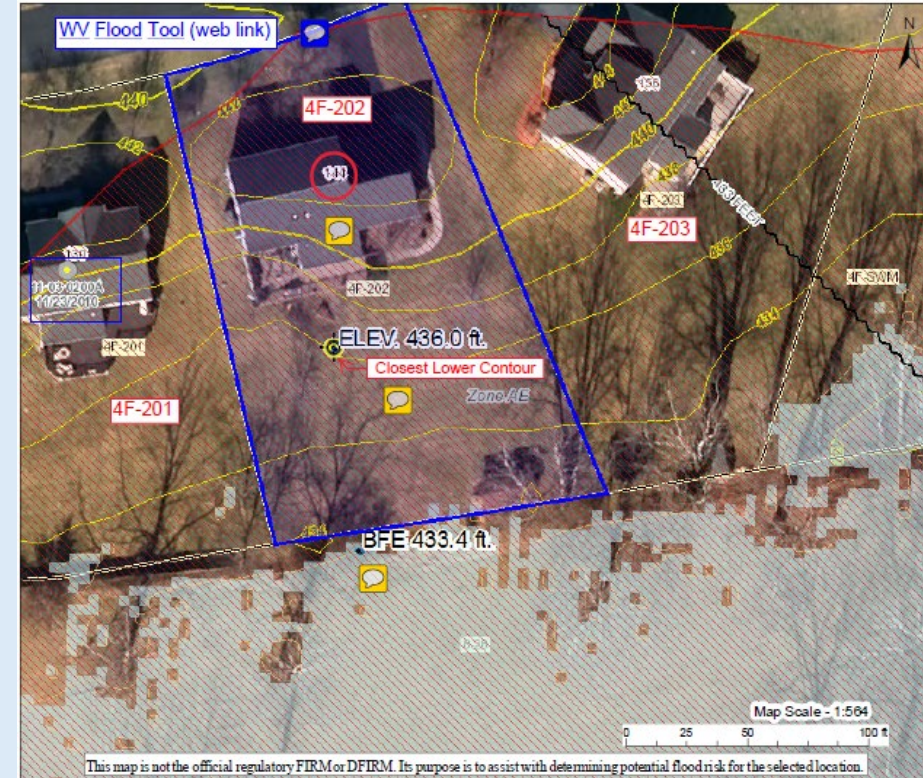
Mapped-out structures of the SFHA may qualify for LOMAs



WV Flood Tool
LiDAR LOMA:

[Instructions](#) | [Guide](#)

LOMA Map: 144 APPALOOSA WAY, Charles Town, WV



H I G H S K	<p>Zone AE 1-Percent-Annual-Chance Flood Hazard Area With Base Flood Elevation (BFE)</p> <p>Floodway Regulatory Floodway in AE Zone</p> <p>Zone A 1-Percent-Annual-Chance Flood Hazard Area Without BFE (may have Advisory Flood Heights)</p> <p>Advisory 1-Percent-Annual-Chance High Risk Advisory</p>	<p>Map created by Kurt Donaldson, WVU on 11/9/2020</p> <p>User Closest Lowest Contour 436 ft. - 1 ft. = 435.0 ft. (LAG). The LAG Notes 435.0 ft. => BFE 433.4 ft.</p>	<p>Flood Hazard Area Location is WITHIN the FEMA 100-year floodplain.</p>
	<p>Download the Full Legend for all Flood tool symbols https://www.mapwv.gov/flood/map/docs/wv_flood_tool_legend.pdf</p>	<p>Flood Zone AE</p> <p>Stream Flowing Springs Run</p> <p>Watershed (HUC8) Shenandoah (2070007)</p> <p>Flood Height 433.4 ft. (Source: User Defined) (NAVD88)</p> <p>Water Depth 436.1 ft. (Source: FEMA 2012) (NAVD88)</p> <p>Elevation 436.1 ft. (Source: FEMA 2012) (NAVD88)</p> <p>Community & ID Jefferson County (ID: 540065)</p> <p>FEMA Map & Date 54037C0130E; Effective Date: 12/18/2009</p> <p>Location (lat, long) (39.313144, -77.824168) (WGS84)</p> <p>Parcel ID 19-02-004F-0202-0000</p> <p>E-911 Address 144 APPALOOSA WAY, Charles Town, WV, 25414</p>	
	<p>WEB LINKS:</p> <p>WV Flood Tool</p> <p>Assessment Record 4F-202</p>	<p>LiDAR Metadata</p> <p>Building Sketch</p>	

River/Stream Building Risk Assessment



MEDIAN BUILDING VALUE: **Town Run** and **Shenandoah River** rank first and fourth, respectively, of 156 major rivers/streams in the state with the highest median value of structures in high-risk flood areas.

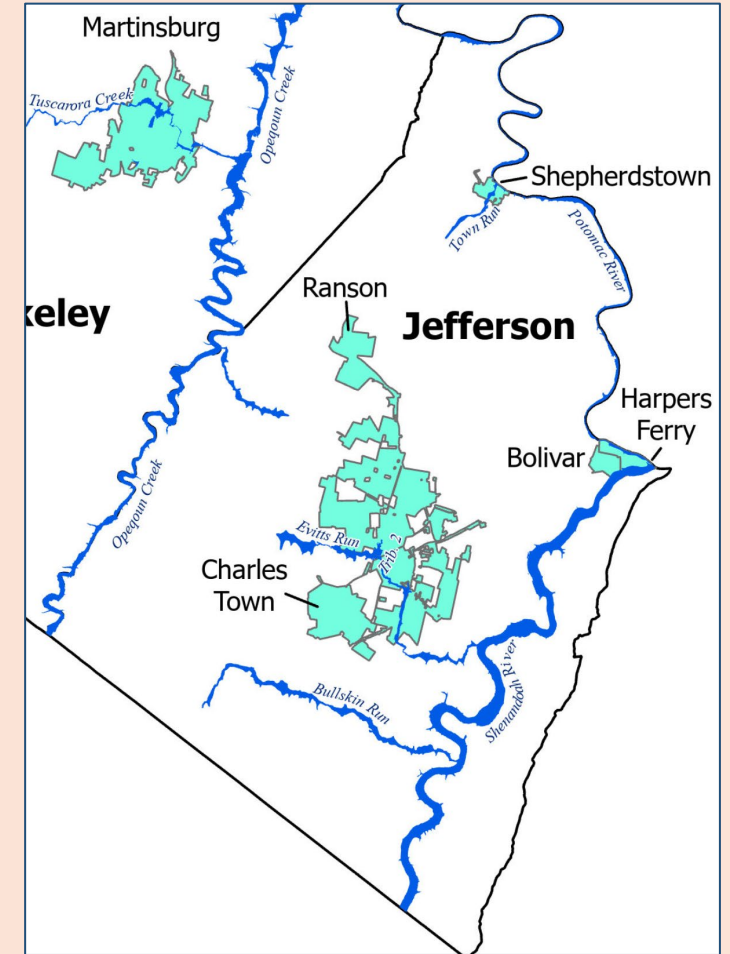
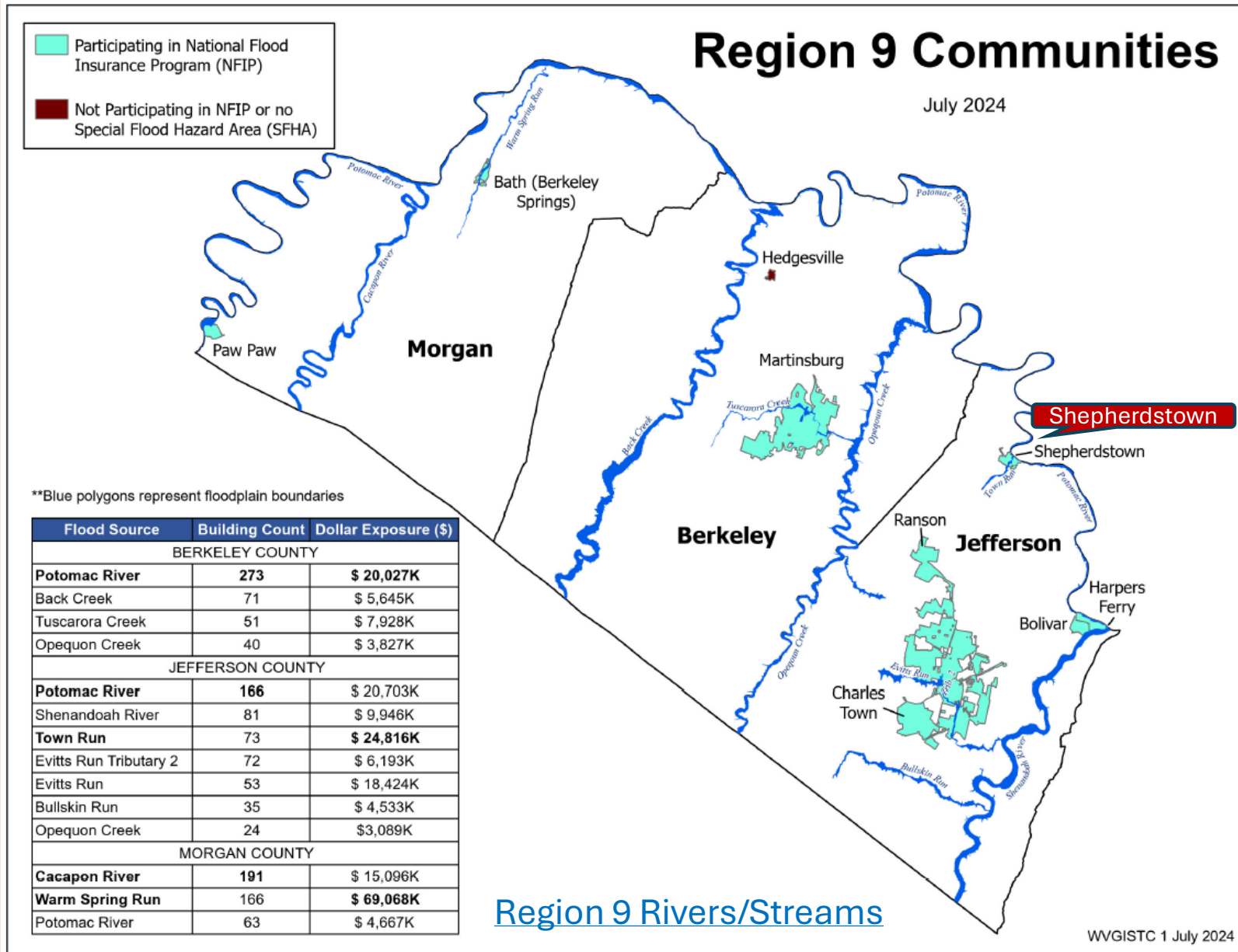
#	STATE CATEGORY RANK	River/Stream Floodplain	Building Characteristics		CATEGORY SCORE
			Building Median Value		
1	1	Town Run	\$247,700		100.0%
2	4	Shenandoah River	\$95,100		98.0%
3	24	Potomac River	\$57,300		85.1%



FLOOD DEPTH MEDIAN: Floodplain structures along the **Shenandoah River** have high flood depths compared to 156 other major rivers/streams in the state.

#	STATE CATEGORY RANK	River/Stream Floodplain	Floodplain Characteristics		CATEGORY SCORE
			Floodplain Length	Flood Depth Median	
1	12	Shenandoah River	30.2 Miles	7.4 Ft	92.9%
2	2	Potomac River	143.8 Miles	4.5 Ft	99.3%
3	147	Town Run	2.1 Miles	0.2 Ft	5.8%

River/Stream Building Risk Assessment



Top rivers with high building counts in SFHA are **Potomac River** (166), **Shenandoah River** (81) and **Town Run** (73). Town Run has highest building dollar exposure.

Jefferson County Risk Assessment



Statewide Rank
among the Top 5

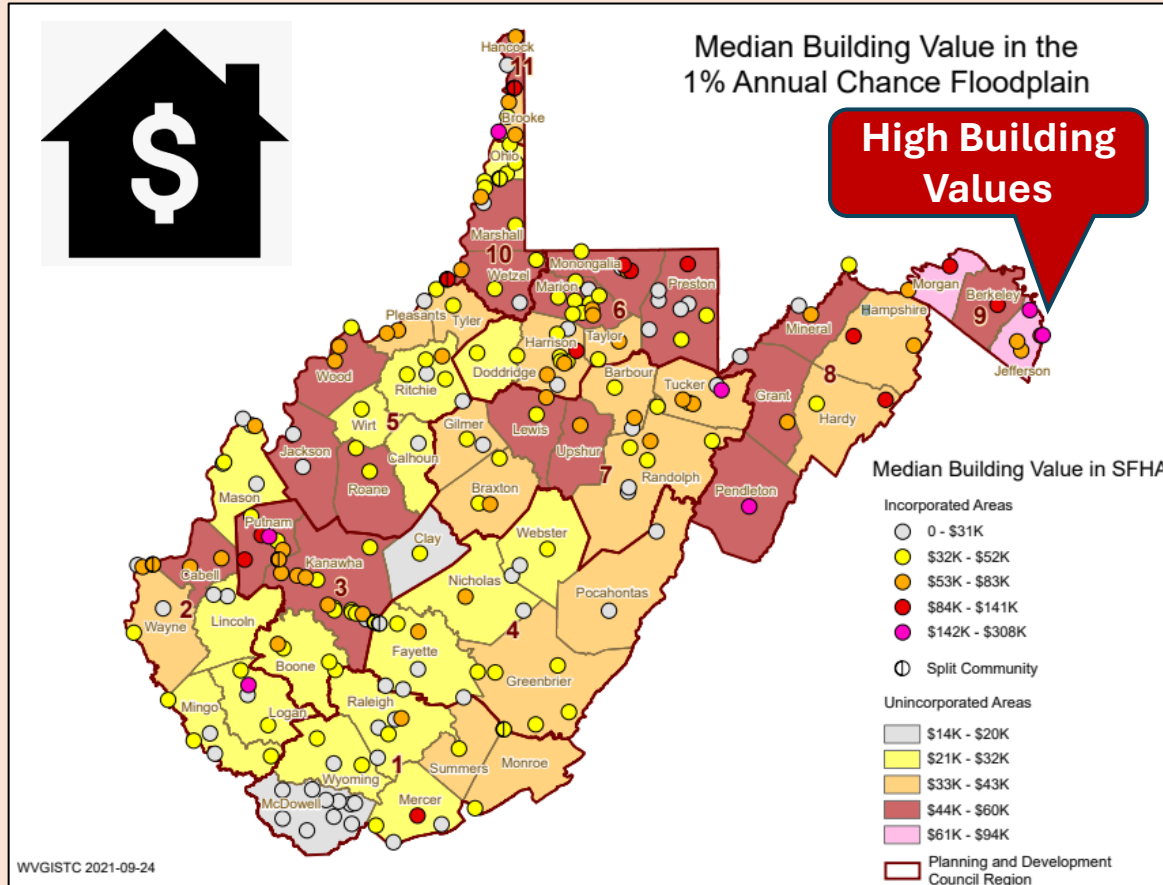
JEFFERSON COUNTY ranks “very high” or in the **top 20%** of all 55 counties in the state for the five risk indicators below. View [Top 20% Risk Indicators Report](#) for county. Click on Risk Factor links for rationales/recommendations.

Category	Flood Risk Indicator		Value for Jefferson	Indicator Score (0 - 100%)	Indicator Rating
Building Characteristics	Building Median Value	1	\$97,450 (Median \$42,200)	100.0%	VERY HIGH
	Bldg. Subgrade Basements Ratio	4	49.5%	94.4%	VERY HIGH
	Bldg. Year Minus Rated Post-FIRM Ratio		9.4%	81.4%	Very High
Community Assets	Community Assets Historical	4	120	94.4%	VERY HIGH
Building Damage Loss	Bldg. Substantial Damage Ratio		24.0%	90.7%	VERY HIGH

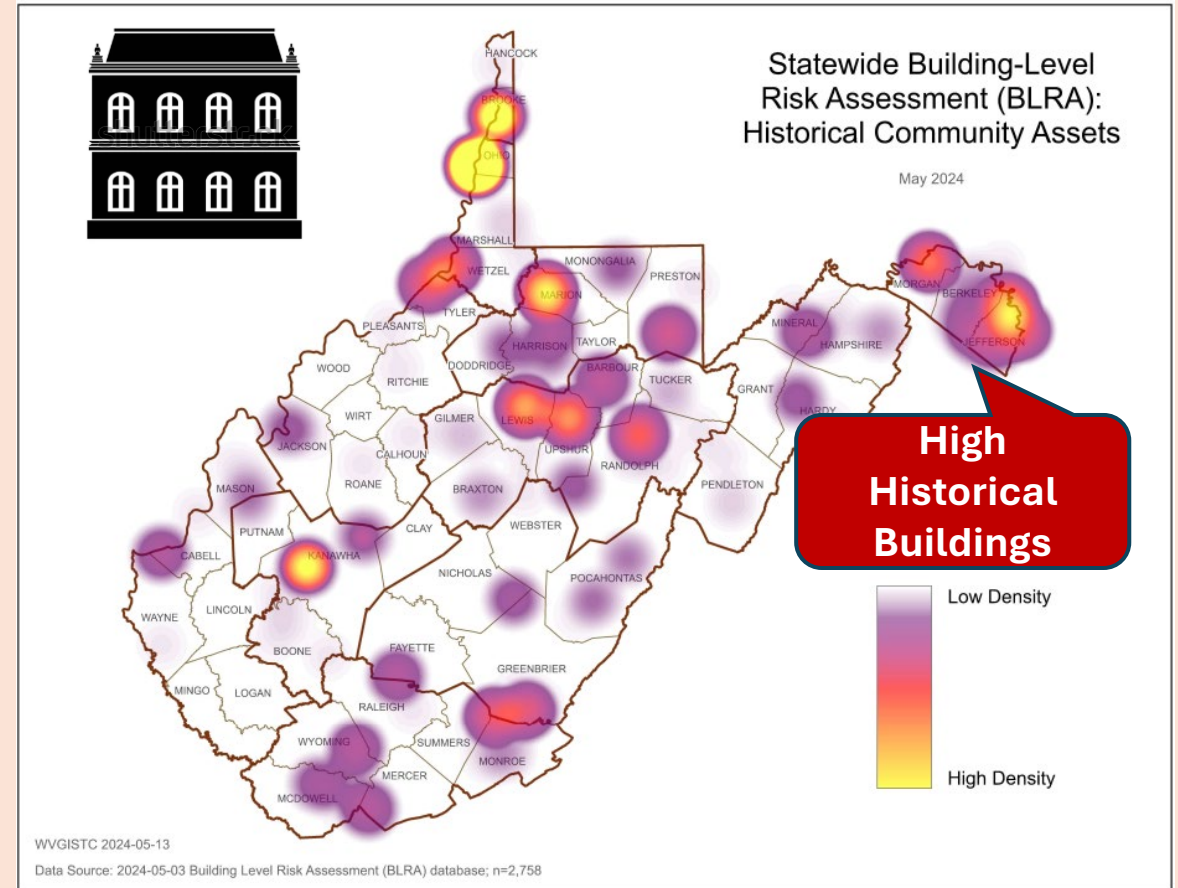
JEFFERSON COUNTY UNINCORPORATED* ranks “very high” or in the **top 20%** of all 55 unincorporated areas in the state for the six risk indicators below. View [Top 20% Risk Indicators Report](#) for incorporated area.

Category	Flood Risk Indicator		Value for Jefferson County* - Unincorporated	Indicator Score (0 - 100%)	Indicator Rating
Floodplain Characteristics	Flood Depth Median	4	4.7 Ft	94.4%	VERY HIGH
Building Characteristics	Building Median Value	1	\$93,150 (Median \$37,350)	100.0%	VERY HIGH
	Bldg. Subgrade Basements Ratio	2	48.9%	98.1%	VERY HIGH
	Bldg. Year Minus Rated Post-FIRM Ratio		14.5%	90.7%	VERY HIGH
Community Assets	Community Assets Historical	1	26	100.0%	VERY HIGH
Building Damage Loss	Bldg. Substantial Damage Ratio		29.7%	90.7%	VERY HIGH

Jefferson County Building Risk Assessment



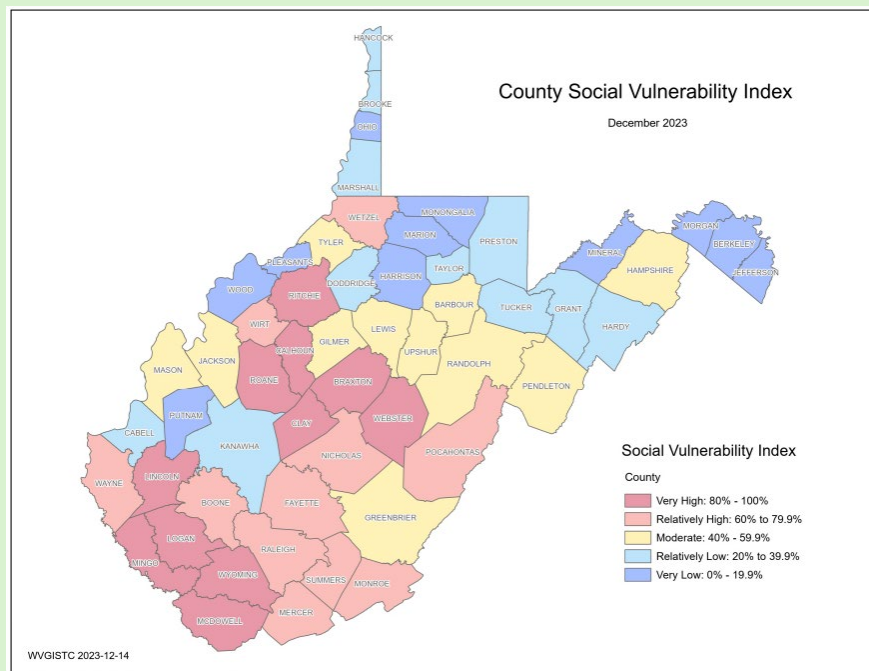
Jefferson County has very high [Building Values](#), or more than double the statewide median value.



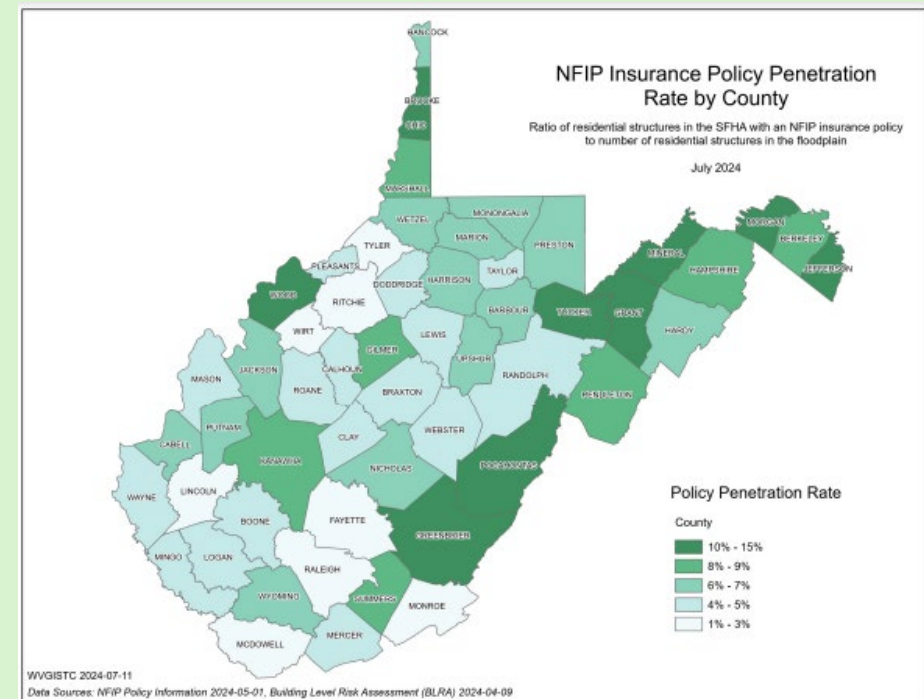
Jefferson County has a high number of [Historical Community Assets](#) on the National Register.

Jefferson County Resiliency

(1) Jefferson County has no [Essential Facilities](#) in the high or moderate risk floodplains

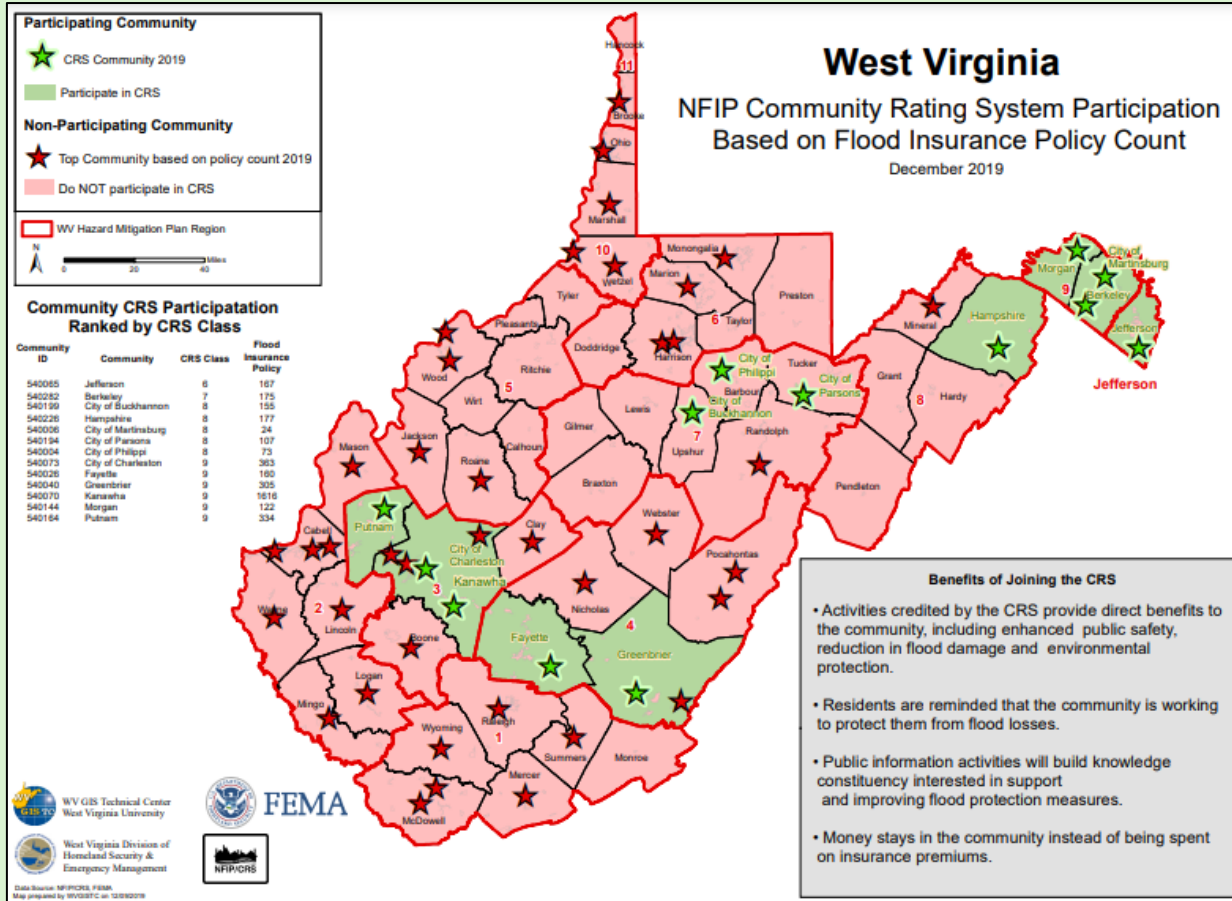


(2) Jefferson County has the lowest [Social Vulnerability Index](#) in the State

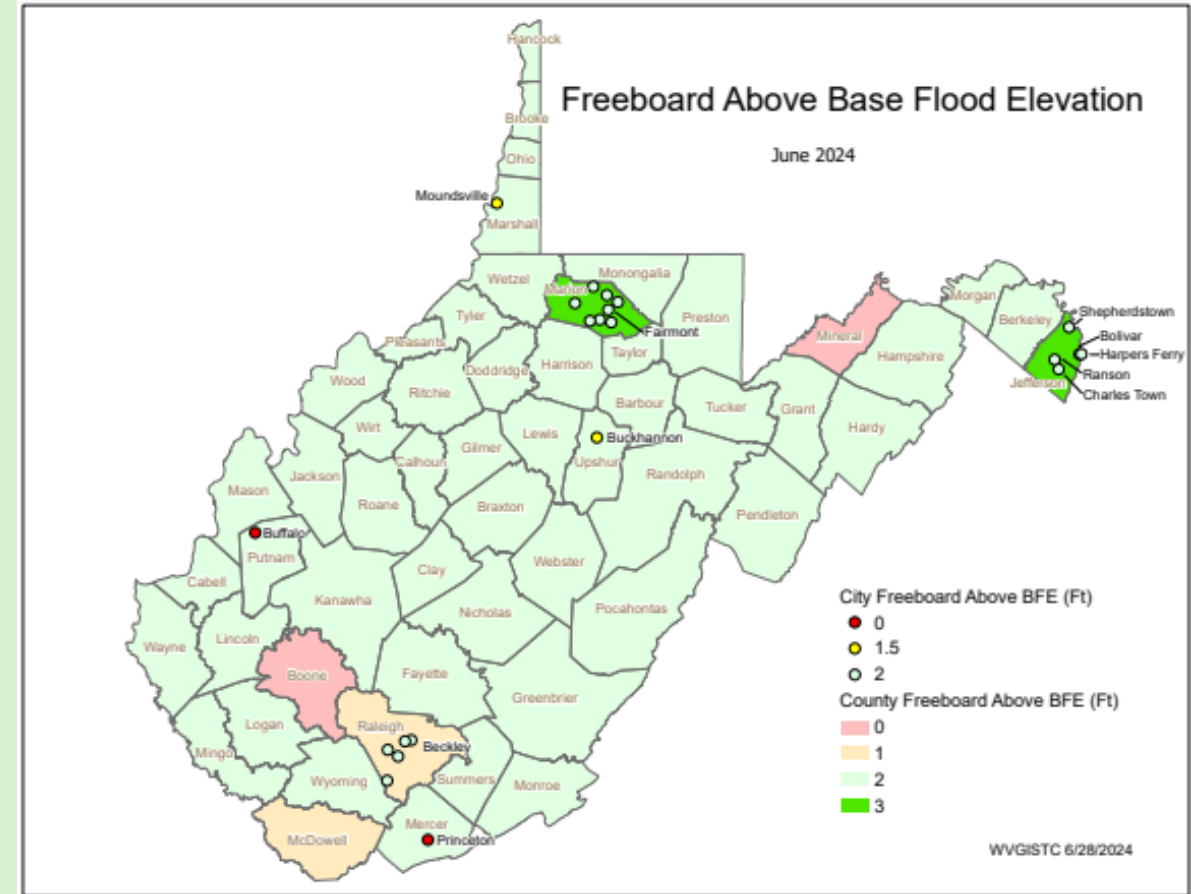


(3) Jefferson County has higher [NFIP Insurance Penetration Rate](#) than other counties

Jefferson County Unincorporated* Resiliency

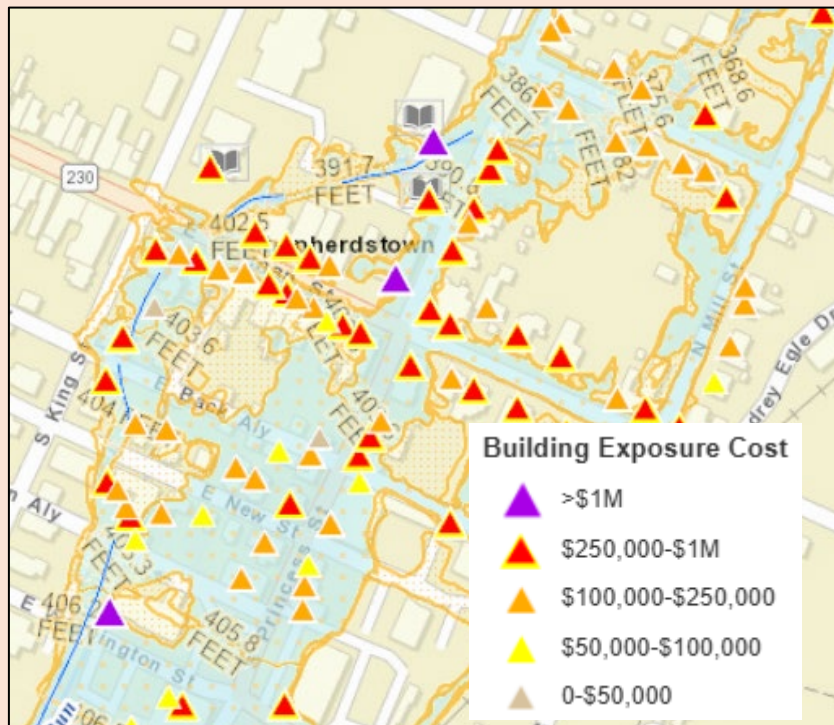


Jefferson County Unincorporated has a high [CRS](#) Rating of Class 7



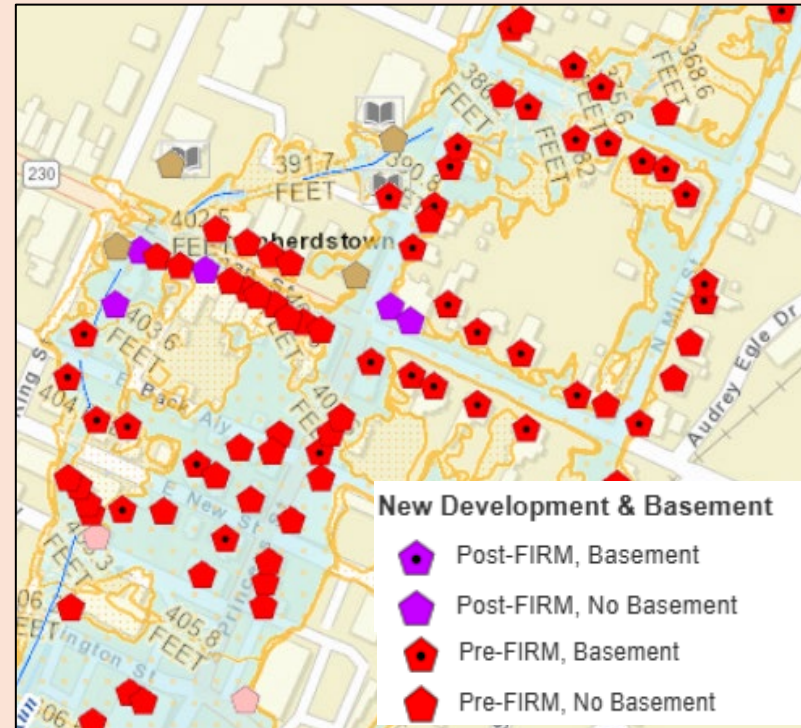
Jefferson County Unincorporated has a high [Freeboard](#) safety factor of 3 feet

Shepherdstown Risk Assessment



Building Value and Density.

Median Building Value ranks first of 229 incorporated places in the state. High density of buildings in small area.



Pre-FIRM and Basements.

Nearly 90% of structures are Pre-FIRM and nearly half have basements.



Historical Buildings.

Most building are in the National Historic District.

Refer to online [All Risk Indicators Report](#)

Sources: [WV Flood Tool's Risk Map View](#) & Statewide Building-Level Risk Assessment



Shepherdstown 3D Flood Movie



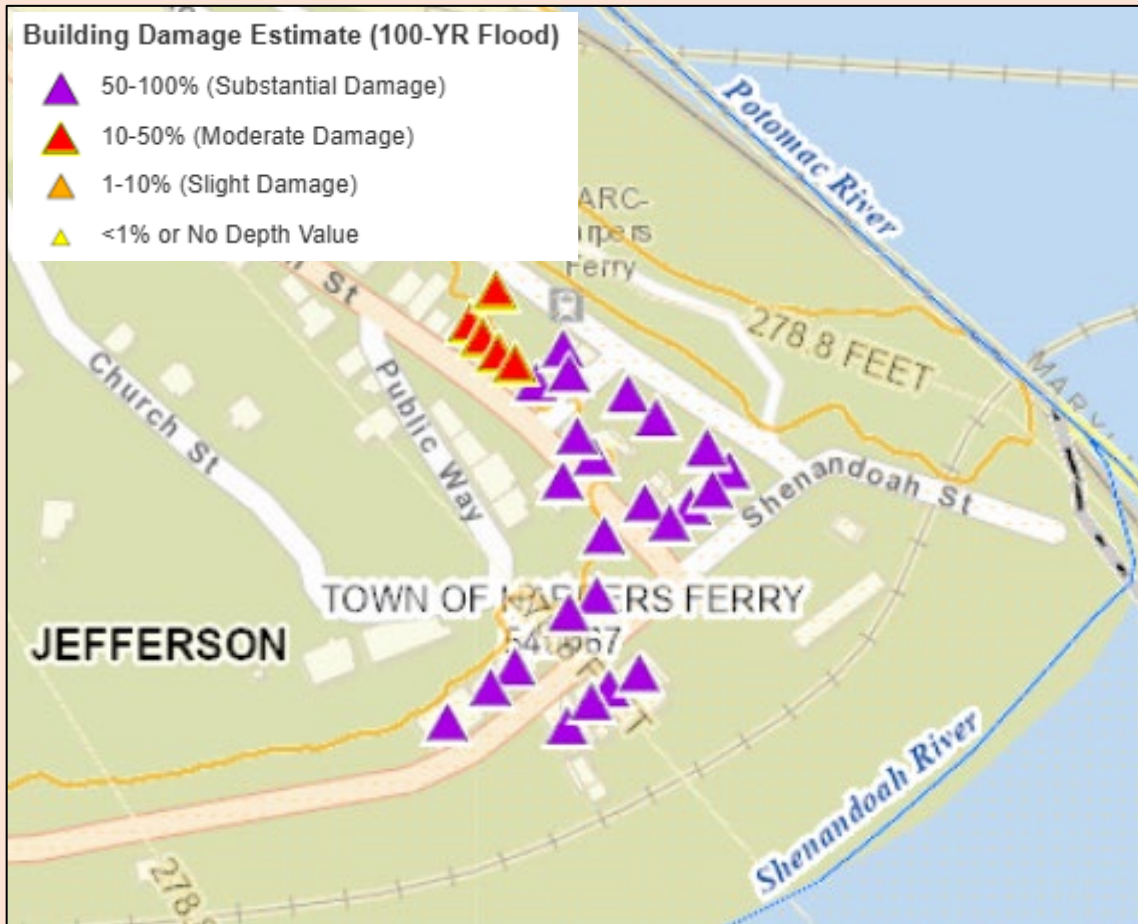
Click [here](#) to view 3D Flood Movie of Shepherdstown

Example Urban Flooding



View [Videos](#) of 2021 Morgantown Flooding along *Popenoe Run* on Pattleson Drive near WVU stadium that may occur similarly on *Town Run* in Shepherdstown

Harpers Ferry Risk Assessment



Building Substantial Damage Ratio highest of all 229 incorporated places in the state



Pre-FIRM Building Ratio highest of all 229 incorporated places in the state

Refer to online [All Risk Indicators Report](#)

Sources: [WV Flood Tool's Risk Map View](#) & Statewide Building-Level Risk Assessment

Harpers Ferry Risk Assessment

744 Shenandoah St, Harpers Ferry, WV, 25425

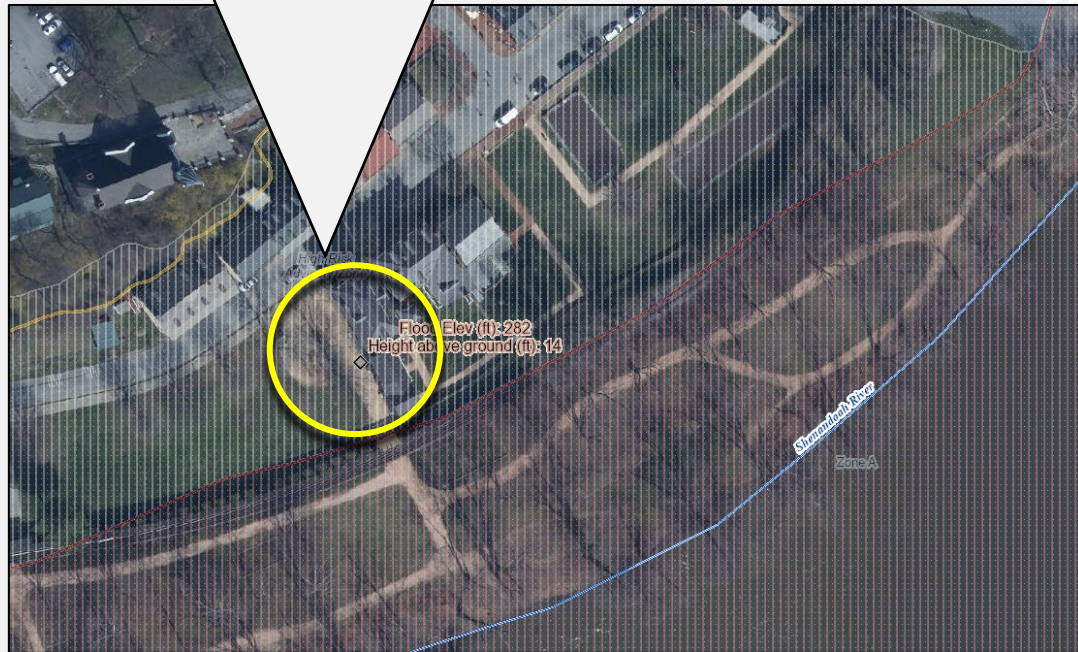
Building ID: [19-05-0004-0025-0000 801A](#)

Historical structure built in 1845

14' (1936 High Water Mark)

8' (1996 High Water Mark)

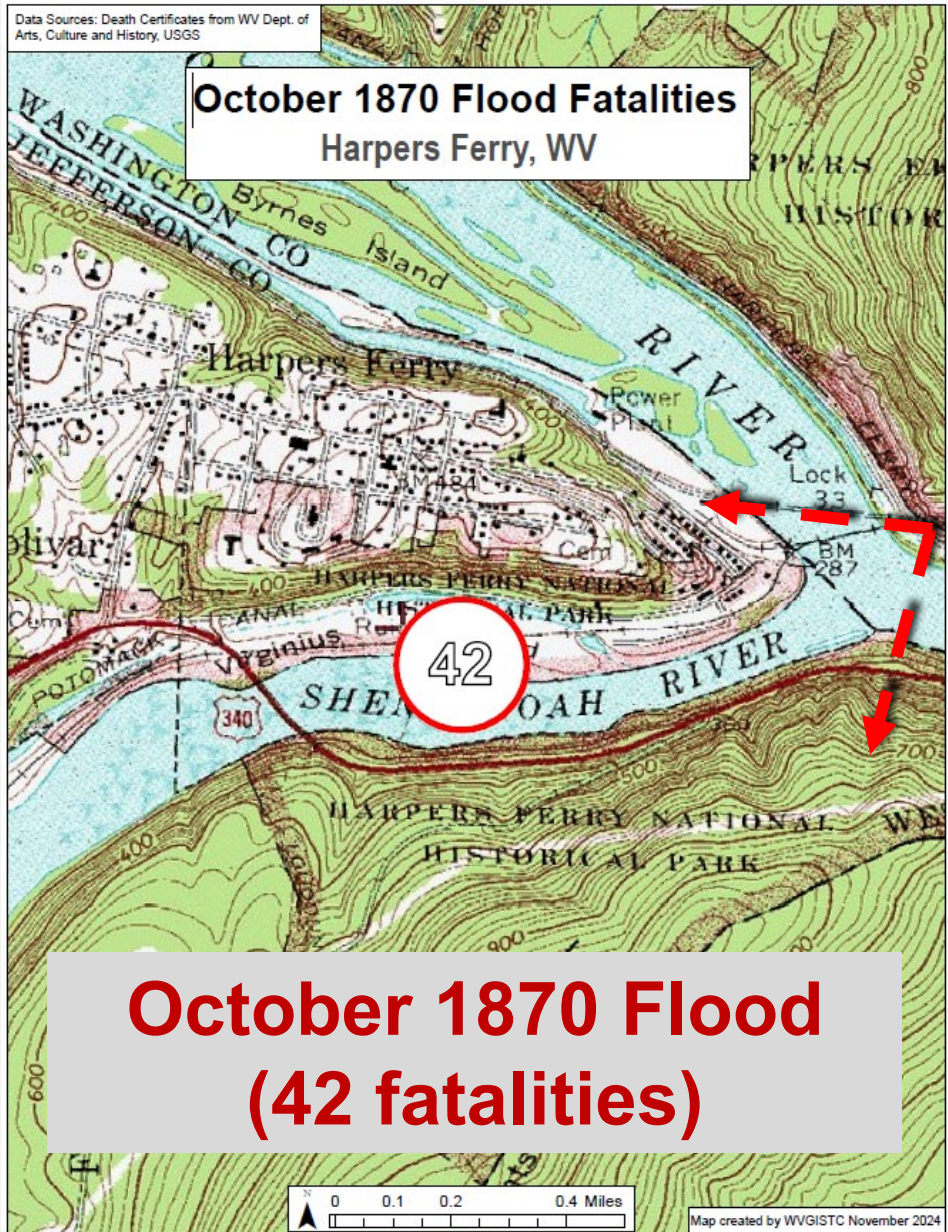
1936 Flood of Record



High Water Mark



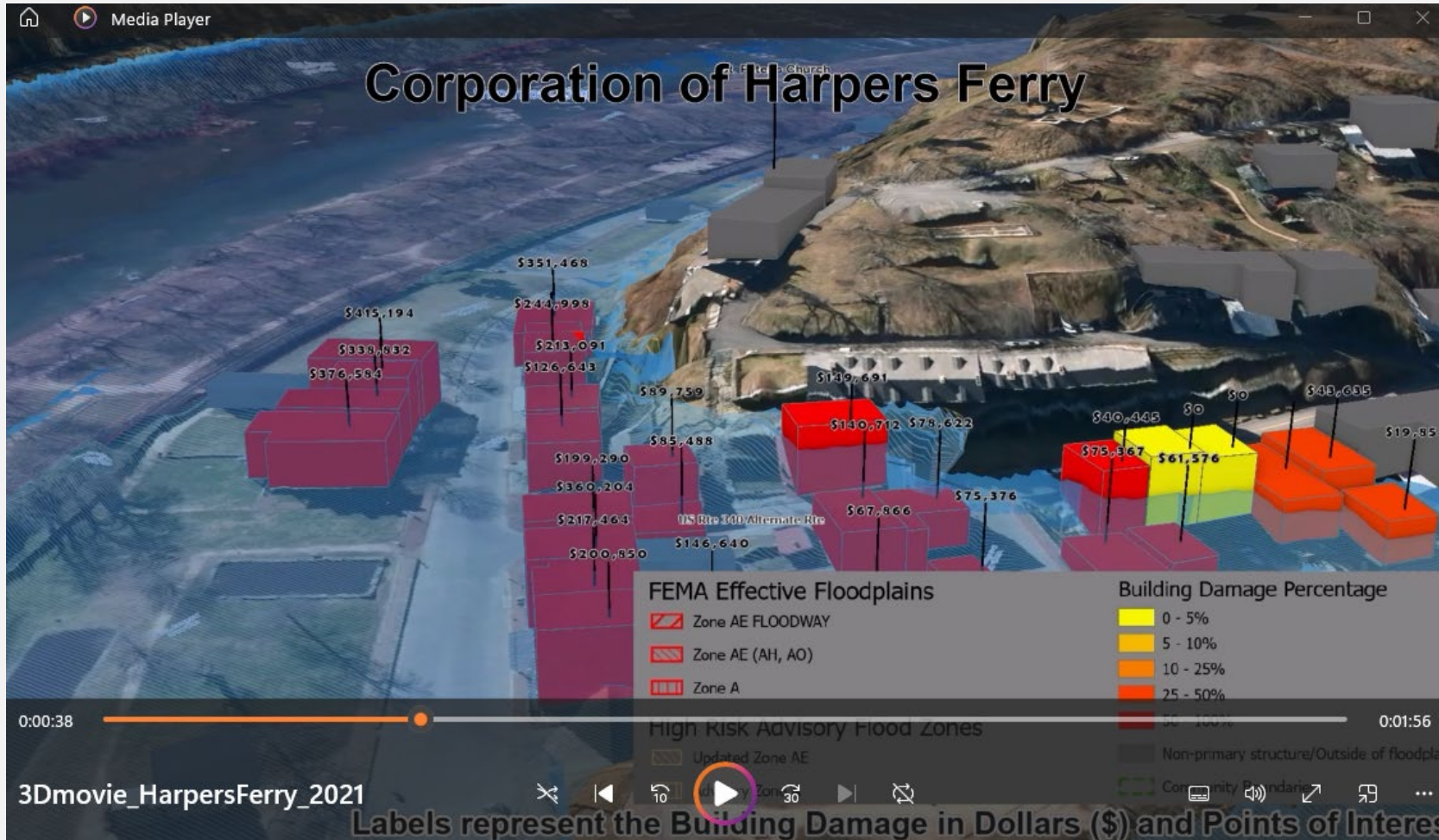
Historical Flood Research (Harpers Ferry, WV)



Link to [WV Flood Fatality Dashboard](#)

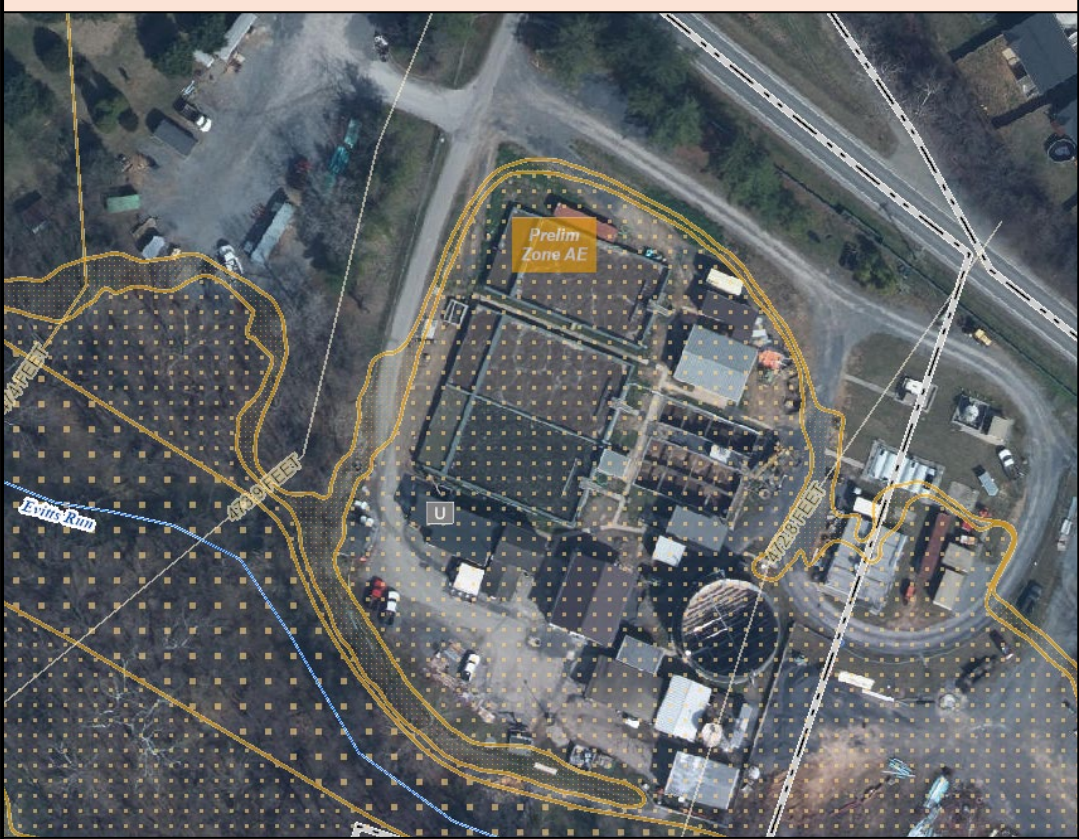


Harpers Ferry 3D Flood Movie



Click [here](#) to view 3D Flood Movie of Harpers Ferry

Utilities in Floodplain (High \$ Exposure)



City of Charles Town Wastewater Treatment Plant (FD: 1 ft)
 Highest CA Value (\$6.8M) in Jefferson County
 (Building ID: [19-03-0008-0001-0000_842](#))
[Value source](#) inflation adjusted to 2021



Shepherdstown Water Works Water Treatment Plant (FD: ? ft)
 (Building ID: [19-10-0001-0052-0000_309](#)) (\$3.1M)
[Value source](#) inflation adjusted to 2021

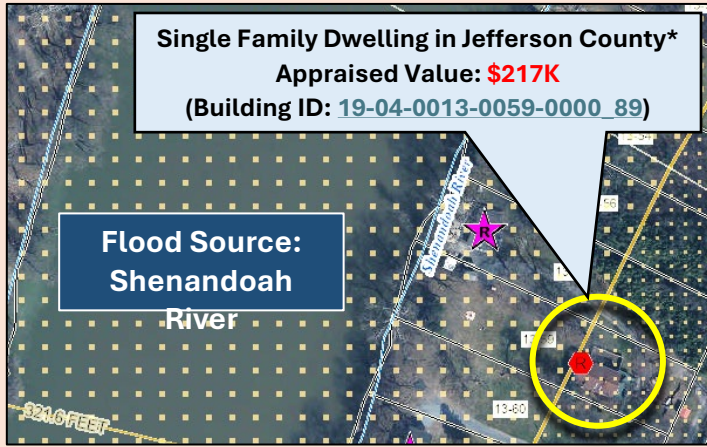


Harpers Ferry Bolivar PSD Wastewater Treatment Plant (FD: 1 ft)
 (Building ID: [19-05-0004-0025-0000_192](#)) (\$462K)
[Value source](#) inflation adjusted to 2021





Building Flood Profile - Unmitigated



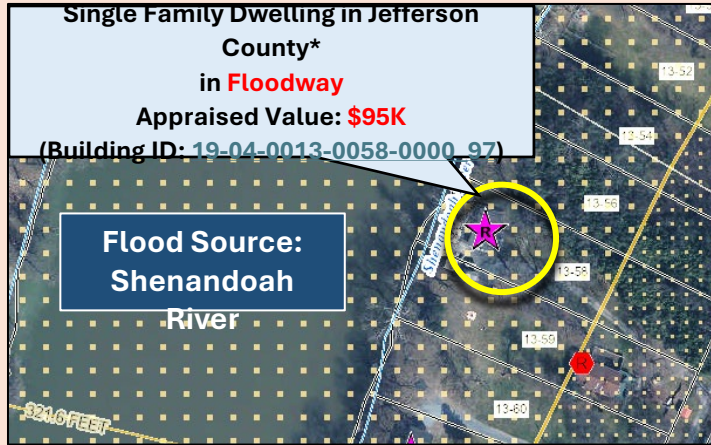
BUILDING INFORMATION	
Property Class Type	R - Residential
Land Use	101 - Residential 1 Family
Year Built	1985 Post-FIRM

	HEIGHT (ft.)
BUILDING	
Freeboard (FBD)	3
FLOOD DEPTH	
FEMA 1% (100-Yr)	13.6
FEMA 100-Yr + FBD	16.6
FEMA 0.2% (500-Yr)	19.6





Building Flood Profile - Unmitigated



BUILDING INFORMATION	
Property Class Type	R - Residential
Land Use	101 - Residential 1 Family
Year Built	1971 Pre-FIRM

	HEIGHT (ft.)
BUILDING	
Freeboard (FBD)	3
FLOOD DEPTH	
FEMA 1% (100-Yr)	13.7
FEMA 100-Yr + FBD	16.7
FEMA 0.2% (500-Yr)	19.7

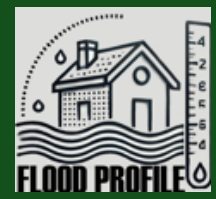


19.7' (FEMA 0.2% / 500-Yr)

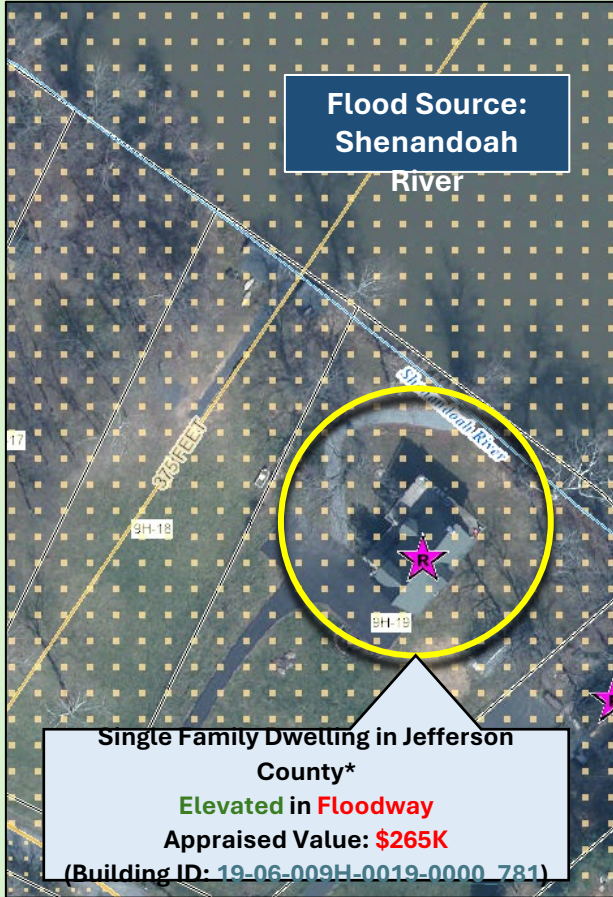
16.7' (FEMA 1% + / 100-Yr +)

13.7' (FEMA 1% / 100-Yr)

Ground Level



Building Flood Profile – Mitigated to DFE



BUILDING INFORMATION	
Property Class Type	R - Residential
Land Use	101 - Residential 1 Family
Year Built	2011 Post-FIRM

	HEIGHT (ft.)
BUILDING	
Freeboard (FBD)	3
FLOOD DEPTH	
FEMA 1% (100-Yr)	9.9
FEMA 100-Yr + FBD	12.9
FEMA 0.2% (500-Yr)	18.9

