

**New York City Department of Environmental Protection
Bureau of Water Supply**

**Second Evaluation of the
Local Flood Hazard Mitigation Program**

June 2023

*Prepared in accordance with Section 4.6 of the NYSDOH
Revised 2017 Filtration Avoidance Determination*



Prepared by: DEP, Bureau of Water Supply

1. Introduction

The Local Flood Hazard Mitigation (FHM) Program was developed collaboratively by the New York City Department of Environmental Protection (DEP) and West of Hudson (WOH) watershed communities in the years following widespread flooding impacts caused by Tropical Storms Irene and Lee in 2011. The City and watershed stakeholders collectively agreed that the FHM Program is intended to reduce repetitive flood losses, improve the resiliency of WOH watershed communities, and protect the quality of the City's water supply.

The components of the FHM Program include: (1) a Local Flood Analysis (LFA) that identifies flood hazards in population centers and recommends potential mitigation projects; (2) dedicated funding through DEP's Stream Management Program (SMP) to develop LFAs and implement stream related FHM projects; (3) dedicated funding through the Local Flood Hazard Mitigation Implementation Program (LFHMIP) administered by the Catskill Watershed Corporation (CWC) to implement a wider range of LFA recommended and other FHM projects; and (4) a New York City-Funded Flood Buyout Program (NYCFFBO), with dedicated funding through DEP's Land Acquisition Program (LAP).

Pursuant to the City's 2007 Filtration Avoidance Determination (FAD) as revised by the New York State Department of Health (NYSDOH) in 2014, DEP initially committed \$10.1 million to local SMP partners for LFA development and project implementation; \$17 million to CWC for the LFHMIP; and \$15 million for the NYCFFBO. The NYCFFBO is further codified in 2016 modifications to the City's 2010 Water Supply Permit (WSP) issued by the New York State Department of Environmental Conservation (NYSDEC).

The 2017 FAD, as revised by NYSDOH in 2022, requires the City to continue supporting the FHM Program as follows: (1) complete LFAs and commit an additional \$15 million to SMP partners to support a minimum of 50 LFA recommended projects; (2) annually assess funding commitments for SMP partners and CWC, and commit additional funding as needed; (3) coordinate with State and federal agencies to support matching grant applications for LFA recommended projects; (4) support the use of Flood Insurance Rate Maps (FIRMs) by watershed communities; (5) evaluate the NYCFFBO in 2018 and 2021; and (6) evaluate the FHM Program in 2020 and 2023. This report fulfills the latter FAD deliverable due June 30, 2023.

Since the NYCFFBO was already evaluated in two prior FAD reports, this evaluation focuses on the remaining components of the FHM Program while acknowledging that the NYCFFBO has been an important tool in enabling several LFA projects to progress. The following sections describe progress on the completion of LFAs in WOH watershed communities; the implementation of LFA projects through the SMP and CWC's LFHMIP; the status of City funding commitments to the FHM Program; an update on FHM recommendations offered by DEP in its June 2020 FAD evaluation report; and new recommendations for the FHM Program, based on input from local partners as solicited by DEP during the past year.

Specifically, DEP convened three FHM coordination meetings in September 2022, January 2023 and May 2023 during which this evaluation was discussed with CWC and all SMP partners. DEP collected data and input on program elements via phone calls and emails, and DEP

circulated eleven initial draft recommendations to all partners for review and discussion at the May 2023 meeting. Following constructive partner feedback at the May meeting, DEP revised the recommendations by merging some, eliminating others, and creating a new one. The final recommendations contained in this report were circulated one last time to all FHM partners in mid-June to confirm overall consensus on potential program improvements.

2. Local Flood Analyses

LFAs are the critical foundation of the FHM Program; they provide municipalities with scientifically based planning tools to assess flooding risks, estimate benefits offered by particular projects, and evaluate the viability of project options to mitigate flooding risks and impacts. LFAs build upon hydraulic models developed and completed in 2015 by the Federal Emergency Management Agency (FEMA) for all WOH communities under a \$7 million DEP contract. The models updated floodplain maps under the National Flood Insurance Program (NFIP) by depicting areas of inundation, depth, and velocities under a series of changing assumptions; these models provide estimates for several recurrence intervals including the 100-year “base flood” event (the 1% annual chance recurrence flood event) which is the basis for NFIP floodplain delineation and corresponding regulations. Applied together with a benefit cost analysis (BCA), the results give watershed communities a planning-level assessment of potentially viable LFA projects and their relative approximate costs.

2.1 LFA Process

The LFA process establishes a Flood Advisory Committee (FAC) for a defined population center. The FAC is comprised of municipal officials (town supervisors, village mayors, planning board members, highway superintendents, code enforcement officers, and floodplain administrators), as well as other representatives such as realtors, business owners, and community residents. Active participation in the FAC ensures that local concerns are fully represented throughout the LFA process while promoting a shared understanding within a community about localized flooding issues, impacts, and mitigation options.

Throughout the LFA process, DEP, CWC and SMP partners including county Soil and Water Conservation Districts (SWCDs) and Cornell Cooperative Extension of Ulster County (CCEUC) collectively serve as a resource for the FAC. The local SMP partner typically procures the engineering consultant on behalf of the municipality. The consultant identifies the location and magnitude of flooding, considers options for reducing damages (often comparing the benefits and costs of each option using planning estimates), and prepares recommendations for potential projects. A municipality typically accepts the LFA via formal resolution, thus allowing it and individual residents or businesses to pursue projects for implementation using funds available through the SMP, CWC, or the NYCFFBO. Importantly, the LFA also provides information required for grant applications to FEMA, New York State, and others.

The most frequent flooding issues identified or confirmed by LFAs include backwater flooding upstream of undersized bridges and culverts; over bank flooding of channelized or walled streams; displaced flood waters from filled floodplains; and flooding caused by debris jams at bridges. To mitigate the impacts of these flooding issues, LFA recommended projects

often rely on a BCA to quantify relative benefits and planning-level costs vis-à-vis a benefit cost ratio (BCR). It is worth noting that a BCA is typically required for FEMA grant applications, and coordinating the FHM Program with State and federal funding programs is explicitly referenced in the Revised 2017 FAD. Historically, a BCR of at least 1.0 was the threshold for federal FHM grants; however, recent changes have allowed projects with lower BCRs, particularly in rural and impoverished communities, to advance by using an alternative calculation method. Recent LFAs have not always included BCRs for projects. Currently, none of the City's FHM partners enforce a BCR threshold for project funding.

2.2 LFA Status

To address the dual goals of community resiliency and water quality protection, DEP and watershed stakeholders agreed that all WOH villages, hamlets, and village extension areas as designated in the 1997 Watershed Memorandum of Agreement (MOA) would be eligible for the LFA process. If needed, LFA boundaries may be extended upstream or downstream of a village or hamlet to reflect flooding concerns more broadly. In July 2014, the SMP adopted final LFA program rules that codified the eligibility of specific MOA population centers to apply for SMP funding to undertake the LFA process, with one of the requirements being the creation of a municipally designated FAC to oversee the LFA consultant process.

To date, 43 of the 59 MOA-designated villages and hamlets (73%) are covered by 25 completed LFAs, with several LFAs covering more than one population center and a few covering population centers not designated in the MOA. Since DEP submitted its June 2020 evaluation report, seven population centers have completed LFAs (Pine Hill, Jewett, East Jewett, South Jewett, Curry, Unionville, and Grahamsville) and nine population centers in Delaware County have requested to begin the LFA process (the Village of Margaretville, the hamlets of Trout Creek and Bloomville, and three hamlets each in Middletown and Bovina).

Because the remaining MOA-designated communities have little or no risk of inundation flooding due to physical/hydrological characteristics and a general lack of structures within floodplains, it is unlikely that every eligible population center will undertake the LFA process. As a result, DEP believes that the LFA study phase is substantially complete, with most eligible communities now engaged in the implementation of projects. It is worth noting that some communities have inquired about updating older LFAs or completing an LFA for a population center that is not one of the 59 MOA designated villages and hamlets. For example, the non-MOA hamlet of Lanesville, located in the Ashokan basin portion of the Town of Hunter in Greene County, has formed an FAC and is interested in pursuing an LFA by working through the SMP; discussions are underway about funding and next steps.

Figure 1 depicts the geographic location of all LFAs completed and planned/proposed thus far, along with remaining eligible communities. The total cost of all completed LFAs is just under \$2 million and does not include DEP's \$7 million commitment to the original FEMA flood mapping study. DEP funded the completion of LFAs through portions of the initial \$10.1 million commitment to SMP partner contracts per the Revised 2007 FAD and portions of subsequent funding commitments per the Revised 2017 FAD. All municipalities undertaking LFAs have accepted them. Completed LFAs are available at catskillstreams.org.

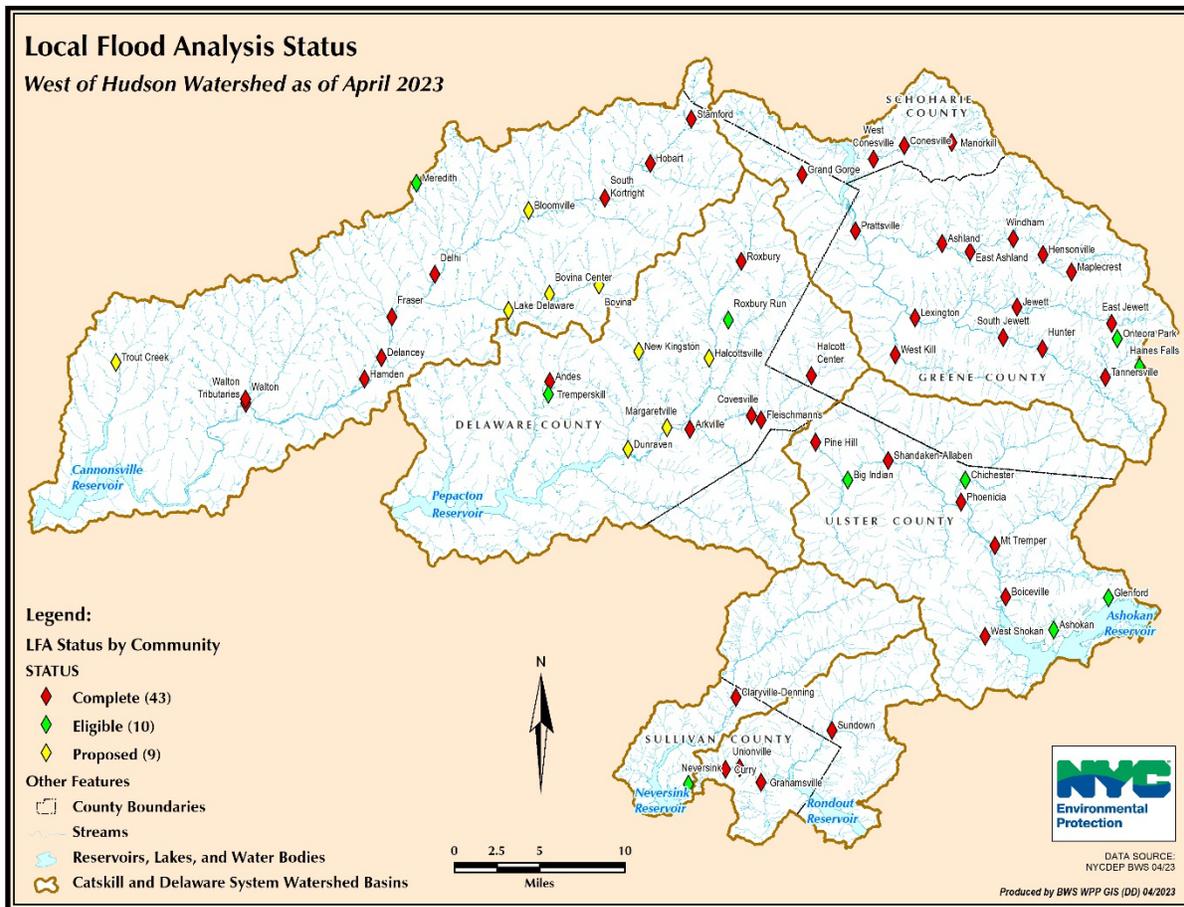


Figure 1. Status of 25 LFAs covering 43 WOH communities as of April 2023.

2.3 LFA Recommendations

The 25 LFAs covering 43 communities recommend a diversity of project options that are summarized in Table 1. LFAs often provide BCRs for larger and more complex projects, especially floodplain restoration or infrastructure projects. As previously noted, the BCA serves as a planning-level cost estimate only, with additional analysis often needed to better assess project costs once a community is ready to proceed with implementation.

Infrastructure upgrades/replacements represent the largest increase (23%) in LFA project categories since DEP’s 2020 evaluation report due to several factors. First, flood risk and flood history are not as prevalent in newer LFAs, since these population centers are smaller with fewer habitable structures as compared to the initial set of LFA communities. Second, recent LFAs cover population centers that are located predominantly in mid-to-upper reaches of the watershed, compared to previous LFAs covering population centers located in broader valleys or at confluences of larger rivers. Given the geography of the more recent communities completing LFAs, more stream crossings are inherently present, particularly culverts. For example, in the community of Pine Hill, which completed its LFA in 2022, 13 stream crossing structures were assessed, seven of which were determined to be contributing to backwatering conditions.

Table 1. Summary of recommendations in 25 completed LFAs covering 43 communities.

Project Category	Approximate Number (as of June 2020)	Approximate Number (as of June 2023)	Percent Change
Floodplain Restoration	23	24	2%
Infrastructure Upgrade/Replacement	34	54	23%
Property Protection ¹	30	34	6%
Flood Buyout ¹	15	15	0%
Emergency Response	10	10	0%
Pollution Prevention	17	21	11%
Channel Modification	9	12	14%
Streambank Stabilization ¹	9	9	0%
Relocation	8	8	0%
Flood Control	2	2	0%
Administrative Action ²	-	9	N/A

¹ These recommendations frequently involve multiple projects or properties.

² This is a new category tracked by DEP since the 2020 FHM evaluation report.

Floodplain Restoration

This category of projects, which had the smallest increase (2%) since DEP’s 2020 evaluation report, allows streams and rivers to access their floodplains at higher flows, thereby lowering the water surface elevation (WSE) and velocity of floodwaters as well as increasing storage of flood flows on the floodplain. Achieving these objectives requires different approaches. In some cases, restoration requires excavating fill that was placed in a floodplain, such as the Water Street Floodplain Restoration Project in Walton. In other cases, floodplains are created anew where they were previously eroding the base of a failing streambank or hillslope. Restoration of a stream’s floodplain can direct flows away from structures in or near floodplains while enhancing habitat and providing greenspace.

When restoring a floodplain, municipal infrastructure such as bridges and roadways often needs to be modified to accommodate the change in flood routing. The ability or willingness of a community to implement floodplain restoration recommendations can depend on the implications for property owners, the municipal tax base, and community character. The disproportionately high cost of infrastructure modifications and disposal of excavated material compared with the relatively lower benefits associated with fewer structures in the floodplain are key factors helping to explain why floodplain restoration projects are rarely feasible in smaller population centers even though they can pose significant flood reduction benefits.

Infrastructure Upgrade/Replacement

Upgrading or replacing undersized stream related infrastructure continues to be the most common recommendation in completed LFAs to date, due to the undersized nature of bridges and culverts combined with the increased magnitude of future flood flows; these recommendations are particularly important for improving community access and emergency response, which affect long-term community resiliency. LFAs recommend the replacement of bridges or culverts consistent with New York State Community Risk and Resiliency Act

(CRRA) standards. Project costs can range from \$1-2 million for town structures, and up to \$30 million or more for large bridges. Responsibility for bridge replacement typically rests with the New York State Department of Transportation (NYSDOT) or county highway departments, while culverts are usually the responsibility of town highway departments and generally cost \$1 million or less. The timeframe for design and construction of a culvert project is typically 18-24 months; the timeframe for designing and constructing larger-scale bridge projects is longer and often spans several years.

One of the first steps taken during the LFA process is to hydraulically model whether bridges and culverts constrict flows and create backwater conditions. When the estimated cost of a bridge replacement is substantially greater than the mitigation value (as in rural areas), the LFA typically recommends replacing the bridge with a longer span (and potentially including a floodplain under the new span) when its structural condition warrants such replacement.

Property Protection

This category of projects includes the elevation or floodproofing of structures located in the area of the floodplain outside of the floodway, where flood elevations and velocities are not excessive, thereby allowing certain structures to remain in place with certain protective measures. These measures are possible for properties where the WSE is typically less than three feet and velocities are less than five feet per second. In addition to reducing flood damages, property protection can preserve a community's tax base, lower flood insurance costs for residents, and increase property values. This is particularly important in communities where rising flood insurance costs create an obstacle to the sale of flood-prone properties.

To help offset rising flood insurance premiums, municipalities can consider applying to the federal Community Rating System (CRS), which is administered by FEMA through the NFIP. The CRS is a voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the NFIP. Once a community enrolls in the CRS, insurance policy holders receive discounted rates that are determined by the extent to which the community implements or performs proactive FHM standards, practices, and activities. Over 1,500 communities participate in the CRS nationwide. Currently, only 30 municipalities throughout New York State are enrolled in the CRS; however, six of these CRS communities (20%) are located within the WOH watershed.

It is worth noting that as of April 2023, FEMA has fully implemented a new NFIP pricing methodology called Risk Rating 2.0, which began a phased rollout starting October 2021. This new methodology is intended to leverage industry best practices and cutting-edge technology to deliver rates that are actuarially sound, easier to understand, and better reflect a property's flood risk. FEMA takes the position that purchasing flood insurance is the first line of defense against flood damage and a step toward quicker post-flood recovery, noting that rates since the 1970s have predominantly emphasized a property's elevation within a FIRM. Ten states and dozens of municipalities have filed a lawsuit against FEMA claiming that residents are being priced out of their homes, and existing community and individual flood mitigation measures are not adequately accounted for in the rate calculation. Since it is possible that Risk Rating 2.0 may start to disincentivize property owners from implementing property protection

measures and maintaining flood insurance, it will be important for the FHM Program to monitor evolving federal and State standards, guidelines and regulatory requirements in the years ahead.

Flood Buyouts

Buyouts include the purchase of residential, commercial, or municipally owned properties and demolition or removal of all improvements so that streamside buffers can revert to a flood-resilient land use such as a natural floodplain and/or a constructed flood-mitigation project designed to reduce stormwater impacts. The option to return to a natural landscape is particularly applicable where alternatives such as floodplain restoration cannot appreciably lower flood elevations or velocities, or where protection of a given property is not practical due to flood depths and velocities. Buyouts are typically recommended for abandoned structures in or near a floodway, where flood elevations and velocities are most excessive.

The NYCFFBO requires municipal approval of each buyout and willing participation of the property owner. The NYCFFBO encourages municipalities to own and manage each property as a natural landscape or mitigation project with a conservation easement granted to NYSDEC, and a reuse plan developed by the municipality and approved by NYSDEC. While some LFAs recommend specific buyout properties, sensitivity to the privacy of property owners has led several communities to instead recommend designated areas where multiple buyouts could be considered. To date, the NYCFFBO has closed on 24 properties, including 12 that are municipally-owned with 12 that are City-owned. Six additional properties are under purchase contract and in process of closing, all of which will be municipally-owned.

Regardless of whether a local municipality or the City becomes the eventual owner of a NYCFFBO property, DEP through the LAP provides or funds virtually all real estate transaction services related to appraising properties, negotiating buyout deals and signing purchase contracts with willing sellers, due diligence work such as surveys or environmental site assessments, and costs associated with closing on the property.

Business and Critical Facility Relocation

Relocating essential businesses (often called anchor businesses) and critical facilities out of a floodplain or floodway is a key LFA recommendation to both protect water quality and help ensure community resiliency. Many LFAs completed to date identify specific anchor businesses and critical facilities that have incurred repetitive losses and are recommended for relocation, such as town halls, highway departments and fire houses. Some LFAs recommend relocations in combination with floodplain restoration to protect flood fringe properties.

Funding is available through the NYCFFBO to purchase the flood-prone structure and underlying land, while the property owner is responsible for building a new structure on an upland site outside of the floodplain, for which cost-sharing funds are available through CWC's LFHMIP. CWC has traditionally required that applicants purchase a similarly sized area of land outside of the floodplain but within the same municipality. Per discussions with DEP in the years following the 2020 FHM evaluation report, CWC has agreed to allow individual towns, as a condition of receiving funding through the LFHMIP, to waive the

requirement that anchor businesses or critical community facilities must relocate within the same municipality. DEP commends CWC for demonstrating flexibility on this issue.

Streambank Stabilization

LFAs recommend streambank stabilization projects where downed trees and stream sediment (jointly referred to as debris) have historically clogged channels, bridges and culverts or damaged floodplain buildings. This practice is best suited for treating failing hillslopes caused by channel incision (lowering of the streambed by natural or human activity) or scour along the toe of a hillslope. Projects often include creation of a floodplain along the toe of the failing hillslope, referred to as a floodplain bench. The bench also serves to store sediment and help prevent trees from washing down the hillslope. Streambank stabilization projects are particularly viable recommendations in areas where excess sediment from eroding banks contributes to channel aggradation and reduces stream conveyance capacity.

Emergency Response

This category of LFA recommendation has predominantly referred to the installation of flood warning systems and emergency notifications, particularly at vulnerable locations along roadways. Recommendations also include the installation or reactivation of stream gages to better predict flood flows downstream population centers and infrastructure.

Pollution Prevention

Nearly every LFA recommends the general anchoring of existing fuel tanks that are currently unanchored to help prevent avoidable sources of pollution from becoming mobilized during flood events and entering the City's water supply. Through the LFHMIP, CWC funds the anchoring of fuel oil and propane tanks located in the 500-year floodplain at no cost to property owners. It should be noted that any property owner is eligible for this funding, regardless of whether they live in an LFA community or the fuel tank anchoring is recommended in an LFA.

Channel Modification

This category examines the feasibility of altering a portion of the stream channel to reduce flooding nearby. Specific LFA recommendations have included the creation of a bypass channel, or re-alignment or dredging of the stream channel. Although many of these projects are not eligible for City funding and might not be the best mitigation option, LFAs are intended to reflect community goals and public input and therefore include all options for consideration.

Flood Control

Flood control measures such as constructing a levee or berm are also not eligible for City funding through the FHM Program. However, LFAs may contain these recommendations (only two thus far, and none since 2020) as reflected by community goals and/or public input.

Administrative Actions

This new category of LFA recommendation reflects a variety of actions a community might take before deciding to advance a large or complex infrastructure project. Examples include conducting feasibility analyses to assess the hydraulic capacity of aging infrastructure approaching the end of its useful life, or conducting additional hydraulic modeling to support the updating of current flood maps. For large-scale infrastructure replacement projects, if a municipality takes this step and subsequently constructs the infrastructure to a higher standard, the community and its critical assets will likely become more resilient to future flooding.

3. Evaluation of the LFA Process and Projects

As noted in its 2020 evaluation report, DEP continues to believe that WOH watershed communities have successfully used the LFA process to identify and implement projects that may reduce future flood damages, protect water quality, and increase community resiliency. Local SMP partners have played a critical support role to municipal leaders to organize FACs, select and hire consultants, advance LFAs on schedule, and ensure consultants incorporate community concerns and public input.

The formation of FACs and their regular interaction between engineering consultants and community leaders has been an invaluable component of the LFA process. Local engagement among the FACs and members of the public helped to exchange critical science-based information and led to the development of many LFA recommendations. Public involvement was key to the LFA process. FACs encouraged the exchange of ideas and opinions on local flooding issues and mitigation options, including some alternative FHM strategies that were controversial. An extensive local engagement process helped the LFA consultants to gauge community willingness to consider a multitude of project alternatives.

At the time of DEP's 2020 evaluation, six FACs were meeting regularly and several LFAs were still in process. Currently, with no LFAs underway, only Shandaken and Walton continue to have active FACs that meet on a regular basis. Figure 2 summarizes the number of active FACs in WOH communities each year during the period 2012-2023. As LFAs are completed, FACs tend to stop meeting, which can potentially impact project implementation.

As the length of time increases since the last major flood, awareness of FHM issues tends to decrease. With the exception of the localized December 25, 2020 flood, which impacted the Town of Shandaken by washing out portions of municipal roads and inundating two homes (one was occupied), there has not been a major flood affecting the WOH watershed in more than a decade. If communities continued to have active FACs, this could help maintain attention and focus on flood risk, which is the most common natural disaster in New York State; this risk is expected to increase due to impacts from climate change.

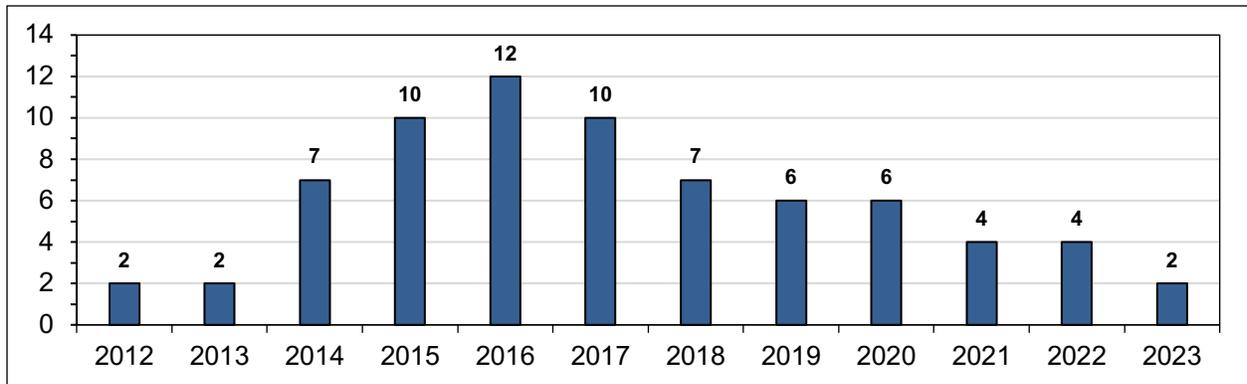


Figure 2. Number of active FACs in the WOH watershed each year during 2012-2023.

As part of this evaluation, DEP asked SMP partners about the status of FACs in their communities, and all agreed that the majority of the original FACs have evolved into smaller, project-driven groups that convene only when needed. These scaled-back versions of the original FAC membership typically only involve municipal officials or key residents appointed to committees or boards; interest of these smaller groups range from advancing specific LFA projects to more generalized stream corridor management issues.

As DEP noted in its 2020 evaluation report, projects recommended in LFAs vary greatly in scale and complexity. Some projects are straightforward and can be constructed within one to two years. Other projects require longer timeframes to develop community consensus, secure additional funding or property rights, complete project designs, and obtain necessary permits. Many projects such as culvert replacements, streambank stabilizations, property protection measures, and fuel tank anchoring have advanced rather quickly. Thus far, all communities with completed LFAs have project recommendations that are eligible for City funding and potential State and federal funding. It remains a community's decision whether and when to implement LFA recommendations.

One of the challenges for the FHM Program is the growing bottleneck of work due to the limited number of local consulting firms that are qualified to complete LFAs or able to undertake design work for floodplain enhancement projects, complex in-stream projects, and large-scale bridge or culvert projects. Only three different firms have completed all 25 LFAs thus far, with one firm completing 20 (80%). DEP and local FHM partners agree that the pool of trusted firms is small, and each has unique strengths and weaknesses. There could be a benefit to the FHM Program overall if the number of planning and design firms were to expand, which might decrease project costs due to greater competition. This was initially one of DEP's draft recommendations, but after discussing with local partners it was universally agreed that expanding the availability of firms is almost exclusively beyond anyone's control.

As DEP also noted in its 2020 evaluation report, none of the completed LFAs contain a detailed enumeration of water quality benefits. Quantifying water quality benefits during the LFA process was deemed not workable in the early phase of the Program, so LFAs only describe in general terms the water quality protections associated with a particular project, such as recommending a highway garage for relocation and correlating that to a reduced risk of hazardous chemicals and petroleum products being released. Regardless, DEP considers the

LFA process to be a successful endeavor. City funding was used efficiently to provide LFA communities with a planning-level analysis of complex projects that may progress in stages, from feasibility study to design to construction. DEP is pleased that implementation of LFA-recommended projects is well underway through both the SMP and CWC’s LFHMIP.

4. Project Implementation through the SMP

The SMP funds stream related LFA projects by awarding FHM grants through the Stream Management Implementation Program (SMIP). Stream related LFA projects include floodplain restoration, infrastructure modification or replacement, streambank stabilization, and channel modification that strive to lower flood elevations, prevent debris jams, and improve stream stability. As a matter of policy, the SMP does not fund routine maintenance activities, dredging, channelization, private bridges, or flood control projects such as flood walls, berms and levees even when they are recommended in an LFA. CWC maintains the same policy for the LFHMIP.

Because the SMIP is locally driven, municipalities control the pace of project initiation and advancement. Local SMP partners are available to administer contracts for project design and/or construction on behalf of a municipality. Most stream related LFA projects are designed by the SMP’s consulting engineers selected in coordination with the municipality. Project designs typically require 12-18 months to complete depending upon complexity. Therefore, given that certain large-scale LFA projects span multi-year timeframes and require the bidding and awarding of individual contracts for each phase of a project (feasibility study, design, and construction), DEP counts individual funding awards towards fulfillment of the 2017 FAD requirement that SMP partners fund at least 50 LFA projects.

Table 2 summarizes the 24 LFA recommended projects that SMP partners have funded through 36 funding awards (distinct contracts) as of May 1, 2023. In terms of the SMP’s progress towards funding at least 50 LFA projects, these accomplishments reflect 48% achievement based on total projects and 72% achievement based on distinct funding awards.

Table 2. Summary of 24 LFA projects and associated funding awards (36 distinct contracts) by local SMP partners as of May 1, 2023.

Project Name	Number of Contracts	Total Funding	Status
Desilva Road Culvert Replacement	3	\$894,146	Complete
Upper Boiceville Road Culvert Replacement	3	\$608,892	Complete
Burgher Road Culvert Replacement	2	\$169,210	Complete
Maltby Hollow Bridge Replacement	2	\$150,000	Complete
Phoenicia Bridge Street Bridge Replacement and Floodplain Restoration	1	\$150,000	In Process
Water Street Floodplain Restoration	1	\$746,026	Complete
Steele Brook Debris Removal	1	\$20,000	Complete
Steele Brook Streambank Stabilization	1	\$396,683	Complete
Mill Street Floodplain Restoration	1	\$128,446	Complete
South Street Bridge Replacement	1	\$550,000	In Process
Andes Central School Floodplain Restoration and	1	\$400,000	In Process

Streambank Stabilization			
Maple Avenue Bridge Replacement	2	\$300,000	In Process
Vega Mountain Culvert Replacement, Phase 1	1	\$400,000	In Process
Elk Creek Road Stabilization	1	\$300,000	In Process
Buntline Drive Culvert Replacement	2	\$360,000	In Process
Delhi Price Chopper Berm Removal	1	\$160,000	In Process
Blue Hill Lodge Streambank Stabilization	2	\$565,504	Complete
Denning Town Hall Streambank Stabilization	2	\$483,404	Complete
Hunter Road Elevation Study and Design	1	\$25,000	Complete
Slater Road Culvert Replacement	1	\$74,800	In Process
Rion Streambank Stabilization and Floodplain Restoration	2	\$479,817	Complete
Railroad Avenue Streambank Stabilization	1	\$90,000	Complete
Pangman Road Floodplain Restoration	2	\$156,990	In Process
County Route 23C Culvert Replacement	1	\$88,000	In Process
Totals:	36	\$7,696,918	

In addition to the above FHM funding award contracts, four LFA projects are currently in process of being designed or have already been designed in-house by local SMP partners (primarily county SWCDs). Even though in-house designs do not represent a distinct funding award, they are completed with City funds through DEP partner contracts and are integral to the advancement of LFA recommended projects. As such, DEP recommends that in-house project designs completed by SMP partners be counted towards the 2017 FAD requirement that the SMP fund at least 50 LFA projects. If these in-house designs were counted, the SMP would be credited with 40 funding awards in support of 24 LFA projects.

4.1 Floodplain Restoration Projects

Almost all stream related projects recommended in LFAs include a floodplain restoration component to lower flood elevations and mitigate damages, with the scale of restoration dependent upon the specific geographic setting (broad floodplain versus narrow valley). LFAs in smaller hamlet areas with steeper mountain settings have less flood-prone area yet floodplain restoration is still important; in these cases, recommendations for floodplain restoration may not be front and center in the LFA, but floodplain restoration is still implemented as a secondary component of infrastructure or streambank stabilization projects.

Since 2020, local SMP partners and DEP have learned to remind communities that mitigation benefits identified by LFAs are relatively coarse and for planning purposes only, and that actual flood mitigation benefits are determined during each project's hydraulic modeling and design process. The Water Street Project in Walton is one example of a large-scale floodplain restoration where the LFA modeling provided a planning-level estimate, but the actual project design process required re-modeling of site hydraulics and creation of excavation, grading, stormwater and site protection plans prior to construction. In the future, this potential evolution of mitigation benefits between LFA development and the project design phase will continue to require explanation by local SMP partners and consultants as communities move from the conceptual planning phase to the actual selection of projects.

As large LFA projects are completed, it behooves communities to go through a process referred to as a Letter of Map Revision (LOMR). A LOMR is a modification to the FIRM (which is the basis for floodplain management, mitigation, and insurance activities in the NFIP) based on the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, WSEs, and floodplain. The LOMR officially revises the FIRM and sometimes the Flood Insurance Study, which is a supplementary report prepared by FEMA.

Case Study: Walton Letter of Map Revision

In 2022, after a floodplain restoration project along the East Brook in Walton, both the Town and Village were successful in obtaining a LOMR from FEMA for a section of the East Brook. The effective FIRM for this reach was dated 2012 and did not account for a 1,000-foot-long floodplain enhancement project or the removal of a downstream hydraulic constriction (the East Street Bridge and its abutments). As a result of the FHM work that was facilitated by Delaware County SWCD, the Town and Village of Walton hired an engineering firm to update the hydraulic models and assist them with the lengthy and costly LOMR process. As a result, over 40 structures benefitted from the FHM work, and when re-mapped, 22 structures were completely removed from the 1% annual chance floodplain. Figures 3 and 4 show the changes to the 1% annual chance floodplain for the downstream end of the project reach.

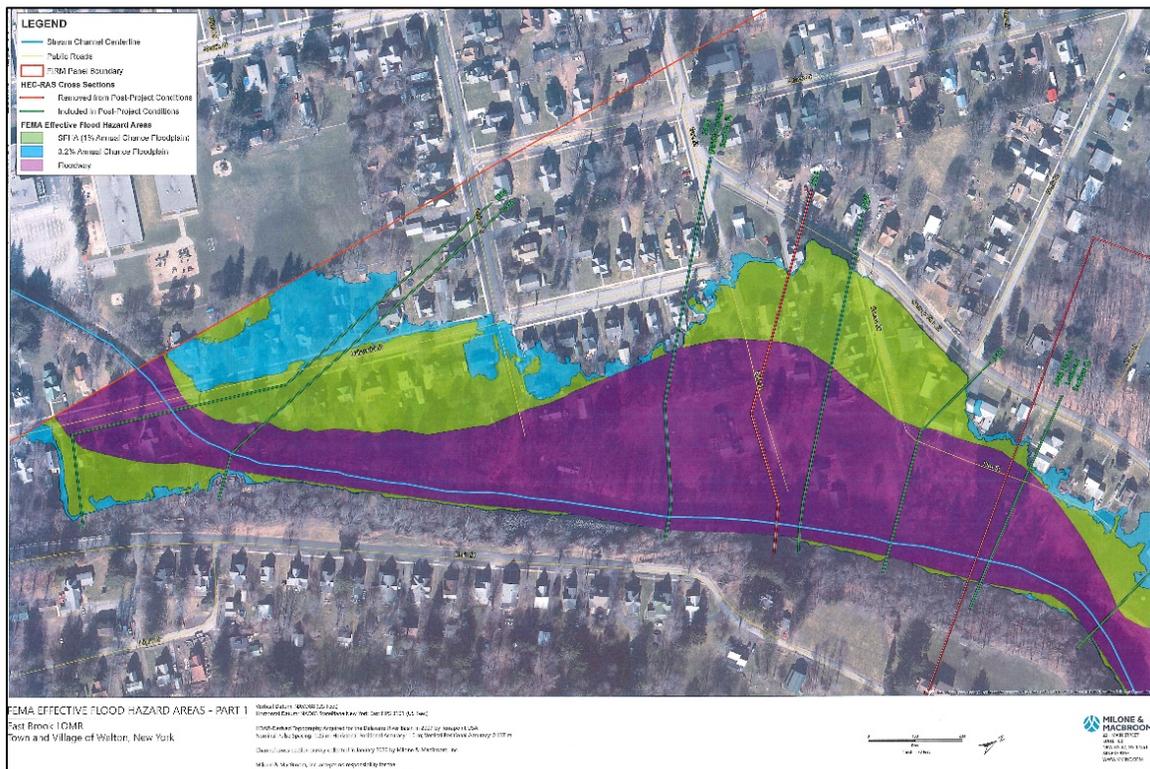


Figure 3. Original FIRM (dated June 2016) for a reach of the East Brook in the Village of Walton, before implementation of an FHM project.

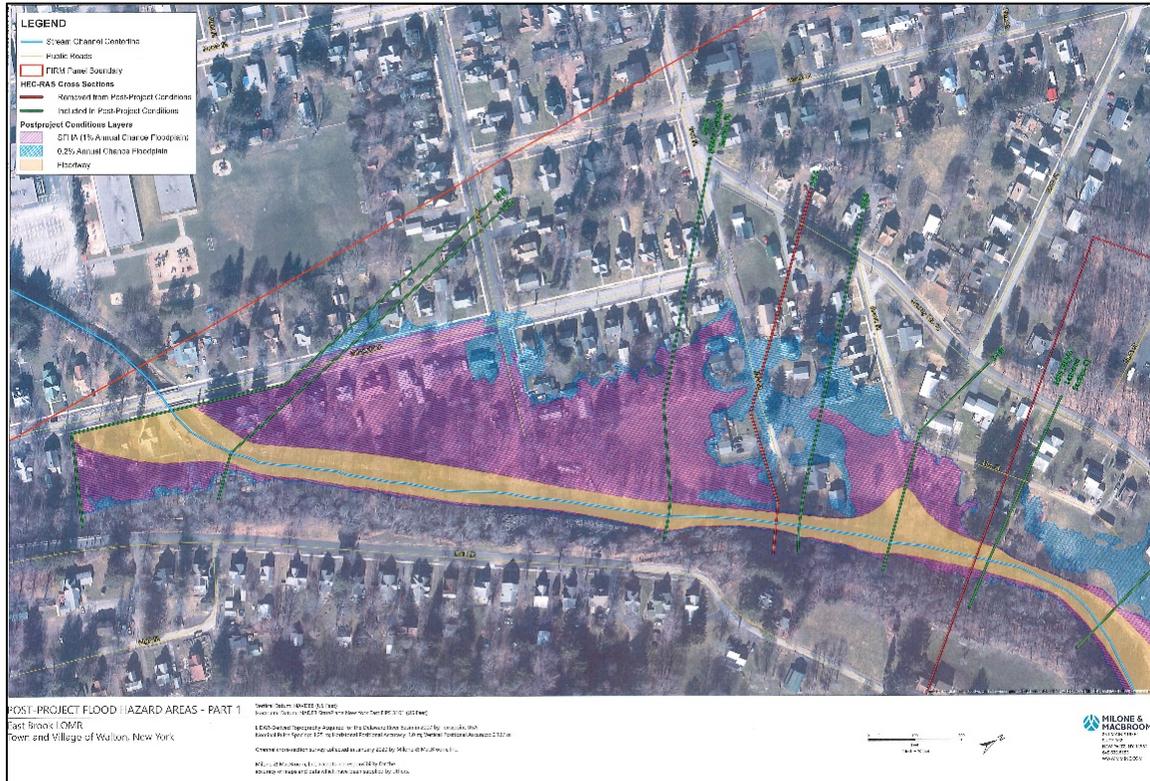


Figure 4. Revised FIRM in the Village of Walton (dated November 2022) after completion of the LOMR following implementation of an FHM project affecting the East Brook.

Watershed municipalities, with the help of FHM partners, should continue to explore opportunities to update FIRMs through the LOMR process, particularly after completion of larger projects with significant flood reduction benefits. The NYSDOT and NYSDEC have a draft agreement that requires NYSDOT to notify the local floodplain administrator when any project results in a 1-2 foot decrease in the base flood elevation. For projects that lead to a greater than 2-foot decrease, NYSDOT must also notify FEMA while completing a LOMR if private properties are affected. While this State agreement is beneficial to municipalities in certain instances, it will not account for all projects funded by FHM partners.

4.3 Streambank Stabilization

To date, local SMP partners have completed five LFA recommended streambank stabilization projects while three more are in process. These projects have addressed or will address several FHM priorities including transportation infrastructure threatened by stream erosion (Railroad Avenue in Tannersville, Pangman Road in Conesville), critical facilities threatened by stream erosion (Denning Town Hall, Andes Central School), and excessive volume of fallen trees that threaten to block bridges causing backwater flooding, and risking infrastructure failure (Steele Brook in Delhi). Streambank stabilization projects have been designed in-house by SMP partners and consultants, and construction funding has been provided through both the SMP and CWC’s LFHMIP.

4.2 Infrastructure Upgrades and Replacements

To date, eleven LFA projects completed or in process by local SMP partners are for culvert replacements or bridges with increased spans and, where possible, improved floodplain access. To date, four of these projects have been completed, all in Olive: DeSilva Road Culvert, Upper Boiceville Road Culvert, Burgher Road Culvert, and Maltby Hollow Bridge. The seven projects in process include: Greene County Route 23C Culvert Replacement in Jewett, Slater Road Culvert Replacement in Neversink, Buntline Drive Culvert and South Street Bridge Replacement in Stamford, Bridge Street Bridge Replacement and Floodplain Restoration in Phoenicia, Maple Avenue Bridge Replacement in Hobart, and Vega Mountain Culvert Replacement in Roxbury. Designs have proceeded by the SMP partners and their consultants, and construction costs have been provided by local SMP partners and through CWC's LFHMIP.

Case Study: Maltby Hollow Bridge Replacement

The Maltby Hollow Bridge was identified in the 2017 Olive LFA as being in very poor condition, undersized, threatened by debris jams, and posing a significant access vulnerability during and after flood events; a detour of more than 60 miles would be required for residents in the event the bridge were to fail. The Ulster County Department of Public Works designed the new structure to exceed the NYSDOT standard for passing the future projected peak flow of the 100-year flood (defined as the current peak flow increased by 20%) as well as the 100-year flow with a modeled 50% flood-debris blockage and the 500-year flow with no blockages. The project, shown in Figure 5, was completed in 2021 and cost nearly \$2.2 million including a \$230,000 contribution from CCEUC through the Ashokan Watershed Stream Management Program (AWSMP) towards design and construction inspection costs, and a \$750,000 CWC contribution through the LFHMIP towards project construction costs.



Figure 5. The significantly upsized Maltby Hollow Bridge after replacement of an original crossing that was undersized.

Ensuring a stable and reliable transportation network through the WOH watershed is a key priority for improving community sustainability and protecting water quality, which are dual goals of the FHM Program. In recent years, two LFA recommended infrastructure projects in the Ulster County towns of Olive and Shandaken were designed and constructed along NYS Route 28 as a result of the FHM Program. These projects will improve transport for evacuation and emergency response purposes during and after flood events, thus enabling faster recovery for all communities along NYS Route 28. The two projects include:

- The replacement and substantial expansion of the NYS Route 28 Bridge in Mount Tremper, a multi-phase LFA recommended project facilitated in part by the AWSMP and DEP, in collaboration with FEMA, Ulster County, NYSDOT and others. This project, which was damaged and temporarily closed following Tropical Storm Irene in 2011, was funded primarily by NYSDOT following the buyout of 17 properties through either the NYCFFBO or FEMA. An existing berm was removed, a tributary to the Esopus Creek was realigned, a new 12-acre floodplain was constructed, and the previous bridge (366 feet) was replaced with a longer span bridge (800 feet), with five additional feet of clearance beneath the new bridge deck to facilitate debris transport during future 100-year floods. This project cost nearly \$32 million and was completed during a span of 5 years (2017-2021).
- The replacement and expansion of the Upper Boiceville Road Culvert by the AWSMP in 2022, enabling an alternative transportation route around the community of Boiceville during flood events.

Given the completion of these large infrastructure upgrade projects, the Town of Shandaken is currently going through the LOMR process.

5. Project Implementation through the CWC LFHMIP

DEP has funded the LFHMIP since 2015 through a \$17 million contract with CWC that provides grants to property owners, businesses, organizations and municipalities to implement LFA and other FHM projects that go beyond the scope of the SMP. In 2022, DEP and CWC finalized negotiations on a \$15 million successor contract to continue the LFHMIP pursuant to the 2017 FAD; this contract has registered and commences work July 1, 2023.

Under the new LFHMIP contract, eligible categories of projects include: (1) relocation assistance for anchor businesses, critical facilities, businesses and residences; (2) infrastructure protection; (3) property protection measures, (elevation and floodproofing of structures); (4) pollution prevention (fuel and propane tank anchoring); (5) emergency stream debris removal (fallen trees threatening infrastructure and flood debris that can re-mobilize); (6) design and construction of stream related LFA projects; and (7) flood buyout activities in support of the NYCFFBO (demolition plans, structure demolition and site restoration).

CWC receives and processes project applications, manages subcontracts with consultants, advises municipalities and FACs on LFA funding opportunities, and coordinates with DEP, local SMP partners, project applicants or sponsors, and others. CWC accepts applications on a rolling basis, and these are shared with DEP for review and comment before

being recommended for funding approval by CWC’s Board of Directors. In addition to funding projects, CWC also contracts with local consulting and engineering firms to provide technical assessments for NYCFFBO properties, prepare demolition plans, and complete project feasibility studies. To date, CWC’s consultant contracts have totaled \$800,000.

Table 3 summarizes all LFHMIP grants awarded through May 31, 2023, organized by project category and excluding funds allocated to consultant contracts. Cumulatively, a total of 176 grants have been awarded totaling over \$14.3 million, of which 153 grants have been completed (87%). By comparison, in its June 2020 evaluation report, DEP reported that 101 grants had been awarded totaling nearly \$6.3 million, of which 75 grants had been completed (74.3%). This represents an 74% increase in the number of grants and a 128% increase in the amount of funding allocated through these grants during the past three years. It is encouraging to note that grant completion rates have increased from 74.3% in 2020 to 87% in 2023.

Table 3. Summary of all CWC LFHMIP project grant funding awards as of May 31, 2023.¹

Type of Project	Grants Awarded	Grants Completed	Funds Allocated
Property Protection ²	75	65	\$2,959,545
Relocation	10	8	\$1,481,772
Pollution Prevention	53	52	\$180,946
Infrastructure ³	5	2	\$1,930,344
Stream-Related	11	7	\$5,415,882
NYCFFBO Demolitions	18	15	\$1,643,110
Other Demolitions ⁴	3	3	\$318,740
Property Buyouts	1	1	\$388,550
Total	176	153	\$14,318,889

¹ Although Funds Allocated includes subsequent or additional funding awarded to the same project or applicant for cost overruns, the number of grant awards reflects total funding awarded to a single project or applicant.

² DEP’s 2020 evaluation report incorrectly counted the total number of Property Protection grants awarded as 45 (correct number is 44, including 36 feasibility studies, five project design, and three construction awards).

³ Reflects a decrease of \$250,000 compared to the funding award reflected in DEP’s 2020 evaluation report due to the amount being reduced at the request of awardee (Funds Allocated are updated to reflect this).

⁴ DEP’s 2020 evaluation report counted three demolition projects that were not associated with the NYCFFBO (these are now broken out separately for clarity).

5.1 Property Protection

CWC funding is available for wet and dry floodproofing of commercial structures, and the elevation of residential and commercial structures or utilities. Property protection options vary depending upon the type of use (residential versus commercial) and whether the structure is located on the fringe of a floodplain where depths and velocities are lower, or within the floodway where depths and velocities can be extreme. Table 4 summarizes the status of all property protection grants awarded by CWC between July 1, 2020 and May 31, 2023.

As noted in DEP’s 2020 evaluation report, property protection is a relatively new practice in the WOH watershed. To assist applicants, CWC contracts with a private engineering firm to prepare feasibility studies that describe the FEMA flood zone, 1% chance recurrence flood elevation, first floor elevation, and design elevation for mitigation. A feasibility study identifies

the best, affordable and/or practical options to protect property, but ultimately the decision on what option to advance belongs to the property owner. Occasionally, an owner chooses to select a less-desirable option (from a technical and floodplain management perspective) to advance to the design phase; this highlights the importance of CWC and DEP providing thorough technical comments on every project application, including potential risks that may result or additional steps that may be warranted if a less-desirable option is pursued by an applicant.

Table 4. CWC property protection funding awards (July 1, 2020 to May 31, 2023).¹

Type of Award	Number of Awards	Funds Allocated	Status
Feasibility Study	13	\$65,000	10 Complete 3 In Process
Project Design	11	\$236,529	8 Complete 3 In Process
Project Construction	7	\$2,015,631	3 Complete 4 In Process
Total	31	\$2,317,160	

¹ Although Funds Allocated includes subsequent or additional funding awarded to the same project or applicant for cost overruns, the number of grant awards reflects total funding awarded to a single project or applicant.

It is worth noting that many property owners choose not to proceed with a project after completion of a feasibility study. To date, CWC has funded a total of 49 feasibility studies, of which only 16 grant recipients (32.6%) have applied for and received design funding through the LFHMIP to advance a property protection project. Similarly, only seven of the 18 total project designs (39%) that have received CWC design funding have advanced to construction; as depicted in Table 4, all of these projects have advanced in the past three years, which further documents the multi-year timeframe that some projects follow given various project phases.

Although the LFHMIP provides funding for 100% of the costs for feasibility studies and project design, construction projects require a 25% cost share by the owner. Of the ten construction awards funded to date (seven in the past three years per Table 4), four address commercial properties, two address critical facilities (Prattville Town Hall and Townsend Elementary School), and two address residences. The 25% out-of-pocket cost may be one reason why many property protection projects, particularly for residential projects have not advanced beyond design. Another contributing factor could be that building and material costs not associated with flood mitigation (and therefore ineligible for CWC funding) yet required by current building code, become additional out-of-pocket expenses for the owner.

In recognition of these challenges, CWC, with DEP support, submitted a federal Hazard Mitigation Grant application (DR-4480 New York COVID-19 Pandemic) for over \$1.2 million in 2022. The application is currently awaiting FEMA approval. As a local match requirement to the grant, CWC committed up to \$625,000 in City funds through the LFHMIP to support construction costs for the elevation of ten floodplain structures in Ulster and Greene counties that previously received CWC funding for elevation design costs. If FEMA funding is awarded, all construction costs (100%) would be covered for these affected property owners using a combination of federal sources and City funding through CWC’s LFHMIP. Many of the affected property owners are awaiting the outcome of this grant application before deciding whether to

initiate construction. DEP commends CWC for taking this proactive step, which aligns with the FAD goal for coordinating with State and federal FHM agencies to maximize City funding.

5.2 Relocation of Businesses and Critical Facilities

Relocating anchor businesses and critical community facilities out of floodplains requires coordination between the NYCFFBO purchasing the existing floodplain structure, CWC as the funder of relocation, and the entity purchasing land upon which to build a new structure. The cost of constructing new structures is a property owner’s responsibility, which for a critical community facility usually means the local municipality.

To date, no business or critical facility has fully completed the relocation process due to a combination of factors that include the upfront cost of constructing a new building while the former structure gets acquired; the inability or practicality of physically lifting and relocating certain large structures to another parcel; and the lack of suitable relocation properties. One exception is the construction of a new Boiceville Fire Station by the Olive Fire Department, a critical community facility that has partially completed the relocation process.

Case Study: Boiceville Fire Station Relocation

The new Boiceville Fire Station (Figure 6), which is scheduled for completion in 2023, will soon become the first facility in the WOH watershed to be successfully relocated from the floodplain due largely to funding provided through CWC’s LFHMIP. CWC funds were used to purchase a vacant parcel of land for relocation (\$155,000), fund a portion of design and construction (\$827,400), and fund a portion of the new septic system (\$50,000). To construct this \$2 million-plus facility, the Olive Fire Department also needed two loans to cover the balance of construction costs. Once vacant, the former Boiceville Fire Station will be acquired through the NYCFFBO and demolished through CWC’s LFHMIP, restoring an important floodplain immediately upstream of the Ashokan Reservoir. It is likely this parcel, to be owned by the city pursuant to a resolution by the Town of Olive, will be a critical link in connecting the hamlet of Boiceville to the Ashokan Rail Trail.



Figure 6. The nearly completed Boiceville Fire Station that was rebuilt outside the Esopus Creek floodplain in an upland area along NYS Route 28 in the Town of Olive.

5.3 Pollution Prevention

To help prevent avoidable sources of pollution during flood events, CWC funds the anchoring of fuel oil and propane tanks in WOH watershed floodplains at no cost to property owners. CWC funds up to \$5,000 for oil tanks up to 330 gallons and propane tanks up to 420 gallons. Since 2015, as listed in Table 3, CWC has awarded 53 grants to anchor 21 oil tanks and 49 propane tanks securing 5,000 gallons of oil and 16,066 gallons of propane; these grants total \$180,946. Since DEP’s 2020 evaluation report, which listed 36 funding awards for pollution prevention (fuel tank anchoring), CWC has awarded 17 additional grants totaling \$57,846; sixteen of these grants are completed and one remains in process as of May 31, 2023.

While current floodplain development ordinances require new tanks to be anchored, hundreds of pre-existing tanks are not. During the COVID-19 pandemic, outreach efforts to homeowners, businesses and fuel suppliers was halted or curtailed, causing a reduction in tanks anchored. Since then, CWC and other local partners have stepped up promotional efforts to property owners, fuel companies, and contractors, with incremental success being made including direct communication with fuel companies and local masons. These enhanced outreach efforts are expected to generate greater participation moving ahead.

5.4 Infrastructure

CWC funds LFA projects that alter public infrastructure or utilities, including bridge and culvert replacements, and protection for municipal wells and wastewater treatment facilities. DEP’s prior FHM evaluation report listed only one infrastructure project award as of June 2020, the Maltby Hollow Bridge Replacement in the Town of Olive. Since then, CWC has funded four more infrastructure projects totaling nearly \$1.2 million. Table 5 summarizes the infrastructure grants awarded by CWC between July 1, 2020 and May 31, 2023.

Table 5. CWC funding awards for infrastructure projects (July 1, 2020 to May 31, 2023).

Project Name	Funding Allocated	Status
Burgher Road Culvert Replacement (construction)	\$625,000	Complete
Peekamoose Road Infrastructure Protection (feasibility study)	\$20,000	In Process
Halcott CR 1 Culvert over Brownell Creek (design)	\$57,500	In Process
Village of Walton Third Brook Culvert (design)	\$477,844	In Process
Total	\$1,180,344	

5.5 Stream Related Projects

CWC also funds the design and construction of stream related LFA projects, which is one area where the LFHMIP overlaps with the work performed by the SMP. Through CWC’s LFHMIP, municipalities can either directly procure engineering support of their projects, or CWC can contract on their behalf. CWC and DEP jointly review stream project designs prior to awarding construction funds, which is consistent with the design review process followed by local SMP partners.

CWC can also fund feasibility studies in support of stream related projects, such as the Andes Central School utility relocation feasibility study that was funded in 2021 to support a larger floodplain restoration and stream stabilization project. Construction of this project is planned for summer 2023 using a combination of CWC funding through the LFHMIP and SMP partner funds awarded by Delaware SWCD.

In DEP’s 2020 evaluation report, five stream related projects were listed as being funded through the LFHMIP, including two that were complete and three that were underway. One of those projects (design of the Sundown Stream Restoration in Denning) has since been canceled for myriad reasons including the inability to finalize a technically viable design that achieved the stated multi-objectives; a component of this project may advance at a later date in scaled back form. Since the previous evaluation, CWC has awarded funding for six additional stream related LFA projects as summarized in Table 6. It is worth noting that CWC’s funding of stream related LFA projects does not count towards the 2017 FAD requirement that the SMP award funding to implement at least 50 LFA-recommended projects.

Table 6. CWC funding awards for stream related projects (July 1, 2020 to May 31, 2023).

Project Name	Funding Allocated	Status
Mitchell Hollow Streambank Stabilization (construction)	\$112,919	Complete
Breakey Motors Floodplain Restoration Piling Removal (design)	\$25,900	Complete
Breakey Motors Floodplain Restoration Piling Removal (construction)	\$149,000	In Process
Railroad Avenue Streambank Stabilization (construction)	\$1,200,000	In Process
Andes School Utility Relocation Study (design)	\$100,00	In Process
Andes School Floodplain Restoration and Streambank Stabilization (construction)	\$1,500,000	In Process
Total	\$3,987,819	

5.6 Property Buyouts

To date, the 2018 purchase of the Breakey Motors property in the Village of Walton has been the only CWC-funded flood buyout. The project, to return the 1.1-acre site to floodplain open space, will be completed in 2023 after sheet piling along the West Branch Delaware River is removed, and grading and site stabilization are completed. The property is currently owned by the CWC, however a recission agreement is in place that will revert the property to the Town of Walton once the project is completed and a conservation easement is filed with NYSDEC. All other acquisitions for LFA-recommended stream and infrastructure projects have advanced through the NYCFBFO, which follows established protocols for landowner contacts, appraisals, purchase offers and contracts, property surveys, environmental site assessments, closings, conveyance of conservation easements, and preparation of reuse plans.

5.7 Demolition Support

Post-closing, CWC manages the demolition process for properties acquired under the

NYCFFBO through a consulting engineer who prepares demolition and safe work plans, drafts bid documents, and provides oversight of hazardous materials abatement, demolition, and site remediation. DEP provides the environmental site assessments, surveys, and pre-demolition site testing for hazardous materials that is given to CWC for use in preparing the bid documents. Between July 1, 2020 and May 31, 2023, CWC has funded 15 additional demolitions at a total cost of more than \$1.5 million; twelve of these demolitions have been completed and 3 are in process of being completed.

Since DEP submitted its June 2020 evaluation report, demolitions have ramped up significantly as shown in Figure 7. Given the pipeline of NYCFFBO projects under purchase contract or active discussion, DEP anticipates that between four and six demolitions will occur annually during the next several years.

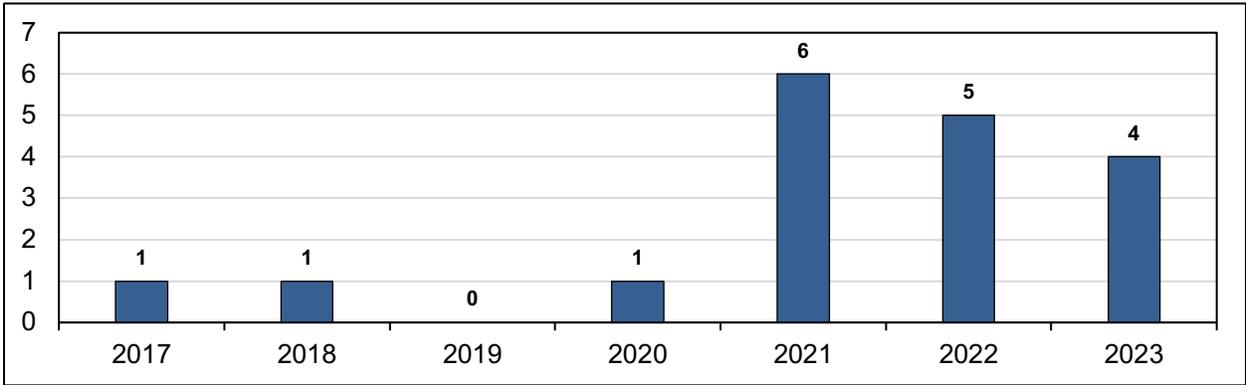


Figure 7. Number of demolitions completed by CWC each year in support of the NYCFFBO during 2017-2022 and projected total for 2023.

Figure 8 depicts the number of days between the closing date for NYCFFBO properties and the date of completed demolition for 15 properties as of May 31, 2023. For all 15 properties, the average time is 525 days or 17.5 months. When the 2017 demolition is removed, the average time increases to 558 days (18.6 months) for the remaining 14 properties; for the six demolitions completed during 2022-2023 to date, the average time increases to 639 days (21.3 months).

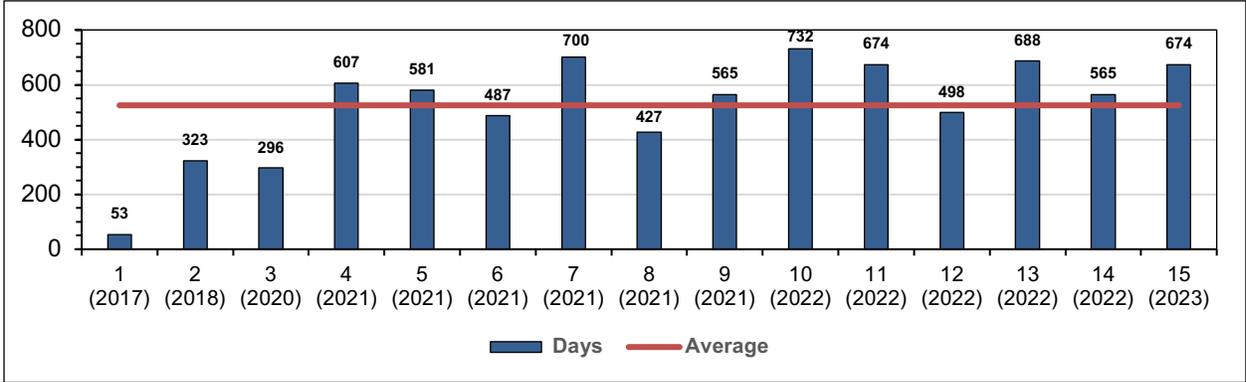


Figure 8. Number of days between the closing date for 15 properties acquired through the NYCFFBO and completion of demolitions.

While this process is shorter than similar State and federal buyout programs, communities have inquired whether the process can be expedited, since many of these vacant, flood-damaged structures are in hamlets and represent aesthetic nuisances and/or potential safety risks to the public. While shortening the timeframe is a shared goal of CWC and DEP, the sheer amount of material to be removed from each property varies widely, with some properties almost vacant – with floods having swept them clean of most improvements – and others with massive structures that require careful planning to demolish and remove safely. In addition, the process involves many steps with multiple contributors and timelines:

- Preparation and review of Pre-demolition Survey (DEP)
- Preparation and review of Demolition and Safe Work Plans (CWC, DEP)
- Preparation of bid documents (CWC)
- On-site pre-bid meeting with prospective bidders (CWC, DEP, vendor)
- Bid submission and bid opening/award (CWC)
- Bid award approval by CWC Committee and Board of Directors (CWC)
- Bid awardee obtains all approvals, insurance, permits, etc. (vendor)
- Pre-construction meeting (CWC, DEP, vendor, municipality)
- Asbestos abatement (vendor)
- Demolition of structure (vendor)
- Site restoration (vendor)
- Final site inspection (CWC, DEP)

Once CWC’s demolition vendor/consultant is provided with the pre-demolition survey, it has taken on average about six months to complete the necessary demolition plans and safe work plans, and then oversee demolition. This same consultant is also under CWC contract to prepare property protection feasibility studies and engineering designs; this dual role held by one contractor may be contributing to a bottleneck in the overall demolition process.

5.8 Emergency Debris Management

CWC administers an emergency stream debris program to remove woody debris and other items washed from the interior or exterior of properties capable of being remobilized during a flood. This program requires activation by the CWC Board of Directors following a flood event, which hasn’t happened since the onset of the LFHMIP. As reported in DEP’s June 2020 evaluation report, CWC has funded one application for debris removal to enable the Town of Walton to remove an abandoned mobile home located within the Third Brook floodplain. There has been no further program activity since then.

6. City Funding Commitments to the FHM Program

In 2014, pursuant to the Revised 2007 FAD, DEP allocated just over \$10.1 million out of existing contract budgets with local SMP partners to support LFA development and FHM project implementation. Nearly \$6.9 million was committed to eligible projects (including LFA development), of which just under \$6.2 million was expended before each contract expired. DEP has since closed out all prior SMP contracts and registered five new successor contracts with local SMP partners. In total, nearly \$3.9 million of the original \$10.1 million was never

allocated to projects, or project allocations were not fully expended prior to contract closeout.

The 2017 FAD requires that DEP commit an additional \$15 million to support 50 LFA projects through local SMP partner contracts. DEP has thus far committed an initial \$7.1 million divided among five current SMP partner contracts that expire at various times between 2024-2025, leaving a minimum \$7.9 million funding commitment in the next set of SMP successor contracts to support LFA projects through 2027. DEP has been actively negotiating successor contracts with each SMP partner since fall 2022, so future funding commitments for implementation of LFA projects are not yet finalized.

Table 7 summarizes the status of DEP’s current \$7.1 million commitment to existing SMP partner contracts for implementing LFA projects in the six WOH reservoir basins as of April 30, 2023. Over \$5.5 million has been committed to projects, of which \$2.4 million has been expended (\$3.1 million remains unexpended) and nearly \$1.6 million remains available for new project commitments.

Table 7. Status of SMP funding allocations pursuant to the 2017 FAD, as of April 30, 2023.

Basin	Budgeted	Allocated	Expended	Available
Ashokan	\$2,500,00	\$2,100,228	\$1,563,192	\$399,772
Schoharie	\$1,200,000	\$409,990	\$196,821	\$790,010
Rondout/Neversink	\$500,000	\$174,238	\$63,864	\$325,762
Cannonsville/Pepacton	\$2,900,000	\$2,818,438	\$576,674	\$81,562
Total	\$7,100,000	\$5,502,894	\$2,400,551	\$1,597,106

As mentioned previously, DEP dedicated \$17 million to support the CWC LFHMIP, and a successor contract totaling \$15 million will commence work on July 1, 2023. As required by the Revised 2017 FAD, DEP will continue to assess the use of all FHM funding commitments to its various partners; report on these commitments every November during the annual FAD budget meeting; and, in consultation with NYSDOH and others, determine whether remaining funding is adequate to meet future program needs.

7. Update on 2020 Evaluation Recommendations

In June 2020, DEP submitted its first evaluation of the FHM Program, which documented challenges and proposed a series of recommendations intended to streamline project implementation, improve coordination between partners, encourage the leveraging of City funding with State and federal funding, and generally encourage broader participation in a variety of program opportunities. These recommendations are summarized below, along with a brief update on progress and accomplishments during the past three years.

- 1. DEP recommended that FHM partners improve cooperation and coordination, potentially having the SMP become the primary designer and funder of stream related projects, while CWC could fund a wider array of non-stream projects.**

DEP noted that because the SMP and CWC both fund the design and construction of stream related projects, this programmatic overlap could impact efficiencies, create confusion

among applicants, and potentially affect the SMP's ability to fund 50 LFA projects per the 2017 FAD. DEP noted that SMP partners and their engineering consultants collectively have extensive years of experience and technical training in river engineering, hydraulic modeling, stream morphology, floodplain restoration processes, and stream design and construction. DEP also noted that supplemental funds are needed for larger and more complex projects, which could potentially be awarded by CWC to complement respective funding sources.

FHM partners have made significant progress to improve cooperation and coordination since 2020. Several project designs have been funded or completed in-house by local SMP partners while construction costs have been funded by CWC. The Maltby Hollow Bridge Replacement in the Town of Olive is a perfect example of this coordination, whereby CCEUC through the AWSMP provided \$230,000 for design and inspection, while CWC funded the \$750,000 cost of construction. Other examples include the Railroad Avenue Streambank Protection and Restoration Project in Tannersville and the Andes Central School Floodplain Restoration and Streambank Stabilization Project.

2. DEP recommended that FHM partners continue outreach efforts to local FACs and municipal officials, emphasizing the community resiliency benefits associated with LFA projects and the various tools available to protect floodplains.

DEP noted that many communities have reservations about property buyouts that are needed to advance floodplain restoration projects. DEP also noted that while CWC has the funding to acquire properties for certain LFA projects, the City's LAP also has the funding, capacity, and expertise to advance acquisition projects through the NYCFFBO, which is one of the established components of the FHM Program.

DEP believes that progress is being made, as communities are increasingly willing to consider floodplain enhancement projects given that predicted WSE reduction benefits can be significant. However, the associated property buyouts, relocations, and/or easements often require extensive time and resources and can be slow to materialize. For example, the Town of Shandaken is working to advance the Bridge Street Bridge Replacement and Floodplain Enhancement Project in Phoenicia, but this project is taking time due to the complexity of the site, a change in local leadership, and the involvement of multiple stakeholders, including nearly a dozen potentially impacted property owners.

3. DEP recommended that the NYCFFBO remain the primary mechanism for acquiring FHM properties.

Since DEP submitted its June 2020 evaluation report, the NYCFFBO has remained the primary mechanism for acquisition of properties. As a result, CWC funding assistance has not been necessary although it remains an option to support FHM goals if needed.

4. DEP recommended that CWC work to increase the number of fuel tanks anchored each year to achieve short-term water quality benefits, and to potentially establish a list of pre-qualified contractors to facilitate the completion of projects more efficiently by a greater number of applicants.

CWC has made progress on this recommendation by starting to engage directly with masons who can potentially line up several anchoring jobs at once, thus increasing efficiency. For similar reasons, CWC has outreached to local fuel and propane suppliers, encouraging them to submit a tank anchoring application for multiple eligible customers at once to achieve better efficiencies. This differs from the previous individually driven approach, in which participation had dwindled over time. Finally, CWC and local SMP partners both continue to conduct outreach about the tank anchoring program. In 2022, for example, CCEUC through the AWSMP developed and disseminated a flyer that promoted CWC's tank anchoring program, which was widely circulated via websites and social media.

5. DEP recommended that project designers obtain Phase I and II environmental site assessment results and factor in clean-up costs and timelines prior to advancing projects to construction.

This recommendation, while still valid, has not been applicable given the types of projects implemented since DEP issued the June 2020 evaluation report.

6. DEP recommended that City funds be leveraged to advance designs for priority infrastructure projects that could be funded by State or federal sources, and that matching funds be considered a condition of larger bridge and culvert projects exceeding a certain funding threshold.

DEP noted that LFA-recommended infrastructure projects have significant offsite flood benefits, but they can be complicated and expensive, often exceeding the funding and institutional capacity of local FHM partners. The replacement of undersized bridges and culverts is often required for many floodplain enhancement projects that are recommended in LFAs, which offers an opportunity to coordinate with NYSDOT and county highway departments to prioritize projects and secure matching funds. DEP anticipates more progress in the coming years when large infrastructure projects with floodplain enhancement components, such as the Bridge Street Bridge in Phoenicia and the Third Brook Culvert in Walton advance to construction with funding from NYSDOT or NYSDEC.

7. DEP recommended that the LFHMIP become more consistent with the NFIP and other State and federal FHM standards to leverage matching funds and assist with the prioritization of projects.

Although DEP has discussed this recommendation with CWC, the LFHMIP continues to operate according to its own standards and requirements. When DEP comments on CWC grant applications, DEP often refers to State and federal standards and guidelines to continue raising awareness about the importance of this recommendation.

8. DEP recommended that FHM partners work closely with property relocation applicants to secure additional funds for new facility construction, and that CWC modify the requirement that critical community facilities must relocate within the same municipality.

DEP noted that while relocation of businesses and critical facilities is an essential recommendation in LFAs, the lack of available funds to construct new buildings outside of floodplains remains an obstacle and DEP does not support the expanded use of City funds for this purpose. DEP is pleased to report that CWC has agreed to allow individual towns, as a condition of receiving funding through the LFHMIP, to waive the requirement that anchor businesses or critical community facilities must relocate within the same municipality.

8. New Recommendations

As part of this evaluation, DEP has developed new recommendations for the FHM Program based on input from local partners during multiple meetings and direct correspondence via phone and email. In May 2023, DEP dedicated an entire FHM coordination meeting with CWC and all SMP partners to vet eleven recommendations in their initial form and assess concurrence or disagreement with DEP's position. Following partner feedback at the May meeting, DEP further revised the recommendations by merging some, eliminating others, and creating a new one. The final recommendations presented below were circulated one last time to all FHM partners in mid-June to confirm overall consensus on potential program improvements.

1. DEP recommends that local FHM partners expand education, outreach and training efforts to municipal officials, with a focus on continued long-term engagement of local FACs to maintain momentum for completing LFA projects.

DEP believes it is important to enhance education, outreach and training opportunities for local officials, floodplain managers, watershed residents and businesses to continue the successful implementation of LFA projects and ensure the resiliency of watershed communities. DEP recognizes that local FHM partners work very hard to support municipalities with programmatic resources to facilitate proper floodplain management. However, many local FACs are no longer active or engaged following completion of the LFA process, which increases the likelihood that project implementation might decelerate, especially given the length of time since the last major flood. Some considerations for the future might include:

- Explore creative and proactive ways to reinvigorate local FACs and accelerate the implementation of LFA projects before the next major flooding event. For example, DEP and local FHM partners could (a) actively reengage FACs by hosting a grant application workshop that targets their specific LFA and aligns potential projects with the most appropriate funding source; (b) develop and distribute written materials that clearly articulate eligible and ineligible project costs; or (c) develop and conduct a survey of local officials in the watershed so that results might be used to refine future FHM programming and ensure continuity of knowledge about the LFA process and projects as local leadership changes and evolves.
- Seek to expand the number of communities enrolled in the CRS. Due largely to the collective partnership efforts of the FHM Program as a whole, municipalities in the WOH watershed have strong floodplain management principles and standards already in place, and residents could be rewarded with lower flood insurance premiums. DEP and its partners could further coordinate activities and messaging to local leaders about ways to accrue CRS points through LFA projects and encourage enrollment in

the CRS to achieve additional benefits for watershed residents.

- A regularly occurring conference that targets municipal officials, floodplain managers, watershed residents and businesses. By showcasing LFA projects that have already been implemented and the multiple benefits achieved, conference attendees might be inspired to pursue LFA projects in their communities and/or help ensure that FACs remain active and engaged. For example, DEP and CWC have discussed the possibility of convening a future Local Government Day that focuses on FHM issues, showcases successful LFA projects, highlights the flood insurance rate reductions for CRS communities, stresses the importance of active FACs, and encourages local floodplain administrators to become Certified Floodplain Managers (CFMs). As of May 2023, there are 11 CFMs in the WOH watershed, accounting for 7% of the New York State total number of CFMs.
- Continue to provide professional training opportunities for CFMs to maintain the dense network in the WOH watershed and address staff turnover, and to ensure municipalities continue to have technical support on local FHM issues. The role of floodplain managers is expanding due a recognized need to adequately address increases in disaster losses and the emphasis on mitigation to alleviate the cycle of damage-rebuild-damage.
- DEP and local FHM partners should consider developing enhanced educational materials about various program opportunities to minimize confusion by property owners and municipal officials about eligible projects, sources of funding, eligible costs for reimbursement, and related FHM considerations such as local building code requirements. While there are many instances of repeat applicants that know the programs well, municipal officials do change over time which creates an ongoing learning opportunity about the overall FHM Program. Providing clear and detailed guidance to prospective applicants would lead to stronger applications that allows the various partners to maximize funding resources for project implementation.

2. DEP recommends that potential future impacts from climate change be better incorporated into local FHM planning, as well as the design and construction of LFA-recommended projects.

The Revised 2017 FAD requires DEP to coordinate the FHM Program with State and federal agencies to maximize funding to WOH watershed communities and support the preparation of State and federal matching grant applications for implementation of LFA projects. At both the federal ([Federal Flood Risk Management Standard](#)) and State levels ([CRRA](#)), recent guidance on protecting public infrastructure and critical assets from future flooding has already been developed. As such, entities seeking funding and permitting for projects that impact floodplains must consider climate change impacts by using climate-informed science and conducting design and construction alternatives accordingly.

It is important to note that LFA projects implemented to date have not been tested by a major flooding event. Future floods will help FHM partners evaluate what has been constructed and how future projects may need to evolve based on a changing climate. Opportunities exist to become more consistent across all project categories and entities. This is particularly important

when designing critical community facilities and infrastructure projects; if designs could be more closely aligned with evolving State and federal standards or guidelines, this could allow more LFA projects to leverage outside funding while resulting in longer project lifespans and a better investment of City funds to support larger and more expensive LFA projects.

3. DEP recommends that LFAs should be considered “living documents” that are periodically revisited and potentially updated on a case-by-case basis, as needed.

Although LFAs are completed with the best available data and expertise at the time, some were completed nearly a decade ago. Several recent LFAs have utilized 2-D HEC-RAS modeling for the hydraulically complex locations, such as confluences that are aggrading and bridge openings. This 2-D modeling is becoming not only the standard (including for NYSDOT), but increasingly critical to designing the best possible projects that reduce WSEs. In 2020, the National Academies of Science, Engineering, and Medicine (NASEM) Expert Panel commended the SMP for extensive use of hydraulic modeling and recommended that the SMP expand its use of 2-D hydraulic modeling into future project planning and decision-making.

Similarly, the NASEM Expert Panel articulated the importance of community-driven FHM programs, local FACs, and the LFA process. Since each community is distinct and each LFA contains planning-level studies and estimates (not specific project-level studies and estimates), LFAs should be revisited and potentially updated as needed by each community to correct possible oversights or errors and consider recent changes to floodplain characteristic or hydraulic conditions based on newer modeling and mapping tools. This would also provide another opportunity for engaging newer community leaders who were not involved in the development of the original LFA, or reengaging local FACs to ensure continuity and momentum with the implementation of projects. Some considerations might include:

- Updating the BCA portion of an LFA as federal guidelines [have recently been updated](#), resulting in more favorable BCRs for small, rural communities.
- Adding a specific recommendation in LFAs that communities go through the LOMR process to update their FIRMs to accurately depict WSE and Special Flood Hazard Area reductions after LFA project implementation, or to correct FEMA mapping errors flagged during the LFA process.
- Conducting the surveying and modeling work needed to establish regulatory flood elevations in existing “A Zones” where no detailed study has been done. This accounts for 311 miles of stream in the WOH watershed where only approximate flood elevations exist.
- Work with local FHM partners to determine if there are additional watershed population centers that were not part of the original MOA eligibility list and might benefit from creating an FAC and developing an LFA. If certain geographic locations are identified, DEP suggests codifying specific criteria to formalize the process by which smaller communities might become eligible.

4. DEP recommends that the LAP and CWC explore opportunities to expedite the demolition process and timeline for NYCFFBO properties.

DEP is willing to explore opportunities with CWC for expediting the process and timeline for advancing demolitions associated with the NYCFFBO. For example, when structures are not occupied, the required and partially invasive pre-demolition survey (i.e., testing samples of walls, insulation, roof materials, etc.) could begin prior to closing, thus enabling CWC to begin working on demolition plans before or immediately after closing. Staff that review demolition plans, safe work plans, and other documents, could attempt shorter turnaround times when possible. CWC could develop a tighter timeline for the demolition consultant to produce the demolition and safe work plans, while demolition vendors could be required to complete projects faster. Finally, all involved parties could strive to improve communication and coordination as a general matter of practice, with a shared goal of numerous mutual benefits.

5. DEP recommends that NYSDOH consider revisiting the FAD metric that requires the SMP to fund at least 50 LFA-recommended projects to better and more fully reflect the accomplishments of the FHM Program as a whole.

The FHM Program is an expansive partnership between DEP, local SMP partners, and CWC. As such, there are numerous project advancements that are significant and worthy of reporting that are not necessarily reflected in the current FAD metric. DEP recommends a more holistic accounting of LFA project accomplishments, such as potentially counting the in-house designs of local SMP partners, or potentially counting the stream related LFA projects that are funded by CWC through the LFHMIP. To date, SMP partners have designed four LFA projects, whereas CWC has awarded funding to eleven stream related LFA projects. If SMP in-house designs were counted, DEP would be able to report 40 funding awards in support of 24 LFA projects. If CWC's stream related LFA project awards were also counted, DEP would be able to report 51 funding awards in support of 29 LFA projects. By offering these suggestions, DEP is not recommending that NYSDOH mangle or revisit the respective funding commitments to each FHM partner, but rather take into account that the current FAD metric is narrowly defined as currently written and/or interpreted.

Beyond just the 50 LFA projects associated with the SMP, a more comprehensive reporting of LFA projects across all categories and partners would better reflect the overall implementation accomplishments of the FHM Program. However, DEP notes that accounting for LFA projects in general poses a number of challenges due to the multiple phases each project may progress through over a long period of time, coupled with the combination of funding sources that many LFA projects often use through either local SMP partners or CWC's LFHMIP. Another complicating factor is the specificity v. generality of individual LFAs when it comes to recommending actual projects. DEP finds it challenging to tally an accurate number of LFA-recommended projects due simply to the variations in each LFA.

For example, LFA recommendations for property protection or buyout projects are usually captured with broad language that refers to all eligible properties within a certain geographic area; LFAs rarely refer to specific properties due to concerns over landowner privacy. Also, property protection projects may potentially consist of three distinct funding awards, covering the feasibility study, design, and construction phases; this is why DEP counts each phase funded as a distinct LFA award while also being clear about the actual number of

projects these funding awards support. Another consideration is whether or how to count funding awards for projects that were never completed and/or projects that advanced through one phase (feasibility or design) but not to construction and final implementation. Yet another complication pertains to the NYCFFBO, in which not all properties acquired are LFA-recommended, and not all acquisitions require demolitions that could be counted as a separate project funding award.

Since it is difficult to determine a precise metric given the above factors, one possible solution is for NYSDOH to eliminate the current FAD metric altogether, which is narrowly focused on the SMP, and move towards an annual reporting metric that considers the full breadth of LFA projects and accomplishments by all FHM partners. The FAD already requires that DEP annually assess FHM funding commitments for all local partners and commit additional funding as needed. Moving away from a program-specific implementation metric to a reporting metric would allow for the natural ebb and flow of project advancement due to variations in community interest, readiness or willingness to proceed based on numerous local considerations.

9. Conclusion

Overall, the Local FHM Program continues to demonstrate success in beginning to achieve the multi-goal framework agreed to by the City and watershed stakeholders in the years following widespread flooding impacts caused by Tropical Storms Irene and Lee in 2011. As DEP noted in its June 2020 evaluation report, fully achieving all of the stated goals may take decades, and it will require the ongoing commitment of all FHM partners working closely with watershed communities, residents and businesses to implement a variety of viable FHM projects recommended by more than two dozen locally developed and endorsed LFAs.

Similar to the 2020 evaluation conclusions, DEP continues to believe the LFA process is working as intended to provide local leaders with a scientifically based road map of potential FHM projects that will reduce repetitive flood losses, improve the resiliency of WOH watershed communities, and protect the quality of the City's water supply over the long-term. With support from DEP, local SMP partners and CWC have worked together in recent years to improve coordination and award complimentary funds to implement projects recommended in LFAs. As project implementation continues in the years ahead, the need for coordination will remain a priority to maximize City funding commitments and potentially leverage additional sources of non-City funding to further advance larger and more complex projects.

In summary, DEP commends all local partners, community leaders, and individuals for their dedication and commitment to achieving the multi-goals of the Local FHM Program.