
TO: Halcott Flood Advisory Committee
FROM: Milone & MacBroom, Inc.
RE: Halcott LFA FAC Meeting #3
DATE: September 18, 2019
MMI #: 5197-16

A third meeting for the Halcott Local Flood Analysis (LFA) was held on the evening of September 16, 2019 at the Grange Hall. In attendance were Mark Carabetta and Matt Trueheart from Milone and MacBroom (MMI), as well as members of the Halcott Flood Advisory Committee (FAC). FAC members included representatives from the Halcott, the New York City Department of Environmental Protection (NYCDEP), Catskill Watershed Corporation (CWC) and the Delaware County Soil and Water Conservation District (DCSWCD). A sign-in sheet and the presentation slides are appended.

The purpose of the meeting was to:

- Review the LFA study area and project objectives
- Present alternatives and recommendations
- Solicit feedback regarding proposed alternatives
- Discuss final steps in the LFA process

The meeting began with MMI's presentation of recommendations for five culverts in the LFA area, how to prioritize upgrades, and potential funding sources for culvert replacements; valuable feedback was gleaned from the FAC. Following this discussion, MMI presented alternatives and recommendations for the Town Highway Garage on Ursus Way. Discussions were largely focused on the best approach to funding these recommendations, as the need to address flooding at the Highway Garage is well-recognized. MMI staff collected information and took detailed notes, which are summarized below.

While presenting and discussing culvert upgrades, the FAC made the following observations:

- Seasonal maintenance of Townsend Hollow Road levees additional importance on this road's crossing of Elk Creek, since it is essentially a dead end road in the winter months.
- While the CR3 crossing of an unnamed tributary to Vly Creek is in good condition, the downstream scour hole may destabilize the headwall if it continues to grow.
- Detour routes often include inadequate stream crossings.
- Upgrades to the Fairbairn Drive culvert are contingent upon the future of the Town Garage.
- It was suggested that barriers to fish passage may insulate local native brook trout populations from incursions of brown and rainbow trout from downstream rivers, and may therefore be desirable.

MMI's recommendation is to relocate the Town Highway Garage, either to higher ground on its existing parcel, or to a new parcel that is not within or accessed through flood-prone areas. These two approaches have different requirements, advantages, and disadvantages, which were discussed in detail. Relocating to a new parcel is the preferred solution, as it avoids the long-term costs of maintaining the vulnerable Ursus Way and Fairbairn Drive access routes.

- Historically, a creamery was located near the current site of the Town Highway Garage
- Floodproofing the Highway Garage is not a viable alternative because the facility needs to be operational in a flood, which floodproofing measures often preclude.

- Cost estimates for constructing a new highway facility assumed in-kind replacement. However, this is not realistic, and Town Board members informed MMI that the cost for a new, upgraded highway facility has been estimated at approximately \$600,000 or possibly more.
 - Several nearby towns have recently replaced their garages that may be comparable: Ashland, Andies, Bovina, Thompkins, Roxbury, Lexington
- Potential funding sources were presented, and are detailed in the LFA report, although CWC funding opportunities were discussed in detail:
 - CWC will fund up to \$50,000 for wastewater at a 25% cost share.
 - CWC will fund 100% of the purchase of a new parcel, which must be built upon within 5 years of acquisition.
 - CWC will buy out the existing property at 100% of the appraised value with no cap.
 - CWC will fund 100% of a feasibility study, up to \$10,000.
 - Additional funding sources would be necessary.

Town Board members stated that they do not have enough staff to dedicate resources to seeking grants.

Looking forward, the final public meeting date was set for **Saturday, October 19, 2019, at 10am**. MMI will provide Greg Beechler, the Halcott webmaster, with a draft report to post on the Halcott web page prior to the public meeting. Following a brief comment period, MMI will issue its final LFA report.

MEETING SIGN-IN SHEET

 MILONE & MACBROOM	Meeting Date: September 16, 2019, 6:00PM
Project: #5197-16 Halcott LFA	Place/Room: Halcott Grange Hall

Name	Company	Phone	E-Mail
Mark Carabetta	Milone & MacBroom, Inc	(845) 633-8153	mcarabetta@mminc.com
Matt Trueheart	Milone & MacBroom, Inc	(845) 633-8153	mtrueheart@mminc.com
GALE NEACE	Del. Co. SWCD	607-437-9863	gale-neace@dcswcd.org
PHIL PESKELI	NYC DEP	845 340-7853	peskeli@dep.nyc.gov
ALBERT DOUARAYA - President		845-254-4324	
Patti Warfield Clerk-T of H.		845-254-4833	Clerk@townofhalcott.org
Judy DiBenedetto	Town of Halcott Town Board	845-254-4009	cdibenz2@gmail.com
Russell Bento	Town of Halcott Highway	845 254 5736	Randy9@yahoo.com
ALAN REYNOLDS	Town Board	845-254-4522	ALANREYNOLDS05@GMAIL.COM
John Mathiesen	CWC	845 586-1400	jmathiesen@cwc online.org
INNESS KASANOF	Town Board	845 254-9920	inneskas70@gmail.com
YUKA DAY	Town Board	845 254-60136	day.yuka@yahoo.com

MILONE & MACBROOM

Local Flood Analysis

Town of Halcott, NY




Mark Carabetta
Matt Trueheart

FAC Meeting #3 | September 16, 2019

Purpose of Tonight's Meeting

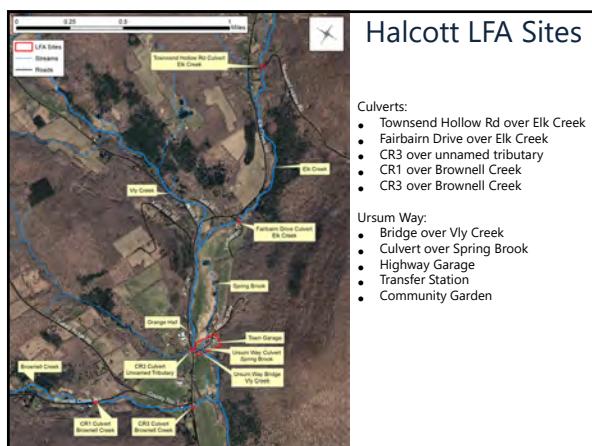
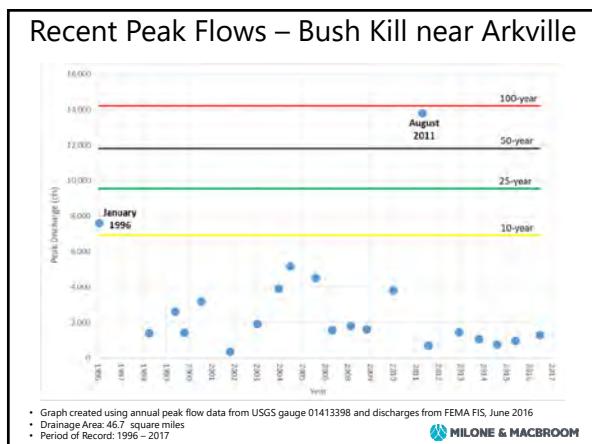
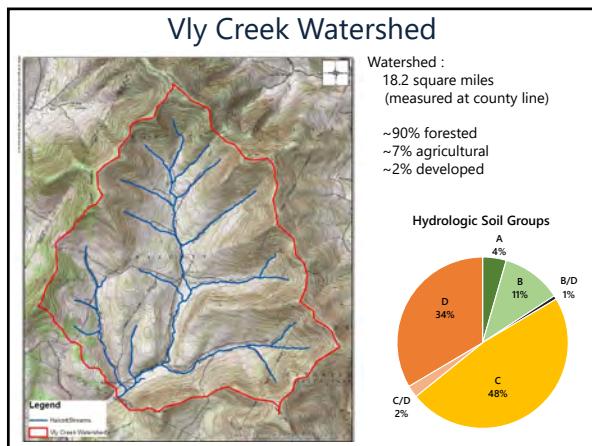
- Recap preliminary analysis and FAC#2 feedback
- Present alternatives and recommendations
 - Culverts and upgrade prioritization
 - Ursum Way and Highway Garage
 - Homes in flood hazard area
 - Satellite emergency facility
- Additional feedback
- Next steps in LFA
- Set date for Public Meeting #2

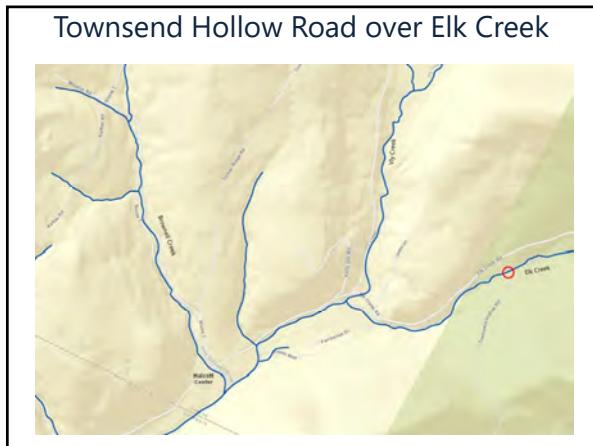


MILONE & MACBROOM

LFA Meeting Schedule

Halcott Fair (July 20)	FAC Kick-off (April 15)
Public Meeting #1 (July 22)	
	FAC #2 (August 19)
	FAC #3 (September 16)
Public Meeting #2 - present results and gather feedback (Fall)	





Townsend Hollow Road over Elk Creek

Elk Creek - Townsend Hollow Rd Crossing

Culvert	Structure Description	80 cfs (Bankfull)	230 cfs (2-Yr)	380 cfs (5-Yr)	510 cfs (10-Yr)	880 cfs (50-Yr)	1060 cfs (100-Yr)	Capacity (cfs)
Existing	6' diameter, circular CMP 5% slope, square edge with headwall	Pass	Fail	Fail	Fail	Fail	Fail	200
Recommended	18' span, 5' rise concrete box 5% slope, square edge with wingwalls, inlet invert lowered by 0.4', Roadway raised by 0.3'	Pass	Pass	Pass	Pass	Pass	Fail	910

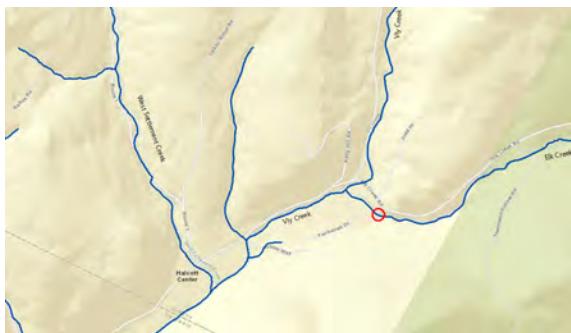
- Low-medium priority for replacement
 - Long detour, hydraulically deficient, history of failure
 - Only services a few properties, seasonal alternative access from south
- Current culvert does not pass 2-year flow
- 18 foot x 5 foot concrete box culvert would pass 50-year flow
- Requires slight increase in roadway profile

Townsend Hollow Road over Elk Creek

- Home in SFHA; owners should consider buyout if property has a history of flooding damage, and they are willing to relocate
 - May affect culvert design



Fairbairn Drive over Elk Creek



Fairbairn Drive over Elk Creek

- 7.5' diameter riveted steel pipe
- Stone & timber wingwalls in poor condition, partial failure
- Does not pass 5-year flow; barrier to fish passage
- If relying on Fairbairn Dr for emergency access to town garage, upgrading this culvert is recommended
- Priority for replacement depends on town garage:
 - Higher if town garage remains on current parcel
 - Lower if town garage moved to new parcel



Fairbairn Drive over Elk Creek

Elk Creek - Fairbairn Dr Crossing								
Culvert	Structure Description	100 cfs (Bankfull)	300 cfs (2-Yr)	490 cfs (5-Yr)	650 cfs (10-Yr)	1120 cfs (50-Yr)	1360 cfs (100-Yr)	Capacity (cfs)
Existing	7.5' diameter circular metal pipe 2.8% slope, square edge with headwall	Pass	Pass	Fail	Fail	Fail	Fail	350
Recommended	24' span, 6' rise concrete box 2.8% slope, square edge with wingwalls	Pass	Pass	Pass	Pass	Pass	Pass	1370

- 24-foot span would pass 100-year flow
- Designing the replacement structure to pass the 100-year flood is recommended if Fairbairn Drive is to be a permanent alternative emergency access to garage.
- Recommended that Town of Halcott acquire right-of-way if Highway Garage is to remain on current parcel (improved access to funding for culvert replacement for public vs. private road).
- Short term, recommended that the Town reach an agreement with the owners of Fairbairn Drive to secure interim alternate emergency access to the Garage in case of flooding in the near future.

Fairbairn Drive over Elk Creek

- Owners of properties in SFHA with history of flooding damage should consider floodproofing, or buyout if willing



Tributary under County Route 3



Tributary under County Route 3

- 7-foot span, 4.5-foot rise elliptical CMP with headwall
- No reported problems
- Structure appears to be in good condition
- Some aggradation of material in culvert
- Perched outlet impedes aquatic organism passage
- AADT on CR3: 373 (2008), 432 (2002); Detour length: 5 miles



Tributary under County Route 3

Turkey Ridge Trib - County Road 3								
Culvert	Structure Description	20 cfs (Bankfull)	60 cfs (2-Yr)	95 cfs (5-Yr)	130 cfs (10-Yr)	220 cfs (50-Yr)	270 cfs (100-Yr)	Capacity (cfs)
Existing	Elliptical CMP, 83" span, 53" rise 4.6% slope, square edge with headwall	Pass	Pass	Pass	Pass	Pass	Fail?	270

- Current culvert passes 50-year flow
- Possibly passes 100-year flow
- Low priority for replacement
 - Good condition
 - Fair/Adequate hydraulics
 - Minor upgrades may improve fish passage
 - Maintain capacity with regular debris removal

Tributary under County Route 3

- No buildings in SFHA



County Road 1 over Brownell Creek



County Road 1 over Brownell Creek

- 16-foot span, 5-foot rise open-bottom concrete box
- Very poor alignment with stream, often flanks on left in floods
- Structure in poor condition
- Detour length: 6 miles or 5.5 miles
- Medium priority for replacement
 - Structural/hydraulic deficiency
 - Multiple detour routes available



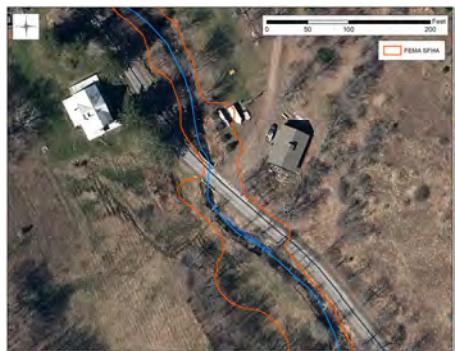
County Road 1 over Brownell Creek

Brownell Creek - County Road 1 Crossing								
Culvert	Structure Description	80 cfs (Bankfull)	200 cfs (2-Yr)	340 cfs (5-Yr)	450 cfs (10-Yr)	790 cfs (50-Yr)	950 cfs (100-Yr)	Capacity (cfs)
Existing	16' span, 5' rise open bottom conc. box 0.1% slope, square edge with headwall	Pass	Pass	Pass	Fail	Fail	Fail	370
Recommended	26' span, 5' rise concrete box 2.9% slope, square edge with wingwalls, outlet invert lowered by 0.75'; includes downstream channel modifications and raising of the road by 1.0'	Pass	Pass	Pass	Pass	Pass	Pass	1020

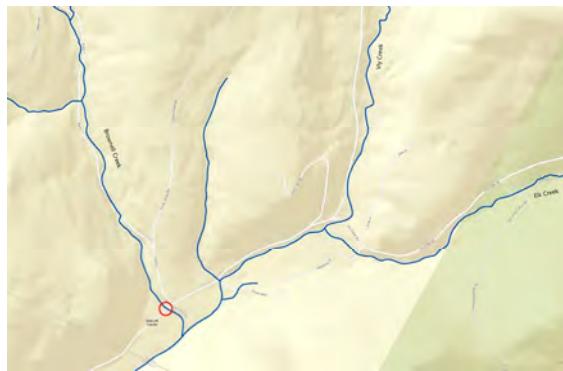
- Current crossing does not pass 10-year flow
- 26-foot span would pass 100-year flood with road grade raised by 1 foot
- Channel modification to eliminate constriction just downstream are required for improved hydraulic performance

County Road 1 over Brownell Creek

- No buildings in SFHA



County Route 3 over Brownell Creek



County Route 3 over Brownell Creek

- 12.3-foot span, 5.3-foot rise open-bottom concrete box
- Key crossing for emergency vehicles; access to/from town would be difficult this culvert were damaged or washed out.
- Structure in poor condition and hydraulically inadequate
- AADT on CR3: 373 (2008), 432 (2002); Detour length: 6 miles
- High priority for replacement
 - May require repairs and/or scour countermeasures in interim



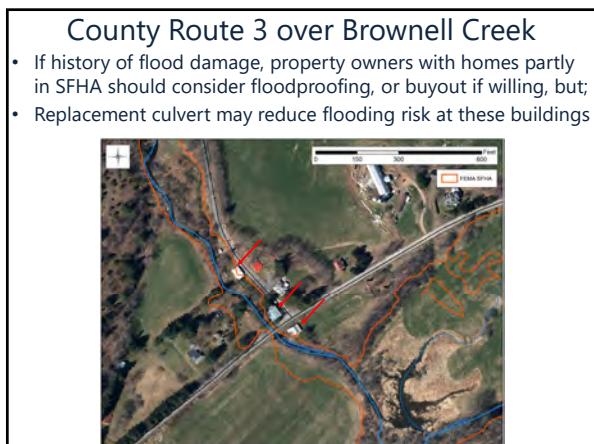


County Route 3 over Brownell Creek

Brownell Creek - County Road 3 Crossing

Culvert	Structure Description	90 cfs (Bankfull)	220 cfs (2-Yr)	360 cfs (5-Yr)	490 cfs (10-Yr)	840 cfs (50-Yr)	1020 cfs (100-Yr)	Capacity (cfs)
Existing	12.3' span, 5.3' rise open bottom conc. box 8.9% slope, square edge with headwall	Pass	Pass	Pass	Pass	Fail	Fail	520
Recommended	22' - 24' span, 5' rise concrete box 5% - 9% slope, square edge with wingwalls, inlet invert elevation decreased by 1.0'	Pass	Pass	Pass	Pass	Pass	Pass	1080

- Current crossing does not pass 25-year flood
- 22- to 24-foot span would pass 100-year flood
- A robust structure capable of meeting the demands of a 100-year flood is recommended due to the importance of this stream crossing.
- Current structure has not been inspected by Greene County



Approximate Culvert Cost Estimates

18-24' concrete open-bottom or box culvert: \$150,000 - \$250,000
 Design, permitting, construction: \$150,000 - \$250,000
Total cost per culvert replacement: **\$300,000 - \$500,000**

Potential funding sources:

- FEMA
- BridgeNY
- CWC
- SMIP-FHM

Recommended that full hydraulic assessments be conducted to ensure that replacement structures are adequately sized and compliant with NYSDOT design standards and NYSDEC guidelines

Prioritizing Structures for Replacement

- Risk minimization – how important is the crossing to transportation, emergency response, and life safety networks?
 - Roadway functional classification (highway, collector, local, etc.)
 - In case of failure, detour length of alternate route (if one exists)
 - Does alternate route include other at-risk structures?
 - Annual average daily traffic (AADT), if available
 - Access to/from emergency services and other critical facilities, homes, anchor businesses
- "Worst First"
 - Structural and/or hydraulic deficiencies should be addressed before failure occurs – corrective maintenance, improvements, or replacement

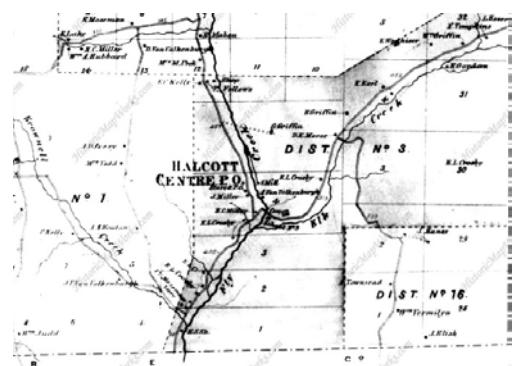
Prioritizing Structures for Replacement

- Available resources – local, county, state, federal, not-for-profit orgs.
 - Funding sources depend upon project goals
 - Example: additional grants may be available if a project improves fish passage as well as mitigating flooding
 - Seek multiple funding sources for each project
- Management
 - Routine inspections and up-to-date asset inventory
 - Scheduled preventive maintenance and debris clearing
 - Emergency action plan

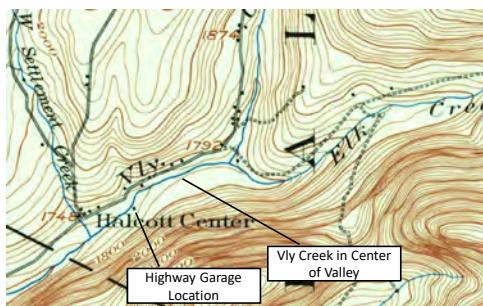
Prioritizing Structures for Replacement

1. County Route 3 over Brownell Creek
2. Fairbairn Drive over Elk Creek – if Highway Garage remains on current parcel
3. County Route 1 over Brownell Creek (esp. w/ new emergency facility)
4. Townsend Hollow Road over Elk Creek
5. County Route 3 over tributary to Vly Creek

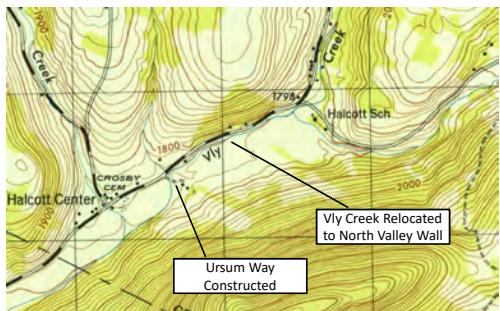
Historical Map – Halcott, 1867



Historical Map – Halcott, 1900



Historical Map – Halcott, 1945



Aerial Imagery – 1960



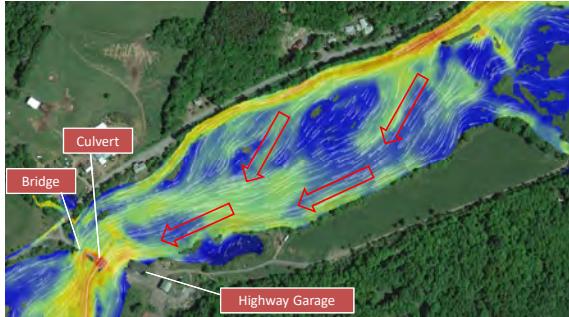
Ursum Way & Highway Garage



Ursum Way & Highway Garage



Ursum Way & Highway Garage



- During floods, Vly Creek channel fills and spills onto floodplain
- Floodplain flow converges on low terrain opposite from main channel
- Highway Garage lies in preferential flow path
- Terrain constriction and undersized structures exacerbate flooding at garage

Ursum Way & Highway Garage

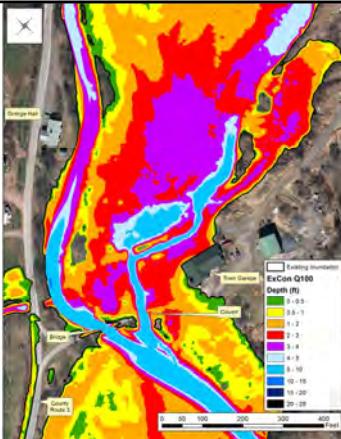
- Historical modifications have aligned channel poorly with Ursum Way
- Bridge & culvert cannot convey flood flows
- Ursum Way embankment dams water as flows overwhelm structures
 - Road overtops, and town garage floods
 - Culvert damaged numerous times in past floods
- If Fairbairn Dr. and/or its culvert over Elk Creek are damaged as well, town garage is not accessible at all.
- Town garage is a critical facility for disaster response and must be accessible and resilient to flooding damage.
- Transfer station and chemical storage at town garage may negatively impact water quality when flooded.



Ursum Way & Highway Garage

Existing Conditions:
Maximum depth,
100-year flood

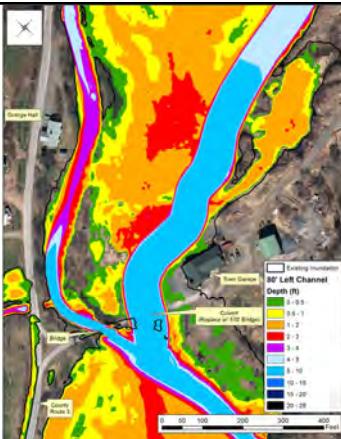
- Ursun Way overtopped.
- Culvert damage probable.
- Bridge damage possible.
- 1-2 ft of water at town garage



Ursum Way & Highway Garage

Replace Culvert with
Large Bridge:
Maximum depth,
100-year flood

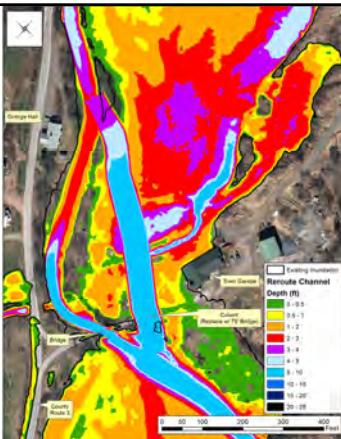
- 80' bottom-width channel at Spring Brook to convey flood flows that spill onto floodplain.
- 100' bridge to replace culvert.
- Existing bridge remains to convey normal flow in channel.
- Town garage not inundated.
- Ursun Way passable.
- Significant investment.
- Regulatory challenges.

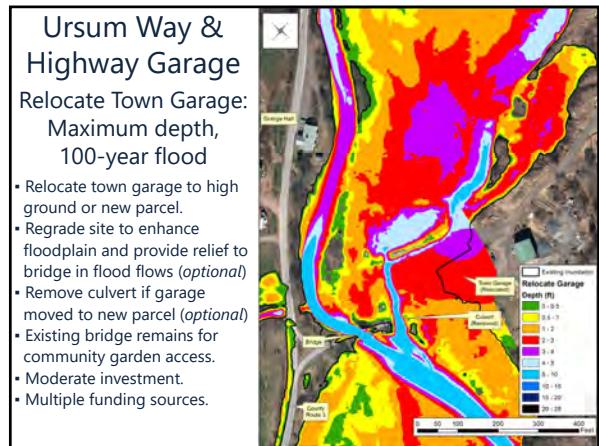


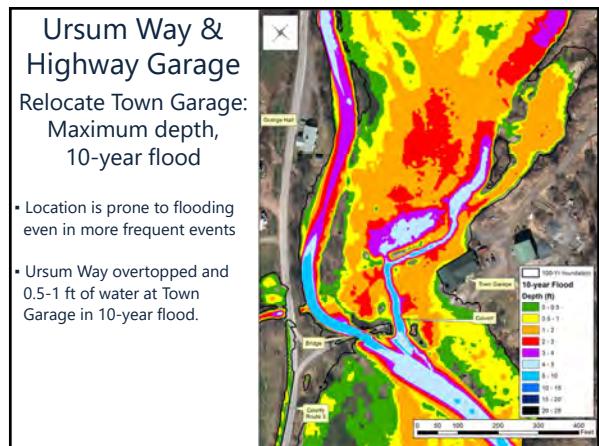
Ursum Way & Highway Garage

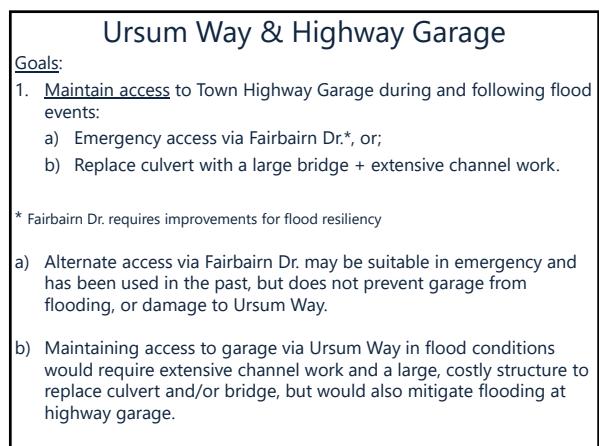
Reroute Channel:
Maximum depth,
100-year flood

- Realign 600 linear feet of channel to more natural flow path, 50' bottom width.
- Replace culvert w/ 75' bridge.
- Existing bridge remains for additional flood conveyance.
- 0.5-1 ft of water at garage.
- Slight overtopping of Ursus Way, passable by trucks.
- Significant investment.
- Regulatory challenges.









Ursum Way & Highway Garage

Goals:

2. Reduce/eliminate flooding of Town Highway Garage:
 - a) Replace culvert w/ large bridge + extensive channel work, or;
 - b) Floodproof highway garage, or;
 - c) Relocate highway garage to higher ground on same parcel and access via Fairbairn Dr.* in emergency, or;
 - d) Relocate highway garage off-site:
 - Leave Ursum Way as-is and continue to maintain, or;
 - Remove culvert and keep bridge for garden access.
 - Floodplain enhancements are possible at town garage location that may improve bridge resiliency

* Fairbairn Dr. requires improvements for flood resiliency

Ursum Way & Highway Garage

Goals:

2. Reduce/eliminate flooding of Town Highway Garage
 - a) A new, large bridge is impractical and cost-prohibitive; regulatory permitting for the required channel work would be challenging.
 - b) Floodproofing the town garage does not improve emergency access, but may address water quality concerns.
 - c) Relocating town garage to high ground on the same parcel and securing emergency access via Fairbairn Dr. is an effective solution; Ursum Way may still be damaged in floods.
 - d) Relocating town garage to a new parcel is likely the most cost-effective solution, short- and long-term, to improve flood resiliency.
 - Partial or complete strategic disinvestment of Ursum Way
 - Bridge may be left in place for access to community garden
 - Could also include floodplain enhancements

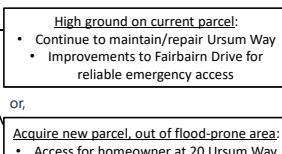
Ursum Way & Highway Garage

Goals:

1. Maintain access to Town Highway Garage during and after floods
2. Reduce/eliminate flooding of Town Highway Garage

Two alternatives to achieving both goals:

- Extensive channel modifications and construction of a large bridge
or,
- Relocation of town garage



Ursum Way & Highway Garage

- 100' span at Ursum Way culvert: \$2.75-4M
 - Structure, design, site work, construction: \$2.5-3M
 - Channel work for 80' channel at Spring Brook: \$750k-1M
- 75' span at Ursum Way culvert: \$2.25-4M
 - Structure, design, site work, construction: \$2.25-2.75M
 - Channel work to reroute main channel: \$1-1.25M
- Relocate highway garage on same parcel: \$600-700k
 - Relocate building or construct new \$50-150k
 - Deconstruction and cleanup of current site: \$50k
 - Repair/replace Ursum Way 66' CMP culvert after floods: \$8-12k
 - Possibly every 10-25 years (done by Town of Halcott post-flood)
 - Improvements to Fairbairn Drive: \$100k
 - Replace Fairbairn Dr. culvert over Elk Creek: \$400k
- Relocate highway garage to a new 5-acre parcel: \$200-300k
 - Acquire property ($\pm \$5k/acre$): \$30k
 - Construct building: \$150k
 - Deconstruction and cleanup of current site: \$50k

Ursum Way & Highway Garage

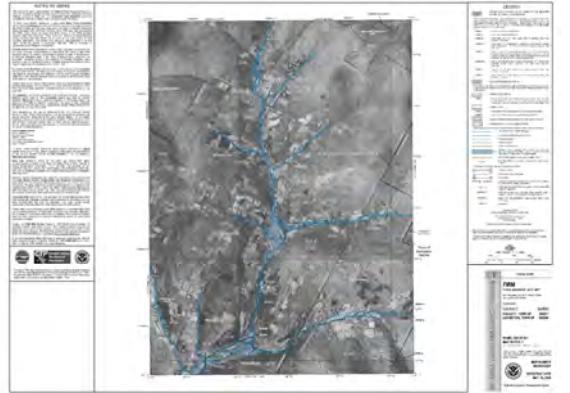
Recommendation is to relocate the Town Highway Garage.

- New parcel and building requires initial investment, but avoids long-term, repetitive flood damages
 - Must locate appropriate property from willing seller
 - May remove Ursum Way culvert proactively to provide relief to bridge, or wait until flooding damage
 - Floodplain enhancements may provide additional relief to bridge
 - Property at 20 Ursum Way requires access, likely by Fairbairn Dr.
- High ground on existing parcel would require more maintenance, and investment in emergency alternate access
 - Repairs to Ursum Way following floods
 - Upgrades to Fairbairn Drive for reliable emergency access is the majority of this alternative's cost

Ursum Way & Highway Garage

- Either relocation option is more practical and less expensive than other alternatives that both maintain access and reduce flooding damages to the garage in its current location.
- Relocating garage out of SFHA may be eligible for funding from FEMA, CWC, NYC
- Relocating the garage provides the opportunity for floodplain enhancements, which may make funding available from SMIP-FHM.
- Public garden is a valuable asset for the community, and access to it can be maintained in either relocation scenario. Culvert removal and floodplain enhancements may reduce damages to the garden in floods as well.

Homes and Property in SFHA



Homes and Property in SFHA

- Several buildings in the Town of Halcott are in the special flood hazard area (SFHA), both within and outside the LFA project area
- Reports from Halcott residents of flood damage to homes and property in the past
- Depending on their history of flooding damages and owner interest, these property owners should consider buyouts or relocation (FEMA, NYC, CWC) or floodproofing measures (CWC, ESD)
- Encourage property owners to purchase NFIP flood insurance and make claims when damage occurs
- Upgrading undersized culverts in certain cases may reduce floodwater elevations at upstream homes and property

Potential Funding Sources

Detailed in LFA Report

Recommendation	Potential Eligibility		
	Federal	State	Other
Replace undersized culverts	FEMA	Bridge NY	SMIP-FHM
Debris removal following floods	USACE		CWC
Relocate Town Highway Garage out of SFHA	FEMA		CWC; NYC
Relocate transfer station		NYS Dept. of State	CWC
Floodplain enhancements at Garage site			SMIP-FHM
Install floodproofing at critical facilities	FEMA		CWC
Floodproof or relocate the most flood-vulnerable properties where there is owner interest	FEMA	ESD	CWC; NYC
Anchor fuel tanks			CWC

Important to identify combinations of funding sources to reduce requirement to provide matching funds.

Satellite Emergency Facility



Satellite Emergency Facility

- New parcel on CR3, just east of junction with CR1 – is this the correct location?
- Not in SFHA, but may experience flooding if CR3 culvert over Brownell Creek is obstructed by debris and flow flanks the structure
- Location near this junction increases the importance of CR3 and CR1 culverts over Brownell Creek
- Probably can not accommodate relocated Town Garage as well

LFA Schedule

FAC Kick-off (April 15)

Halcott Fair (July 20)

Public Meeting #1
(July 22)

FAC #1 (August 19)

FAC #2 (September 16)

Public Meeting #2 -
present results and
gather feedback
(Fall – date?)

Set dates:

- Public Meeting #2
- Draft Report
- Comment Period
- Final Report

Questions, Comments, or Thoughts?

