WV Flood Tool - User Guide

FEMA

WV Division of Homeland Security & Emergency Management

WV GIS Technical Center

Prepared by WV GIS Technical Center

Revised 7/8/2011

Contents

Introduction

General Information

The WV Flood Tool allows floodplain managers, insurance agents, developers, real estate agents, local planners and citizens to make informed decisions about the degree of flood risk for a specific area or property. The user simply navigates or zooms to the location of interest, and then clicks on the map to query flood hazard information.

The online mapping application and documentation can be accessed at the following link: http://www.mapwv.gov/flood/

Features

- Allows users to make informed decisions about the degree of flood risk for a specific area or property. Helps to determine whether a house or business is in an identified 1% annual chance (100-year) flood area.
- Presents customized map views for the general public and more advanced users
- Displays and queries flood hazard information including advisory flood height data for Approximate A Zones
- Displays and queries HAZUS 100-year flood event information to assist in mitigating flood risks
- Displays the approximate elevation of the ground at any location with a vertical accuracy of 10 feet
- Provides access to 12 base map services from ESRI, Bing, WV DEP, and WVGISTC
- Includes the best available overlay reference layers: addresses, elevation contours, roads, streams, boundaries, etc.
- Permits users to view high-resolution aerial photography at a map scale of 1:1,128
- Includes a cascading geocoding service which incorporates site and street addresses from WV DHSEM's Statewide Addressing and Mapping System
- Provides multiple ways to locate areas of interest, including by address, coordinates, place names, and navigation controls
- Links specific areas of the map to local floodplain manager contacts or FEMA's online map service center to view official flood maps
- Allows users to publish or exchange links of flood maps
- Employs ArcGIS Server 10 technology to improve performance and visual appearance of map features

About This Guide

This guide contains information on features and functions of the WV Flood Tool. If you should have additional questions, or require information not contained within this manual, please contact the WV National Flood Insurance Program Offices at the WV Division of Homeland Security & Emergency Management:

Browser Specifications and Other Related Software

Requirements: The online mapping application requires a broadband connection, a modern browser, and Adobe Flash Player. To use all of the features and functions of the online application, please ensure you are using Internet Explorer 7 or greater, or any other modern browser such as Mozilla Firefox or Google Chrome. Adobe Flash Player must be installed for the application to work properly.

Trouble Viewing Application during Start-Up: If you are experiencing trouble viewing the application, then make sure you have the latest version of a modern browser or choose an alternative browser. Also make sure the Adobe Flash Player plug-in or add-on to your browser is the most recent version and correctly installed. The most recent version of Adobe Flash Player can be downloaded from http://www.flash.com.

Application Stops Working: If the application stops working, restart the application by pressing the refresh button on the browser or re-launch the application. If problems still exist viewing the Flood Tool, then contact the WV GIS Technical Center for system administrative support. Refer to the contact information below.

Question about Flood Information: For questions about flood hazards and mitigation of flood risks, please contact your local floodplain manager or WV NFIP Assistant Coordinators. Refer to contact information below.

Contact Information

West Virginia NFIP Assistant Coordinators, WV DHSEM

Richard Carte, CFM
(Richard.L.Carte@wv.gov)

Robyn Mumphard, CFM
(Robyn.C.Mumphard@wv.gov)

Kevin Sneed, CFM
(Kevin.L.Sneed@wv.gov)

WVDHSEM
Capitol Complex
Building 1, Room EB-80
1900 Kanawha Blvd. East
Charleston, WV 25305-0360

Phone: 304-957-2571
Fax: 304-558-8902
Website:http://www.dhsem.wv.gov/mitigation/floodplain/Pages/default.aspx

West Virginia Mitigation Planning Office, WV DHSEM

State Hazard Mitigation Officer
Timothy Keaton
(Tim.W.Keaton@wv.gov)

Hazard Mitigation Project Officer
Brian Penix
(Brian.M.Penix@wv.gov)

WVDHSEM
Capitol Complex
Building 1, Room EB-80
1900 Kanawha Blvd. East
Charleston, WV 25305-0360

Phone: 304-957-2571
Fax: 304-558-8902
Website: http://www.dhsem.wv.gov/mitigation/Pages/MitigationPlanning.aspx

Federal Emergency Management Agency – Region III

Bob Pierson
Civil Engineer
Federal Emergency Management Agency
615 Chestnut Street, 6th Floor
One Independence Mall
Philadelphia, PA 19106
Phone: (215) 931-5650
Email: robert.pierson@dhs.gov

WV GIS Technical Center (System Administration of Flood Tool)

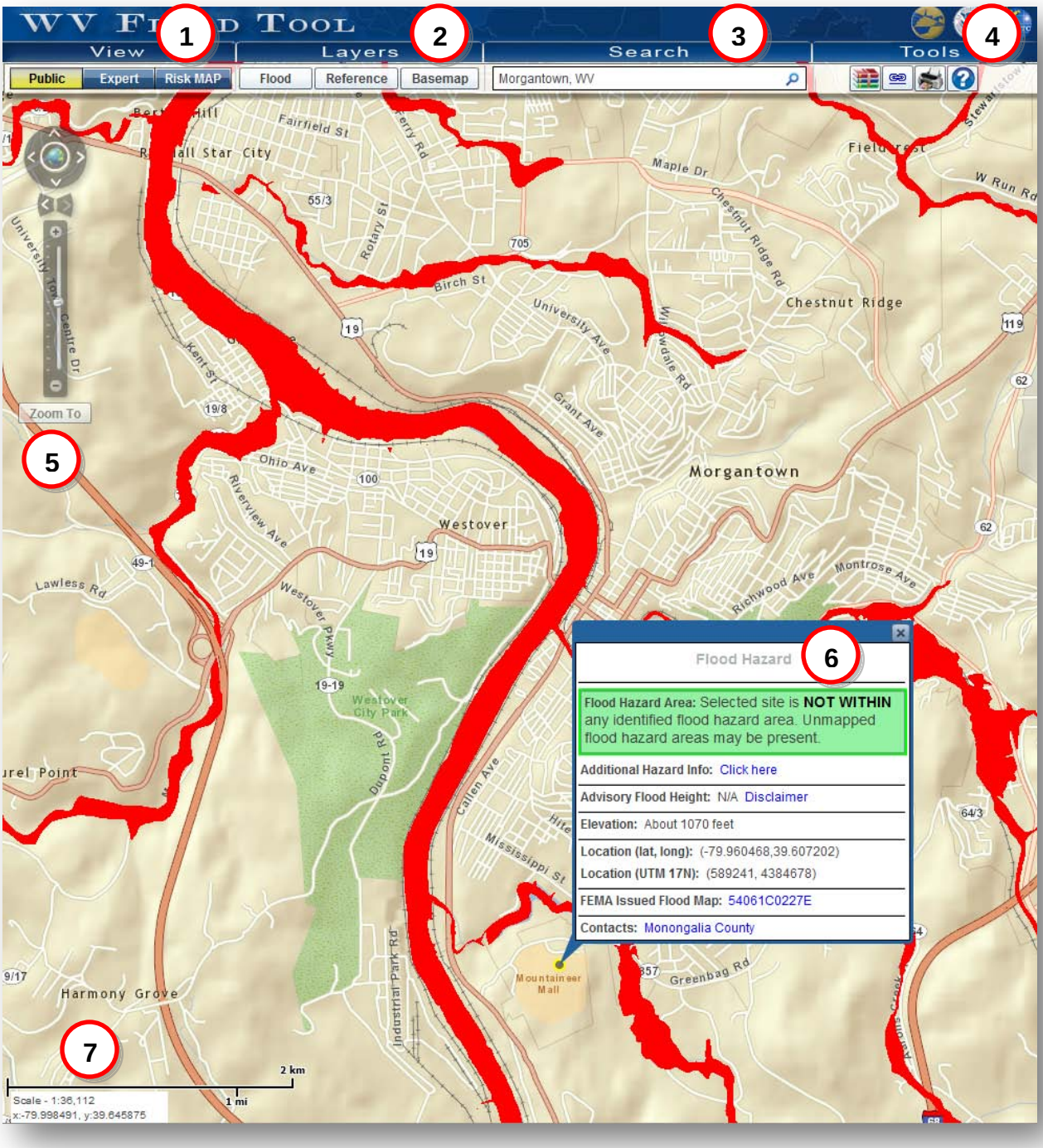
Eric Hopkins
(eric.hopkins@mail.wvu.edu)
Phone: (304) 293-9463

Frank LaFone
(frank.lafone@mail.wvu.edu)
Phone: (304) 293-9466

Kurt Donaldson
(kurt.donaldson@mail.wvu.edu)
Phone: (304) 293-9467

WV GIS Technical Center
WVU Department of Geology & Geography
330 Brooks Hall
P.O. Box 6300
Morgantown, WV 26506
Website: http://wvgis.wvu.edu/

Map Layout



(1) **Map View**: Public, Expert, and Risk MAP

(2) **Map Layers**: Flood (Hazard and Risk) , Reference, Base map

(3) **Search:** Address or City Search

(4) **Tools:** Measure, Bookmark, Share Map Link, Print, Help

(5) **Navigation Tools:** Navigation Slider and Zoom To functions

(6) **Queries:** Query Flood Hazard or Risk MAP information by single mouse click on map

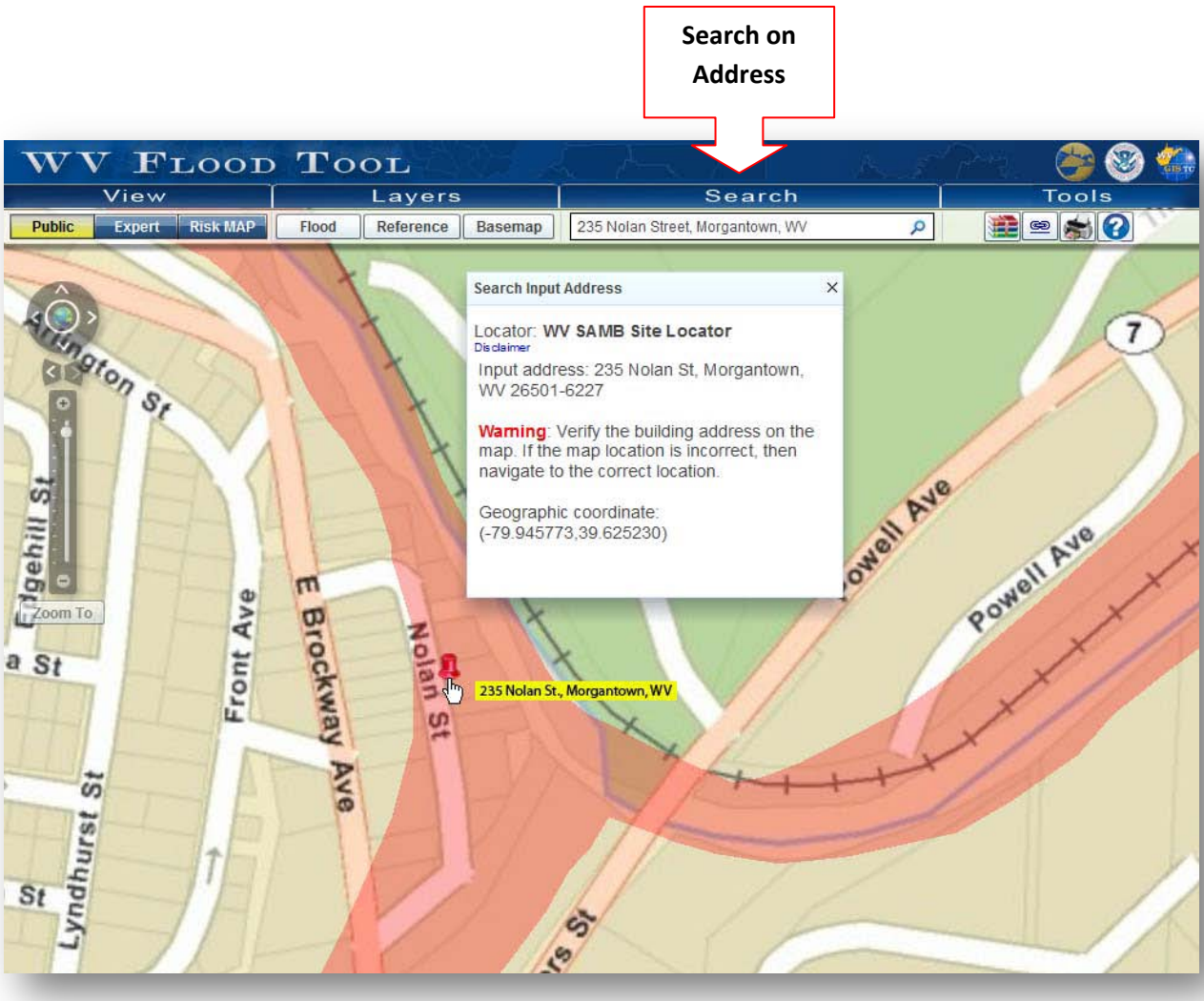
(7) **Map Display:** Scale and Geographic Coordinates

Flood Hazard Determination (Public View Example)

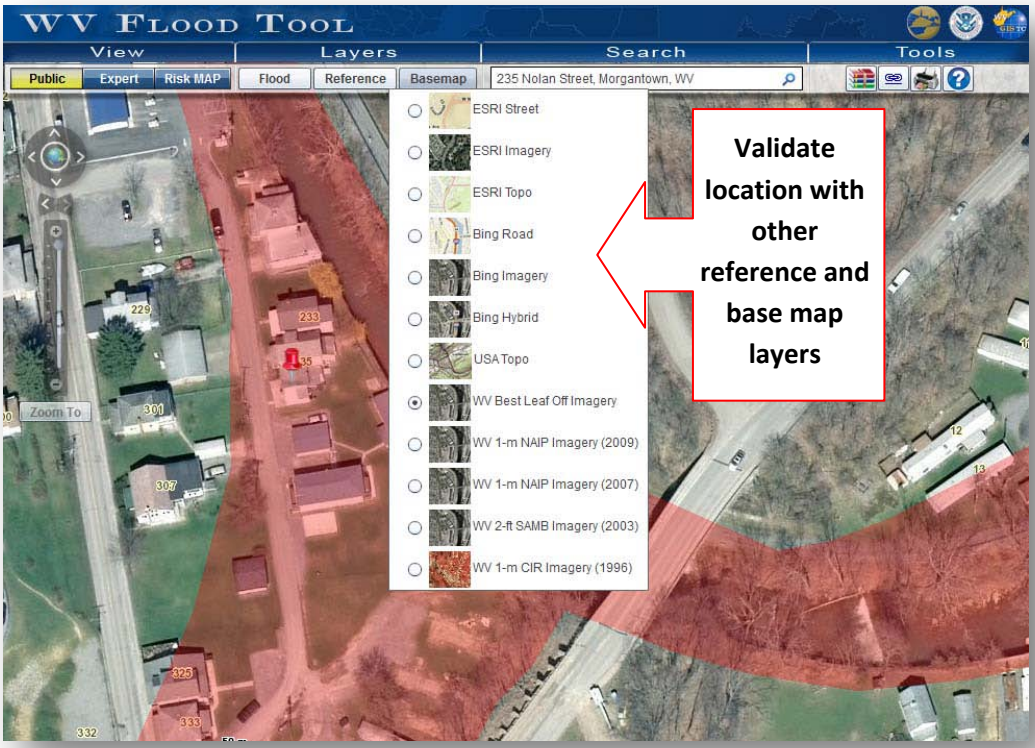
Using the default **public** view, one can quickly make an initial flood hazard determination by following the steps below:

(1) **Search** on the address or navigate to the location of interest.
(2) If necessary, **validate** that the location is correct using other reference or base map layers.
(3) Click on the map to **query** if a flood hazard zone is nearby.

Step 1: The property of interest is 235 Nolan Street, Morgantown, WV. A **search** is made on the address which zooms to the Nolan Street property.

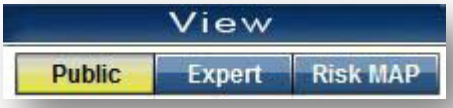


Step 2: If necessary, the user may desire to **validate** the identified location with alternative base map layer such as aerial photography, or with an overlain reference layer such as site addresses. In this example, additional map layers aerial photography and addresses were used to validate the structure location at 235 Nolan Street.



Step 3: Single click on the structure (235 Nolan Street) to determine if it is in a flood zone. The flood hazard **query**reveals that the property is within a FEMA 100-year flood zone and provides other information including local floodplain manager contacts and a link to the official FEMA flood map.

Map Views



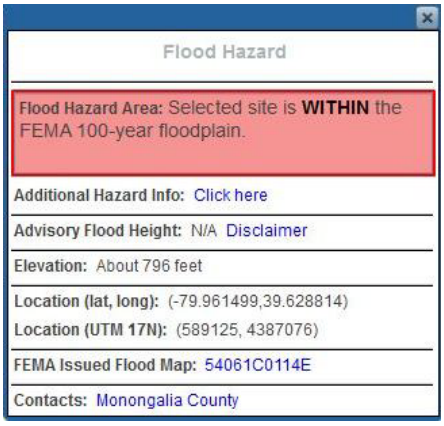
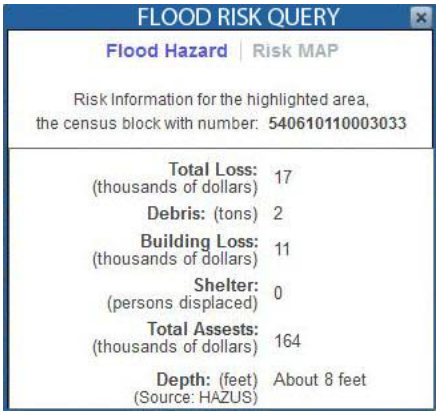
The WV Flood Tool has three customized map views: Public, Expert, and Risk MAP. The Expert and Risk Map Views are for more advanced users who are familiar with FEMA's official flood maps and flood layers like HAZUS for mitigating flood risk.

The **reference** and **base map** layers are the same for all map views whereas the operational **flood** hazard/risk layers differ for each view. The data sources of **flood** layers include Digital Flood Insurance Rate Maps from the FEMA Map Service Center, 2010 HAZUS 100-year event models, and HEC-RAS water surface depths generated for Approximate A Zones.

Map View	Targeted Users	Purpose	Flood Layers	Flood Layer Symbols
Public	General Public (Default View)	Allows the general public to obtain quick and easy **flood hazard** determinations of identified locations relative to flood hazards.	Flood Hazard Hazard Zones	Flood Hazard Zone
Expert	Floodplain managers, insurance agents, developers, planners, informed citizens	Allows users like floodplain managers who are familiar with FEMA flood insurance maps to determine**flood hazards** for areas of interest.	Flood Hazard Hazard Zones X-Section Base Flood Elevation Floodway DFIRM Panel Index	Cross Section (XS) Lines Base Flood Elevation (BFE) Lines Floodway Flood Hazard Zone Approximate Study (Zone A) Detailed Study (Zone AE, AH, AO)
Risk MAP	Public officials, planners, informed citizens	Provides public officials, planners, and other decision-makers with quality data for Risk Mapping, Assessment, and Planning (Risk MAP) that increases public awareness and leads to action that reduces **flood risks** to life and property.	Risk MAP HAZUS - Total Loss - Total Assets - Total Building Loss - Total Debris - Total Shelter Water Depth Flood Hazard	Risk Layer Total Loss Total Building Loss ($1000) 1 - 11 - 40 - 108 - 335 - 78592 Water Depth value (feet): 0 623 Hazard Layer Flood Hazard Zone Approximate Study (Zone A) Detailed Study (Zone AE, AH, AO)

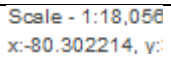
Queries

By a “single” mouse click anywhere on the map, a user queries information about **flood hazards** or **flood risks**.

Query		Views	Query Results
Flood Hazard		All Views	o Flood determination (in, close, or out) to flood hazard area o Additional hazard information o Advisory flood height information (if available) o Ground surface elevation o Location (geographic & UTM coordinates) o Link to official FEMA floodplain map o Link to local floodplain managers
Risk MAP		Risk View	o Total Loss (thousands of dollars) o Debris (tons) o Building Loss (thousands of dollars) o Shelters (persons displaced) o Total Assets (thousands of dollars) o Water Depth (feet) o Census Block Number

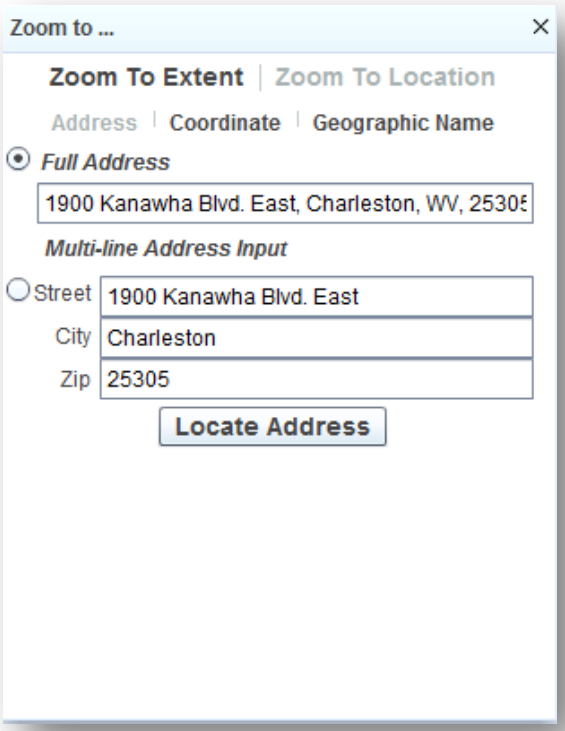
Tools

The WV Flood Tool has the following tools for navigation and for viewing information.

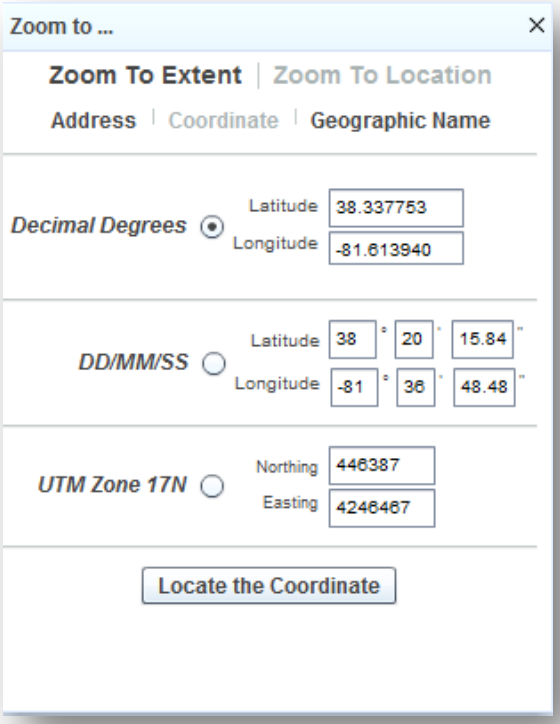
Type		Purpose	Functions
Mouse Button Shortcuts		Navigation	o Pan – Hold down left mouse button and move mouse in desired direction o Zoom Out – Mouse Wheel Scroll Down o Zoom In – Mouse Wheel Scroll Down o Zoom to Box – Holding Shift Key Down, left click mouse button and drag cursor to select rectangular area to zoom.
Find Location		Navigation & Zoom To Location	o 12 zoom scales from smallest scale of 1:2,311,162 to largest scale of 1:1,128 o Pan o Zoom to full extent (click on globe) o Zoom to previous extent o Zoom to city, county, or 7.5-minute USGS quadrangle o Zoom to address, coordinate, or geographic place name
Find Location		Search Address	
Bookmark		Bookmark	Bookmarks remembered by user's computer
Share Map Link		Bookmark	External links for shared users
Measure		Measures features	Measure lengths or areas of user-defined features. Accessible only for Expert and Risk MAP Views.
Print		Publishing	Print 8.5" x 11" inch PDF maps of captured views. Includes legend and disclaimer.
Help		Help	WV Flood Tool Help, Contacts, Data Availability
Display		Dynamic Screen Display	Coordinates and scale level are constantly displayed on screen in lower left-hand corner

Zoom To Functions

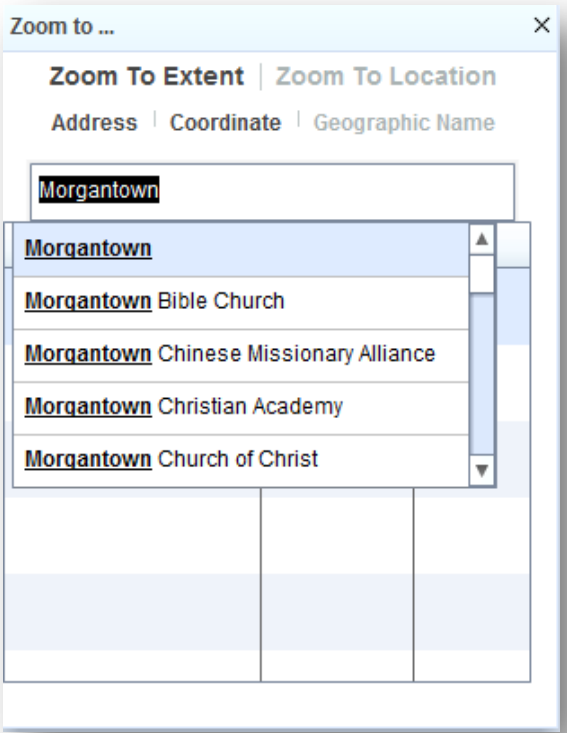
Zoom to **Address**



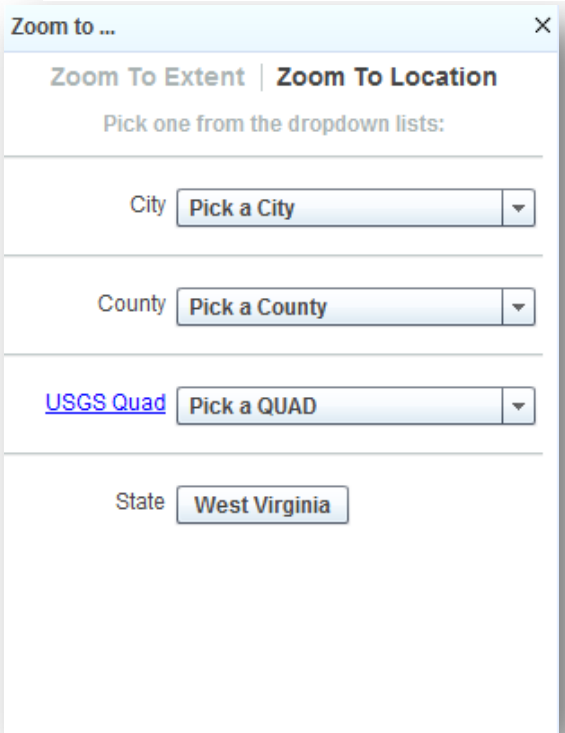
Zoom to **Coordinates**



Zoom to **Geographic Name**



Zoom to **City, County, USGS Quad**

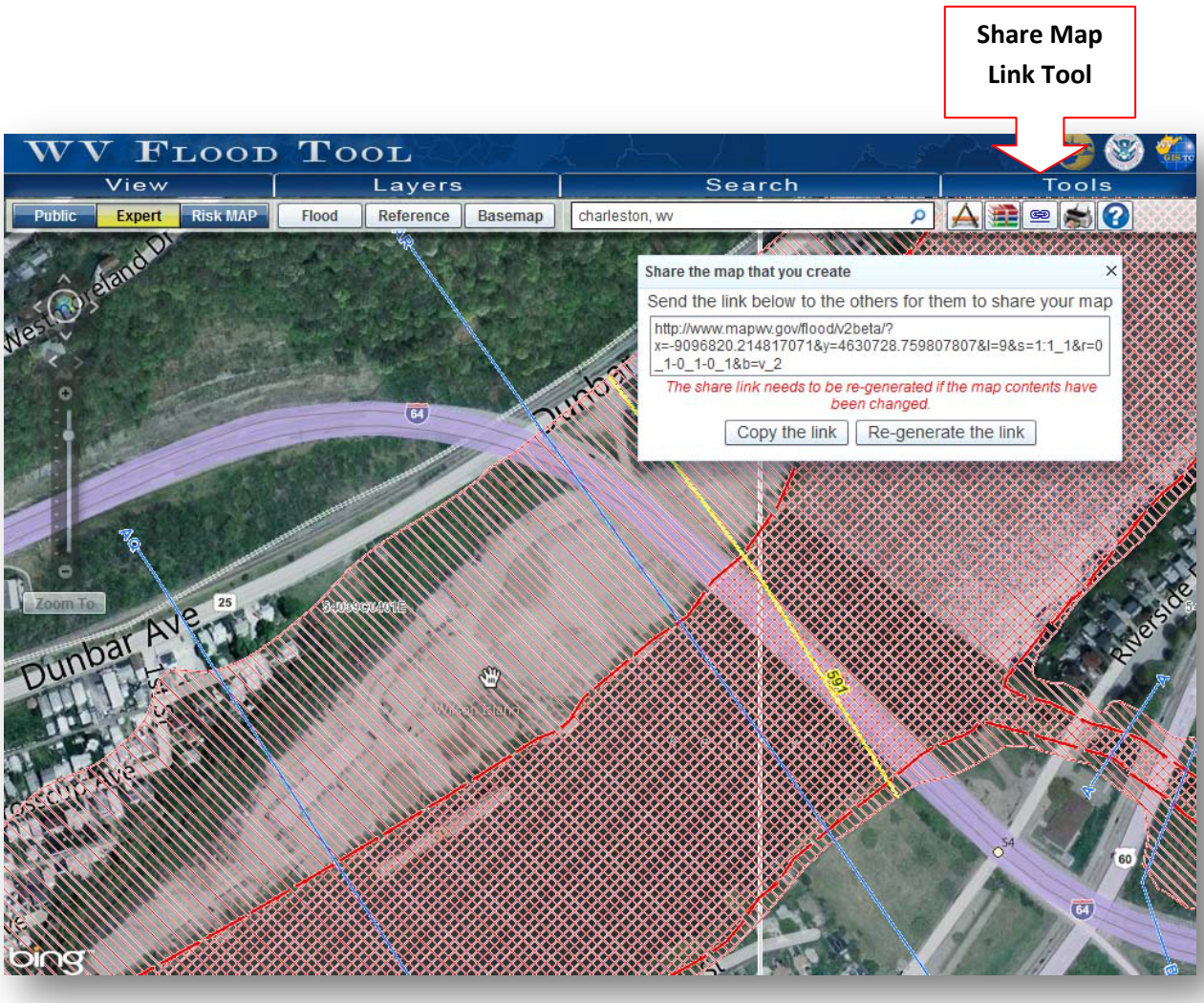


Share Map Link

Share a map view of interest with others using the **Share Map Link** tool. By pressing **Copy the link** button, the current view is copied to the computer's clipboard. One can then share this link with others by pasting the web page address in an email to others.

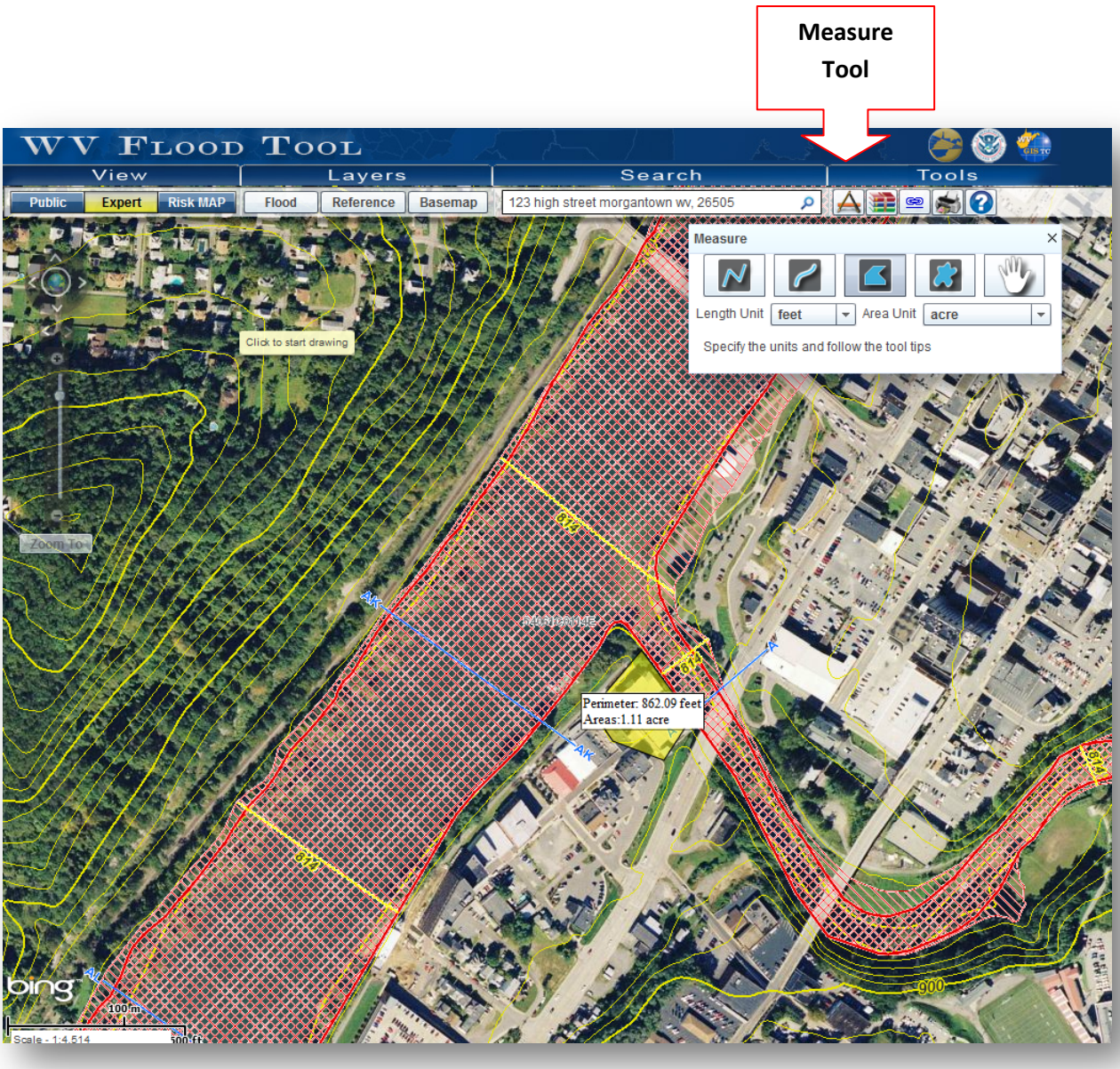
Below is a map link URL generated of the Charleston area from the Expert View.

URL Link generated: http://www.mapwv.gov/flood/v2beta/?x=-9096820.214817071&y=4630728.759807807&l=9&s=1:1_1&r=0_1-0_1-0_1&b=v_2



Measure

The **Measure** tool calculates lengths or areas of user-defined features. This tool is accessible only for the Expert and Risk MAP Views.



Print

The **Print** tool captures a picture of the screen and outputs an 8.5” x 11” inch PDF map with a legend, scale, creation date, and disclaimer. The user has the option to add a customized map tile.

Data Layers

Data layers are divided into three major categories: (1) **base map** or background layers, (2) overlay **reference** layers, and (3) the **flood** hazard or risk layers.Many of the layers are scale-dependent and thus only display at certain map scales.

(1) Base Map Layers

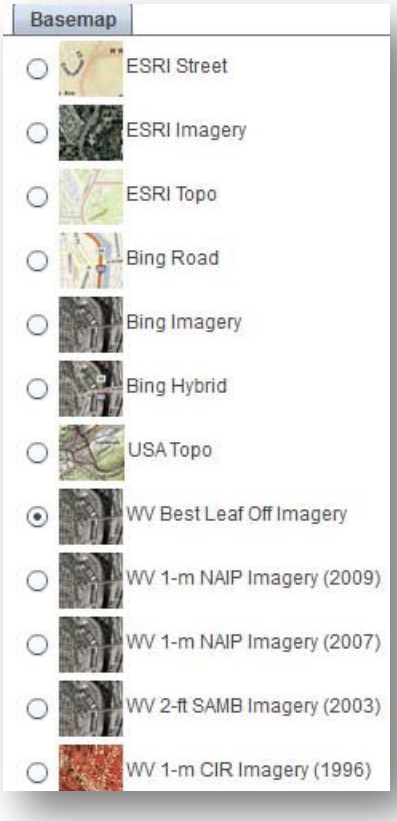
Basemap (or background) layers are cached tile services available for all views.

Name	Server	Type	Largest Scale Displayed
ESRI Roads(Default)	ESRI / WVGISTC*	Roads	1;1,128
ESRI Imagery	ESRI / WVGISTC*	Imagery	1;1,128
ESRI Topo	ESRI	Topographic	1:9,028
USA Topo	ESRI	Topographic	1:18,056
Bing roads	Bing	Roads	1:1,128
Bing imagery	Bing	Imagery	1:2,257
Bing hybrid imagery and roads	Bing	Imagery & Roads	1:2,257
WV Best Leaf- Off imagery mosaic	WVGISTC	Imagery (leaf off)	1;1,128
WV 2009 NAIP 1-m imagery	WVGISTC	Imagery (leaf on)	1;4,514
WV 2007 NAIP 1-m imagery	WV DEP	Imagery (leaf off)	1;4,514
WV 2003 SAMB 2-ft imagery	WVGISTC	Imagery (leaf off)	1;1,128
WV 1996 1-m CIR imagery	WV DEP	Imagery (leaf off)	1;4,514

* Largest map scales 1:2,257 and 1:1,128 cached on WVGISTC servers

Road base map layers are useful for viewing the named features of roads, streams, and other points of interest. *Topographic* base layers are helpful for viewing the terrain. Photographic or satellite *imagery* base layers are useful for viewing structures and high resolution pictures of the earth's surface.

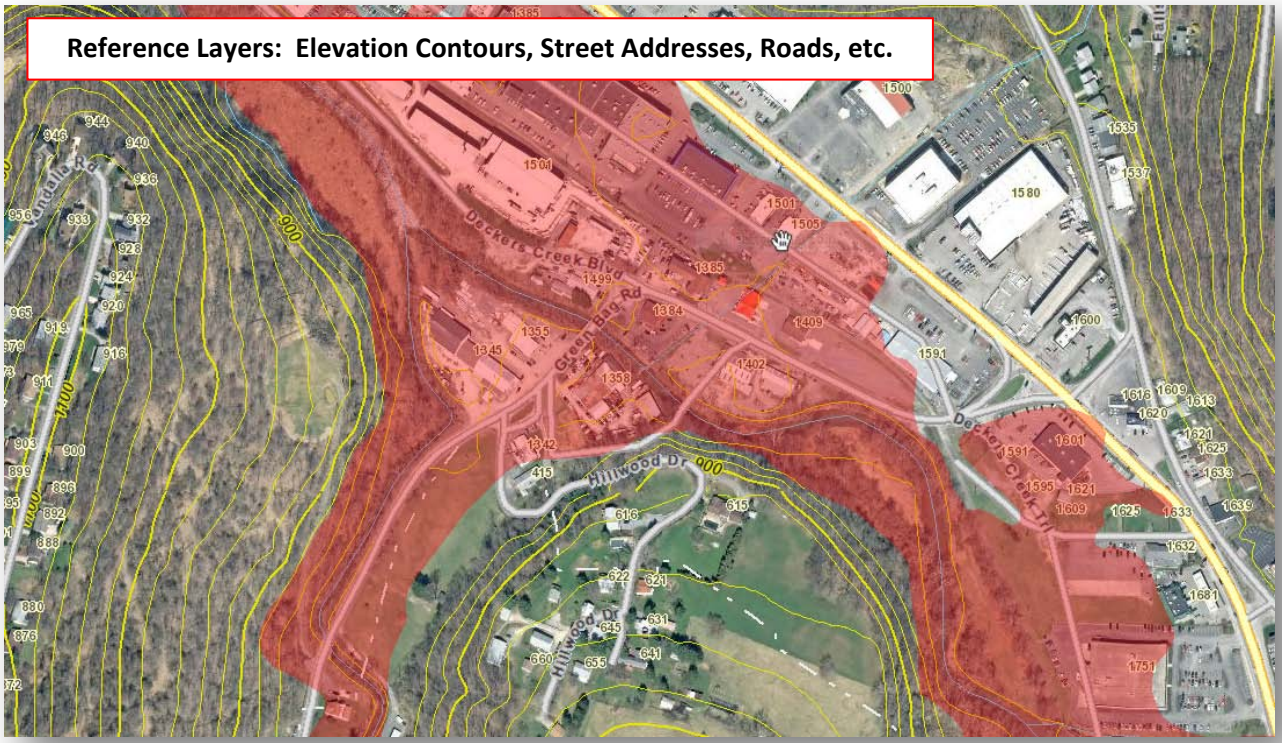
All the imagery is natural color except for the 1996 color infrared imagery. Imagery may have been captured with the leaves on or off. The ESRI and WV Best Leaf-Off contain the highest resolution imagery. The acquisition dates of the commercial ESRI and Bing imagery are not known.



(2) Reference Layers

Overlay **reference layers** are generalized and more detailed at zoom-out and zoomed-in scales, respectively, with all layers displayed at the largest zoom-in scale of 1:1,128. Layers are turned on or off by clicking on the check box. Reference layers are available for all map views, and the user can control the transparency of each reference layer. New reference layers may be added to the WV Flood Tool in the future.

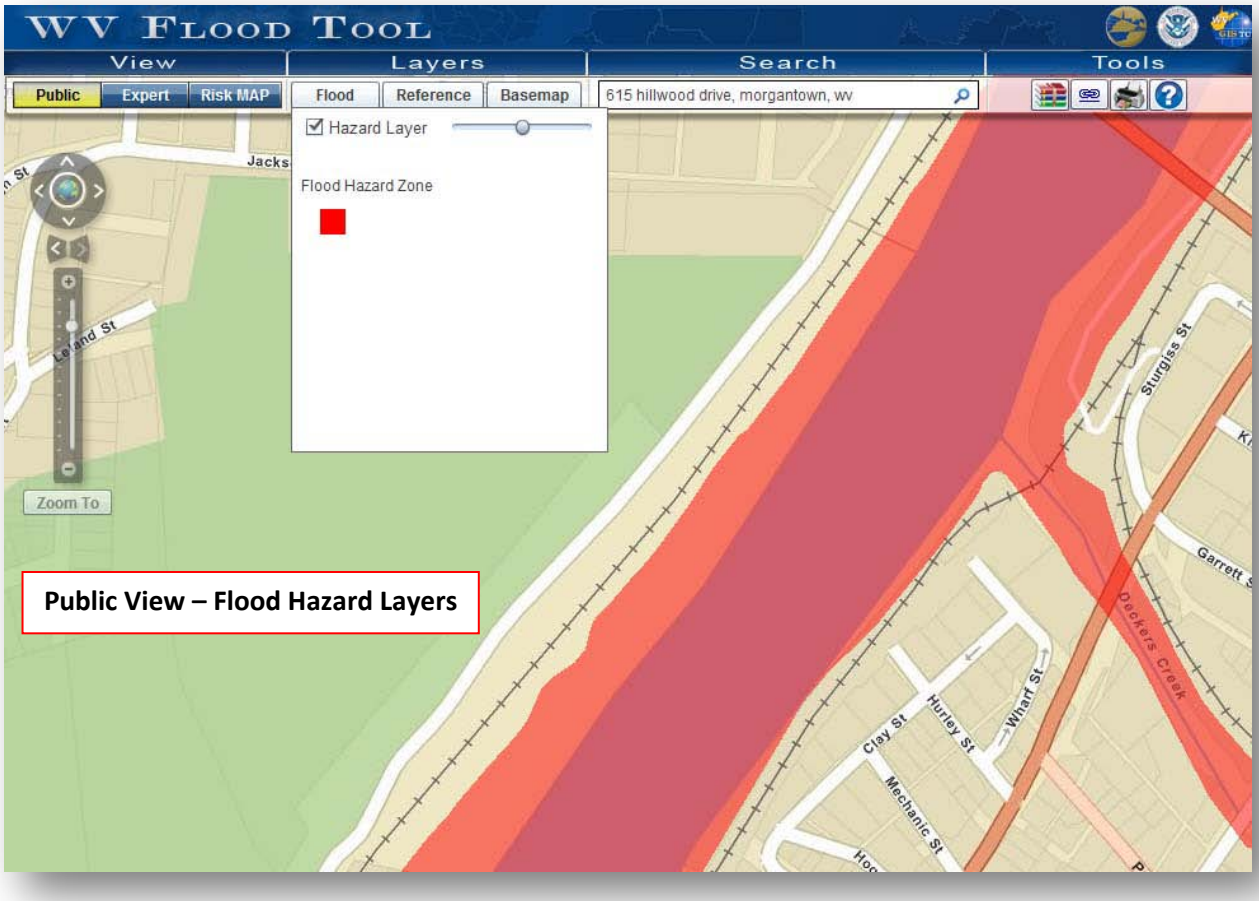
Data Group	Data Layer	Date Created	Published Service Type
Elevation (+/- 10 vertical feet)	3-meter grid 10-ft contours	2003 2003	Query Cached
Addresses	Streets (WV DHSEM / SAMB) Sites (WV DHSEM / SAMB)	2010 2010	Geocoding & Cached
Reference	Hydrography (Local resolution + 24k NHD labels)	2011	Cached
	Transportation (Census TIGER)	2008	Cached
	Place Names (GNIS)	2010	Cached
	Incorporated Areas (Census)	2008	Cached
Future Development	*Parcels where available*		*Cached*

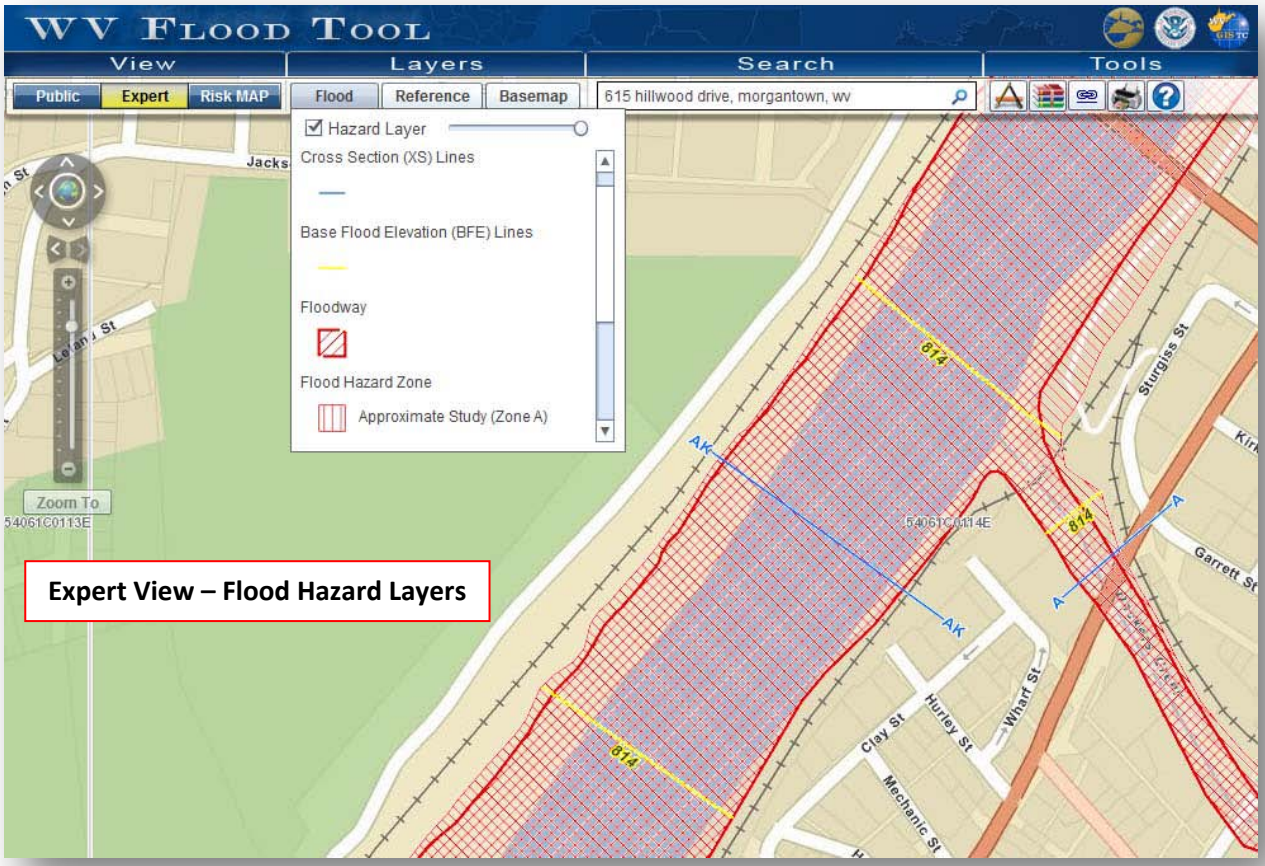


(3) Flood Layers

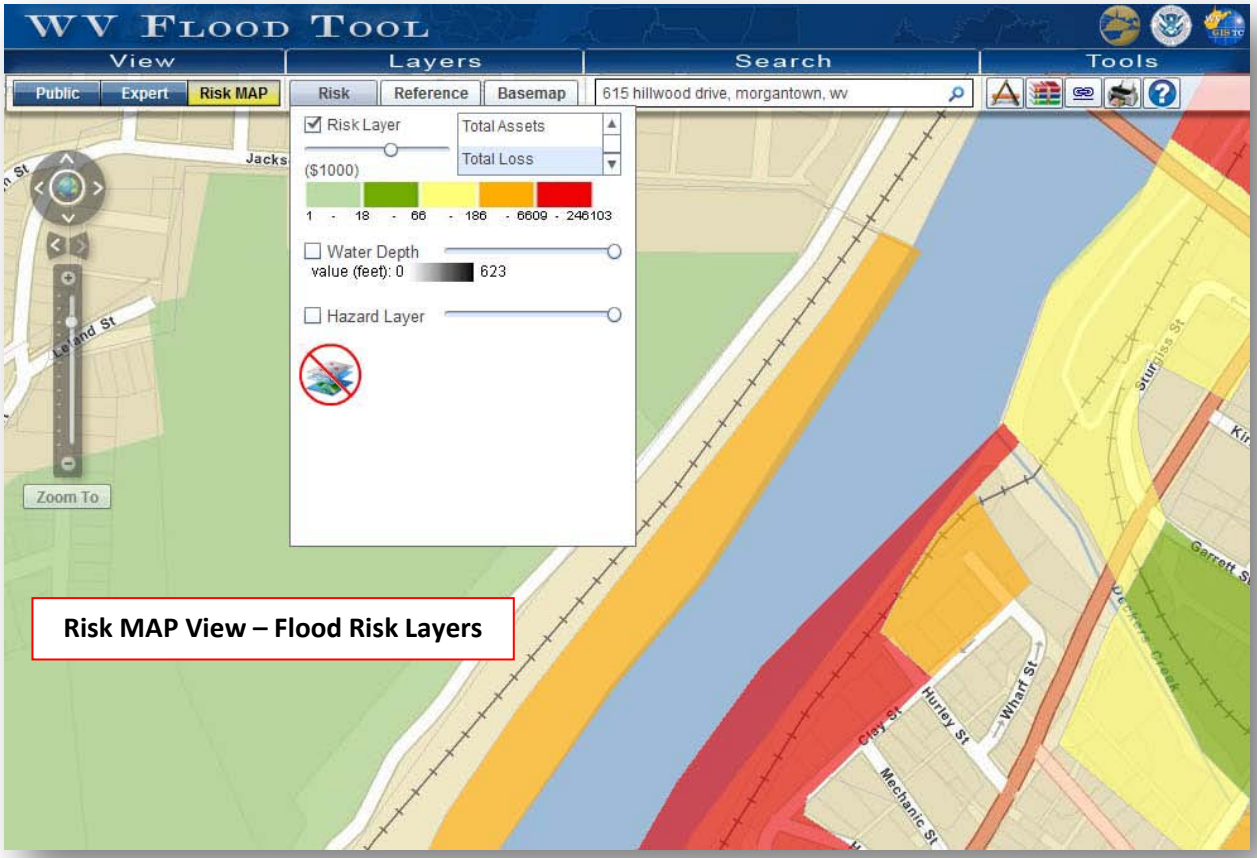
Flood layers, which encompass information aboutflood hazards and mitigating flood risks (Risk MAP), are primarily compiled from the FEMA Map Service Center and FEMA/WV DHSEM contractors. All flood layers have a transparent slider bar and legend symbol. Operational flood layers are reset to the default settings when the user selects another view.

Data Layer	Source	Views	Published Service Type
Flood Hazard	FEMA	All	Dynamicor Query
Floodway	FEMA	Expert	Dynamic
Cross Sections / BFE's	FEMA	Expert	Dynamic
Panel Index	FEMA	Expert	Dynamic
Flood Risk Layers	2010 HAZUS Level 1 for 100-Year Flood Event	Risk	Cached
Water Depth	HAZUS (55 counties) & HEC-RAS (7 counties)	Risk	Dynamic& Query
Water Surface Elevation (Advisory Flood Height)	HEC-RAS (Seven counties)	Public, Expert	Query
DFIRM Status	FEMA	Public, Expert	Dynamic





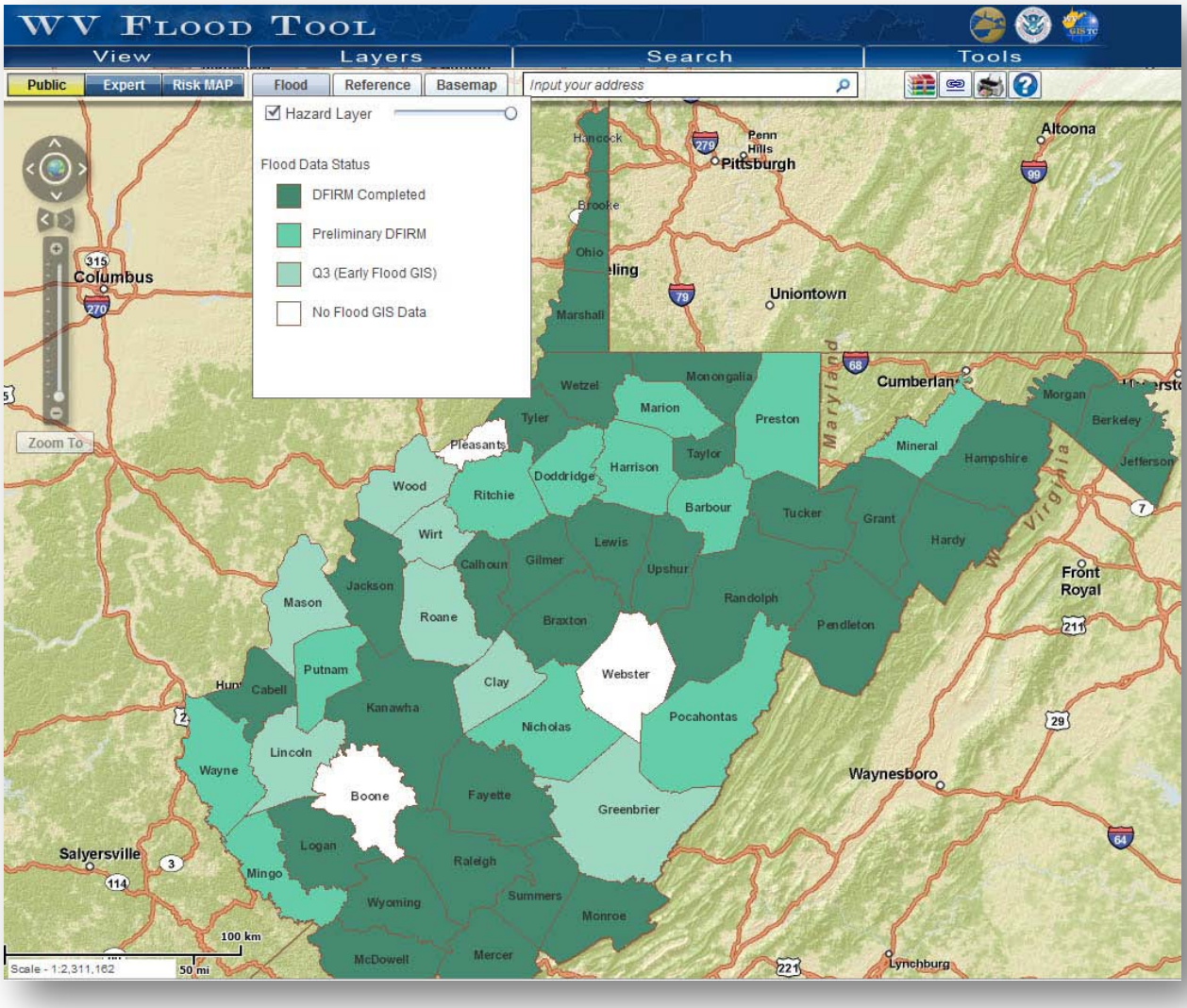
Expert View – Flood Hazard Layers



Risk MAP View – Flood Risk Layers

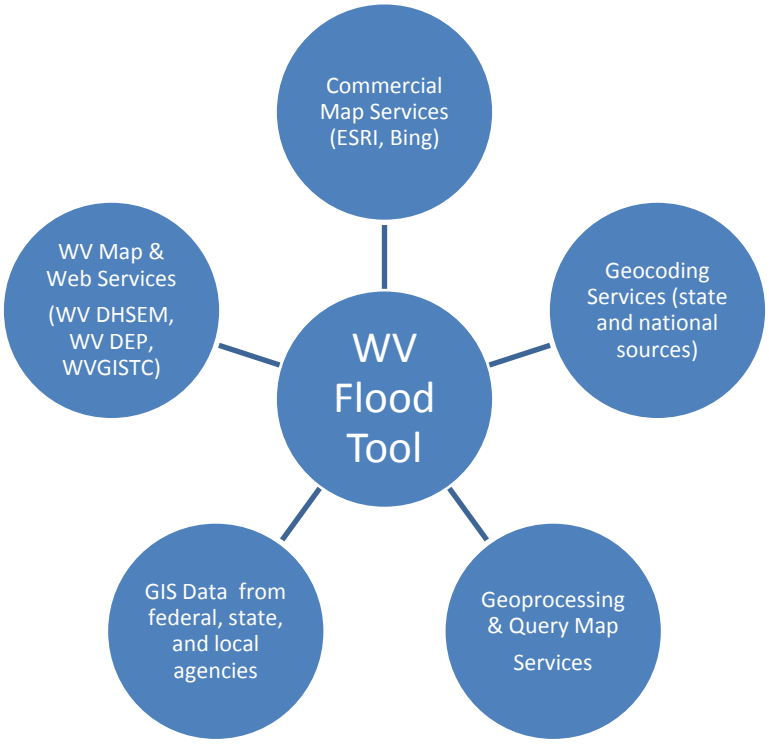
Status Graphic - Digital Conversion of Flood Layers

A flood data status graphic is displayed at the highest zoomed out scales of the Public and Expert Map Views. The graphic displays information about the conversion of counties to FEMA's digital flagship product, the Digital Flood Insurance Digital Rate Maps (DFIRM). The WV GIS Technical Center and its partners update the WV Flood Tool with new digital flood data at it becomes available, with updates usually done every six months.



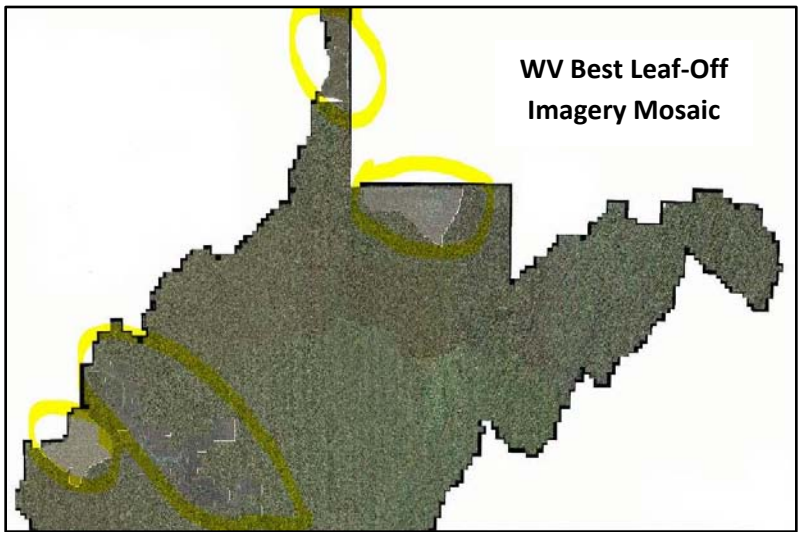
Distributed Data & Web Map Services

The WV Flood Tool consumes GIS data and map servers from many agencies. The shared data and services allow the WV Flood Tool to be more robust in the breadth of capabilities offered to users. In addition, most map layers are cached to distribute online maps faster.

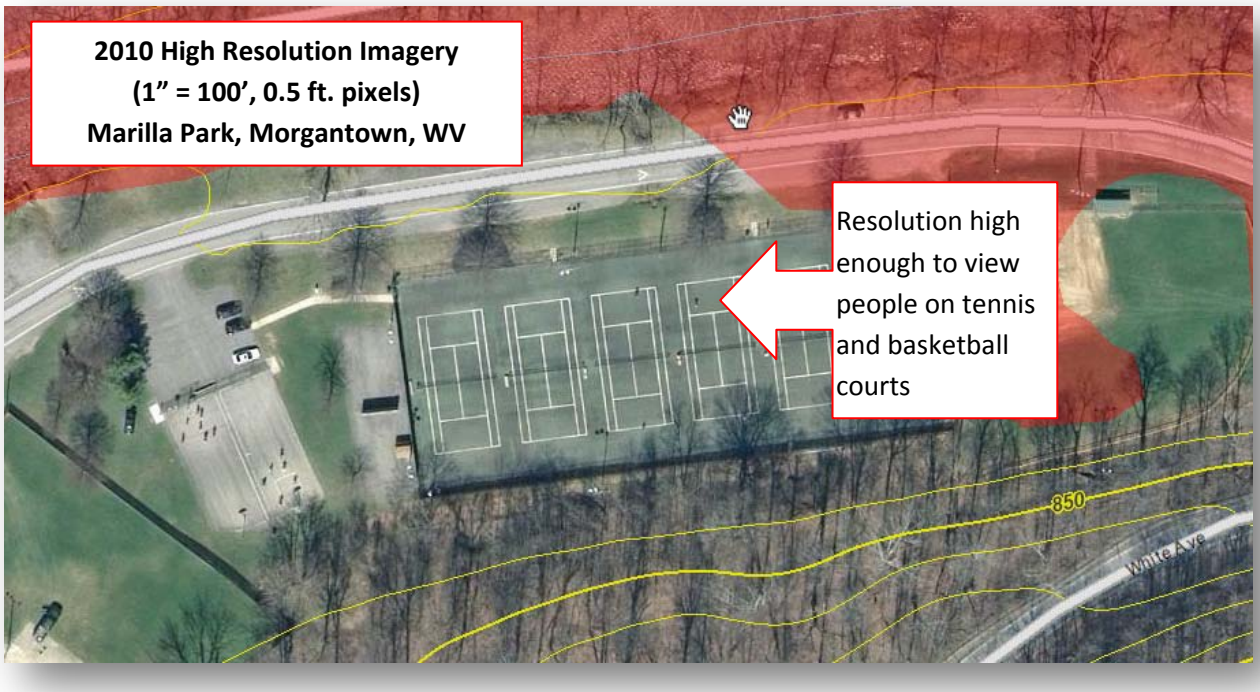


Best Leaf-Off Imagery Mosaic

Leaf off imagery is ideal for locating structures. Presently the best statewide leaf-off imagery is the 2003 SAMB imagery collected at 1:4800-scale and 2-ft pixel resolution. To improve the spatial and temporal resolutions of the SAMB imagery, other organizations have contributed local resolution imagery, resulting in a mosaic of the best leaf-off imagery in West Virginia. Currently the best leaf off imagery mosaic includes 1"=100' orthophotos Brooke, Cabell, Hancock, and Monongalia Counties; and 1"=200' orthophotos for the Charleston Area. Please email Kurt Donaldson at kdonalds@wvu.edu if you would like to have better quality local resolution leaf-off imagery incorporated into the WV Flood Tool.



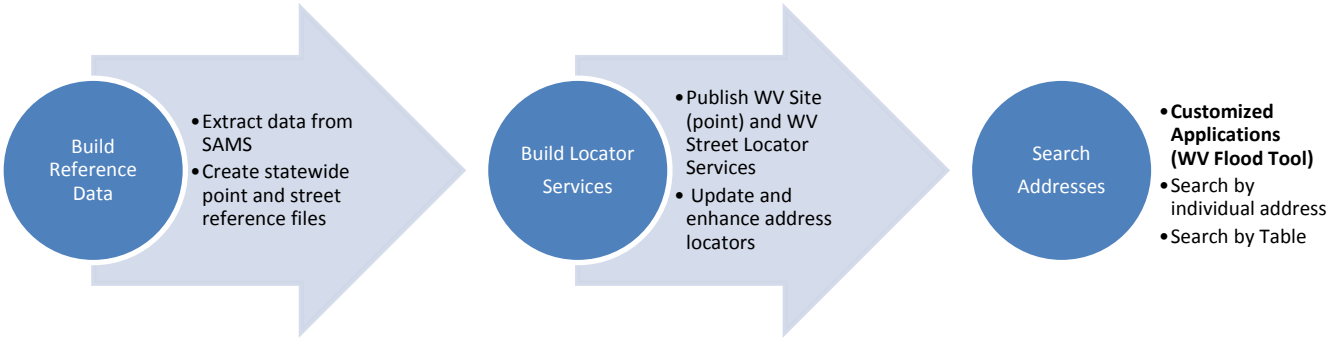
High resolution imagery for Charleston, Huntington, Morgantown, and Weirton areas incorporated into SAMB 2003 statewide leaf-off imagery



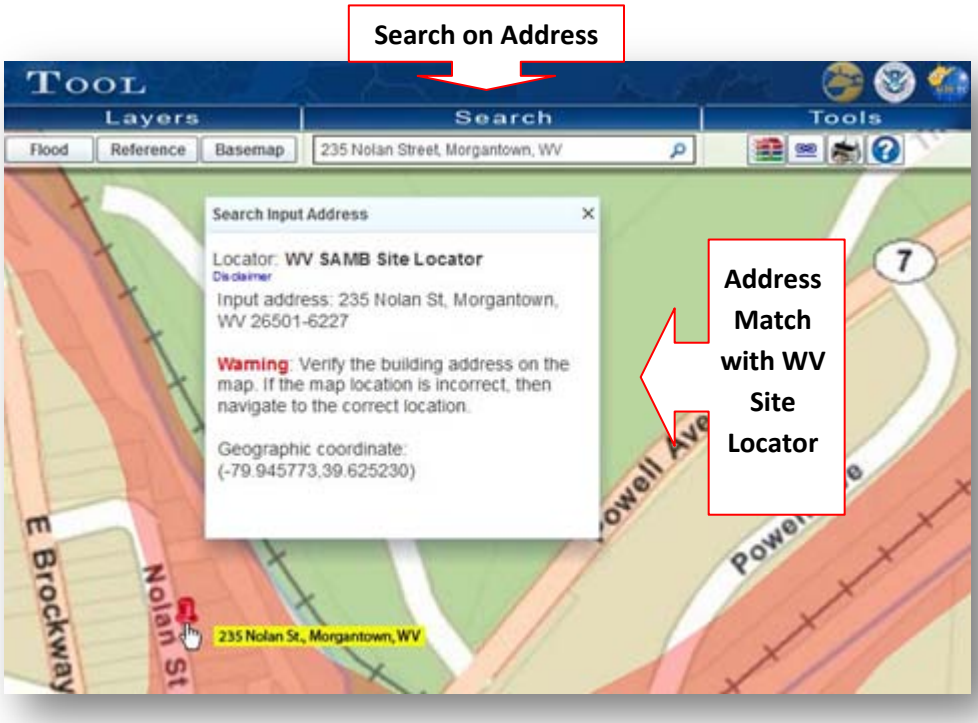
WV Geocoding Service (Address Matching)

The customized Address Locator of WV Flood Tool cascades through three locator services to find the best address match: (1) WV Site, (2) WV Street, and (3) Nationwide Commercial Locator

Steps to Create WV Locator Services: The WV GIS Technical Center, in cooperation with the WV Division of Homeland Security and Emergency Management (WVDHSEM), periodically creates the statewide address locator services for building sites (points) and streets. The address locators are based on data from the Statewide Addressing and Mapping System (SAMS) maintained by WVDHSEM. To create the locator services, first the addressing information is extracted from the addressing and mapping system. Next, programming scripts are executed to generate statewide Site and Street Locator Services.

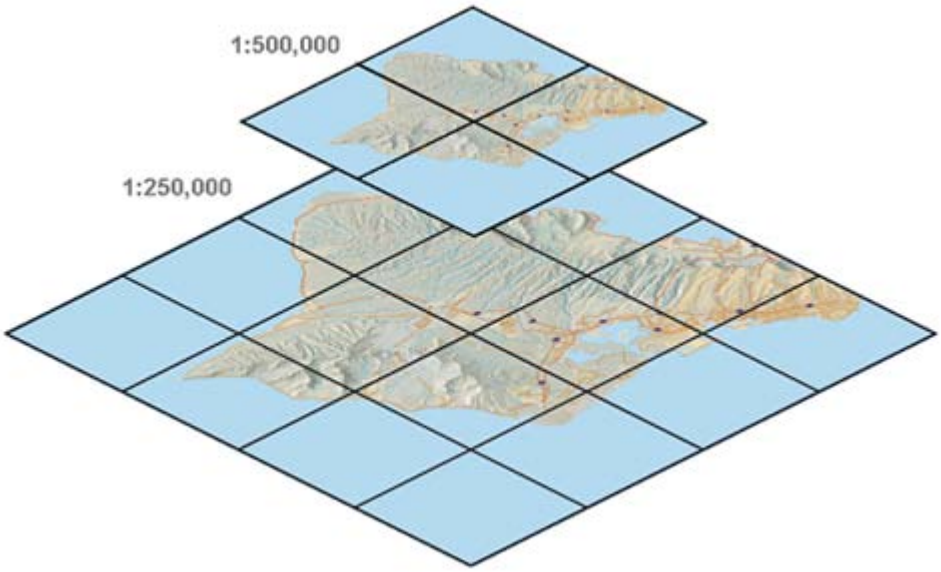


Accuracy: The WV Site Locator Service address matches to the building point (centroid) and is the most spatially accurate locator service in the Nation. However, the accuracy of this service is dependent upon the completeness and accuracy of the data in the Statewide Addressing and Mapping System. In 2010 it was estimated that the Site Locator Service has a 50% successful rate for address matching to building points, but in the future the site address matching should improve as the reference data becomes more complete.



Map Caching

Map caching is a very effective way to distribute online maps faster. When you create a map cache, the server draws the entire map at several different scales, and stores copies of the map images as tiles. The server can then distribute these tiled images whenever someone asks for a map. It's much quicker for a map server to hand out a cached image than to draw the map each time someone requests it. Another benefit of caching is that the amount of detail in the image doesn't noticeably affect how quickly the server can distribute the copy.



Source: http://help.arcgis.com