

Hamlet of Chichester Local Flood Analysis

Public Meeting #2

September 25, 2026



AGENDA

- Introductions
- Review of Chichester LFA study area and approach
- Results of preliminary analyses
- Meeting Schedule



Photo: L. Gale



Meet the Team



Mark Carabetta, CFM

US Manager of Climate
Resilience Planning



Matt Trueheart

Associate Water Resources
Engineer



Adam Doan

Principal Water Resources
Scientist



Elizabeth McCarthy

Project Climate Resilience
Consultant

- **Hamlet of Chichester**
- **Chichester Flood Advisory Committee (ChiFAC)**
 - Town of Shandaken (officials and residents)
 - Cornell Cooperative Extension of Ulster County (CCEUC)
 - Ulster County Department of the Environment (UCDOE)
 - Ulster County Soil and Water Conservation District (UCSWCD)
 - New York City Department of Environmental Protection (NYCDEP)
 - Catskill Watershed Corporation (CWC)



**Ashokan Watershed Stream
Management Program
(AWSMP)**

The LFA is focused on:



- Flood prone homes, businesses, infrastructure and critical facilities along Stony Clove Creek and small portions of Warner Creek and Ox Clove Creek
- Property and infrastructure at risk from erosion
- Vulnerable or undersized bridges and culverts
- Flood prone or vulnerable areas of roadway
- Threats to water quality



Photo: NYCDEP



Public Input – Help us understand flooding patterns and problems

Engineering Analysis – Hydraulic modeling of flood mitigation scenarios

Benefit Cost Analysis – To understand viability

Funding - Identification of potential funding sources

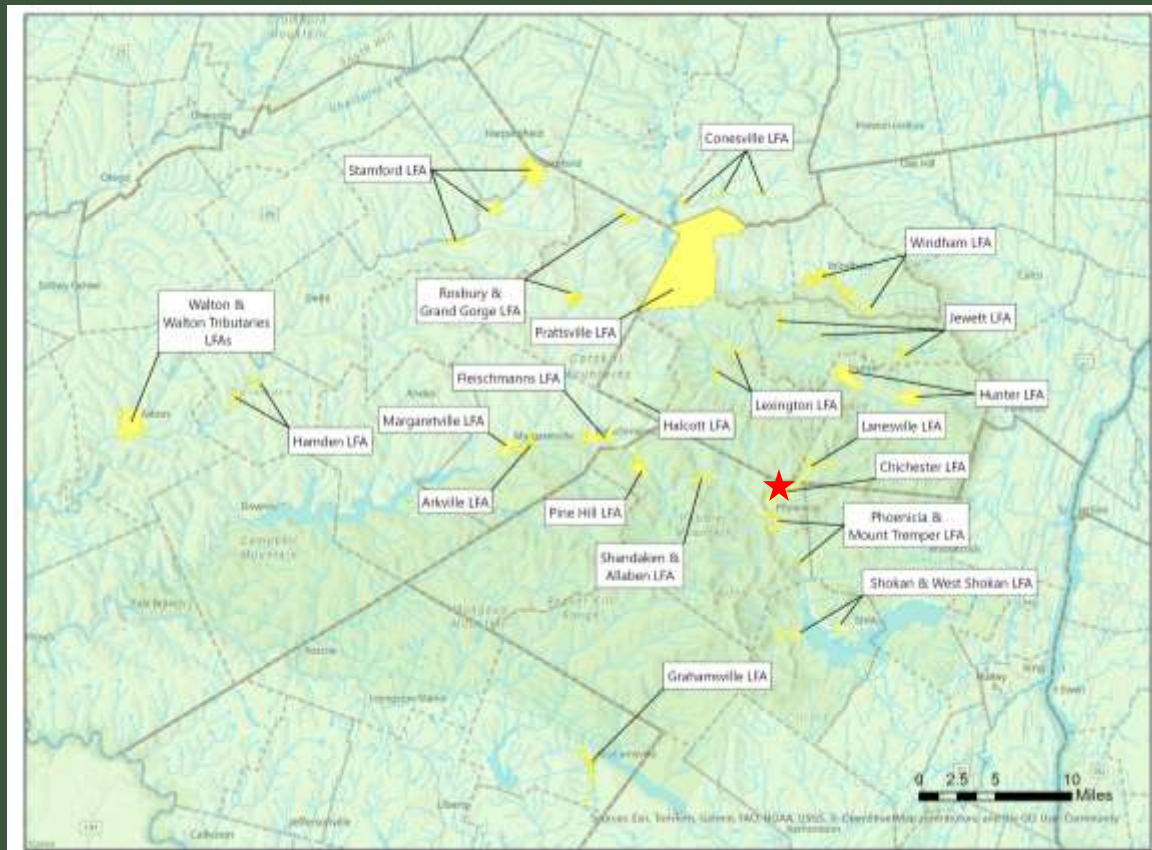
LFA Report and Plan - Blueprint for near- and long-term flood mitigation

Implementation – Town seeks funding to implement recommended projects

LFAs completed by SLR

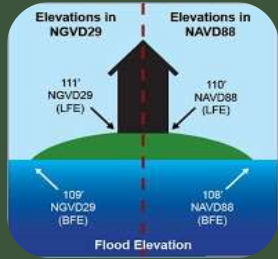


- Prattsville (2013)
- Walton (2015)
- Windham (2015)
- Lexington (2016)
- Walton Tributaries (2015)
- Fleischmanns (2016)
- Phoenicia & Mount Tremper (2016)
- Arkville (2017)
- Conesville (2017)
- Hamden (2017)
- Tannersville (2018)
- Shandaken & Allaben (2018)
- Hunter (2018)
- Halcott (2019)
- Roxbury & Grand Gorge (2019)
- Stamford (2020)
- Grahamsville (2022)
- Jewett (2022)
- Pine Hill (2023)
- Lanesville (2025)
- Margaretville (2025)
- Shokan-West Shokan (underway)
- Chichester (underway)



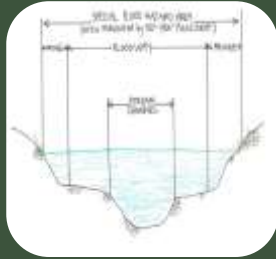
Final LFA Reports: <http://catskillstreams.org/lfa/>

Key Terms



Elevations

Vertical position often relative to another known position



Base Flood

Flood that has 1% chance of occurring in a given year (100-yr flood)

Standard for development regulations and flood insurance



Discharge

River flow

Volume of water over unit of time

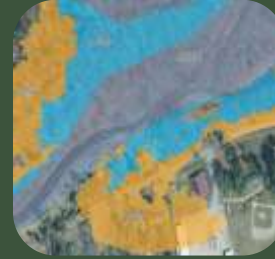
Cubic feet per second (cfs)



Hydrology

Study of water's movement, distribution, water cycle and interactions with the landscape

Process of determining flood flows



Floodplain vs Floodway

Floodplain is area adjacent to a river prone to flooding

Floodway is the channel and adjacent land needed to safely convey floodwaters without raising water levels (regulatory)



Riverine vs Stormwater

Riverine sourced flooding occurs when rivers overtop streambanks

Stormwater flooding occurs when drainage systems are overwhelmed in developed areas



Flood History

- In the Catskills, flooding can happen any time of year but usually results from:
 - Winter and spring rain/snowmelt (January 1996, April 2005, Christmas 2020)
 - Late summer and fall tropical storms (Tropical Storm Irene – August 2011)
- Climate Change Impacts – intense, unpredictable storms

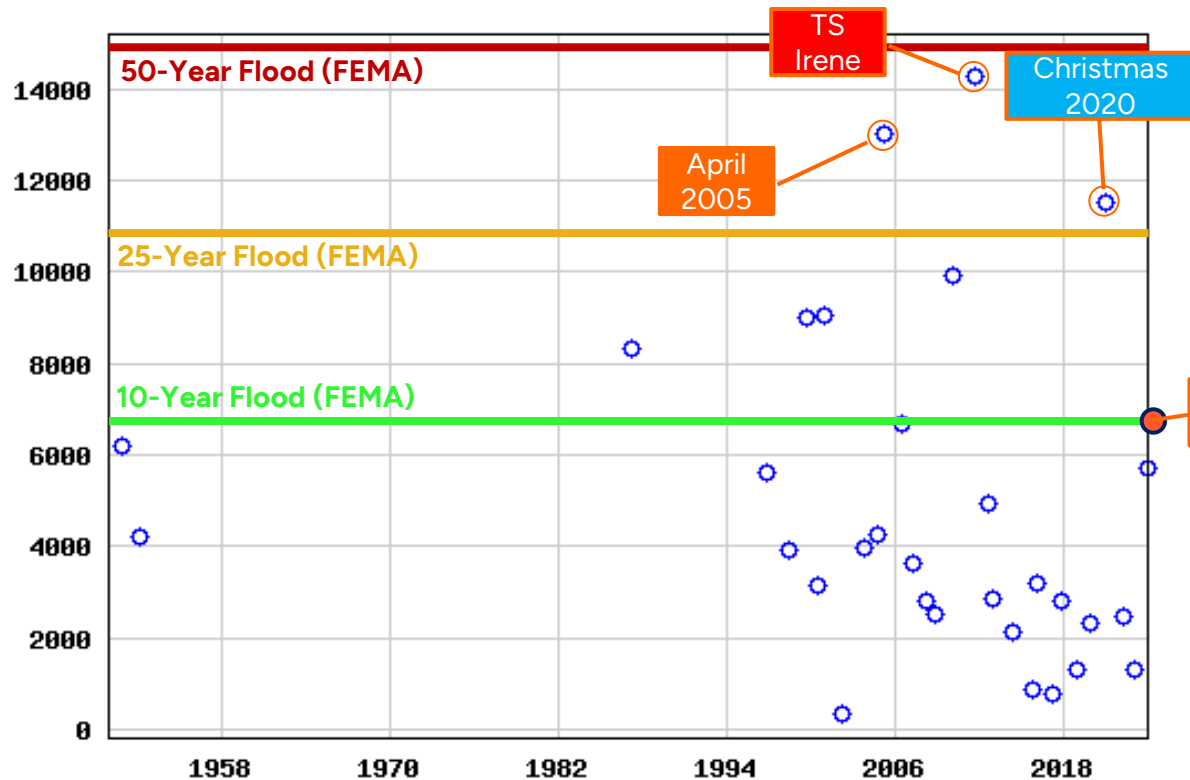


Photo: A. Bennett DEP



USGS 01362370 STONY CLOVE CREEK BLW OX CLOVE AT CHICHESTER NY

Annual Peak Streamflow, in cubic feet per second



July 29,
2026





USGS 01362370 STONY CLOVE CREEK BLW OX CLOVE AT CHICHESTER NY

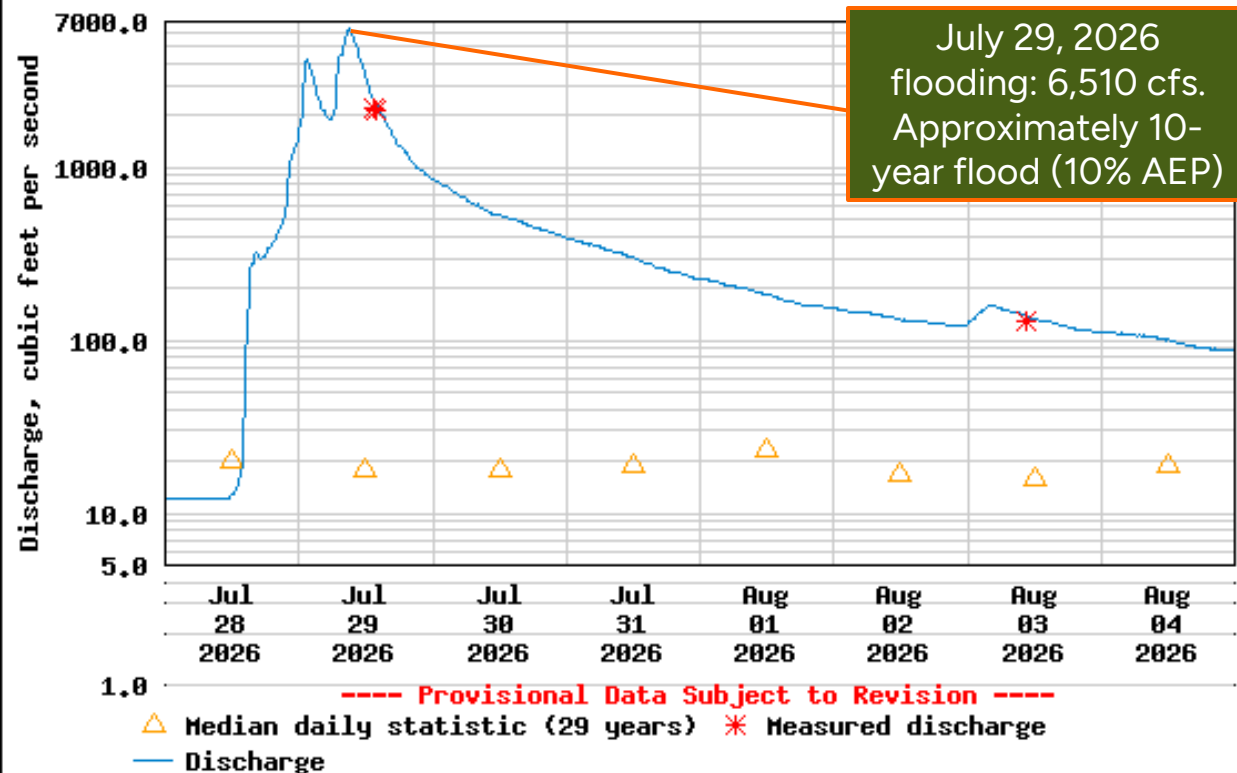


Photo: Supervisor Mansfield



Photo: E. Parker



Why do we want to mitigate flooding?

- Floods are getting worse
- Health and safety of community residents and first responders
- Protect water Economic viability of communities
- A structure in the FEMA 100-year floodplain can expect a **26%** chance of flooding within the span of a 30-year mortgage (that % increases when you consider future flows)
- Just 1 inch of water in a home can cause an average of \$25,000 in damage



Flood Mitigation Toolbox



Bridges, Dams, Culverts

Removal

Operational
Changes

Modification

Replacement

Channel Alteration

Dimension
(Widening -
Deepening)

Profile
(Slope)

Pattern
(Realignment)

Floodplain Alteration

Reclamation

Creation

Enhancement

Planning

Flood Code
Enforcement

Wetland
Protection

Limiting
Impervious
Cover

Zoning
Modifications

River/ Watershed Management

Repair of
Eroding Banks

Watershed
Management

Stormwater
Detention

Sediment or
Debris
Management

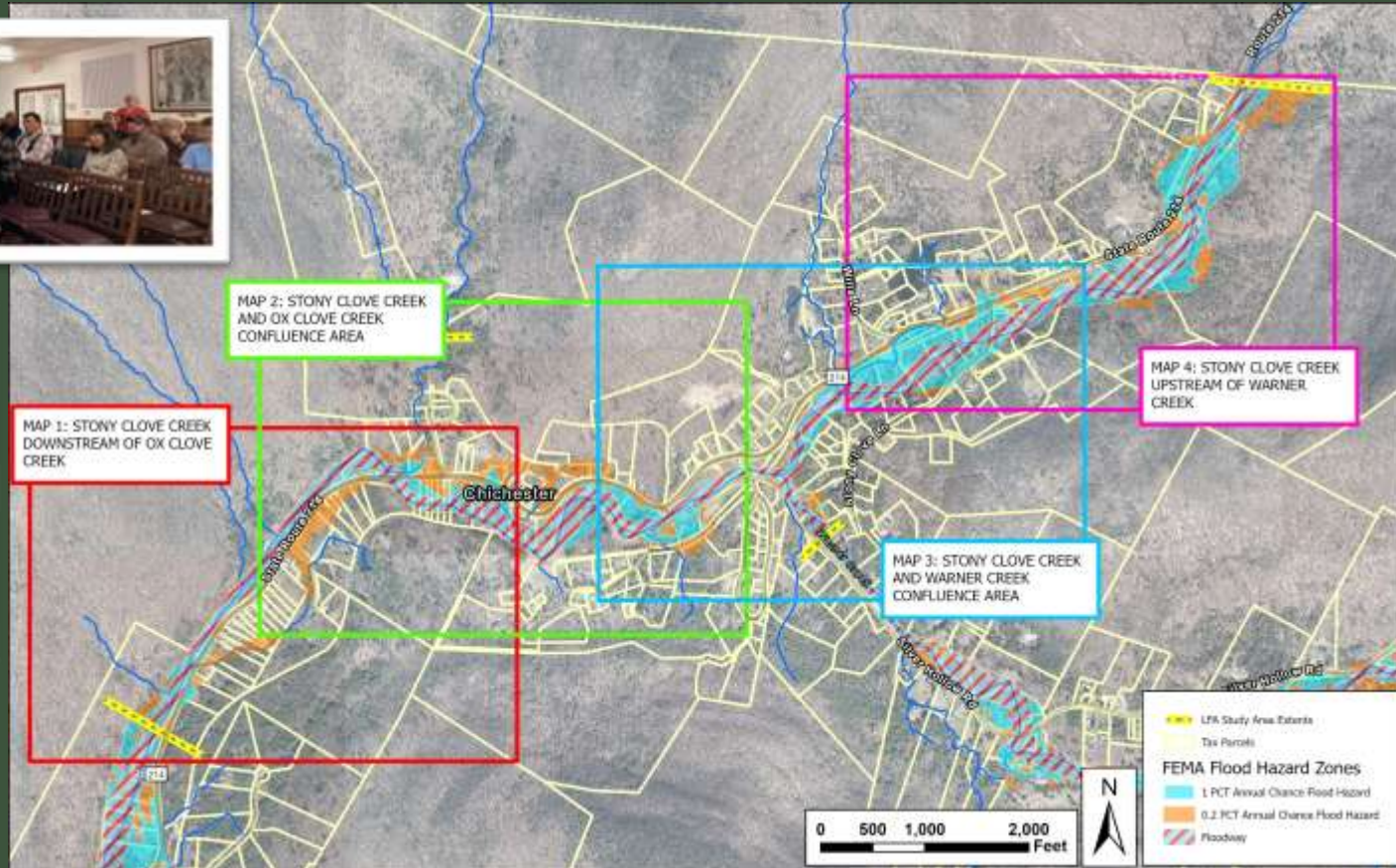
Individual Building Treatments

Flood-
proofing

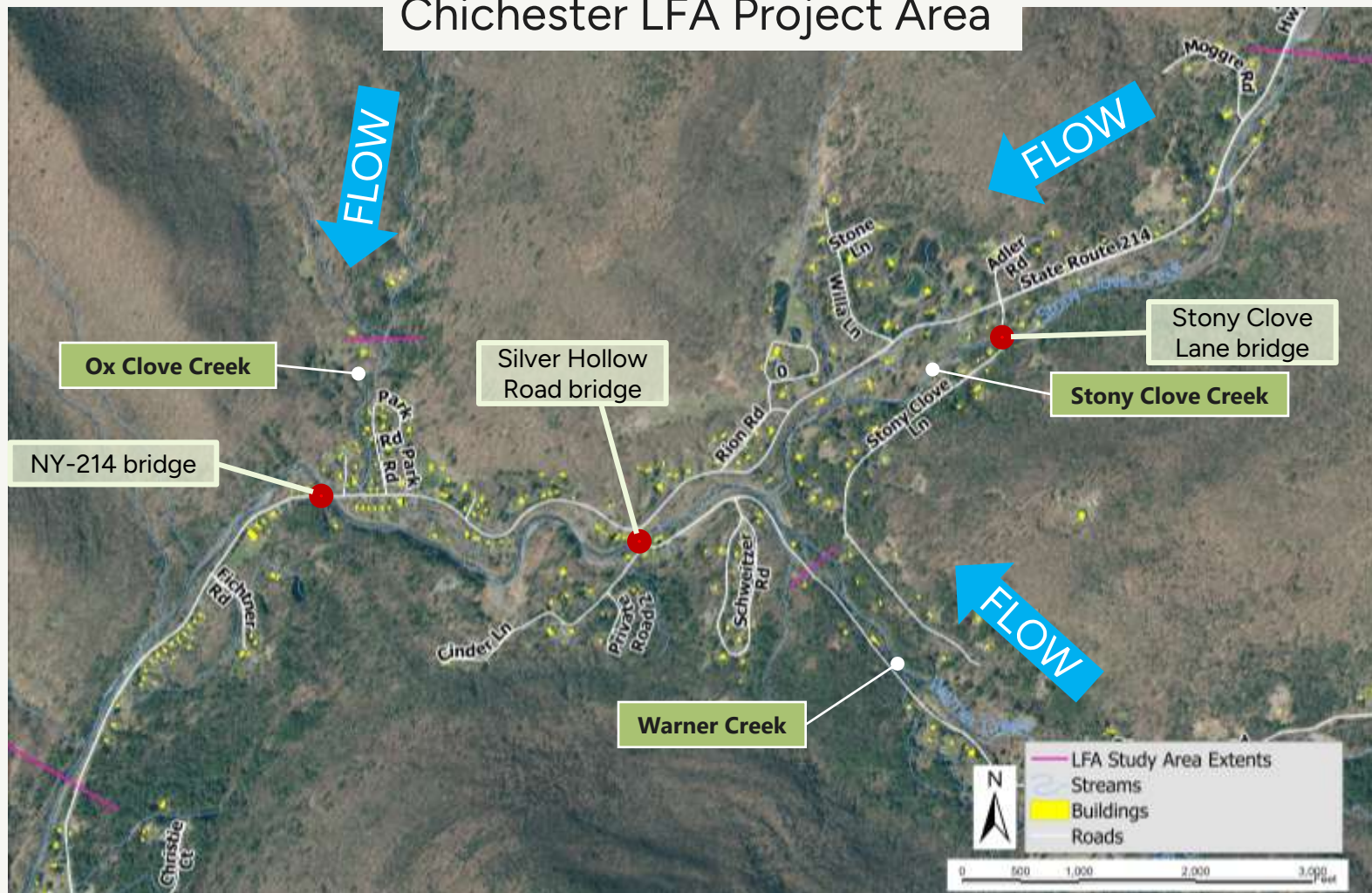
Elevation of
Structures

Voluntary
Relocation or
Buy-Out

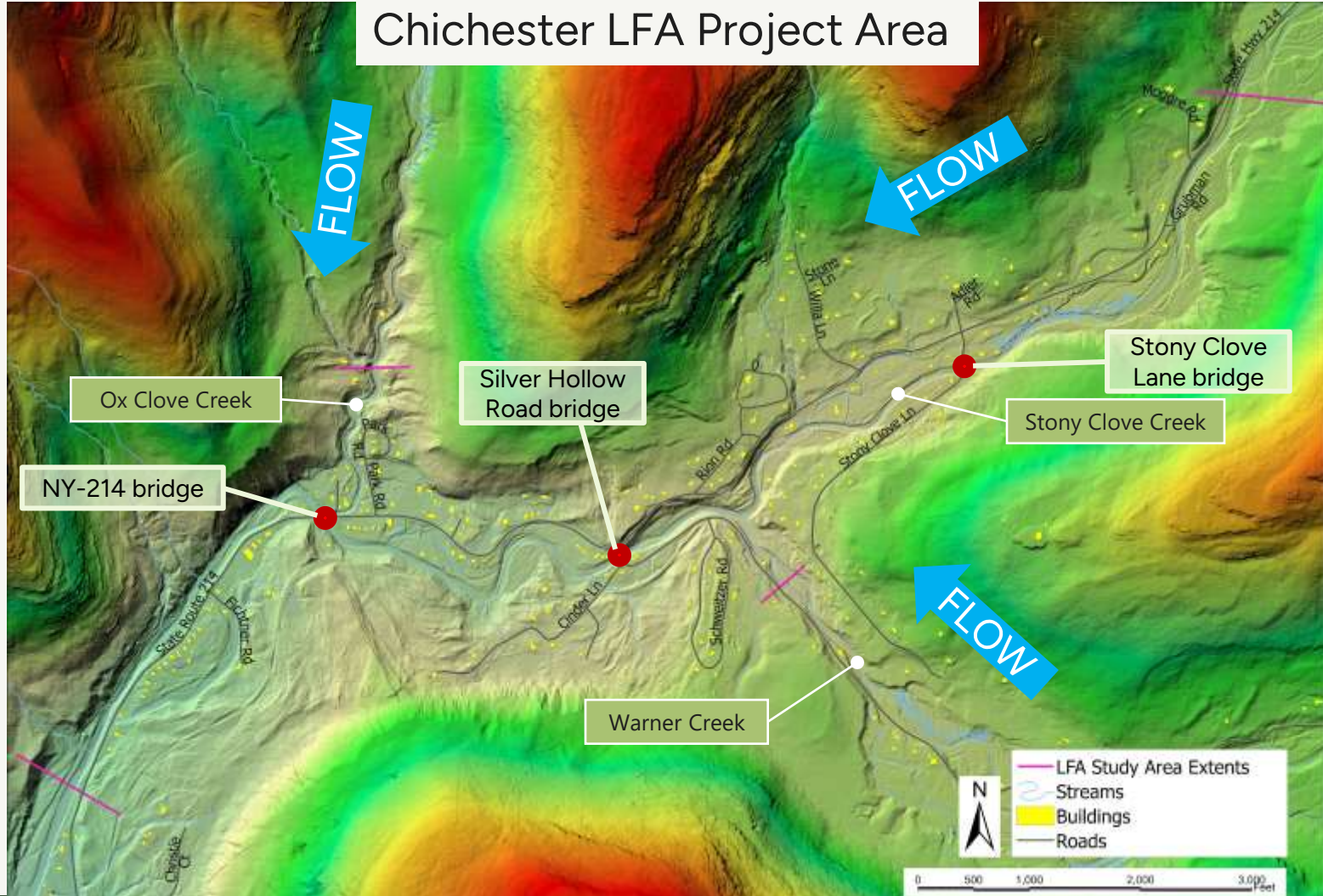
Information Gathering at Public Meeting #1: Thank you for your input!



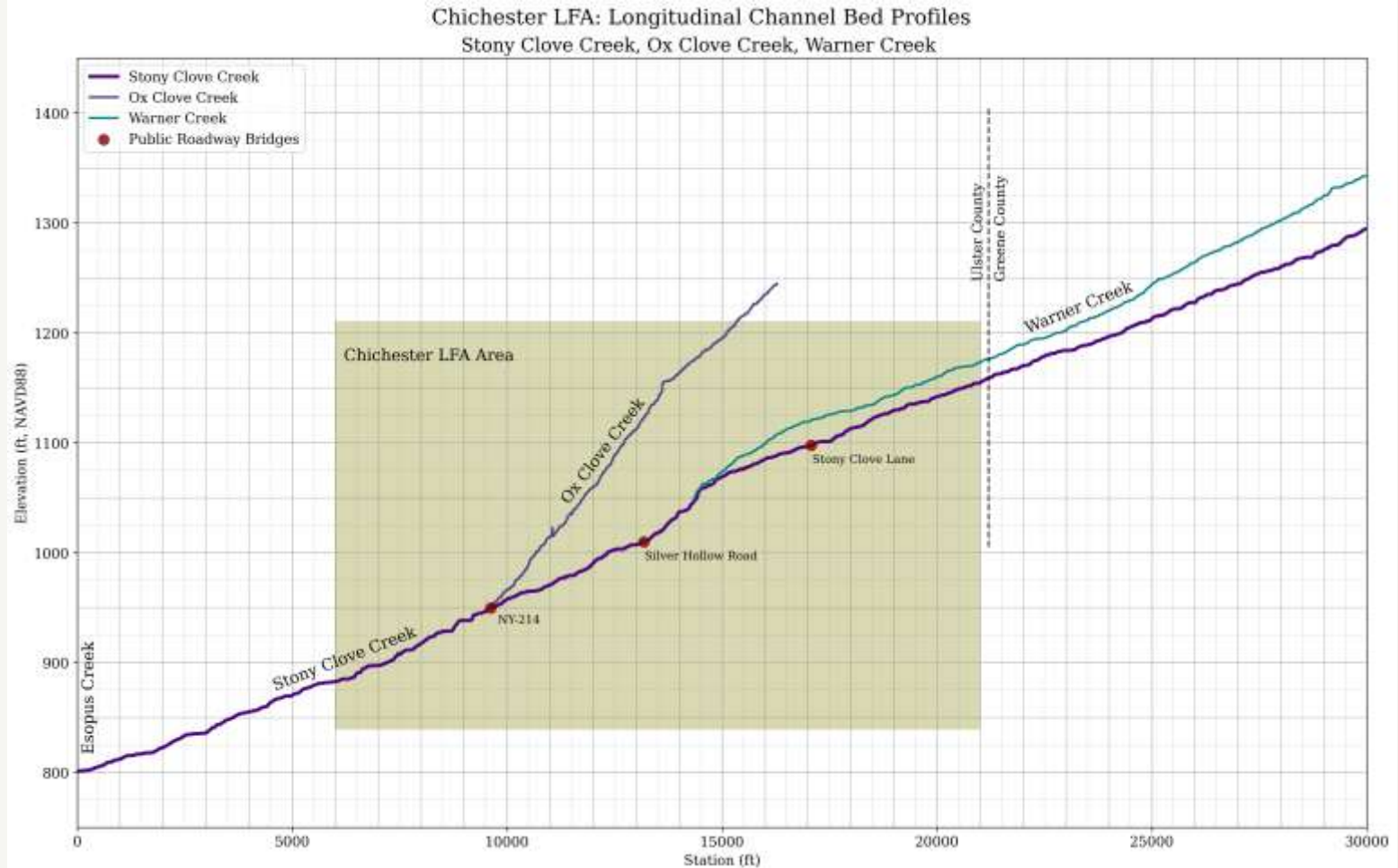
Chichester LFA Project Area



Chichester LFA Project Area



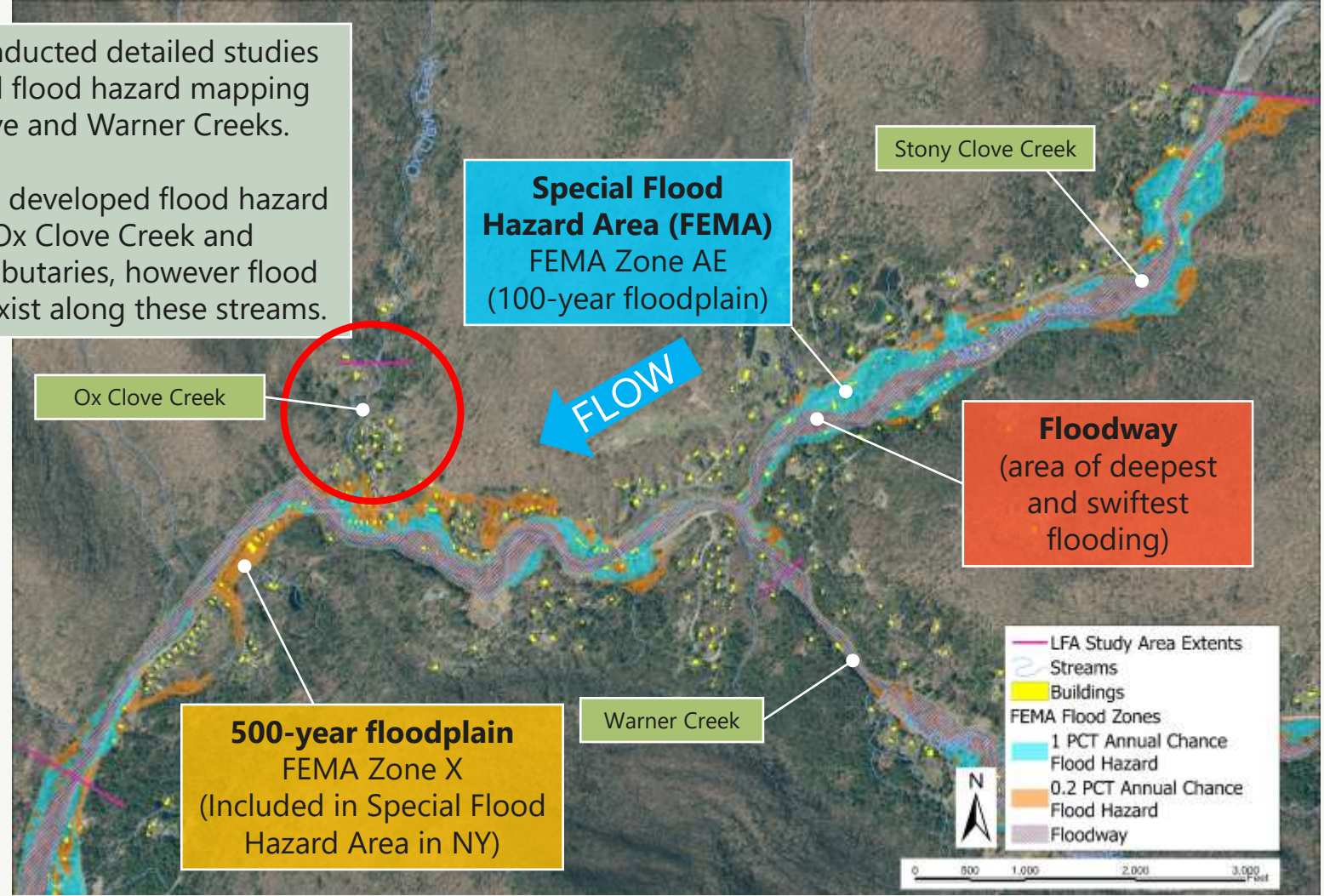
Chichester LFA Project Area





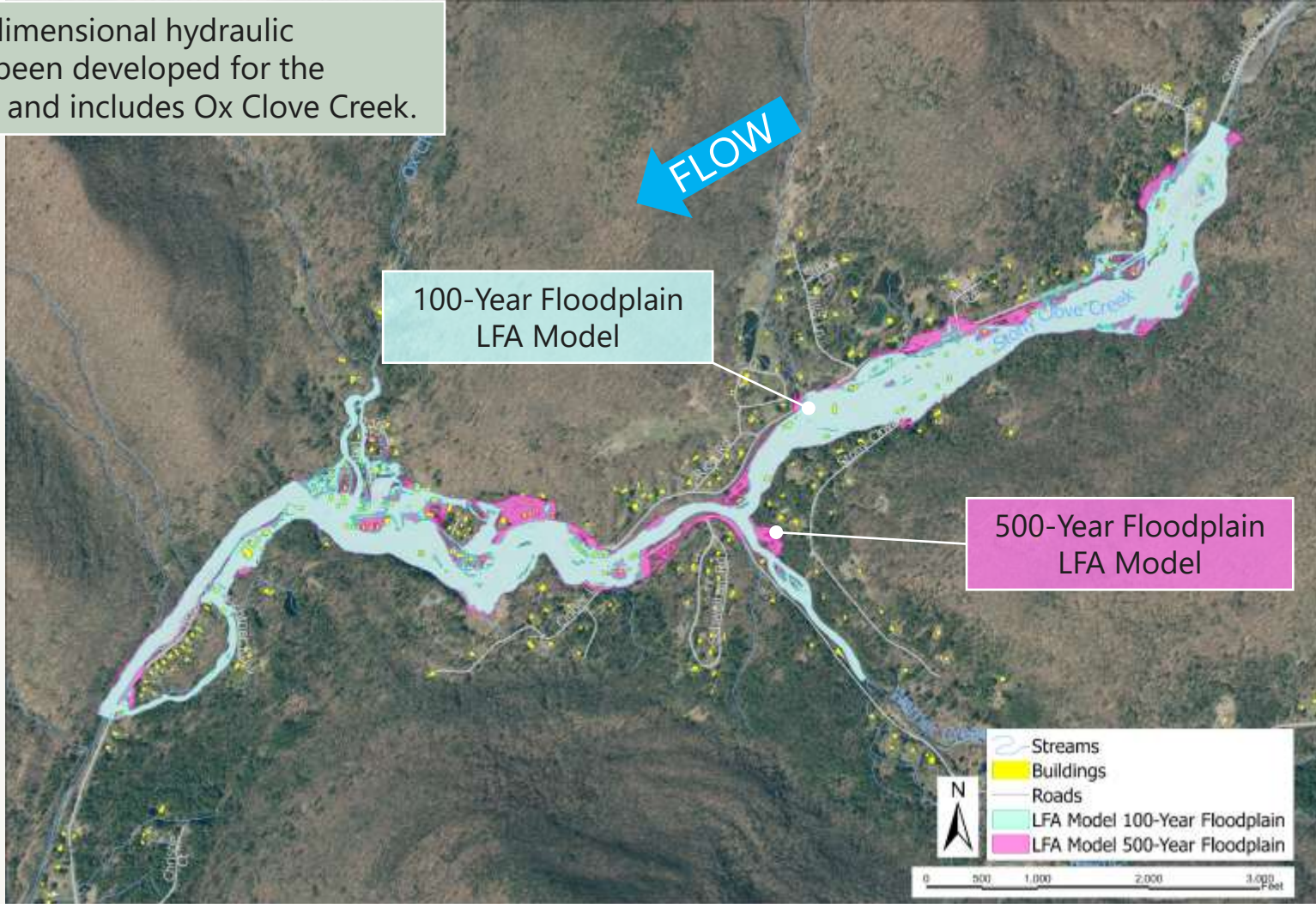
FEMA has conducted detailed studies and produced flood hazard mapping for Stony Clove and Warner Creeks.

FEMA has not developed flood hazard mapping for Ox Clove Creek and other small tributaries, however flood hazards still exist along these streams.





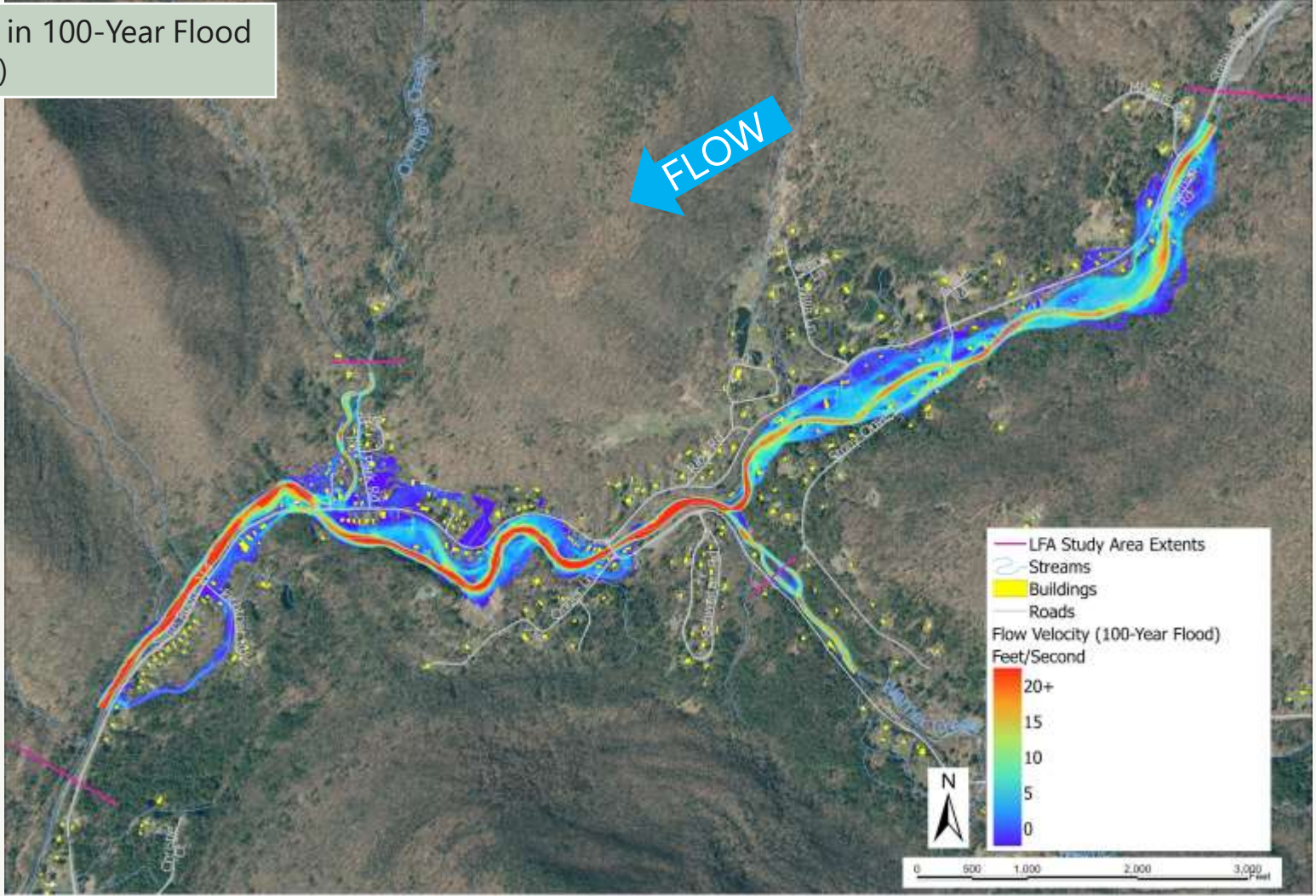
Detailed two-dimensional hydraulic modeling has been developed for the Chichester LFA and includes Ox Clove Creek.



50-Year flood:
Comparable to Tropical Storm Irene in August 2011



Flow Velocities in 100-Year Flood
(LFA 2D Model)



Assessed Bridges in the Chichester LFA Area



	Road Crossing	Year Built	Flood Performance
Stony Clove Creek	NY-214	1991	Impacted by 25-year flood, flanked in 50-year flood, overtopped in 100-year flood. Backwaters and flanking contribute to flooding of NY-214 and nearby properties.
	Silver Hollow Road	1985	Adequate for 50-year flood, impacted and flanked in 100-year flood, overtopped in 500-year flood. Backwaters and flanking contribute to flooding of Silver Hollow Road and nearby properties.
	Korman Road (private drive)	Unknown	Damaged by Tropical Storm Irene, repaired Deck removed in 2025/26
	Stony Clove Lane	1955	Impacted by 10-year flood, overtopped and flanked in 25-year flood. Backwaters and flanking contribute to flooding of nearby properties.
	Grubman Road (Old RR bridge, private drive)	Unknown	Damaged by Tropical Storm Irene, repaired Impacted by 25-year flood, overtopped and flanked in 50-year flood. Backwaters and flanking contribute to flooding of NY-214 and nearby properties.
Ox Clove Creek	Private Drive 1	Unknown	Impacted by 50-year flood, overtopped by 100-year flood Backwaters contribute to flooding of NY-214 and nearby properties.
	Private Drive 2	Unknown	Impacted by 10-year flood, overtopped by 25-year flood. Backwaters contribute to flooding of NY-214 and nearby properties.
	Private Drive 3	Unknown	Adequate for 10-year flood, flanked beginning in 25-year. Flanking contributes to flooding of Park Road and nearby properties.

NY-214 Bridge



- Backwaters from undersized bridge contribute to flooding of several properties.
- Flanking flows cause significant flooding of NY-214, Fichtner Road, and adjacent properties.

Sewer line weir contributes negatively to bridge hydraulic performance – recommend removing weir and replacing sewer with alternative stream crossing:

- Relocate deeper beneath streambed (if practical – possible slope limitations)
- Install pump station and affix sewer line to downstream fascia of bridge



Concrete weir protects sewer line at stream crossing

NY-214 Bridge

2025 Aerial Imagery

Selected: 'SA/2D Connections'



Existing NY-214 bridge

Park Rd

NY-214

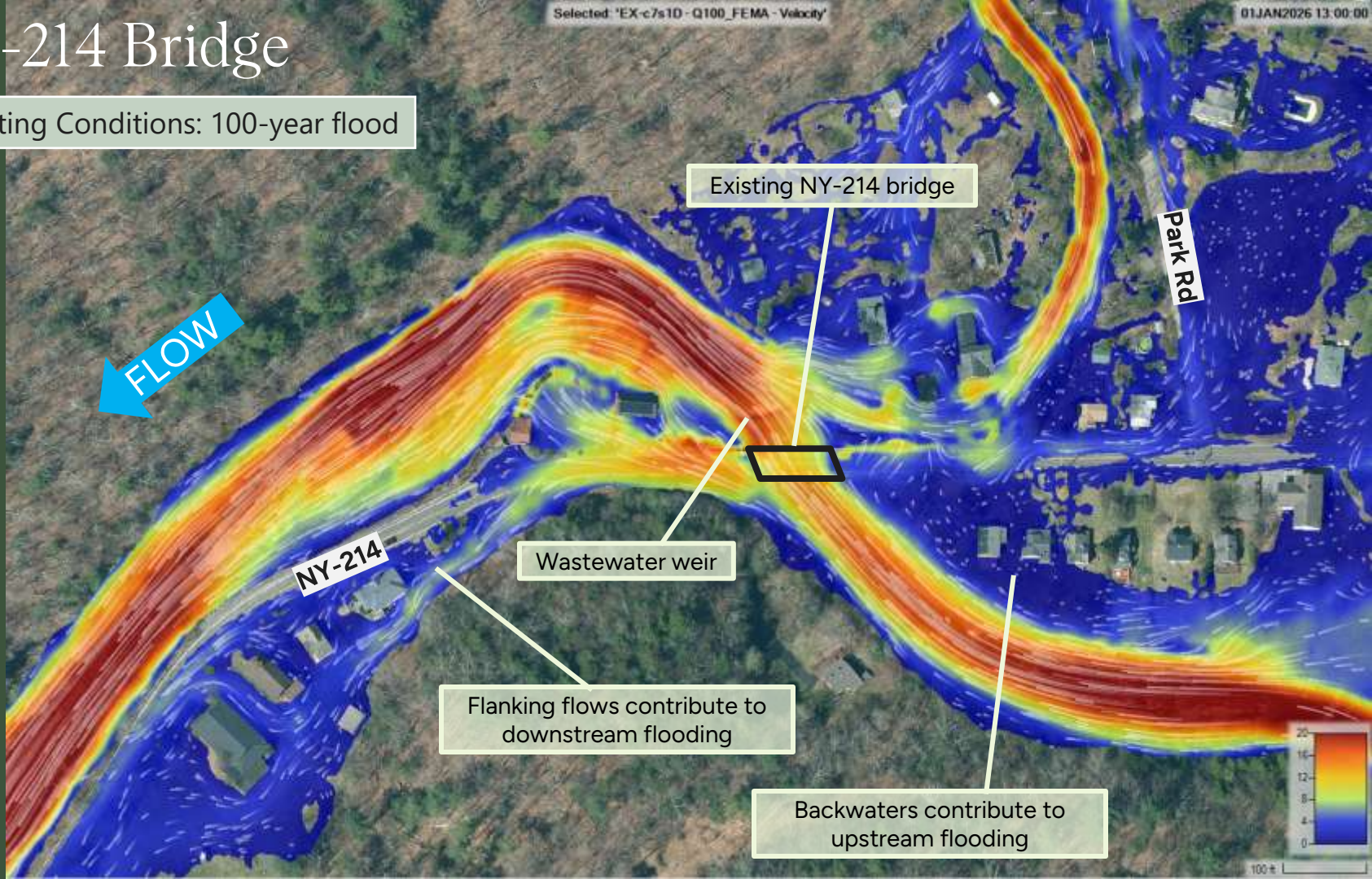
Wastewater weir

100 ft



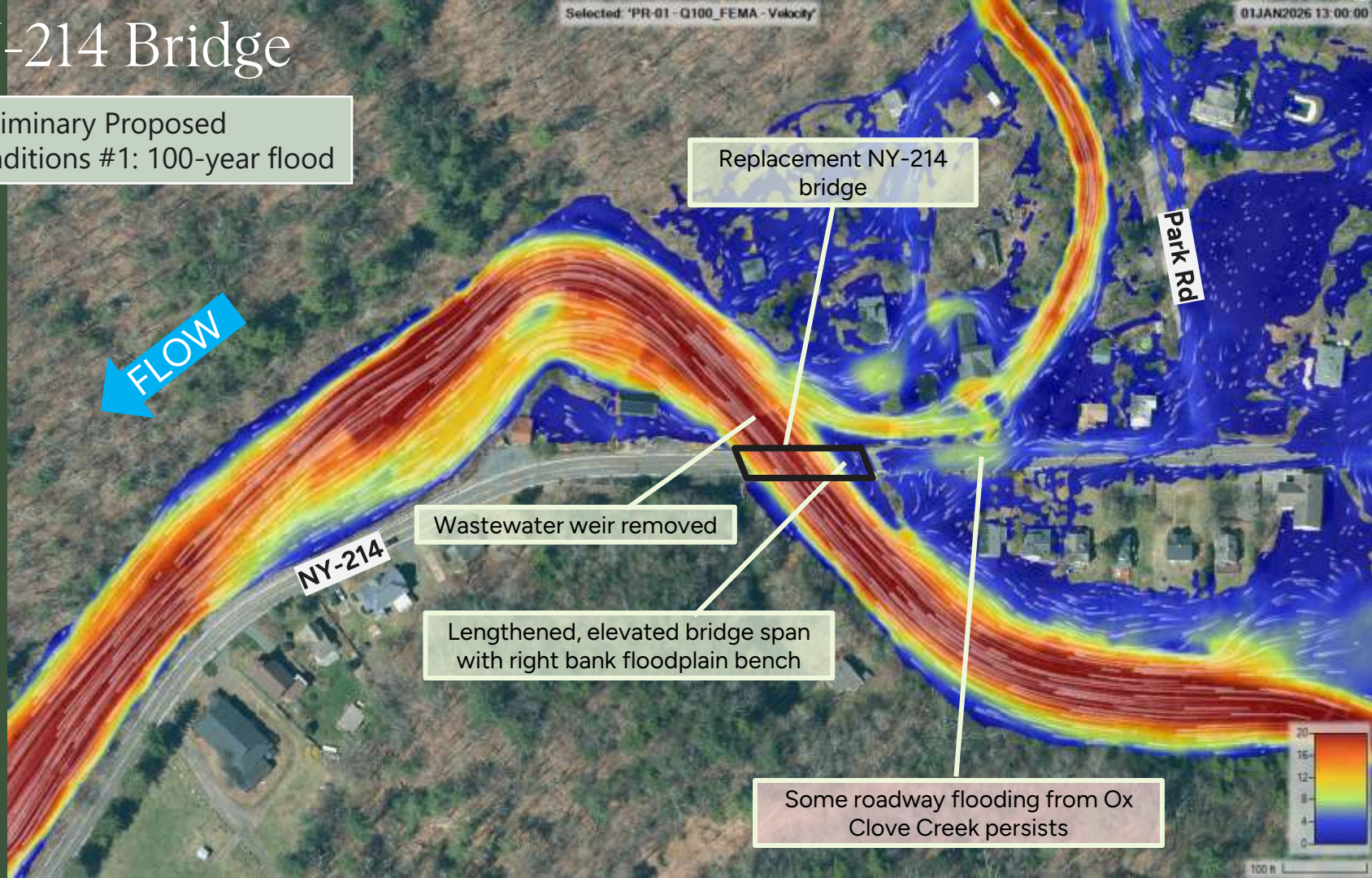
NY-214 Bridge

Existing Conditions: 100-year flood



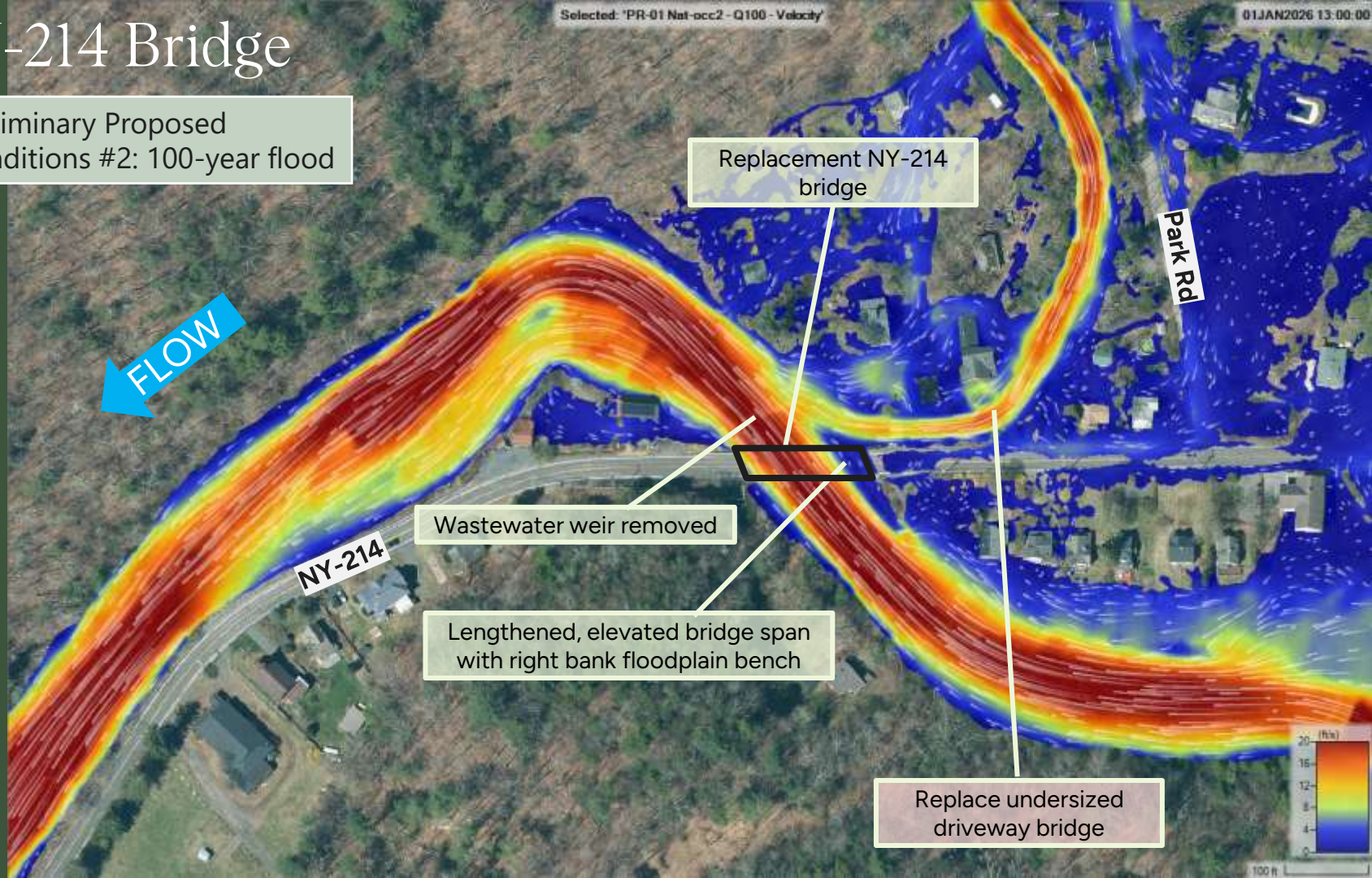
NY-214 Bridge

Preliminary Proposed
Conditions #1: 100-year flood



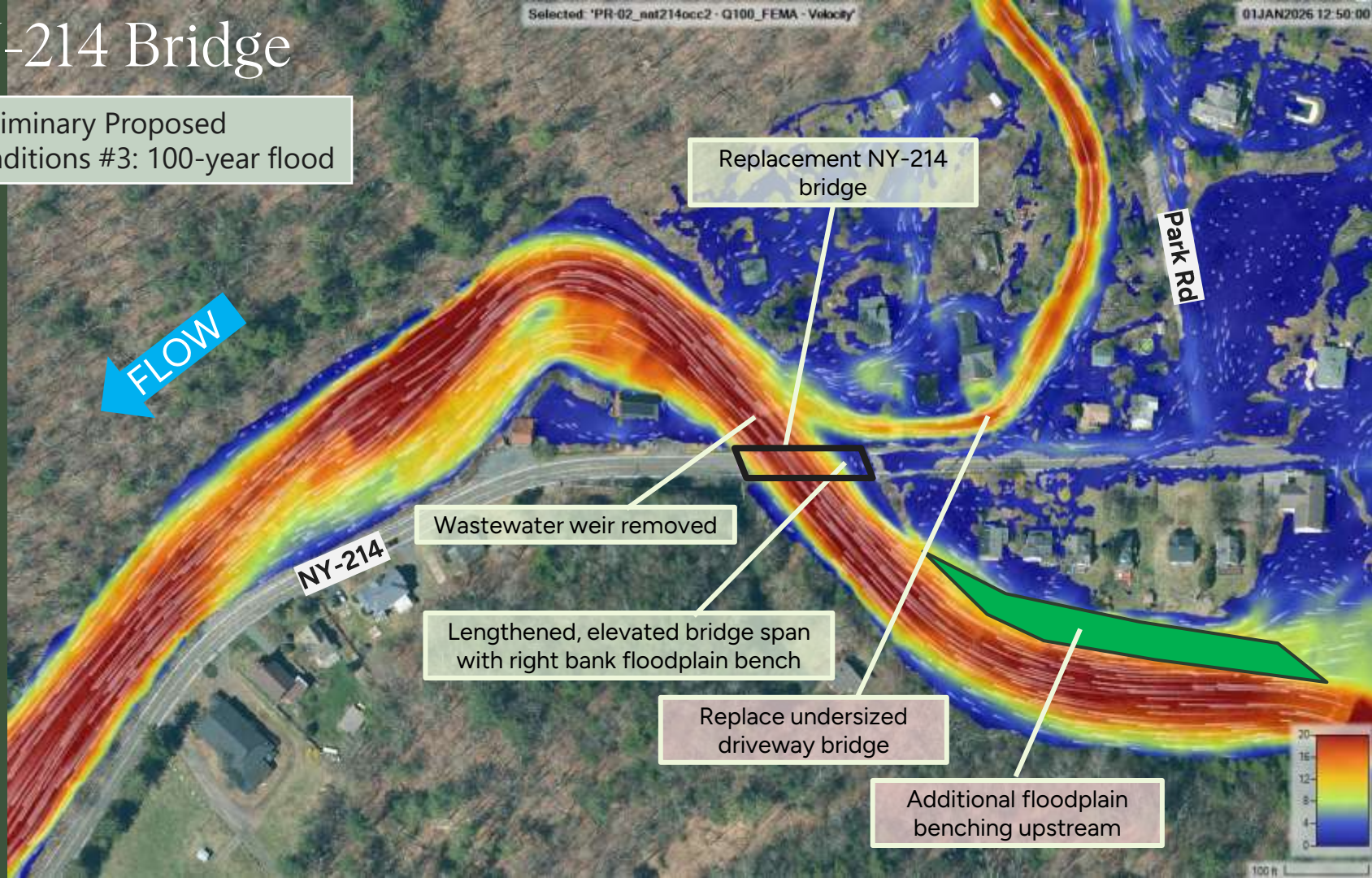
NY-214 Bridge

Preliminary Proposed
Conditions #2: 100-year flood



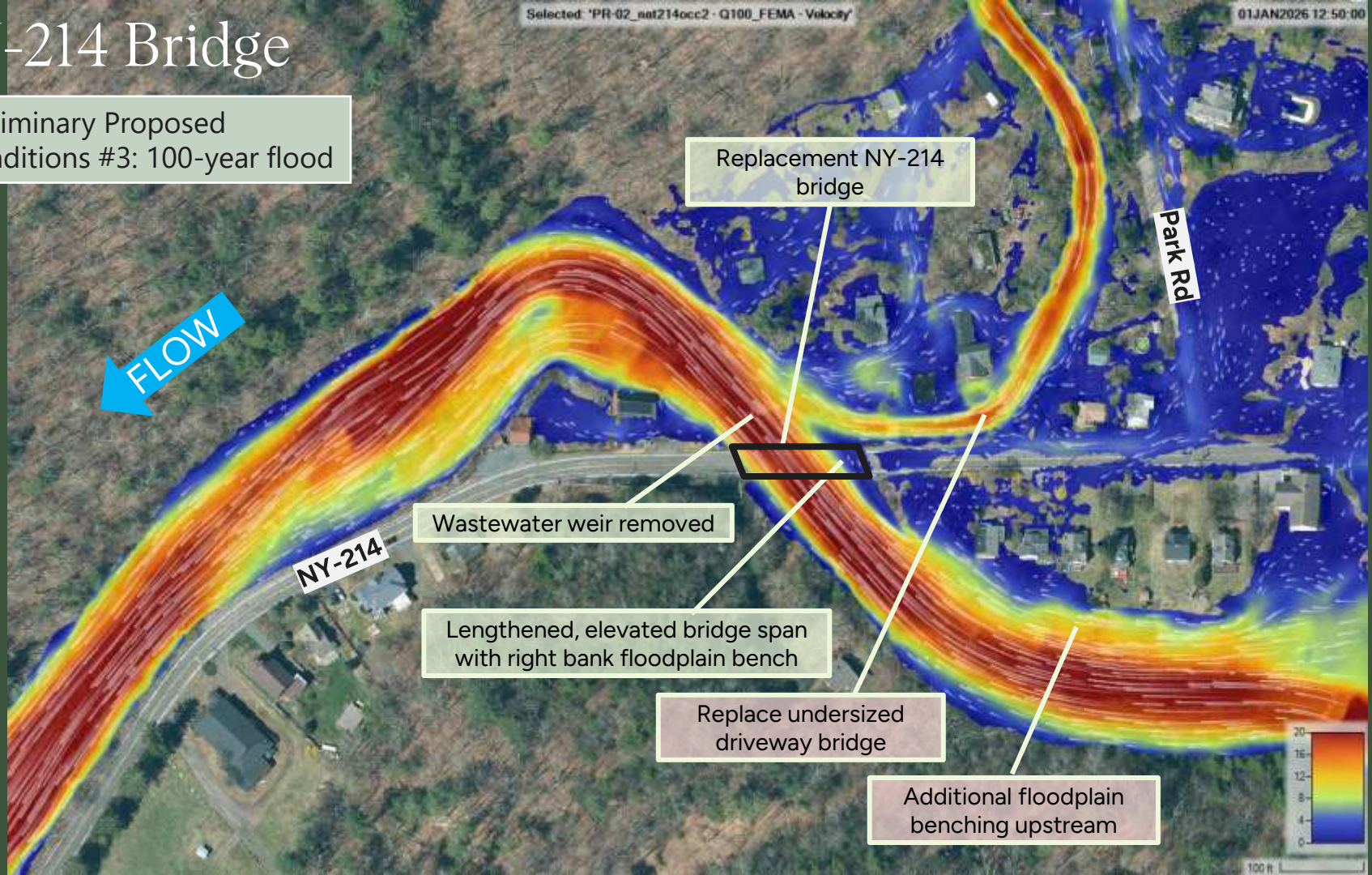
NY-214 Bridge

Preliminary Proposed
Conditions #3: 100-year flood



NY-214 Bridge

Preliminary Proposed
Conditions #3: 100-year flood



Silver Hollow Road Bridge



Photo: T.Y.Lin for FEMA

- Crossing located in steep, confined, high-energy reach of Stony Clove Creek.
- Extreme velocities and shear stress conditions.



Silver Hollow Road Bridge

2025 Aerial Imagery

Selected: 'Boundary Condition Lines'



NY-214

Existing Silver Hollow
Road bridge

Silver Hollow Rd

FLOW

100'

Silver Hollow Road Bridge

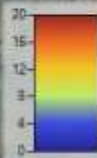
Existing Conditions: 100-year flood

Existing Silver Hollow
Road bridge

Silver Hollow Rd

FLOW

Flanking flows
contribute to flooding



100 ft

Selected: 'EX-c7s1D-Q100_FEMA-Velocity'

01JAN2026 13:00:00



Silver Hollow Road Bridge

Preliminary Proposed
Conditions: 100-year flood

Replacement Silver
Hollow Road bridge

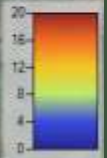
NY-214

Silver Hollow Rd

FLOW

Lengthened, elevated bridge span
with left bank floodplain bench

Potential adverse
impacts downstream



Silver Hollow Road Bridge

Preliminary Proposed
Conditions 100-year flood

Replacement Silver
Hollow Road bridge

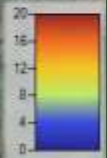
NY-214

Silver Hollow Rd

FLOW

Lengthened, elevated bridge span
with left bank floodplain bench

Floodplain bench may help mitigate
potential adverse downstream impacts



Silver Hollow Road Bridge

Preliminary Proposed
Conditions 100-year flood

Replacement Silver
Hollow Road bridge

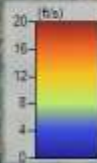
NY-214

Silver Hollow Rd

FLOW

Lengthened, elevated bridge span
with left bank floodplain bench

Floodplain bench



100 ft



Selected: 'PR-01_FP's - Q100_FEMA - Velocity'

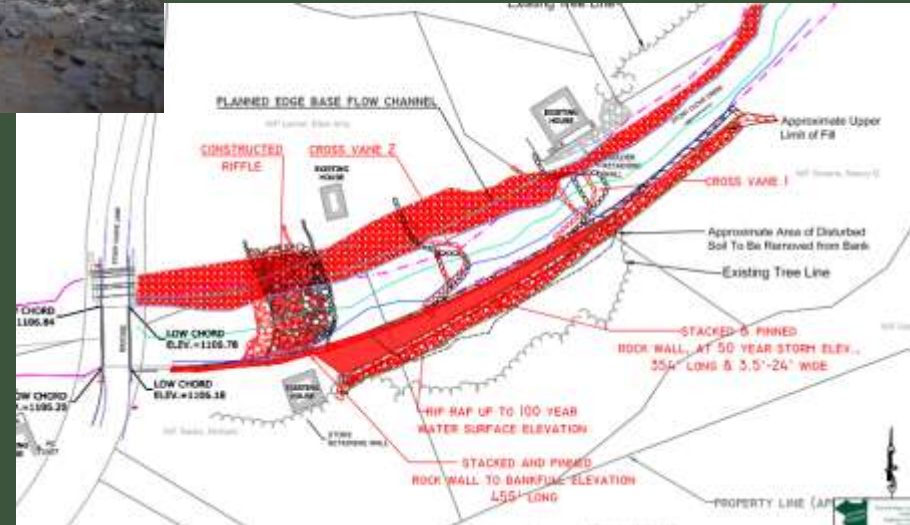
01JAN2026 13:00:00

Stony Clove Lane Bridge



Photos: T.Y.Lin for FEMA

- Undersized crossing has been damaged in the past.
- Relief culverts provide marginal additional conveyance and require frequent maintenance.
- Stream bed and bank stabilization completed in 2014.
- Bridge replacement previously recommended in Ulster County Hazard Mitigation Plan.
- Upstream flood-damaged home removed in 2017.



Stony Clove Lane Bridge

2025 Aerial Imagery

Selected: 'Boundary Condition Lines'

Existing Stony Clove Lane bridge

NY-214

Stony Clove Ln

FLOW



100 ft

Stony Clove Lane Bridge

Existing Conditions 100-year flood

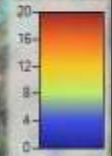
Existing Stony Clove Lane bridge

NY-214

Stony Clove Ln

Flanking flows contribute to flooding

FLOW



100 ft

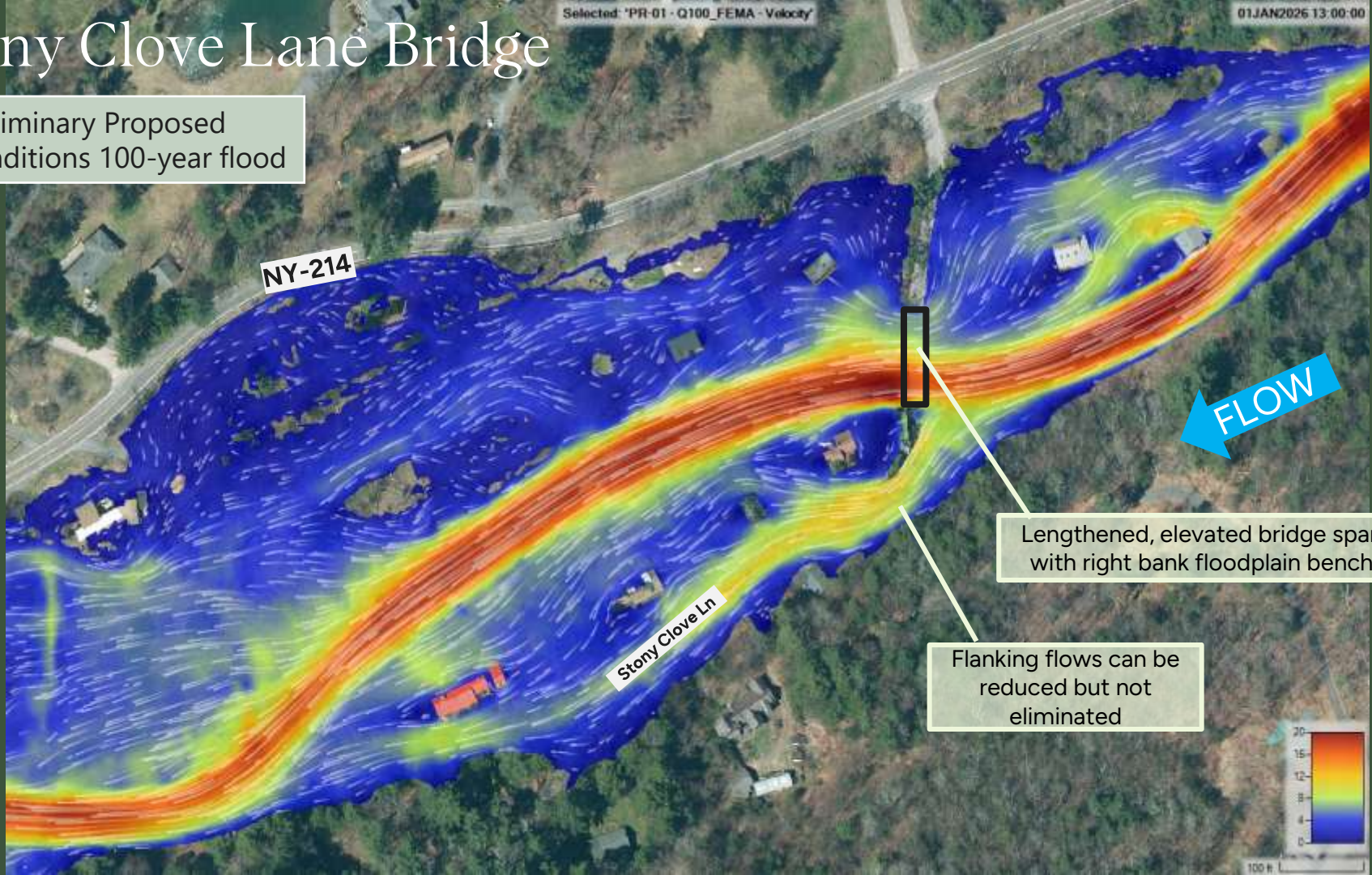


Stony Clove Lane Bridge

Preliminary Proposed
Conditions 100-year flood

Selected: 'PR-01 - Q100_FEMA - Velocity'

01JAN2026 13:00:00



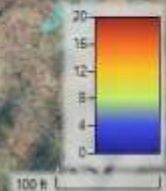
NY-214

Stony Clove Ln

FLOW

Lengthened, elevated bridge span
with right bank floodplain bench

Flanking flows can be
reduced but not
eliminated



Stony Clove Lane Bridge

Natural Conditions
100-year flood

Bridge and approach roadway embankments completely removed

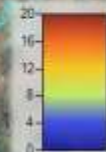
NY-214

Stony Clove Ln

400 feet

FLOW

- Even "ideal" replacement of the Stony Clove Lane bridge can reduce but not eliminate flooding up- and downstream
- All currently flood-prone homes in the area would remain vulnerable
- Buyout, relocation, elevation are recommended for affected properties



100 ft

Grubman Road Bridge

Grubman Road bridge
damaged in Tropical
Storm Irene (2011)



Photos: T.Y.Lin for FEMA



Grubman Road Bridge (Private)



Existing Grubman
Road bridge

Grubman Rd

NY-214

FLOW

200 ft

Grubman Road Bridge (Private)

Existing Conditions 100-year flood

Backwaters and flanking flows contribute to flooding of NY-214 and properties upstream and downstream

Existing Grubman Road bridge

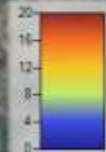
NY-214

Grubman Rd

FLOW

Selected: 'EX-c7s1D - Q100_FEMA - Velocity'

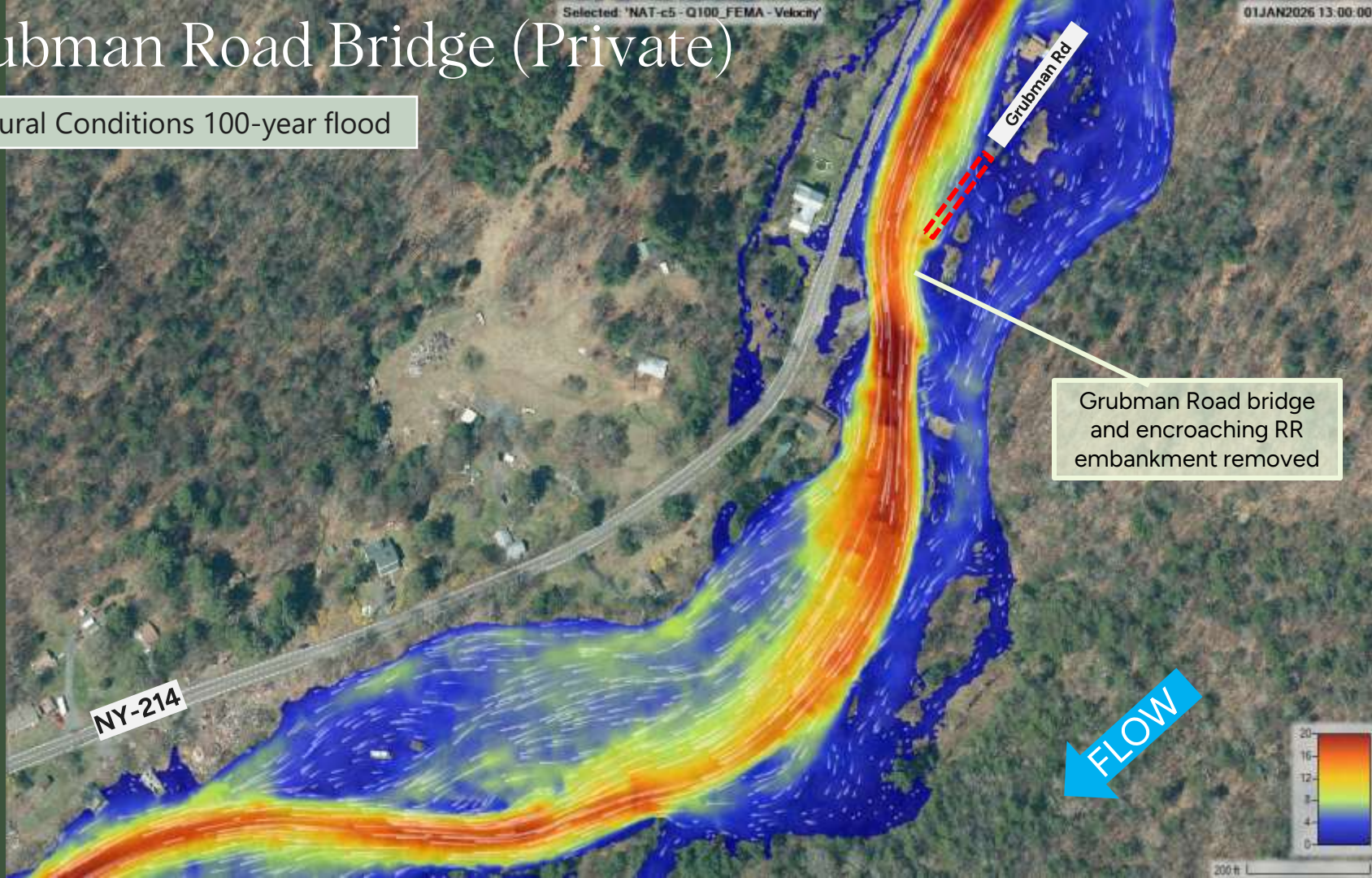
01JAN2026 13:00:00



200' ±

Grubman Road Bridge (Private)

Natural Conditions 100-year flood



Private Bridges – Ox Clove Creek

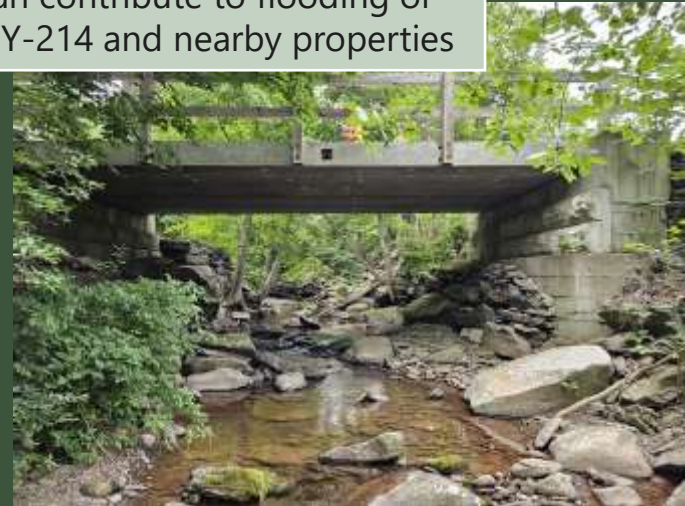
Water supply line on private driveway bridge over Ox Clove Creek is vulnerable to damage during floods



Two downstream driveway bridges over Ox Clove Creek can contribute to flooding of NY-214 and nearby properties



Flanking flows can contribute to flooding along Park Road and nearby properties



Erosion Hazards

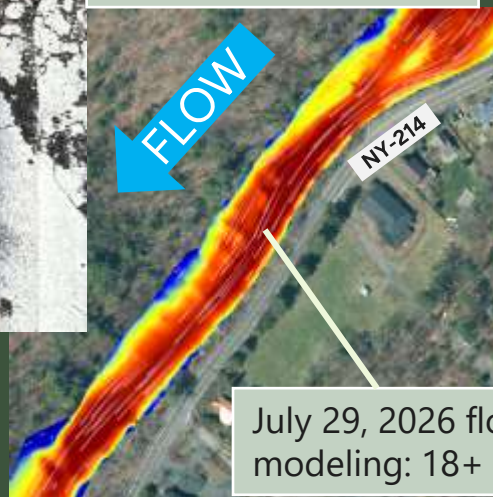


Chichester FAC and Town of Shandaken coordination with NYSDOT



Photo: Supervisor Mansfield

Damage to NY-214
near Fichtner Road,
July 29, 2026.



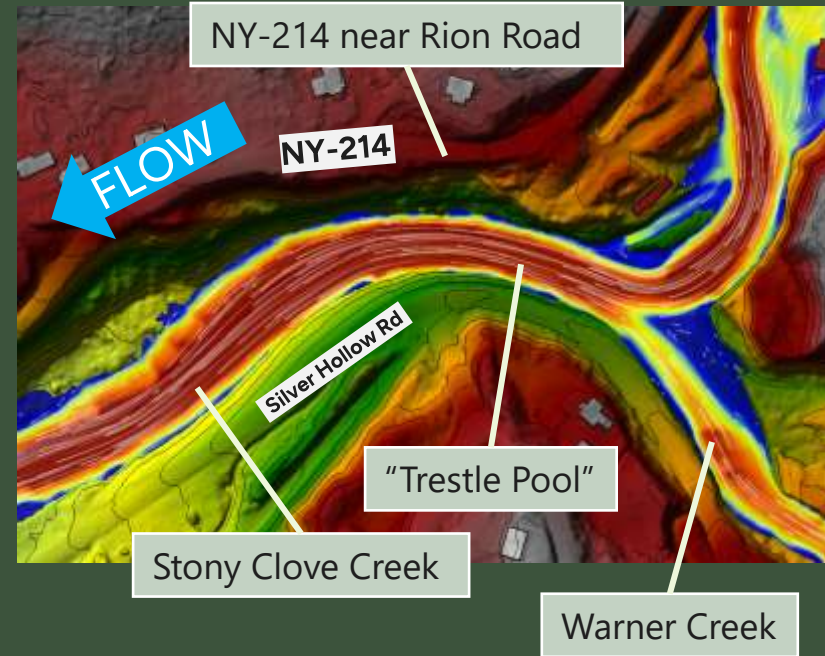
July 29, 2026 flood
modeling: 18+ fps



Erosion Hazards



Chichester FAC and Town of Shandaken coordination with NYSDOT



First Floor Elevation Survey Signup (Pine Hill & Lanesville LFA Examples)



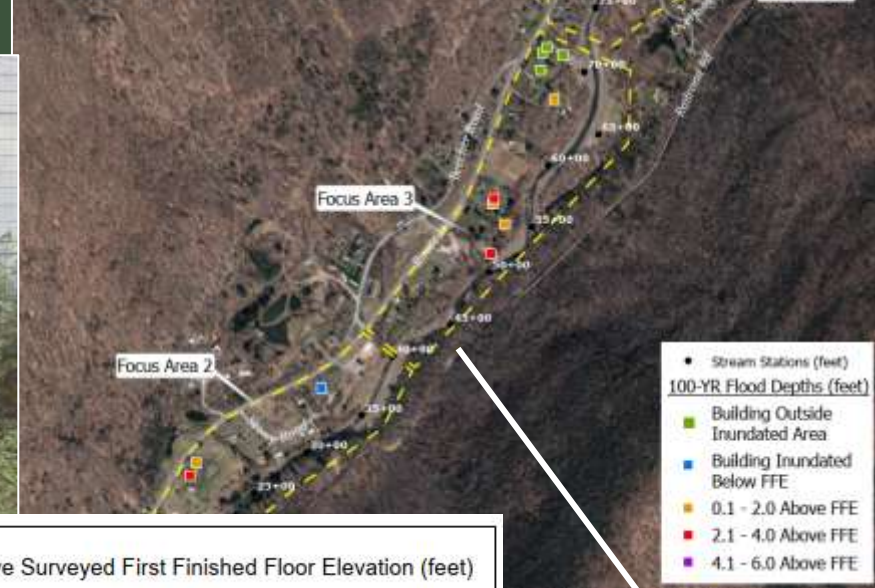
Legend

Flood Depths (feet)

- 0.0
- 0.1 - 2.0
- 2.1 - 4.0
- 4.1 - 6.0
- 6.1 - 8.0
- 8.1 - 10.0

Flood Hazard Areas

- 1 PCT Annual Chance Flood Hazard



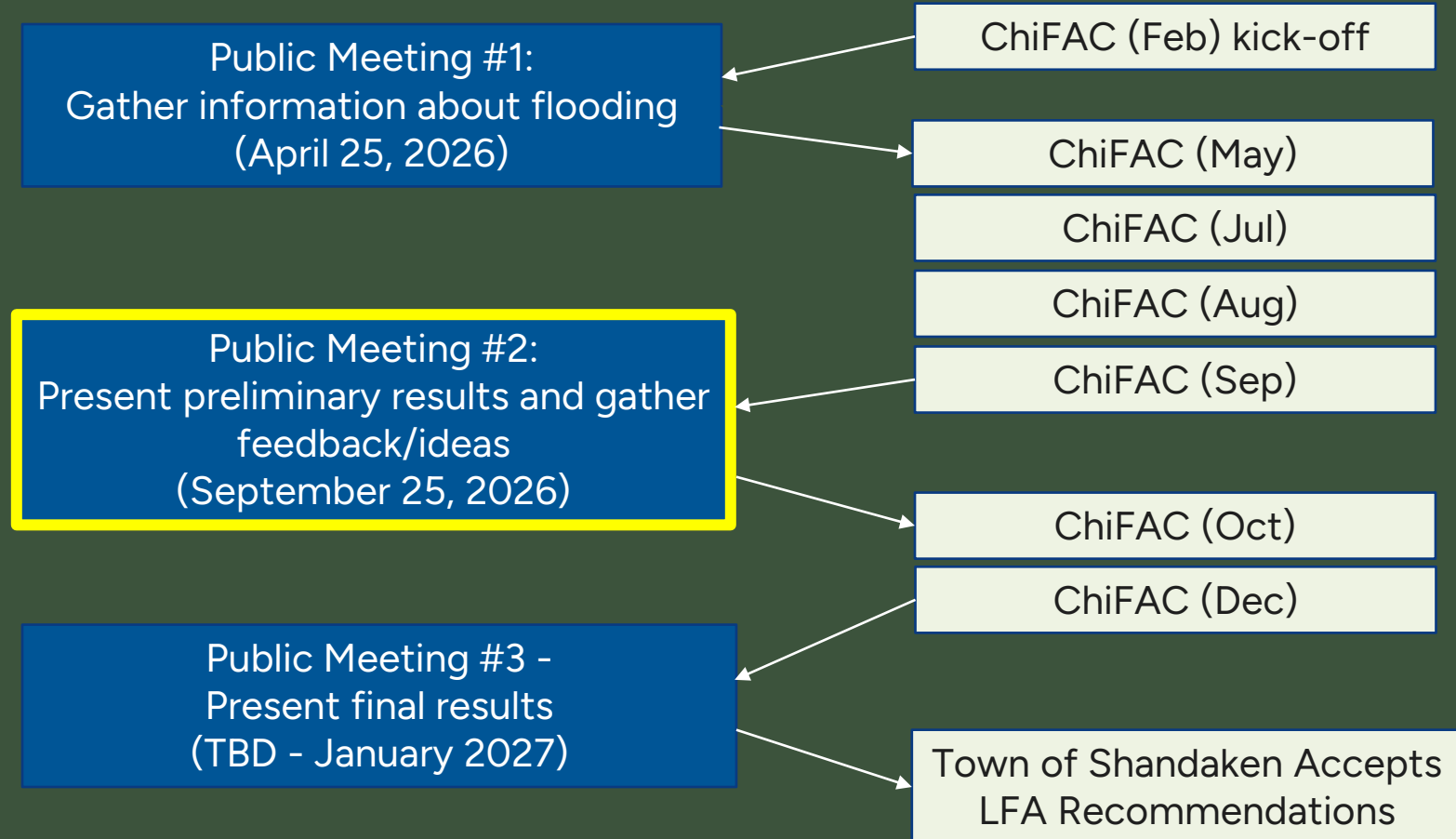
- Stream Stations (feet)
- 100-YR Flood Depths (feet)
- Building Outside Inundated Area
- Building Inundated Below FFE
- 0.1 - 2.0 Above FFE
- 2.1 - 4.0 Above FFE
- 4.1 - 6.0 Above FFE

Surveyed FFE Elevation (feet, NAVD88)	Surveyor Notes	Modeled Flood Depths Above Surveyed First Finished Floor Elevation (feet)							
		Existing Flows (FEMA)				Projected Future Flows – RCP 4.5		Projected Future Flows – RCP 8.5	
		10-Year Flood	25-Year Flood	50-Year Flood	100-Year Flood	50-Year Flood	100-Year Flood	50-Year Flood	100-Year Flood
1247.021		0.0*	0.0*	0.2	1.5	0.9	2.6	1.7	3.3

Mapping included in LFA Report

Participating homeowners receive tabular flood depth data privately

LFA Meeting Schedule





National Flood Insurance Program (NFIP)

- Flood insurance can help homes and businesses recover and does not require a national disaster declaration
- Required for homes in SFHA with federally-secured mortgage
- Encouraged for all flood-prone homes and businesses (does not have to be in mapped FEMA zone)
- Shandaken residents currently receive a 10% discount on NFIP flood insurance premiums thanks to the town's participation in the Community Rating System (CRS).

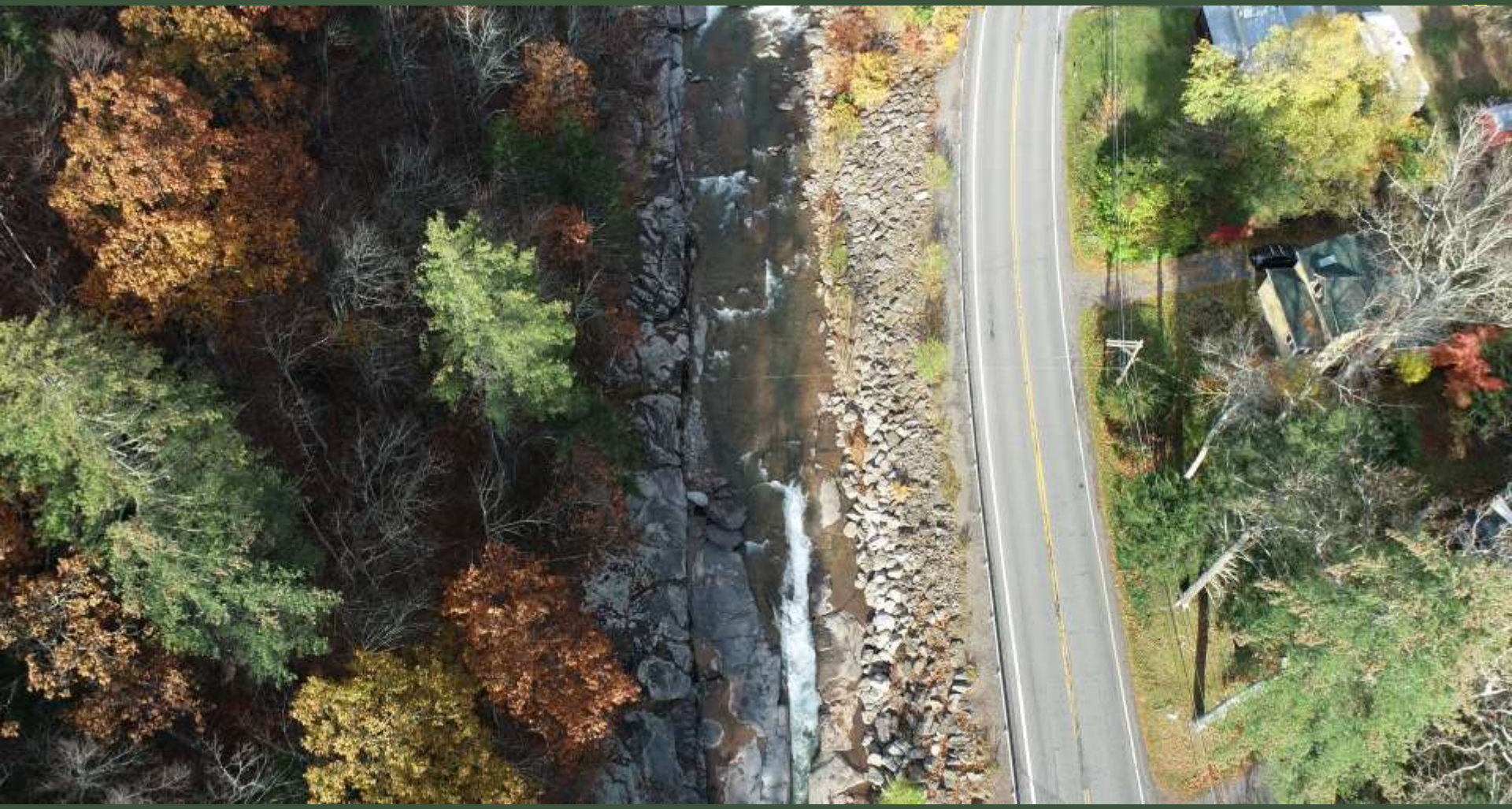


Photo: E. Parker



What can **you** do after LFA acceptance?

- Ashokan Watershed Stream Management Program
 - Riparian buffers – Catskill Stream Buffer Initiative
 - Technical assistance visits
 - <https://ashokanstreams.org/>
- Catskill Watershed Corporation
 - Property protection measures; elevation, floodproofing, utility relocation
 - Relocation assistance for residential, business, or critical community facility
 - Fuel tank anchoring
 - <https://cwconline.org/>
- NYC Department of Environmental Protection
 - NYCFFBO Buyout program for flood- or erosion hazard properties



To follow the progress:

www.ashokanstreams.org/Chichester-local-flood-analysis



Thoughts/Questions/Comments?